City of San Marcos

PRIORITY DEVELOPMENT PROJECT (PDP)
STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
FOR
CORNERSTONE COMMUNITIES WOODWARD
WOODWARD STREET, SAN MARCOS, CA
SP22-0005/ TSM22-0004/ MFSDP22-0005
ASSESSOR'S PARCEL NUMBER(S):
220-210-49

ENGINEER OF WORK:

_____

Robert Dentino, PE 45629

PREPARED FOR:

CORNERSTONE COMMUNITIES WOODWARD
WOODWARD STREET, SAN MARCOS, CA
Contact Person: Jack Robson
Phone: 858-458-9700

PDP SWQMP PREPARED BY:

Excel Engineering
440 State Place
Escondido, CA 92029
760-745-8118

DATE OF SWQMP:
09/22/2022

PLANS PREPARED BY:
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ACRONYMS

APN	Assessor's Parcel Number
BMP	Best Management Practice
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan

PDP SWQMP PREPARER'S CERTIFICATION PAGE

Project Name: Mission Villas

Permit Application Number: GP20-00016

PREPARER'S CERTIFICATION

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

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 BMP Design Manual. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by 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.

No. 45629

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

Robert D. Dentino, RCE

Print Name

EXCEL ENGINEERING

Company

06/22/2023

Date

Engineer's Seal:

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PDP SWQMP PROJECT OWNER'S CERTIFICATION PAGE

Project Name: Cornerstone Communities Woodward

Permit Application Number:

PROJECT OWNER'S CERTIFICATION

This PDP SWQMP has been prepared for Cornerstone Communities Corporation by Excel Engineering. The PDP SWQMP is intended to comply with the PDP requirements of the City of San Marcos BMP Design Manual, which is a design manual for compliance with local City of San Marcos and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan. Once the undersigned transfers its interests in the property, its successor-in-interest shall bear the aforementioned responsibility to implement the best management practices (BMPs) described within this plan, including ensuring on-going operation and maintenance of structural BMPs. A signed copy of this document shall be available on the subject property into perpetuity.

Jack Robson
_____
Project Owner's Signature

Jack Robson
_____
Print Name

Cornerstone Communities Corporation
_____
Company

06/22/23
_____
Date

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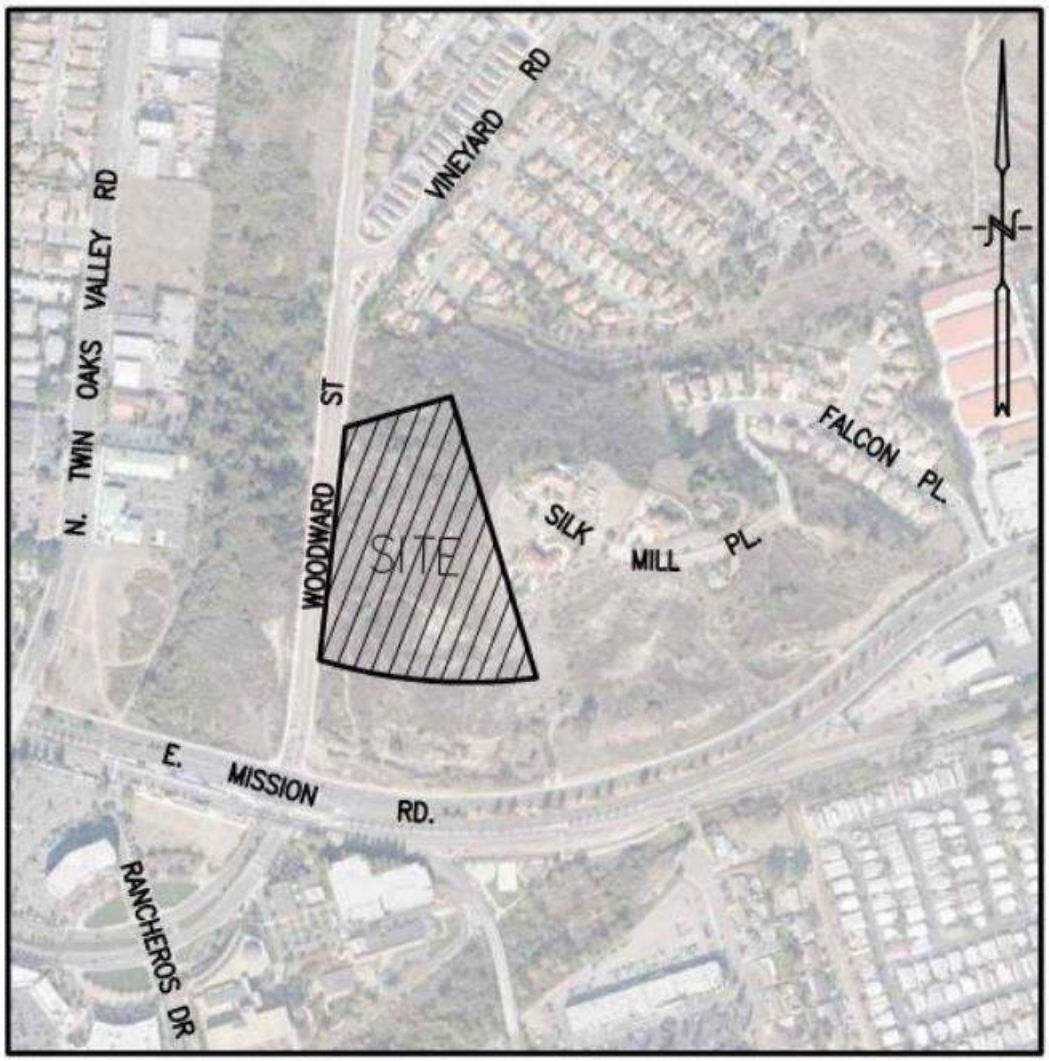
SUBMITTAL RECORD

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

Submittal Number	Date	Project Status	Summary of Changes
1	9/22/2022	☑ Preliminary Design / Planning/ CEQA ☐ Final Design	Initial Submittal
2		☐ Preliminary Design / Planning/ CEQA ☐ Final Design	
3		☐ Preliminary Design / Planning/ CEQA ☐Final Design	
4		☐ Preliminary Design / Planning/ CEQA ☐ Final Design	

PROJECT VICINITY MAP

Project Name: CORNERSTONE COMMUNITIES WOODWARD
Permit Application Number:



VICINITY MAP
NOT TO SCALE

Project Vicinity Map

Applicability of Storm Water Best Management Practices (BMP) Requirements

(Storm Water Intake Form for all Development Permit Applications)
For detailed information please visit:
http://www.san-marcos.net/departments/development-services/stormwater/development-planning

Form I-1
[March 15, 2016]

Project Identification

Project Name: CORNERSTONE COMMUNITIES WOODWARD	
Description: 46 residential airspace units on a 8.57 acre site	
Permit Application Number (if applicable):	Date:09/22/2022
Project Address: Woodward St, San Marcos, California	

Determination of Requirements

This form is required as part of the City's application process. The purpose of this form is to identify potential land development planning storm water requirements that apply to development projects.

Development projects are defined as construction, rehabilitation, redevelopment, or reconstruction of any public or private projects. In addition, the identification of a development project, as it relates to storm water regulations, would truly apply to development and redevelopment activities that have the potential to contact storm water and contribute a source of pollutants, or reduce the natural absorption and infiltration abilities of the land.

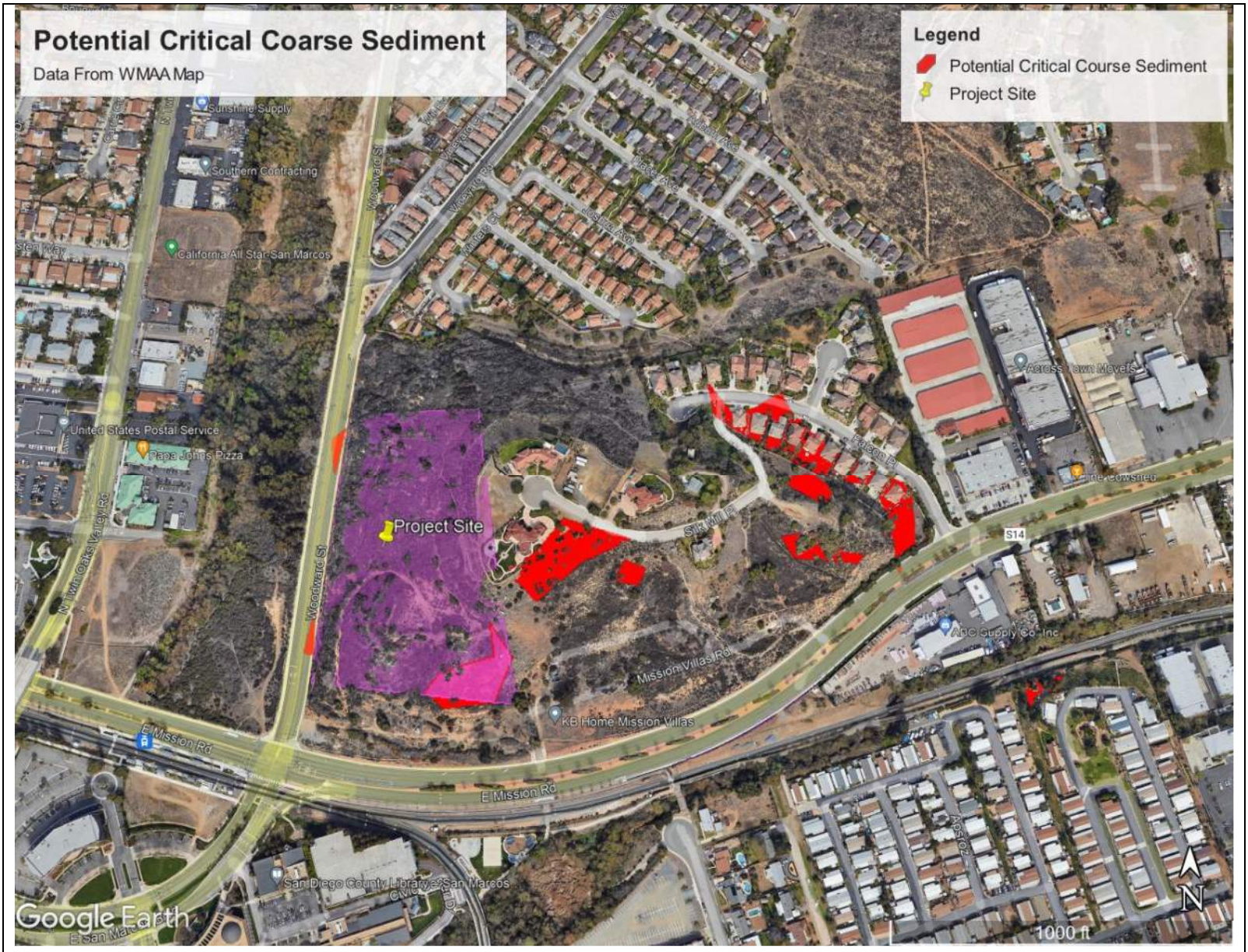
To access the BMP Design Manual, Storm Water Quality Management Plan (SWQMP) templates, and other pertinent information related to this program please refer to:
http://www.san-marcos.net/departments/development-services/stormwater/development-planning

Please answer each of the following steps below, starting with Step 1 and progressing through each step until reaching "Stop".

Step	Answer	Progression
Step 1: Based on the above, Is the project a "development project" (See definition above)? See Section 1.3 of the BMP Design Manual for further guidance if necessary.	☑ Yes	Go to Step 2.
	☐ No	Permanent BMP requirements do not apply. No SWQMP will be required. Provide brief discussion below. **STOP.**
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):		
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? **To answer this item, complete Form I-2, Project Type Determination. See Section 1.4 of the BMP Design Manual *in its entirety* for guidance.** **In addition to Section 1.4, please refer to the City's SWQMP Submittal Requirements form.**	☐ Standard Project	Only Standard Project requirements apply, including Standard Project SWQMP. **STOP.**
	☑ PDP	Standard and PDP requirements apply, including PDP SWQMP. **Go to Step 3 on the following page.**
	☐ Exception to PDP definitions	Standard Project requirements apply, and any additional requirements specific to the type of project. Provide discussion and list any additional requirements below. Prepare Standard Project SWQMP. **STOP.**
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		

Form I-1 Page 2, Form Date: March 15, 2016		
Step 3 (PDPs only). Please answer the list of questions in this section to determine if hydromodification requirements reply to the proposed PDP. Does the project:		
Step 3a. Discharge storm water runoff directly to the Pacific Ocean?	☐ Yes	**STOP**. Hydromodification requirements do not apply.
	☑ No	Continue to Step 3b.
Step 3b. Discharge storm water runoff directly to an enclosed embayment, not within protected areas?	☐ Yes	**STOP**. Hydromodification requirements do not apply.
	☑ No	Continue to Step 3c.
Step 3c. Discharge storm water runoff directly to a water storage reservoir or lake, below spillway or normal operating level?	☐ Yes	**STOP**. Hydromodification requirements do not apply.
	☑ No	Continue to Step 3d.
Step 3d. Discharge storm water runoff directly to an area identified in WMAA?	☐ Yes	**STOP**. Hydromodification requirements do not apply.
	☑ No	Hydromodification requirements apply to the project. Go to Step 4.
Discussion / justification if hydromodification control requirements do <u>not</u> apply:		

Step 4 (PDPs subject to hydromodification control requirements only). Does protection of critical coarse sediment yield areas apply based on review of WMAA Potential Critical Coarse Sediment Yield Area Map? See Section 6.2 of the BMP Design Manual 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.



The map above shows potential critical course sediment areas. The northwesterly Critical Course Sediment area is located on the Woodward Street adjacent to the driveway. This critical course sediment is on a developed area, therefore this project does not impact the existing sediment. A critical course sediment analysis is provided on Attachment 2b.

Project Type Determination Checklist			Form I-2 [March 15, 2016]
Project Information			
Project Name/Description: CORNERSTONE COMMUNITIES WOODWARD			
Permit Application Number (if applicable):			Date: 09/22/2022
Project Address: Woodward St, San Marcos, California			
Project Type Determination: Standard Project or Priority Development Project (PDP)			
The project is (select one): ☑ New Development ☐ Redevelopment			
The total proposed newly created or replaced impervious area is: 373309 ft^2 (8.57) acres			
Is the project in any of the following categories, (a) through (f)?			
Yes ☑	No ☐	(a)	New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☑	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☑	No ☐	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

Form I-2 Page 2, Form Date: March 15, 2016			
Yes ☐	No ☑	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). *Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.*
Yes ☐	No ☑	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ☑	No ☐	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*

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

☐ No – the project is <u>not</u> a Priority Development Project (Standard Project).

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

The following is for redevelopment PDPs only:

The area of existing (pre-project) impervious area at the project site is: ___0____ ft^2 (A)
The total proposed newly created or replaced impervious area is _____ ft^2 (B)
Percent impervious surface created or replaced (B/A)*100: _____%
The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – only new impervious areas are considered PDP

OR

☐ greater than fifty percent (50%) – the entire project site is a PDP

Site Information Checklist For PDPs	Form I-3B (PDPs) [March 15, 2016]
Project Summary Information	
Project Name	CORNERSTONE COMMUNITIES WOODWARD
Project Address	Woodward St, San Marcos, California
Assessor's Parcel Number(s) (APN(s))	220-210-49
Permit Application Number	SP22-0005/ TSM22-0004/ MFSDP22-0005
Project Hydrologic Unit	Select One: ☐ Santa Margarita 902 ☐ San Luis Rey 903 ☑ Carlsbad 904 ☐ San Dieguito 905 ☐ Penasquitos 906 ☐ San Diego 907 ☐ Pueblo San Diego 908 ☐ Sweetwater 909 ☐ Otay 910 ☐ Tijuana 911
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	The project is located in the Richland Hydrologic Sub Area of the San Marcos Hydrologic Area of the CARLSBAD Hydrologic Unit (904.52).
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	8.57 Acres (373309 Square Feet)
Area to be Disturbed by the Project (Project Area)	5.91 Acres (257621.10 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	3.209 Acres (139767 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	5.361 Acres (233542 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Description of Existing Site Condition

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

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

Description / Additional Information:

Existing Land Cover Includes (select all that apply):

- ☑ Vegetative Cover
- ☑ Non-Vegetated Pervious Areas
- ☐ Impervious Areas

Description / Additional Information:

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

- ☐ NRCS Type A
- ☐ NRCS Type B
- ☐ NRCS Type C
- ☑ NRCS Type D

Approximate Depth to Groundwater (GW):

- ☐ 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:

Description of Existing Site Drainage Patterns

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

Describe existing site drainage patterns:

The existing drainage conveyance is natural and fronts onto Woodward Street and East Mission Road. The upper east side of the project site drains westerly to the existing 18 inches and 24 inches storm drain pipe then drains to poc-1, which is located at the southwest corner of the project site. The lower east side of the project site drains southerly to the existing 12 and 18 inches storm drain pipe then to poc-2, which is located at the southeast corner of the project site. At the north edge of the project site, surface runoff drains northerly to poc-3, which is located at the northwest edge of the project site.

At the northeast part of the project site, approximately 0.2 acres offsite areas conveyed through the site then drains to poc-3 finally. At the middle east edge of the project site, approximately 0.15 acres offsite areas conveyed through the site then drains to poc-1 finally. The lower east part of the project site, approximately, 1.2067 acers offsite drains to poc-2.

There are three discharge locations of the site: POC-1 is located at the southwest corner of the project site with the 100 year peak flow of 16.14 CFS. POC-2 is located at the southeast corner of the project site with the 100 year peak flow of 8.61 CFS, and POC-3 is at northwest edge of the project site with the 100 year peak flow of 2.17 CFS.

Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:
The project is the construction of a 46 residential airspace units on a 8.57 acre lot. Improvements include new storm drain pipe systems which includes stormwater filtration and detention features, driveways, parking areas, and associated landscape areas.

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

The proposed impervious areas of the project will include the residential units, the associated parking areas and driveways areas, the associated landscape flatwork (sidewalks) and the paved access road up to the upper areas of the site.

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

The pervious features of the site include all of the landscape areas and the remaining natural areas with graded slopes.

Does the project include grading and changes to site topography?

☑ Yes

☐ No

Description / Additional Information:

The grading will occur to facilitate the construction of the residential units, associated site improvements, and relatively slope areas around the site.

Description of Proposed Site Drainage Patterns

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

☑ Yes

☐ No

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

Describe proposed site drainage patterns:

The proposed grading maintains the location of the three outfalls mentioned in the existing conditions. The post development runoff will pass through an underground storage pipe & biofiltration basin prior to existing the site. The underground storage pipe is designed to meet the hydromodification requirements as well as mitigating the increase runoff created by the development. The underground storage pipe 1 is used for peak flow detention and low flow control. Surface flow generated by proposed impervious surfaces firstly drains to storage pipe 1 then drains to BMP-A, finally drains to POC-1. Storage pipe 2 is only used for peak flow detention, surface flow drains to storage pipe 2 then drains to POC-3. Callouts and section detail are on DMA and HMP exhibit.

Post- Development Outfall POC-1

There are two bio-filtration basins proposed in this project and is labeled as BMP-A on the northeast and BMP-B on the west. Both BMP-A & BMP-B drains to outfall POC-1. The outfall of this system is tied into an existing curb inlet box. This plate has an orifice that meets the hydromodification criteria.

The middle part of the project site is proposed to build multifamily, park, and street improvement. The proposed impervious area routes surface runoff northerly through proposed storm drain storage pipe 1 then to BMP-A, which is located at northeast side of the project site. After runoff get treated in BMP-A, it flows southwesterly to poc-1, which is located at southwest corner of the project site. The west part of the project site includes proposed graded slope, existing slope, and the proposed driveway. This part of the project drains surface flow southwesterly to poc-1.

Post- Development Outfall POC-2

The rest of the project, the east part, routes stormwater southeasterly to the existing 12- and 18-inches storm drain pipe then to poc-2, which is located at the southeast corner of the project site.

Post- Development Outfall POC-3

At the east side of the property, the project proposed to build brow ditch to direct surface flow northerly to the proposed 36 inches storage pipe 2 then follow the existing site slope drains to poc-3, which is located at the north edge along the Woodward Street of the project site.

Summary of Q100 Runoff

	PRE			POST			POST MITIGATION	
	POC-1	POC-2	POC-3	POC-1	POC-2	POC-3	POC-1	POC-3
Q (CFS)	16.14	7.87	2.17	21.31	4.70	3.61	14.76	2.05
A (Acres)	7.10	2.88	0.89	6.59	2.34	1.46	6.59	1.46
TC (MIN)	8.54	6.29	6.98	11.22	7.34	7.57	17.15	11.73

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

Description / Additional Information:

Identification and Narrative of Receiving Water and Pollutants of Concern

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

The project is located in the Richland Hydrologic Sub Area of the San Marcos Hydrologic Area of the CARLSBAD Hydrologic Unit (904.52). The project discharges to a public storm drain system which discharges to an un-named tributary which discharges to the San Marcos Creek which discharges to the Batiquitos Lagoon which discharges to the Pacific Ocean.

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
San Marcos Creek	DDE, Phosphorus, Sediment Toxicity, Selenium	
Lake San Marcos	Ammonia (N), Nutrients	
Batiquitos Lagoon	Pathogen	

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

Pollutant	Not Applicable to the Project Site	Expected 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			

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):

Critical Coarse Sediment Yield Areas*

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

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

☑ Yes

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

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

☑ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite

☑ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment

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

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

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

☑ No critical coarse sediment yield areas to be protected based on verification of GLUs onsite

☐ Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 2.b of the SWQMP.

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

Discussion / Additional Information:
If identified GLU's are not large enough or steep enough to produce a significant amount of CCS they can be made exempt from avoidance. In order for a specific GLU to be considered valid it must rate as having a High Relative Sediment Production (RSP) rating. To conduct a Quantitative Analysis of identified GLU's use the following steps from the Carlsbad Watershed Management Area – Water Quality Improvement Plan, Section A.4.2.
After all the preceding steps are used to confirm the GLU Verifications of the Potential Critical Coarse Sediment onsite, the soil loss equation is used to determine if the local area will produce a significant amount of soil loss to contribute to the determination of the verified GLU's being a Critical Coarse Sediment Yield Area.

This is accomplished by using the RUSLE (RUSLE; Renard et al. 1997) Equation in Appendix D – Watershed Management Area Analysis Section A.4.2 Quantitative Analysis.

$A = R \times K \times LS \times C \times P$

Where

A = estimated average soil loss in tons/acre/year
R = rainfall-runoff erosivity factor R= 43
K = soil erodibility factor K=0.43
LS = slope length and steepness factor LS=1.05
C = cover-management factor C =0.14
P = support practice factor; assumed 1 for this analysis
A= 43*0.43*1.05*0.14*1
A= 2.72 ton/acre/year
Low: Soil Loss <5.6 tons/acre/year
Since area has a low sediment production, it is determined that the site does not have any critical course sediment.

Regional datasets used to determine the inputs required to estimate the soil loss from each GLU are listed in table below:
https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/k_factor_map.pdf
https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/ls_factor_map.pdf
https://www.epa.gov/npdes/rainfall-erosivity-factor-calculator-small-construction-sites

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.

POC-1 is located at southwest corner of the project site. This POC drains to improved public storm drain facilities at the intersection of E Mission Road and Woodward Street. POC-2 is located at the southeast corner of the project site and connects to the existing public storm drain. POC-3 is located at the north edge along the Woodward Street of the project site.

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

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

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

Discussion / Additional Information: (optional)

Other Site Requirements and Constraints

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

Optional Additional Information or Continuation of Previous Sections As Needed

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

Source Control BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)	Form I-4 [March 15, 2016]

Project Identification

Project Name: CORNERSTONE COMMUNITIES WOODWARD

Permit Application Number:

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 Model BMP Design Manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the Model 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:			
SC-2 Storm Drain Stenciling or Signage	☑ Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented:			
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: There are no proposed outdoor material storage areas for this project.			
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: There are no proposed outdoor material work areas for this project.			

Form I-4 Page 2 of 2, Form Date: March 15, 2016			
Source Control Requirement	**Applied?**		
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:			
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, 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 and Equipment Cleaning	☐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
Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.			

Site Design BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)	Form I-5 [March 15, 2016]

Project Identification

Project Name: CORNERSTONE COMMUNITIES WOODWARD

Permit Application Number:

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 Model BMP Design Manual for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the Model 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.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-1 not implemented:			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-2 not implemented:			
SD-3 Minimize Impervious Area	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	☐ Yes	☑ No	☐ N/A
Discussion / justification if SD-5 not implemented: There are no significant areas of level vegetation to implement this BMP. All impervious areas are directed to a biofiltration pond.			

Form I-5 Page 2 of 2, Form Date: March 15, 2016			
Site Design Requirement	**Applied?**		
SD-6 Runoff Collection	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-6 not implemented:			
SD-7 Landscaping with Native or Drought Tolerant Species	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐ Yes	☐ No	☑ N/A
Discussion / justification if SD-8 not implemented:			

Summary of PDP Structural BMPs	Form I-6 (PDPs) [March 15, 2016]

Project Identification

Project Name: CORNERSTONE COMMUNITIES WOODWARD

Permit Application Number:

PDP Structural BMPs

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

PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 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.

See next page:

(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)

(Continued from page 1)

Step 1, the project was divided up and evaluated at the DMA scale. Each DMA area was classified as Self-Treating, Self-Retaining or Draining to a Best Management Practice (BMP). POC-2 has significantly reduced area in the post than in the predevelopment condition. Because of the 47% reduction in area and the fact that POC-2 will only recieve self mitigating runoff. It is believed that no water quality, or flow control will be necessary. POC-3 has received more area in the post than in the pre-develop area and thus compliance with flow control and peak flow will be done. For POC-3 it is assumed that the hillside is self mitigating and will treat itself. Poc-1 will have flow go to storage 1 then to BMP-A. Storage-1 will act as a flow control and peak flow facility. A weir plate will be place to meter water into BMP-A. Once water is in BMP-A this bmp will be a conjunctive use facility and will provide 1 foot minimum of freeboard to ensure safety from failure. All offsite water will be conveyed around the site through browditches and there will be no co mingled flows onsite. DMA-1, DMA-2 and DMA-4 are for water quality purposes.

Step 2, For the DMAs that drain to BMPs, the appropriate runoff factors were applied to each area and the required Design Capture Volume (DCV) of each sub area calculated. For this project, Harvest and reuse is not considered feasible.

Step 3, due to the impermeability of the underlying soils, (soil type D), infiltration BMPs are not feasible.

Step 3A&B for the no infiltration condition leads to section 5.5.3 which is the Biofiltration BMP category. The various sizing methods included in Appendix B.5 were followed and the entire DCV can be treated within the proposed BMPs.

Step 4, each Biofiltration area is sized in accordance with the fact sheet BF-3 found in appendix E of the BMP design manual. This project requires hydromodification controls, so the Biofiltration units accomplish both storm water treatment and flow control mitigation in an integrated design.

Structural BMP Summary Information
(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. **BMP-A**

Construction Plan Sheet No. SHEET 13

Type of structural BMP:

- ☐ Retention by harvest and use (HU-1)
- ☐ Retention by infiltration basin (INF-1)
- ☐ Retention by bioretention (INF-2)
- ☐ Retention by permeable pavement (INF-3)
- ☐ Partial retention by biofiltration with partial retention (PR-1)
- ☑ Biofiltration (BF-1)
- ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
- ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
- ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)
- ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)
- ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below)
- ☐ Detention pond or vault for hydromodification management
- ☐ Other (describe in discussion section below)

Purpose:

- ☐ Pollutant control only
- ☐ Hydromodification control only
- ☑ Combined pollutant control and hydromodification control
- ☐ Pre-treatment/forebay for another structural BMP
- ☐ Other (describe in discussion section below)

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	The Engineer of Work Robert Dentino Excel Engineering 440 State Place Escondido, CA 92029
Who will be the final owner of this BMP?	Project Home Owner's Association
Who will maintain this BMP into perpetuity?	Project Home Owner's Association
What is the funding mechanism for maintenance?	Project Home Owner's Association

Structural BMP Summary Information
(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. **BMP-B**

Construction Plan Sheet No. SHEET 13

Type of structural BMP:

- ☐ Retention by harvest and use (HU-1)
- ☐ Retention by infiltration basin (INF-1)
- ☐ Retention by bioretention (INF-2)
- ☐ Retention by permeable pavement (INF-3)
- ☐ Partial retention by biofiltration with partial retention (PR-1)
- ☑ Biofiltration (BF-1)
- ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
- ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
- ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)
- ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)
- ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below)
- ☐ Detention pond or vault for hydromodification management
- ☐ Other (describe in discussion section below)

Purpose:

- ☐ Pollutant control only
- ☐ Hydromodification control only
- ☑ Combined pollutant control and hydromodification control
- ☐ Pre-treatment/forebay for another structural BMP
- ☐ Other (describe in discussion section below)

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	The Engineer of Work Robert Dentino Excel Engineering 440 State Place Escondido, CA 92029
Who will be the final owner of this BMP?	Project Home Owner's Association
Who will maintain this BMP into perpetuity?	Project Home Owner's Association
What is the funding mechanism for maintenance?	Project Home Owner's Association

Structural BMP Summary Information
(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. **Storage Pipe 1**

Construction Plan Sheet No. SHEET 13

Type of structural BMP:

- ☐ Retention by harvest and use (HU-1)
- ☐ Retention by infiltration basin (INF-1)
- ☐ Retention by bioretention (INF-2)
- ☐ Retention by permeable pavement (INF-3)
- ☐ Partial retention by biofiltration with partial retention (PR-1)
- ☐ Biofiltration (BF-1)
- ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
- ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
- ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)
- ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)
- ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below)
- ☐ Detention pond or vault for hydromodification management
- ☑ Other (describe in discussion section below)

Hydromodification and Hydrology Detention

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)

Hydromodification and Hydrology Detention

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	The Engineer of Work Robert Dentino Excel Engineering 440 State Place Escondido, CA 92029
Who will be the final owner of this BMP?	Project Home Owner's Association
Who will maintain this BMP into perpetuity?	Project Home Owner's Association
What is the funding mechanism for maintenance?	Project Home Owner's Association

Structural BMP Summary Information
(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. **Storage Pipe 2**

Construction Plan Sheet No. SHEET 13

Type of structural BMP:

- ☐ Retention by harvest and use (HU-1)
- ☐ Retention by infiltration basin (INF-1)
- ☐ Retention by bioretention (INF-2)
- ☐ Retention by permeable pavement (INF-3)
- ☐ Partial retention by biofiltration with partial retention (PR-1)
- ☐ Biofiltration (BF-1)
- ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
- ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
- ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)
- ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)
- ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below)
- ☐ Detention pond or vault for hydromodification management
- ☑ Other (describe in discussion section below)
  Peak flow detention

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)
  Peak flow detention

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	The Engineer of Work Robert Dentino Excel Engineering 440 State Place Escondido, CA 92029
Who will be the final owner of this BMP?	Project Home Owner's Association
Who will maintain this BMP into perpetuity?	Project Home Owner's Association
What is the funding mechanism for maintenance?	Project Home Owner's Association

ATTACHMENT 1
BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

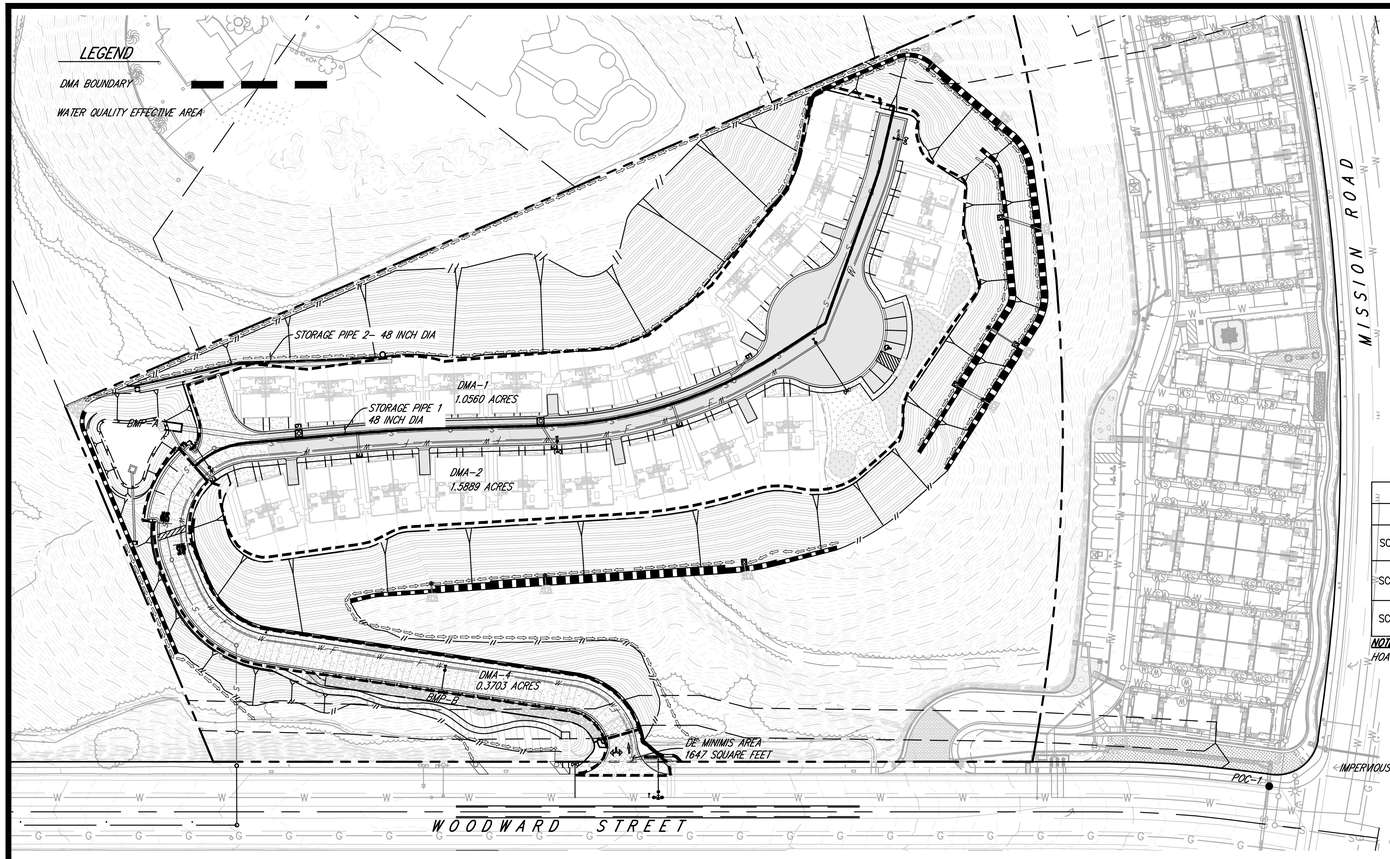
Indicate which Items are Included behind this cover sheet:

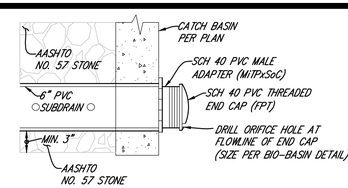
Attachment Sequence	**Contents**	**Checklist**
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☑ Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment 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	☑ 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 demolition
- ☑ Proposed grading
- ☑ Proposed impervious features
- ☑ Proposed design features and surface treatments used to minimize imperviousness
- ☑ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- ☑ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
- ☑ Structural BMPs (identify location, type of BMP, and size/detail)





LOWER ORIFICE DETAIL
NOT TO SCALE

PERMANENT WATER QUALITY TREATMENT FACILITY

KEEPING OUR WATER WAYS CLEAN
MAINTAIN WITH CARE – NO MODIFICATIONS WITHOUT AGENCY APPROVAL

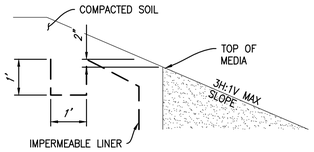
DETAIL
WATER QUALITY SIGN– PLACED AT EACH BIOFILTRATION BASIN

NOTE: ALL BIOFILTRATION AREAS WILL HAVE A SIGN POSTED TO BE VISIBLE AT ALL TIMES.

6" PVC PIPE PERFORATION LAYOUT DETAIL
NOT TO SCALE

DETAIL
"NO DUMPING" AT CATCH BASINS

NOTE: ALL CATCH BASINS WITH GRATES SHALL BE STENCILED WITH CITY REQUIRED ITEM PER ABOVE DETAIL (DAS MANUFACTURING #SDO OR EQUIVALENT).



IMPERMEABLE LINER EDGE ANCHOR DETAIL
NOT TO SCALE

HYDROLOGIC SOIL GROUP

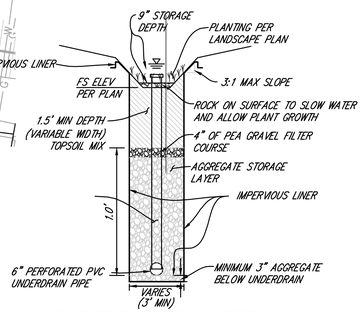
THE ONSITE HYDROLOGICAL SOIL GROUP FOR THIS SITE IS TYPE D.

EXISTING SITE FEATURES:

- THE APPROXIMATE DEPTH TO GROUNDWATER IS GREATER THAN 20 FEET.
- THERE ARE NO NATURAL HYDROLOGIC FEATURES ON THE SITE.
- THE SITE PROPOSES TO CONNECT TO THE EXISTING PUBLIC STORM DRAIN SYSTEM LOCATED IN THE SOUTH EDGE OF THE SITE.
- BASED ON WATERSHED MAPPING OF POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS (CCSYA), THERE ARE NO CCSYA LOCATED WITHIN THE PROJECT BOUNDARY OR TRIBUTARY TO THE RUNOFF BYPASSED AROUND THE SITE.

SOURCE CONTROL			
	SOURCE CONTROL REQUIREMENT	NODE	IMPLEMENTAION
SC-1	PREVENTION OF ILLICIT DISCHARGES	SC-1	EFFECTIVE IRRIGATION WILL BE IMPLEMENTED AND VEHICLE WASHING IS PROHIBITED
SC-2	STORM DRAIN STENCILING OR SIGNAGE	SC-2	STENCIL EVERY INLET WITH PROHIBITIVE WORDS: "NO DUMPING! DRAINS TO WATERWAYS" AND "NO CONTAMINE" IN SPANISH.
SC-5	PROTECT TRASH STORAGE	SC-5	TRASH ENCLOSURE WILL BE PROTECTED BY LID OR BE WALLED WITH ROOF TO AVOID STORMWATER GET CONTAMINATED

NOTE:
HOA WILL BE THE FINAL OWNER OF BMPS, MAINTAIN BMPS INTO PERPETUITY, AND FUNDING MECHANISM FOR MAINTENANCE.



BIOFILTRATION BASIN B SECTION
TYPICAL SECTION
NOT TO SCALE

WATER QUALITY BASIN INSTALLATION NOTES:

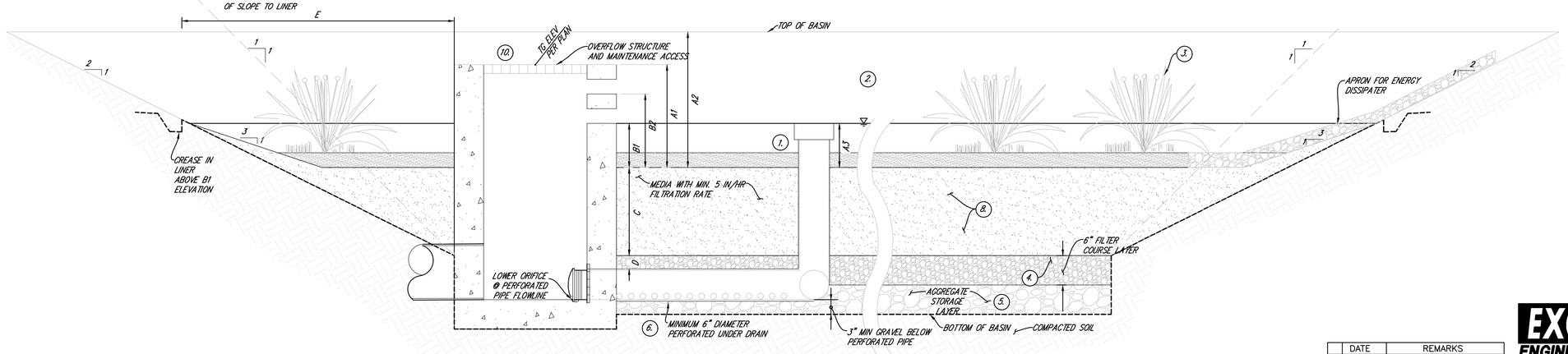
1. 3 INCHES OF WELL-AGED, SHREDDED HARDWOOD MULCH.
2. AN UNDERDRAIN CLEANOUT WITH A MINIMUM 6-INCH DIAMETER AND LOCKABLE CAP IS PLACED EVERY 250 TO 300FEET AS REQUIRED BASED ON UNDERDRAIN LENGTH.
3. VEGETATION USED SHOULD BE SUITABLE FOR THE CLIMATE PER LANDSCAPE PLANS
4. FILTER COARSE IS A MINIMUM OF 6 INCHES PROVIDED IN TWO SEPARATE 3 INCH LAYERS. THE TOP LAYER SHALL BE MADE OF ASTM C33 CHOKER SAND AND THE BOTTOM LAYER BE OF ASTM NO. 8 AGGREGATE. MARKERS STAKES SHALL BE USED TO ENSURE UNIFORM LIFT THICKNESS.
5. AASHTO NO. 57 STONE OR CLASS 2 PERMEABLE PER CAL TRANS SPECIFICATION 68-1.025 IS RECOMMENDED FOR THE AGGREGATE STORAGE LAYER. WASHED, OPEN-GRADED CRUSHED ROCK MAY BE USED, HOWEVER, A 4 INCH MINIMUM WASHED PEA GRAVEL FILTER COURSE LAYER AT THE TOP OF THE CRUSHED ROCK IS REQUIRED.
6. IMPERMEABLE LINER SHALL BE INSTALLED WHEN THE BIOFILTRATION BASIN IS WITHIN 10 FEET OF RETAINING WALLS OR BUILDING FOUNDATIONS, OR AS RECOMMENDED BY THE SOILS ENGINEER, OR REQUIRED BY THESE PLANS. IMPERMEABLE LINER SHALL BE 30 MIL THICK (PER COUNTY OF SAN DIEGO GREEN STREETS DESIGN STANDARD DRAWING GS-3.00 AND COUNTY GREEN STREETS SUPPLEMENT TO CAL TRANS SPECIFICATIONS 20-11.08B) CONFIGURED TO ENTIRELY ENCOMPASS THE SIDES OF THE WATER QUALITY BASIN.
7. IMPERMEABLE LINER BE CONSTRUCTED IN COMPLIANCE WITH THE COUNTY OF SAN DIEGO GREEN STREETS SUPPLEMENT TO CAL TRANS SPECIFICATIONS 20-11.08B.
8. BIOFILTRATION SOIL MEDIA LAYER (BSM) SHALL CONSIST OF 60% TO 80% BY VOLUME SAND, UP TO 20% BY VOLUME TOPSOIL, AND UP 20% BY VOLUME COMPOST (PER COUNTY OF SAN DIEGO BMP DESIGN MANUAL SEPTEMBER 2020 APPENDIX F.2 SECTION 803-2 BLENDED BSM CRITERIA AND TESTING REQUIREMENTS) PLACED IN 6" LIFTS AND COMPACTED WITH WATER PRIOR TO THE NEXT LIFT. INITIAL PERMEABILITY SHALL BE 8" PER HOUR (WITH ASSUMED STABILIZED PERMEABILITY OF 5" PER HOUR).
9. THE AGGREGATE STORAGE LAYER SHALL BE COMPACTED IN ACCORDANCE WITH SOILS ENGINEER'S RECOMMENDATIONS.
10. MP B WILL HAVE A BOX THAT IS USED FOR A PUMP SIZED BELOW THE 0.10Z STORM EVENT TO PUMP OUT LOW FLOW WATER AFTER CLEANING. PEAK FLOW WILL DISCHARGE THROUGH D-25 TO WOODWARD STREET.
11. ALL LINER INSTALLATIONS, FIELD WELDING OF SEAMS, AND OBSERVATION OF SOIL MIX PLACEMENT SHALL REQUIRE SPECIAL INSPECTION BY THE PROJECT GEOTECHNICAL ENGINEER OR OTHER QUALIFIED PERSON. A LETTER CERTIFYING PROPER INSTALLATION SHALL BE PROVIDED TO THE ENGINEER OF RECORD TO ACCEPTANCE OF THE FACILITIES.
12. SPECIAL INSPECTION SHALL BE REQUIRED FOR CONSTRUCTION OF ALL BIOFILTRATION BASINS. INSPECTION SHALL BE PERFORMED BY A QUALIFIED INDIVIDUAL (SUCH AS: ENGINEER OF RECORD, QSD). INSPECTION SHALL INCLUDE:
    - VERIFICATION OF OVERALL DIMENSIONS PRIOR TO PLACEMENT OF MATERIALS;
    - PLACEMENT OF THE LINER, IF REQUIRED; AND SEAMS OR PENETRATIONS
    - PLACEMENT OF THE GRAVEL, FILTER MATERIALS, AND FILTER MEDIA;
    - ALL INLET AND OUTLET STRUCTURES INCLUDING UNDERDRAINS, IF REQUIRED.
    - CONTRACTOR SHALL TAKE PICTURES AT EACH STAGE OF INSTALLATION AND SUBMITTED TO ENGINEER FOR VERIFICATION OF INSTALL.

    INSPECTOR SHALL BE GIVEN A MINIMUM OF 48 HOURS PRIOR TO INSPECTION. UPON COMPLETION THE INSPECTOR SHALL PROVIDE A CERTIFICATION TO THE ENGINEER OF WORK.
13. PROPOSED MATERIALS, SUCH AS AGGREGATE, FILTER MATERIAL, AND FILTER MEDIA SHALL BE SUBMITTED TO THE ENGINEER OF WORK FOR APPROVAL.

STRUCTURAL BIO-BASIN SUMMARY TABLE														
DMA NAME	DMA TYPE	BMP NAME	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) WATER QUALITY	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B1 (INCH) UPPER ORIFICE	B2 (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (INCH) OFFSET	BOX RISER OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER: UPPER B1 H X W (INCH)	ORIFICES DIAMETER: UPPER B2 H X W (INCH)	ORIFICES DIAMETER: LOWER (INCH)	IMPERMEABLE LINER ?
DMA-1+ DMA-2	DRAINS TO BMP	BMP-A	BIOFILTRATION	1490	36	51.48	9	9	28.5	18	12	3	48X48	4 X 3 – 4 BARRELS	6 X 12 – 2 BARRELS	1.4375	YES
DMA-4	DRAINS TO BMP	BMP-B	BIOFILTRATION	436	9	12	9	–	–	18	12	3	18x18	–	–	0.5	YES

NOTE:
-ONLY DMA-1, DMA-2, AND DMA-4 ARE FOR WATER QUALITY. OTHER AREAS ARE SELF-MITIGATING AND CONTAIN NO STRUCTURAL BMPS.
-FREEBOARD IS CALCULATED AS A2-A1
-BMP B WILL HAVE A BOX THAT IS USED FOR A PUMP SIZED BELOW THE 0.10Z STORM EVENT TO PUMP OUT LOW FLOW WATER AFTER CLEANING. PEAK FLOW WILL DISCHARGE THROUGH D-25 TO WOODWARD STREET.

SCALE: 1'=60"
0 60 120 180 240



BIOFILTRATION BASIN DETAIL
NOT TO SCALE

DATE	REMARKS
06/2023	PLANNING SUBMITTAL

EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • GPS • SURVEYING
440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-8334

13
SWQMP - BMP

CORNERSTONE COMMUNITIES
WOODWARD
APN 220-210-49
WOODWARD ST, SAN MARCOS CA

I:\Excel\projects\12\20021\Engineering\PM\PMO1\PM-PROP\13 SWQMP - BMP.dwg 6/22/2023 9:54 AM ORIGINAL PLOT SIZE: ----

Attachment 1B

Tabular Summary of DMA's

This worksheet is not needed since Automated Worksheet B.1 is being used per the first plan check comments. See Attachment 1E for tabular summary of DMA in the Automated Worksheet B.1

Attachment 1C

Harvest and Use Feasibility
Screening Checklist

Harvest and Use Feasibility Checklist	Form 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.

Flushing: (46 employees)x(9.3 gal/emp) = 427.8 gallons (427.8 gal)(1.5 days)/(7.48 gal/cu. ft.) = 85.79 cu. ft.
Irrigation: 36-hr Mod. Water per Table B.3-3 = (1,470 gal days/acre)(5.361 acres)/(7.48 gal/cu feet) = 1053.57 cu ft.

Total Demand = 1139.36 cu. ft.

3. Calculate the DCV using worksheet B-2.1.

DCV = 6279 (cubic feet)

DCV = 6279
0.25xDCV=1569.75

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.

Is harvest and use feasible based on further evaluation?

☐ Yes, refer to Appendix E to select and size harvest and use BMPs.

☑ No, select alternate BMPs.

Attachment 1D

Categorization of Infiltration
Feasibility Condition

Worksheet I-8 : Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet I-8	
Part 1 - Full Infiltration Feasibility Screening Criteria Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The NRCS soils across the onsite are all Type D soils. The site soils are consistent with the NRCS mapped soil types based on site explorations and percolation testing. According to geotechnical report by GeoTek dated 5/16/2019, groundwater is not anticipated to be within 50 ft of the ground surface, which should have an infiltration rate is 0. 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.		X
Provide basis: The NRCS soils across the onsite are all Type D soils. The site soils are consistent with the NRCS mapped soil types based on site explorations and percolation testing. According to geotechnical report by GeoTek dated 5/16/2019, groundwater is not anticipated to be within 50 ft of the ground surface, which should have an infiltration rate is 0. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Worksheet I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: The NRCS soils across the onsite are all Type D soils. The site soils are consistent with the NRCS mapped soil types based on site explorations and percolation testing. According to geotechnical report by GeoTek dated 5/16/2019, groundwater is not anticipated to be within 50 ft of the ground surface, which should have an infiltration rate is 0. 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.		X
Provide basis: The NRCS soils across the onsite are all Type D soils. The site soils are consistent with the NRCS mapped soil types based on site explorations and percolation testing. According to geotechnical report by GeoTek dated 5/16/2019, groundwater is not anticipated to be within 50 ft of the ground surface, which should have an infiltration rate is 0. 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		

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

Worksheet I-8 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: Due to site soils not percolating and the significant amount of clayey soils, it is unlikely that any appreciable volume of water will infiltrate. 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.		X
Provide basis: The NRCS soils across the onsite are all Type D soils. The site soils are consistent with the NRCS mapped soil types based on site explorations and percolation testing. According to geotechnical report by GeoTek dated 5/16/2019, groundwater is not anticipated to be within 50 ft of the ground surface, which should have an infiltration rate is 0. 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.			

Worksheet I-8 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: The NRCS soils across the onsite are all Type D soils. The site soils are consistent with the NRCS mapped soil types based on site explorations and percolation testing. According to geotechnical report by GeoTek dated 5/16/2019, groundwater is not anticipated to be within 50 ft of the ground surface, which should have an infiltration rate is 0. 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.		X
Provide basis: The NRCS soils across the onsite are all Type D soils. The site soils are consistent with the NRCS mapped soil types based on site explorations and percolation testing. According to geotechnical report by GeoTek dated 5/16/2019, groundwater is not anticipated to be within 50 ft of the ground surface, which should have an infiltration rate is 0. 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.		No Inf.

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

Attachment 1E

Pollutant Control BMP Design
Worksheets & Calculations

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	BMP-A	BMP-B	unitless
	2	85th Percentile 24-hr Storm Depth	0.67	0.67	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	107,435	16,132	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)			sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)		0	sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)			sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)			sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)			sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)	7,776		sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)			sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)			sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)			sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)			sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)			sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)			sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)			sq-ft
	18	Number of Tree Wells Proposed per SD-A			#
	19	Average Mature Tree Canopy Diameter			ft
	20	Number of Rain Barrels Proposed per SD-E			#
	21	Average Rain Barrel Size			gal
Initial Runoff Factor Calculation	22	Total Tributary Area	115,211	16,132	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.86	0.90	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.86	0.90	unitless
	26	Initial Design Capture Volume	5,532	811	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.86	0.90	unitless
	32	Design Capture Volume After Dispersion Techniques	5,532	811	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.86	0.90	unitless
	36	Final Effective Tributary Area	99,081	14,519	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	5,532	811	cubic-feet

No Warning Messages

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	*i*	*ii*	Units
BMP Inputs	1	Drainage Basin ID or Name	BMP-A	BMP-B	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	in/hr
	3	Design Capture Volume Tributary to BMP	5,532	811	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	unitless
	8	Provided Surface Area	1,490	719	sq-ft
	9	Provided Surface Ponding Depth	9	9	inches
	10	Provided Soil Media Thickness	18	18	inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	inches
	12	Underdrain Offset	3	3	inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.44	0.50	inches
	14	Specialized Soil Media Filtration Rate			in/hr
	15	Specialized Soil Media Pore Space for Retention			unitless
	16	Specialized Soil Media Pore Space for Biofiltration			unitless
	17	Specialized Gravel Media Pore Space			unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	unitless
	23	Effective Retention Depth	2.10	2.10	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.05	0.16	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	hours
	26	Efficacy of Retention Processes	0.06	0.18	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	334	147	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	5,198	664	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.0931	0.0113	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	2.70	0.68	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	2.70	0.68	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	16.19	4.09	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	16.20	16.20	inches
	38	Drawdown Time for Surface Ponding	3	13	hours
	39	Drawdown Time for Effective Biofiltration Depth	6	24	hours
	40	Total Depth Biofiltered	32.39	20.29	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	7,797	996	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	4,021	996	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	3,898	498	cubic-feet
	44	Option 2 - Provided Storage Volume	2,012	498	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	0.52	1.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	0.58	1.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	-2,323	0	cubic-feet

Attention!

- BMPs sized at <3% of the effective tributary areas must be accompanied by Reduced Size BMP Maintenance calculations (see last tab).

-This BMP does not fully satisfy the performance standards for pollutant control for the drainage area.

See next sheet for Reduced Size BMP Maintenance

Automated Worksheet B.4: Reduced Size BMP Maintenance Interval (V2.0)

Category	#	Description	*i*	Units
Drainage Basin Info	1	Drainage Basin ID or Name	BMP-A	unitless
	2	Final Effective Tributary Area	99,081	sq-ft
	3	Provided BMP Surface Area	1,490	sq-ft
Biofiltration Clogging Inputs	4	Average Annual Precipitation	13.0	inches
	5	Load to Clog (default =2.0)	2.0	lb/sq-ft
	6	TSS Pretreatment Efficacy	0.25	yes/no
	7	Percentage "Commercial"		percentage
	8	Percentage "Education"		percentage
	9	Percentage "Industrial"		percentage
	10	Percentage "Low Traffic Areas"	48%	percentage
	11	Percentage "Multi-Family Residential"	50%	percentage
	12	Percentage "Roof Areas"		percentage
	13	Percentage "Single Family Residential"		percentage
	14	Percentage "Transportation"		percentage
	15	Percentage "Vacant/Open Space"	2%	percentage
	16	Percentage "Steep Hillslopes"		percentage
Result	17	Total Percentage of Above Land Uses	100%	percentage
	18	Average TSS Concentration for Tributary After Pretreatment	18	mg/L
	19	Average Annual Runoff Volume	107,338	cubic-feet
	20	Average Annual TSS Load	121	lb/yr
	21	Available Sediment Storage within BMP	2,980	lb
	22	Anticipated Major Maintenance Frequency	24.7	years

No Warning Messages

BMP meets 10 year minimum maintenance threshold

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

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

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	**Contents**	**Checklist**
Attachment 2a	Hydromodification Management Exhibit (Required)	☑ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
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, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the BMP Design Manual	☑ Included ☐ Submitted as separate stand-alone document
Attachment 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

Attachment 2A:

Hydromodification Management Exhibit

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:

Hydromodification Management Exhibit

PRE DEVELOPMENT HYDROMODIFICATION EXHIBIT

SCALE: 1"=60'

0 60 120 180 240

CORNERSTONE COMMUNITIES WOODWARD
PRE DEVELOPMENT HYDROMODIFICATION EXHIBIT

EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • SURVEYING
440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-1890

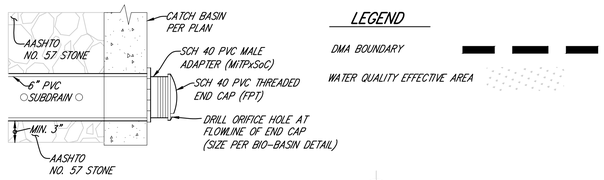
PRE DEVELOPMENT HYDROMODIFICATION BREAKDOWN

PRE DEVELOPMENT		
DMA	ACRE	DRAINS TO
DMA-1	3.7409	POC-1
DMA-2	2.7233	POC-1

Attachment 2A:

Hydromodification Management Exhibit

POST DEVELOPMENT HYDROMODIFICATION EXHIBIT



LOWER ORIFICE DETAIL

NOT TO SCALE

IMPERMEABLE LINER EDGE ANCHOR DETAIL

NOT TO SCALE

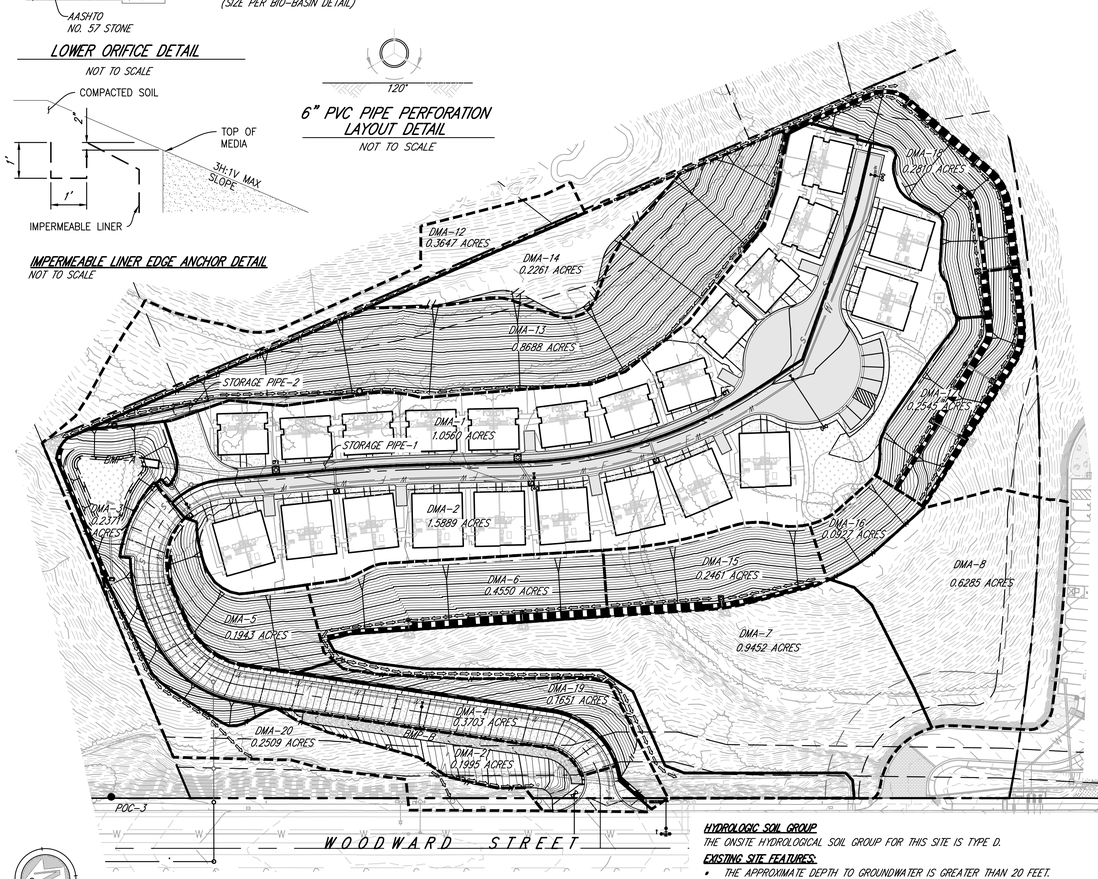
6" PVC PIPE PERFORATION LAYOUT DETAIL

NOT TO SCALE

LEGEND

DMA BOUNDARY

WATER QUALITY EFFECTIVE AREA



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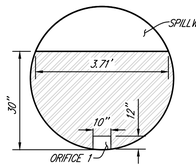
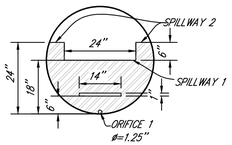


WEIR PLATE 1

NOT TO SCALE

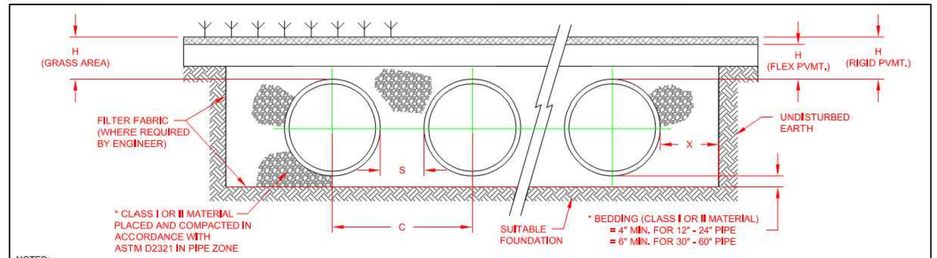
STORAGE PIPE 1 WEIR CROSS SECTION



WEIR PLATE 2

NOT TO SCALE

STORAGE PIPE 2 WEIR CROSS SECTION



NOTES:

1. ALL REFERENCES TO CLASS I OR II MATERIAL ARE PER ASTM D2321 "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST EDITION.
2. ALL RETENTION AND DETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, LATEST EDITION AND THE MANUFACTURER'S PUBLISHED INSTALLATION GUIDELINES.
3. MEASURES SHOULD BE TAKEN TO PREVENT THE MIGRATION OF NATIVE FINES INTO THE BACKFILL MATERIAL. WHEN REQUIRED, SEE ASTM D2321.
4. FILTER FABRIC: A GEOTEXTILE FABRIC MAY BE USED AS SPECIFIED BY THE ENGINEER TO PREVENT THE MIGRATION OF FINES FROM THE NATIVE SOIL INTO THE SELECT BACKFILL MATERIAL.
5. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
6. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I OR II. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-1500mm).
7. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I OR II IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
8. MINIMUM COVER: MINIMUM COVER OVER ALL RETNETION/DETENTION SYSTEMS IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER IS 12" UP TO 36" DIAMETER PIPE AND 24" OF COVER FOR 42" - 60" DIAMETER PIPE. MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

NOMINAL DIAMETER	NOMINAL O.D.	TYPICAL SPACING "S"	TYPICAL SPACING "C"	TYPICAL SIDE WALL "X"	H (NON-TRAFFIC)	H (TRAFFIC)
48" (1200 MM)	54" (1372 MM)	25" (635 MM)	78.5" (1994 MM)	18" (457 MM)	12" (292 MM)	24" (610 MM)

* CLASS I BACKFILL REQUIRED AROUND 60" DIAMETER FITTINGS.

REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
4	GENERAL UPDATES AND RENAMED	TJR	02/19/16	

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ADVANCED DRAINAGE SYSTEMS, INC. ("ADS") HAS PREPARED THIS DETAIL BASED ON INFORMATION PROVIDED TO ADS. THIS DRAWING IS INTENDED TO DEPICT THE COMPONENTS AS REQUESTED. ADS HAS NOT PERFORMED ANY ENGINEERING OR DESIGN SERVICES FOR THIS PROJECT, NOR HAS ADS INDEPENDENTLY VERIFIED THE INFORMATION SUPPLIED. THE INSTALLATION DETAILS PROVIDED HEREIN ARE GENERAL RECOMMENDATIONS AND ARE NOT SPECIFIC FOR THIS PROJECT. THE DESIGN ENGINEER SHALL REVIEW THESE DETAILS PRIOR TO CONSTRUCTION. IT IS THE DESIGN ENGINEERS RESPONSIBILITY TO ENSURE THE DETAILS PROVIDED HEREIN MEETS OR EXCEEDS THE APPLICABLE NATIONAL, STATE, OR LOCAL REQUIREMENTS AND TO ENSURE THAT THE DETAILS PROVIDED HEREIN ARE ACCEPTABLE FOR THIS PROJECT.

RETENTION-DETENTION SYSTEM (CROSS-SECTION)

DRAWING NUMBER: STD-702

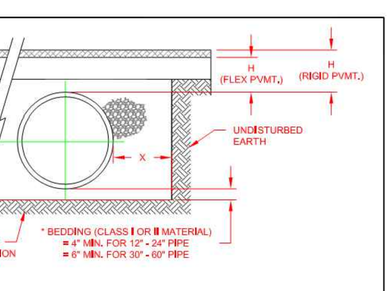
ADS ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD. HILLIARD, OHIO 43026

DRAWN BY: AWM
DATE: 07-25-06
DATE REV.:
SCALE: NTS
SHEET OF

STRUCTURAL BIO-BASIN SUMMARY TABLE

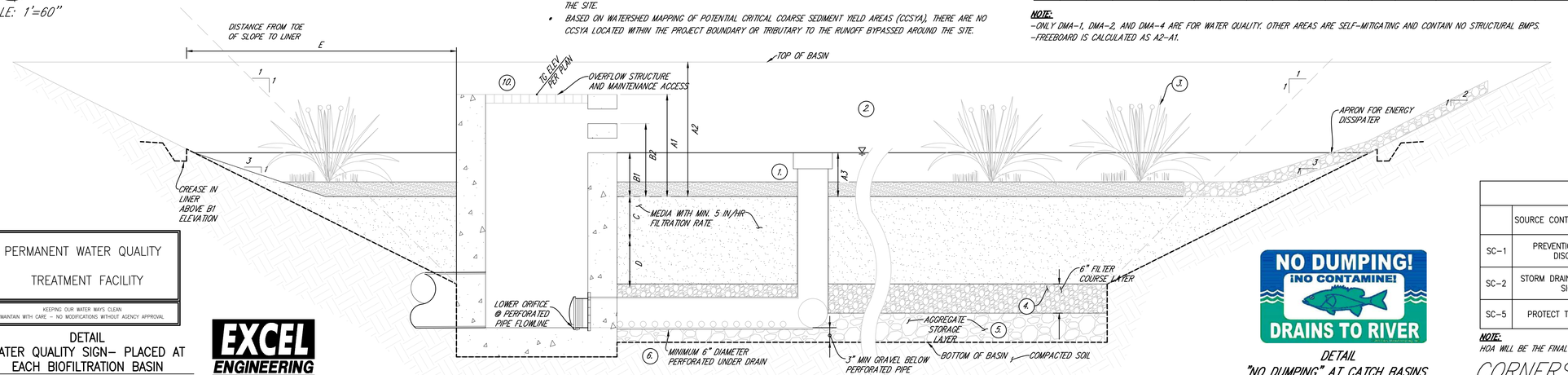
DMA NAME	DMA TYPE	BMP NAME	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) WATER QUALITY	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B1 (INCH) UPPER ORIFICE	B2 (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (INCH) OFFSET	BOX RISER OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER UPPER B1 H X W (INCH)	ORIFICES DIAMETER UPPER B2 H X W (INCH)	ORIFICES DIAMETER LOWER (INCH)	IMPERMEABLE LINER ?
DMA-1 DMA-2	DRAINS TO BMP	BMP-A	BIOFILTRATION	1490	36	51.48	9	9	28.5	18	12	3	48X48	4 X 3 - 4 BARRELS	6 X 12 - 2 BARRELS	1.4375	YES
DMA-4	DRAINS TO BMP	BMP-B	BIOFILTRATION	436	9	12	9	–	–	18	12	3	18X18	–	–	0.5	YES

NOTE:
-ONLY DMA-1, DMA-2, AND DMA-4 ARE FOR WATER QUALITY. OTHER AREAS ARE SELF-MITIGATING AND CONTAIN NO STRUCTURAL BMPS.
-FREEBOARD IS CALCULATED AS A2-A1.



BIOFILTRATION BASIN B SECTION

TYPICAL SECTION
NOT TO SCALE



BIOFILTRATION BASIN DETAIL

NOT TO SCALE

PERMANENT WATER QUALITY TREATMENT FACILITY

KEEPING OUR WATER WAYS CLEAN
MAINTAIN WITH CARE – NO MODIFICATIONS WITHOUT AGENCY APPROVAL

DETAIL
WATER QUALITY SIGN– PLACED AT EACH BIOFILTRATION BASIN

NOTE: ALL BIOFILTRATION AREAS WILL HAVE A SIGN POSTED TO BE VISIBLE AT ALL TIMES.

EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • SURVEYING
440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-1890

DETAIL "NO DUMPING" AT CATCH BASINS

NOTE: ALL CATCH BASINS WITH GRATES SHALL BE STENCILED WITH CITY REQUIRED ITEM PER ABOVE DETAIL (DAS MANUFACTURING #SDO OR EQUIVALENT).

SOURCE CONTROL			
	SOURCE CONTROL REQUIREMENT	NODE	IMPLEMENTAION
SC-1	PREVENTION OF ILLICIT DISCHARGES	SC-1	EFFECTIVE IRRIGATION WILL BE IMPLEMENTED AND VEHICLE WASHING IS PROHIBITED
SC-2	STORM DRAIN STENCILING OR SIGNAGE	SC-2	STENCIL EVERY INLET WITH PROHIBITIVE WORDS: "NO DUMPING! DRAINS TO WATERWAYS" AND "NO CONTAMINE" IN SPANISH.
SC-5	PROTECT TRASH STORAGE	SC-5	TRASH ENCLOSURE WILL BE PROTECTED BY LID OR BE WALLED WITH ROOF TO AVOID STORMWATER GET CONTAMINATED

NOTE:
HOA WILL BE THE FINAL OWNER OF BMPS. MAINTAIN BMPS INTO PERPETUITY, AND FUNDING MECHANISM FOR MAINTENANCE.

CORNERSTONE COMMUNITIES WOODWARD HYDROMODIFICATION MANAGEMENT EXHIBIT

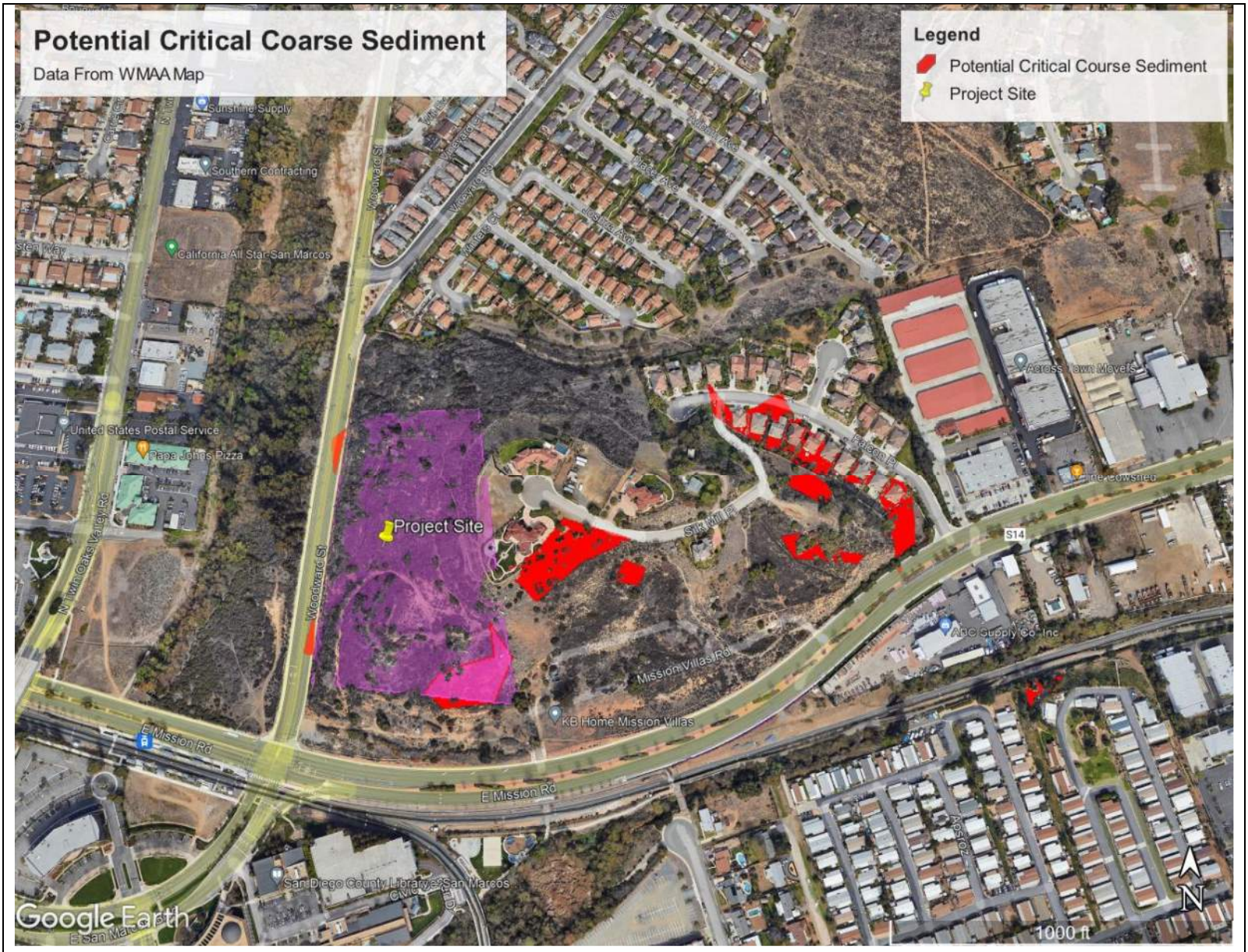
V:\22\22027\Engineering\7M\Storm Working Files\Hydrmod\22027 HYDMOD MANAGEMENT.dwg 2/13/2023 12:01 PM ORIGINAL PLOT SIZE: ----

POST DEVELOPMENT HYDROMODIFICATION BREAKDOWN

POST DEVELOPMENT		
DMA	ACRE	DRAINS TO
DMA-1	1.056	POC-1
DMA-2	1.5889	POC-1
DMA-3	0.2371	POC-1
DMA-4	0.3703	POC-1
DMA-5	0.1943	POC-1
DMA-6	0.455	POC-1
DMA-7	0.9452	POC-1
DMA-8	0.6285	POC-1
DMA-12	0.3647	POC-3
DMA-13	0.8688	POC-3
DMA-14	0.2261	POC-3
DMA-15	0.2461	POC-1
DMA-16	0.0927	POC-1
DMA-19	0.1651	POC-1
DMA-20	0.2509	POC-1
DMA-21	0.1995	POC-1

Attachment 2B:

Management of Critical Coarse Sediment Yield Areas



The map above shows potential critical course sediment areas. The northwesterly Critical Course Sediment area is located on the Woodward Street adjacent to the driveway. This critical course sediment is on a developed area, therefore this project does not impact the existing sediment. A critical course sediment analysis is provided on Attachment 2b.

Attachment 2C:

Geomorphic Assessment of Receiving Channels

Critical Coarse Sediment Yield Analysis

FOR:

Mission 316 West - 67 Condominium Units

City of San Marcos, CA

PREPARED FOR:

KB HOMES COASTAL

9915 Miramesa Boulevard Suite 100

San Diego, CA 92131

Contact: Kurt Bausback

Tel: (858) 877-4262

APPROVED

City Drawing No.: GP-20-00016
GPA 18-0004
CUP 18-0007
Dec 17,2020

PREPARED BY:

Excel Engineering
440 State Place
Escondido, CA 92029
Tel: (760) 745-8118
Project No: 14-041

DATE PREPARED:

August 7, 2018

Summary

This report presents the findings of the Potential Critical Coarse Sediment analysis of the site. The analysis was conducted using the following the guidelines…

1. February 2016 San Diego Region Model BMP Design Manual, and associated Appendix
2. February 2016 County of San Diego BMP Design Manual, and associated appendix
3. June 2016 Carlsbad Watershed Management Area Water Quality Improvement Plan To meet requirements of the San Diego Regional Water Quality Control Board Order R9-2013-0001
   https://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/wqip.html

   http://www.projectcleanwater.org/download/carlsbad-wqip-gis-files/
4. January 2018 Model BMP Design Manual San Diego Region for Permanent Site Design, Storm Water Treatment and Hydromodification Management
5. The San Diego County Help Desk Questions and Answers.

Per results following, It is determined that the site is not a source of Critical Coarse Sediment for the downstream receiving waters and avoidance or mitigation is not necessary.

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Introduction

The purpose of this study is to address the presence of WMAA (Watershed Management Area Analysis) Mapping indicating Potential Critical Coarse Sediment Yield Areas (PCCSYA's) on the Mission 316 West site. The WMAA Map area in question lies on the Northeasterly slope of the project and on the Northwesterly of the project. See Exhibits following. The drainage basin begins with the off-site hill slope which is at the edge of the neighbor's property. The drainage from the offsite property drains to a curb inlet located at the southwesterly of the project site. The total of offsite drainage area is 5.435 acres, 2.89 acres drain to southwest inlet (POC-1A) via existing dirt road and the other 2.55 acres drain to the southeast corner of the site (labeled as POC-2) via natural rill when it is raining and eventually drains to an existing concrete browditch and to an inlet. There are three discharge locations of the site: Two inlets located at the southwest corner of the site, labeled as POC-1A and POC-1B and one inlet located at the southeast corner of the site. This storm drain system ultimately discharges into San Marcos Creek.
The Mission 316 West is classified as a Priority Development Project with respect to stormwater discharge and is subject to Hydromodification requirements. Hydromodification requirements are intended to minimize excessive downstream erosion in receiving waters due to land development activities. There are two main components to hydromodification design. The first component is the mitigation of the increase in peak flow and flow duration rates that result from the addition of impervious surfaces and concentration of runoff that are typical of land development activities. The flow/duration component of the design is covered in a separate report. The second component of hydromodification is protection of the Critical Coarse Sediment (CCS) supply of the stream. The CCS component of the hydromodification requirements is intended to maintain any present sources of stream coarse sediment supply.

Sources of Methodology

The initial reference for analyzing the PCCSYA's is the February 2016 San Diego Regional Model BMP Design Manual for the City of San Marcos. Coarse sediments are addressed in Chapter 6 which primarily discusses Hydromodification requirements. This section is followed up with greater detail on the PCCSYA's topic in Appendix H. However, due to limited information in this version, other sources were needed to support this report. Since the printing of the February 2016 San Diego Regional Model BMP Design Manual, updates from the San Diego County Help Desk have been included (including some more in depth explanation and methodology) in a revised, extended Appendix H. These updates were shown to have been included within the more recent updated additions of the BMP Design Manual including the February 2016 County of San Diego BMP Design Manual, and associated Appendix and the January 2018 Model BMP Design Manual San Diego Region for Permanent Site Design, Storm Water Treatment and Hydromodification Management.

Also the San Diego County Regional Watershed Management Area Analysis (WMAA) printed October 1, 2015 was a reference as well as the June 2016 **Carlsbad Watershed Management**

Area Water Quality Improvement Plan regarding water quality and CCSYA that discusses the Geomorphic Landscape Units (GLU) in more detail than the BMP Manuals. This manual was referenced for greater clarity and provides criteria dictating whether or not avoidance is required for protection purposes.

In regards to the use of the "Carlsbad Watershed Management Area Analysis" report, please recall that the City of San Marcos lies within and is a part of the Richland HAS of the San Marcos Hydrologic Area of the overall Carlsbad Hydrologic Unit. This study was completed for the entire HSU and is not meant to be a reference specific to the City of Carlsbad.

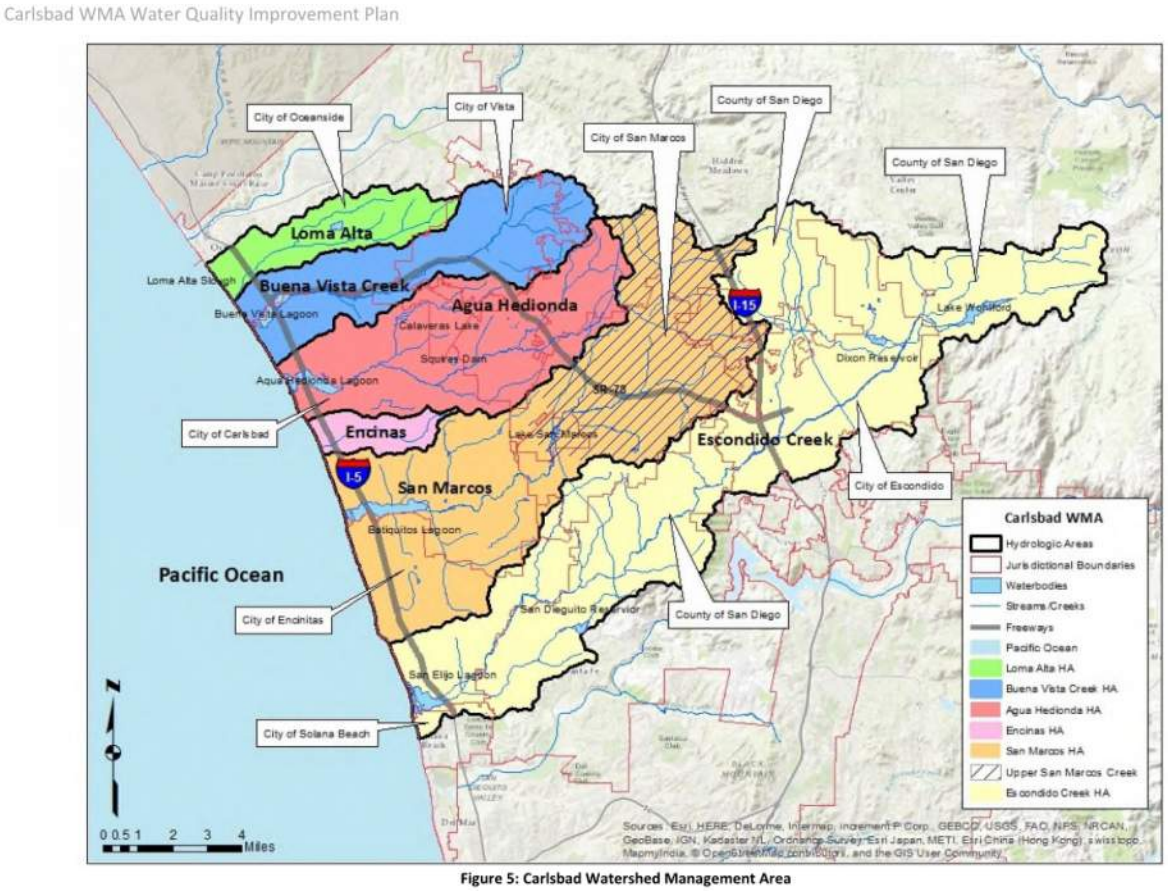


Figure 5: Carlsbad Watershed Management Area

Figure 1 Taken from June 30, 2016 Carlsbad Watershed Management Area (Water Quality Improvement Plan)-Executive Summary Page ES-2

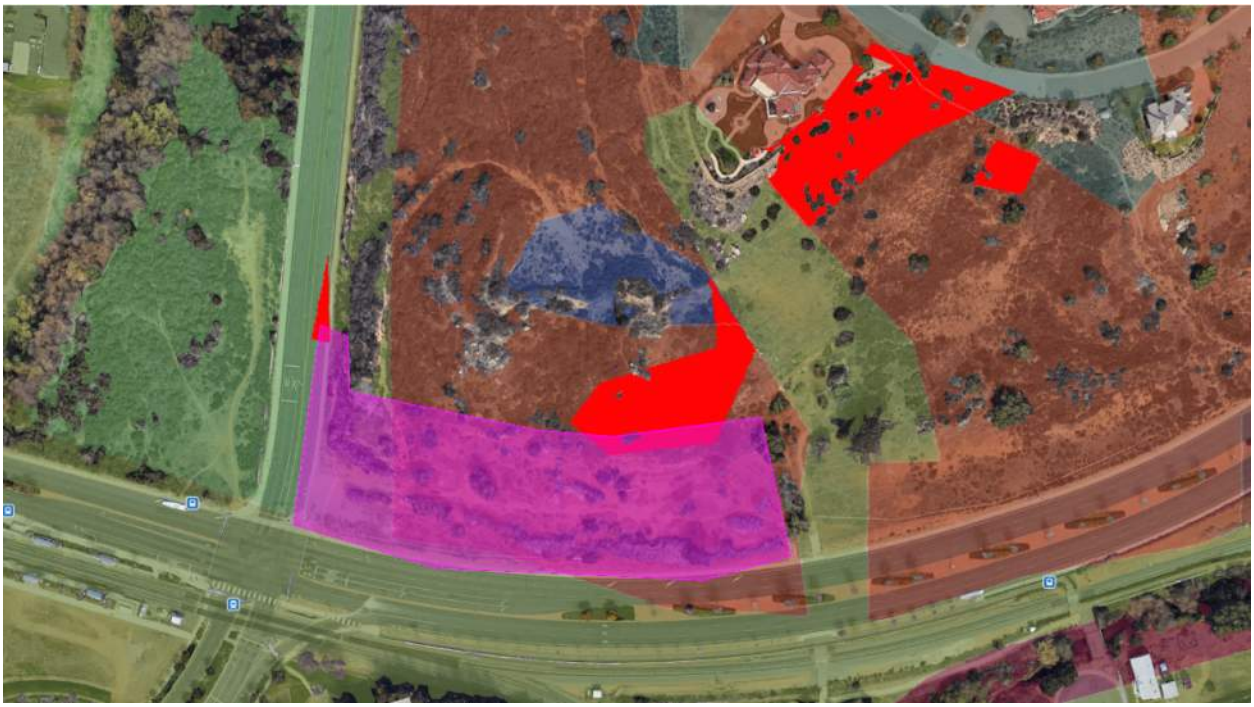


Figure 2 Google Earth Image of Mission 316 West Project with overlay of Hydrologic Area provided courtesy of SANGIS. The Watershed is defined as Carlsbad, HA is San Marcos; HAS Richland (904.52)

Steps of the Analysis

Section 6.2 of Chapter 6 of the February 2016 San Diego Region Model BMP Design Manual and subsequent related publications outline the steps necessary to evaluate if the project will impact the supply of critical coarse sediment to downstream receiving waters. The steps used in this report are summarized below:

Step 1: Consult the Potential Critical Coarse Sediment Yield Map included in the Regional WMAA (found on the Project Clean Water website). If potential areas exist within the project boundaries, then proceed to step 2.

Step 2: Verify the Geomorphic Landscape Units (GLUs) onsite. This process is outlined in Section 6.2.1 of Chapter 6 and Appendix H of the February 2016 San Diego Region Model BMP Design Manual. Further discussion for Carlsbad Watershed Specific areas are located in the Carlsbad Watershed Management Area – Water Quality Improvement Plan (WQIP). If GLU analysis confirms the CCS mapping in the WMAA, then proceed to step 3.

Step 3: Relate GLU to relative sediment production of the local site region. Per CCSYA criteria from the Carlsbad Watershed Management Area Analysis, perform a quantitative analysis of relative sediment production (RSP) using the RUSLE Equation. If RUSLE indicates a High sediment production for the specific site area and the site underlying Geologic Formation is CB, CSI or CSP, and then implement avoidance.

Step 1-Critical Coarse Sediment Mapping

The mapping of Potential Critical Coarse Sediment Areas obtained from the Project Clean Water web site was overlaid into the project site as well as the aerial photo. The resulting composite map shows that there are two areas of the project that have the potential to provide critical coarse sediment to downstream waterbodies (See Map):

Area 1 is located at north westerly of the project adjacent to the proposed driveway. This potential critical coarse sediment is located under the existing road Woodward St (developed area) and 5.7% slope or category 1 of slope category. Runoff from this area flows southwesterly away from the project and does not impact the site.

Area 2 is located at northeasterly of the project and upstream of the project. This potential critical coarse area is classified as a scrub/shrub vegetation cover with >40% slope or category 4 of slope category, runoff of this area drains toward the site.

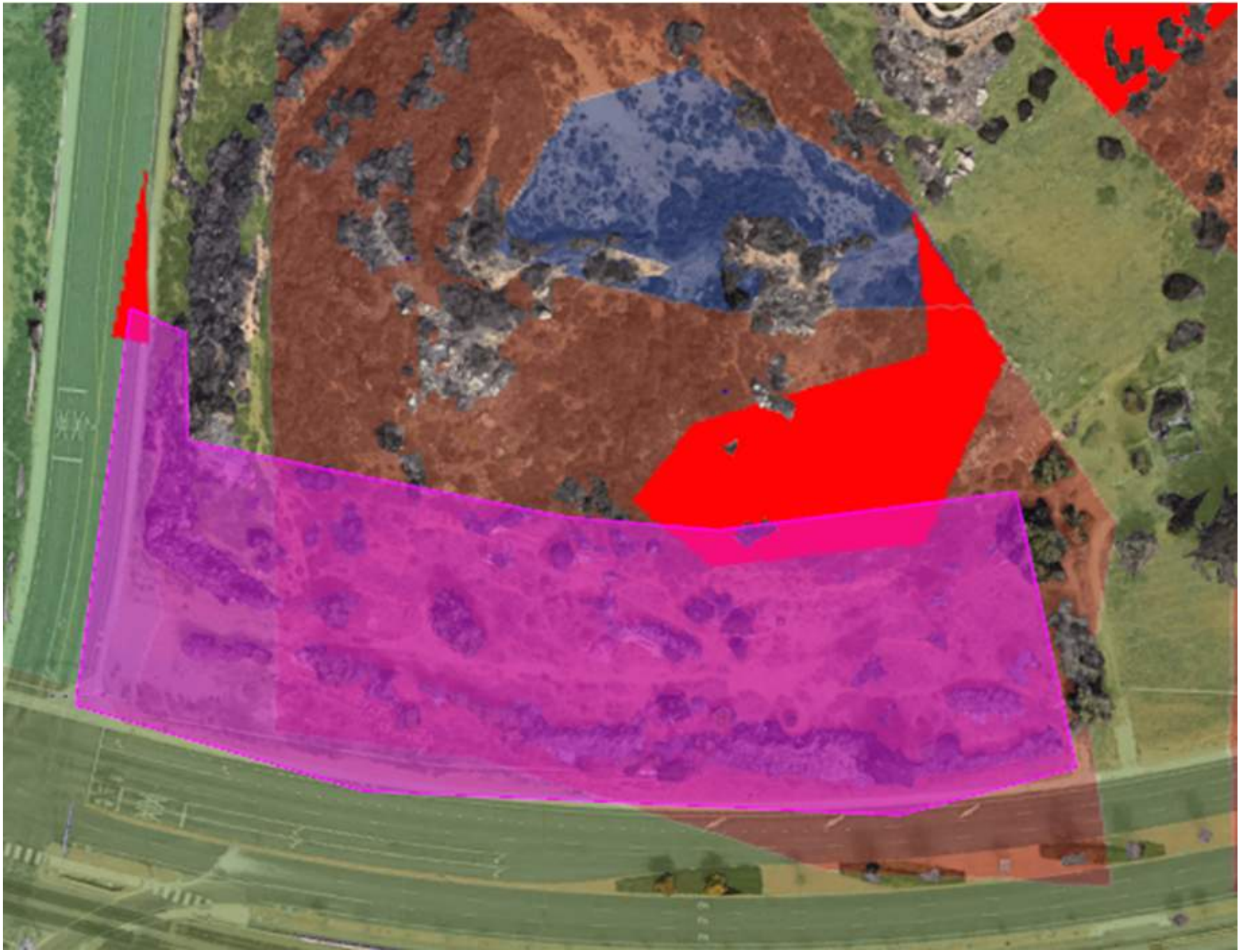


Figure provided from Google Earth with an overlay of potential critical course sediment area from San GIS

Based on the results of the map on the previous page, the site does show the presence of PCCSYA's. The analysis will move on to Step 2, the verification of GLUs onsite.

Step 2-Verification of GLUs Onsite

The WMAA map used in the first part of the analysis is based on regional level data sets. The inherent resolution of these regional level datasets may not accurately depict site specific conditions. Appendix H of the San Diego Region BMP Design Manual provides guidance to confirm if site specific GLUs exist within the project boundary. The following table was taken from the 2016 San Diego Region BMP Design Manual – 6-4 and provides criteria for PCCSYA's which must be investigated further.

TABLE 6-1. Potential Critical Coarse Sediment Yield Areas

GLU	Geology	Land Cover	Slope (%)
CB-Agricultural/Grass-3	Coarse Bedrock	Agricultural/Grass	20% - 40%
CB-Agricultural/Grass-4	Coarse Bedrock	Agricultural/Grass	>40%
CB-Forest-2	Coarse Bedrock	Forest	10 – 20%
CB-Forest-3	Coarse Bedrock	Forest	20% - 40%
CB-Forest-4	Coarse Bedrock	Forest	>40%
CB-Scrub/Shrub-4	Coarse Bedrock	Scrub/Shrub	>40%
CB-Unknown-4	Coarse Bedrock	Unknown	>40%
CSI-Agricultural/Grass-2	Coarse Sedimentary Impermeable	Agricultural/Grass	10 – 20%
CSI-Agricultural/Grass-3	Coarse Sedimentary Impermeable	Agricultural/Grass	20% - 40%
CSI-Agricultural/Grass-4	Coarse Sedimentary Impermeable	Agricultural/Grass	>40%
CSP-Agricultural/Grass-4	Coarse Sedimentary Permeable	Agricultural/Grass	>40%
CSP-Forest-3	Coarse Sedimentary Permeable	Forest	20% - 40%
CSP-Forest-4	Coarse Sedimentary Permeable	Forest	>40%
CSP-Scrub/Shrub-4	Coarse Sedimentary Permeable	Scrub/Shrub	>40%

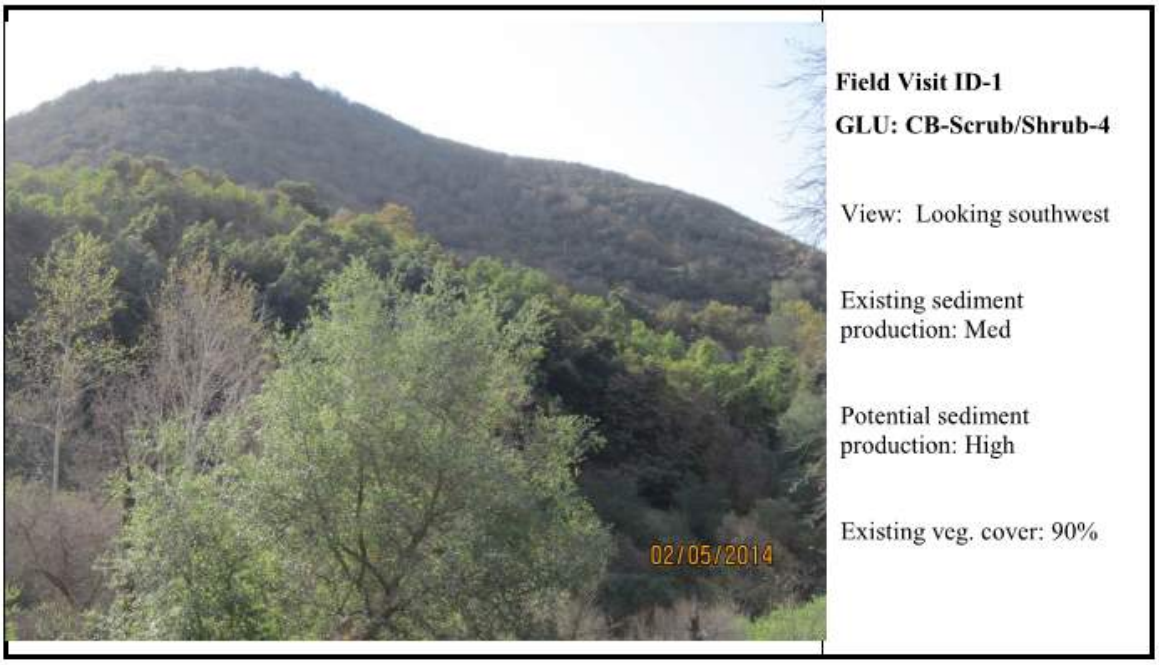
The first step of this process was to classify Land Cover of the site. Table H.1-2 provides a list of names regarding the different types of vegetation land cover but doesn't specify what these look like in the field. SanGIS provides shape files that can be used to determine the land cover in the area. The Mission 316 West project is located within the 32500 Scrub and Chaparral, and 63300 Riparian and Bottomland Habitat; which according to the Table H.1-2 is a Land cover grouping of Scrub/ Shrub. Note that category-1 is not listed on the table above, therefore potential critical coarse sediment for area 1 is not relevant for critical coarse sediment assessment.

Appendix H: Guidance for Investigation Potential Critical Coarse Sediment Yield Areas

Id	SanGIS Legend	SanGIS Grouping	Land Cover Grouping
119	32400 Maritime Succulent Scrub		Scrub/Shrub
120	32500 Diegan Coastal Sage Scrub		Scrub/Shrub
121	32510 Coastal form		Scrub/Shrub

Id	SanGIS Legend	SanGIS Grouping	Land Cover Grouping
105	63000 Riparian Scrubs		Scrub/Shrub
106	63300 Southern Riparian Scrub		Scrub/Shrub
107	63310 Mule Fat Scrub		Scrub/Shrub

The Carlsbad Watershed Management Area Water Quality Improvement Plan does include specified pictures for the region. In the Carlsbad WMAA Attachments section of the report the classifications that appear to be most like the proposed Mission 316 West Project are Scrub/Shrub-4. This type of land cover will be carried through the rest of this analysis for a complete comparison; see pictures below referenced from page 467, and 478 of the Carlsbad Watershed Management Area Water Quality Improvement Plan.



Picture 1

With pictures from the Mission 316 West project site itself, we can confirm the vegetation type; see below for Mission 316 West Pictures.

Picture 2 Image of Mission 316 West to Show Vegetation for GLU

The second step was to classify the site specific soil types into the seven listed GLU categories. This was done by determining the local geology. The specific geologic map used in the stage is the GEOLOGIC MAP OF THE OCEANSIDE 30'X60' QUADRANGLE, CALIFORNIA, California Geological Survey, Regional Geologic Map No. 2, 1:100,000 scale, Compiled by: Michael P. Kennedy and Siang S. Tan, 2002. This map can be found at: http://www.quake.ca.gov/gmaps/RGM/oceanside/oceanside.html#

The project site is then located on the geologic map and found to be within the Kt geologic unit. From Table H.1-1 of the BMP Design Manual, map unit Kt is Geologic Grouping of CB. See Figure 1 Below.

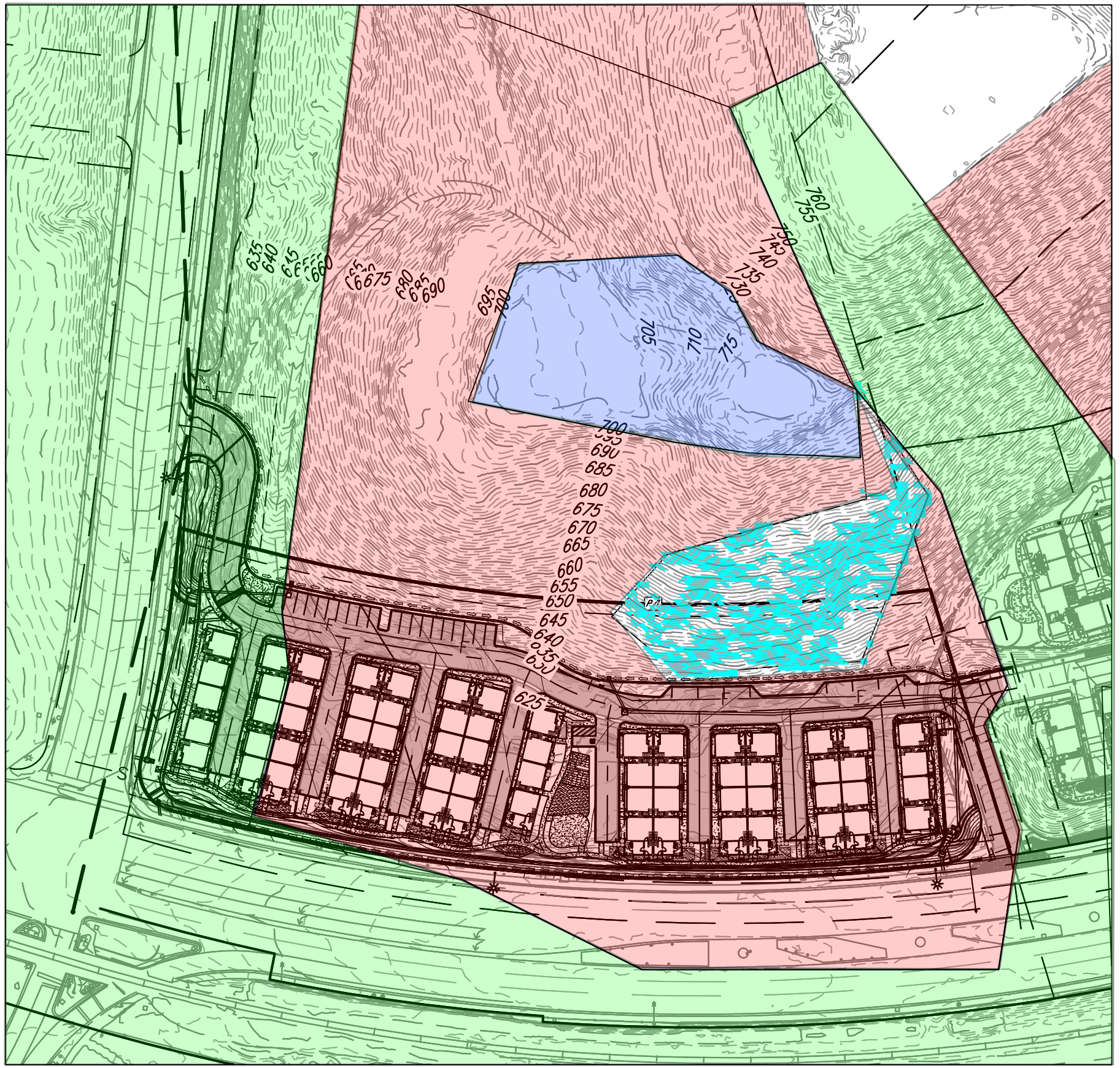
Figure 1

Since the geology is now identified as a Kt we can go back to the 2016 February Model BMP Design Manual to Table H.1-1 which is seen below in Figure 2.

Map Unit	Map Name	Anticipated Grain size of Weathered Material	Bedrock or Sedimentary	Impermeable/ Permeable	Geology Grouping
Kjv	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Klb	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Klh	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Klp	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Km	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kmg	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kmgp	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kmm	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kpa	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kpv	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kqbd	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kr	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Krm	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Krr	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kt	San Diego & Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB

Figure 2 Table H.1-1: Geologic Grouping for Different Map Units

The third step in the analysis was to review slopes of the project site for comparison to the potential GLU's. Using Table 6-1 as a guide, the site was divided into two groups; slopes that are less than 40%, and slopes that are greater than 40%. The slopes that are greater than 40% are represented in cyan as can be seen on the following page.



MISSION 316 WEST

SAN MARCOS, CA 92069

> 40% SLOPE AREA

63300 SOUTHERN RIPARIAN SCRUB

32500 DIEGAN COASTAL SAGE SCRUB

11300 DISTURBED HABITAT

V:\17\17067\Engineering\Current\PGP\Storm\SWQMP\40 PERCENT ccsya exhibit.dwg 8/7/2018 10:48 AM ORIGINAL PLOT SIZE: ----

Table H.6-3: Potential Critical Coarse Sediment Yield Areas

GLU	Geology	Land Cover	Slope (%)
CB-Agricultural/Grass-3	Coarse Bedrock	Agricultural/Grass	20% - 40%
CB-Agricultural/Grass-4	Coarse Bedrock	Agricultural/Grass	>40%
CB-Forest-2	Coarse Bedrock	Forest	10 – 20%
CB-Forest-3	Coarse Bedrock	Forest	20% - 40%
CB-Forest-4	Coarse Bedrock	Forest	>40%
CB-Scrub/Shrub-4	Coarse Bedrock	Scrub/Shrub	>40%
CB-Unknown-4	Coarse Bedrock	Unknown	>40%
CSI-Agricultural/Grass-2	Coarse Sedimentary Impermeable	Agricultural/Grass	10 – 20%
CSI-Agricultural/Grass-3	Coarse Sedimentary Impermeable	Agricultural/Grass	20% - 40%
CSI-Agricultural/Grass-4	Coarse Sedimentary Impermeable	Agricultural/Grass	>40%
CSP-Agricultural/Grass-4	Coarse Sedimentary Permeable	Agricultural/Grass	>40%
CSP-Forest-3	Coarse Sedimentary Permeable	Forest	20% - 40%
CSP-Forest-4	Coarse Sedimentary Permeable	Forest	>40%
CSP-Scrub/Shrub-4	Coarse Sedimentary Permeable	Scrub/Shrub	>40%

As presented in Table H.6-3, the matching GLU's has the potential to supply critical coarse sediments. This area will now be the focus of further verification efforts.

In observing the GLU exhibit, it is readily apparent that there is only one area (28,104 sf) of PCCSYA inside the WMAA Mapping area.

Note that category-1 is not listed on the table above, therefore potential critical coarse sediment for area 1 is not relevant for critical coarse sediment assessment. However, Area 2 does show potential coarse sediment and further analysis needs to be taken.

STEP 3-Determine Relative Sediment Production of the Local Site Area

If identified GLU's are not large enough or steep enough to produce a significant amount of CCS they can be made exempt from avoidance. In order for a specific GLU to be considered valid it must rate as having a High Relative Sediment Production (RSP) rating. To conduct a Quantitative Analysis of identified GLU's use the following steps from the Carlsbad Watershed Management Area – Water Quality Improvement Plan, Section A.4.2.

After all the preceding steps are used to confirm the GLU Verifications of the Potential Critical Coarse Sediment onsite, the soil loss equation is used to determine if the local area will produce a significant amount of soil loss to contribute to the determination of the verified GLU's being a Critical Coarse Sediment Yield Area.

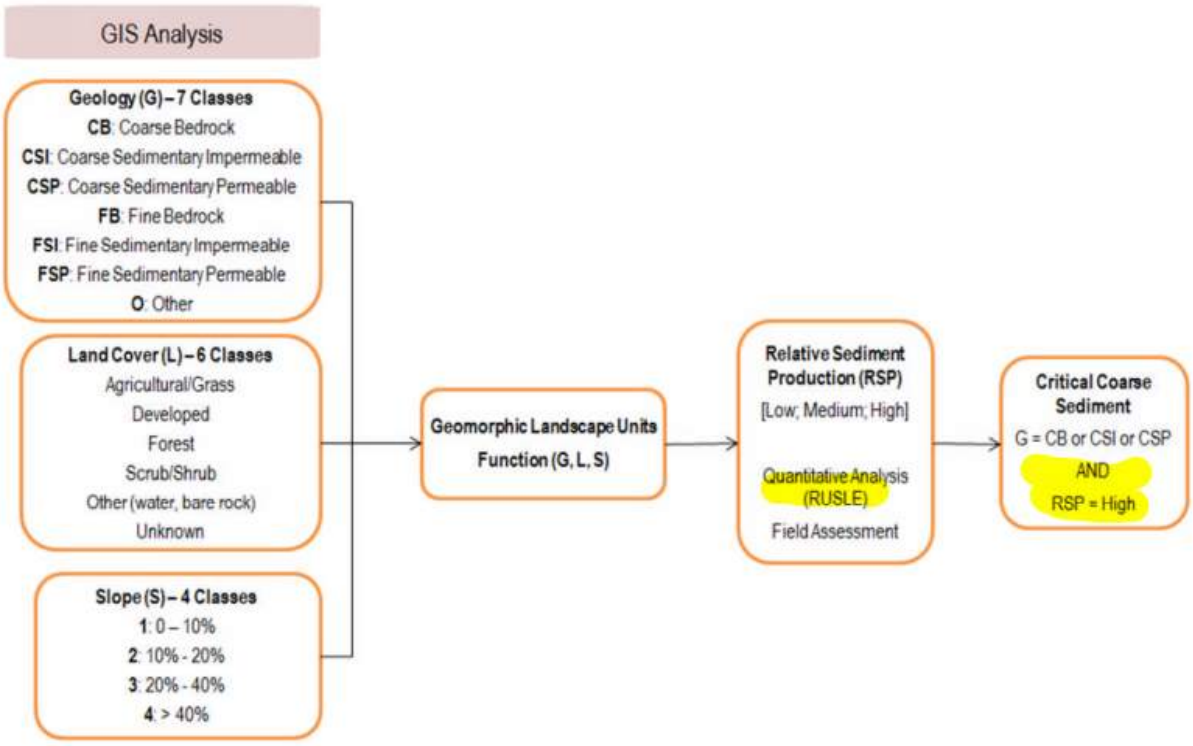


Image 1 Taken from June 30, 2016 Carlsbad Watershed Management Area (Water Quality Improvement Plan)-Carlsbad Watershed Management Area Analysis-Section 2.42 Methodology/ Assumptions/ Criteria for identifying potential critical coarse sediment yield areas

This is accomplished by using the RUSLE (RUSLE; Renard et al. 1997) Equation in Appendix D – Watershed Management Area Analysis Section A.4.2 Quantitative Analysis.

A= R X K X LS X C X P

Where

A = estimated average soil loss in tons/acre/year

R = rainfall-runoff erosivity factor

K = soil erodibility factor

LS = slope length and steepness factor

C = cover-management factor

P = support practice factor; assumed 1 for this analysis

Regional datasets used to determine the inputs required to estimate the soil loss from each GLU are listed in table below:

https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/k_factor_map.pdf

https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/ls_factor_map.pdf

https://www.epa.gov/npdes/rainfall-erosivity-factor-calculator-small-construction-sites

The following criterion was developed using the suggestions listed above and then used to assign relative sediment production rating to each GLU:

- Low: Soil Loss < 5.6 tons/acre/year [GLUs that have a soil loss of 0 to 5.6 tons/acre/year produces around 10% of the total coarse sediment soil loss from the study area]
- Medium: 5.6 tons/acre/year < Soil Loss < 8.4 tons/acre/year
- High: > 8.4 tons/acre/year [GLUs that have a soil loss greater than 8.4 tons/acre/year produces around 42% of the total coarse sediment soil loss from the study area]

Image 2 Taken from June 30, 2016 Carlsbad Watershed Management Area (Water Quality Improvement Plan)-Carlsbad Watershed Management Area Analysis-Section A.4.2 Quantitative Analysis

The results ended giving

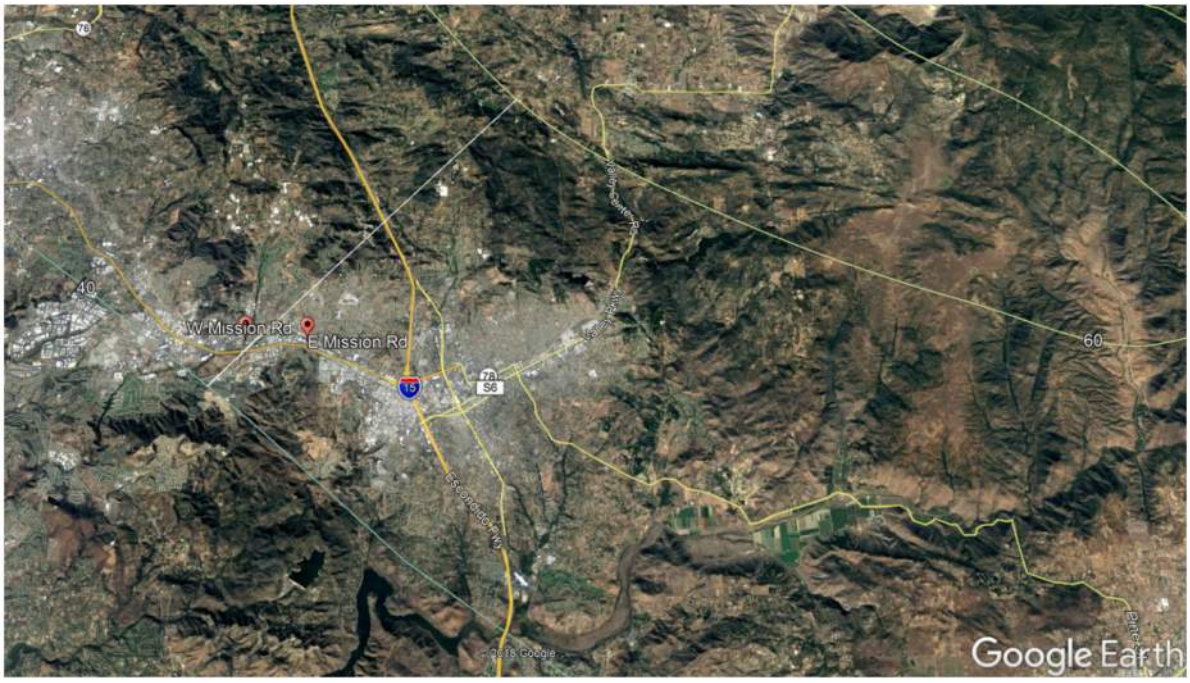


Figure provided from Google Earth with an overlay for RUSLE from SAN GIS
R = 43.2

Figure provided from Google Earth with an overlay for RUSLE from SAN GIS
K = 0.43

Figure provided from Google Earth with an overlay for RUSLE from SAN GIS
LS = 1.05

C factor will be placed as 0.14 to be conservative; this is the highest value in Table A.4.2 Located in the Carlsbad Watershed Management Area – Water Quality Improvement Plan.

P is set as 1 per analysis direction

To recap

R = 43.2

K = 0.43

Ls = 1.05

C = 0.14

P = 1

Therefore A = 43.2 X 0.43 X 1.05 X 0.14 X 1

A = 2.73 tons/acre/year

By comparing this value to the soil loss criteria in Section A.4.2 the resultant annual soil loss for this specific region is considered LOW. For qualification of the area to be a Critical Coarse Sediment Yield Area per the Carlsbad WMAA (Image 1 from Page 14 the area must have a GLU

of CB, CSI, or CSP AND a High RSP. Due to the project sediment production being Low this indicates that the overall region does not produce enough overall soil loss to be considered a source of Critical Coarse Sediment.

Conclusions

Based on the findings of this report, the Mission 316 West project does not have a source of Coarse Sediment that would require avoidance or mitigation. The GLU analysis has verified that the site has limited areas with the potential to contribute coarse sediment. However the continuing analysis shows that the local area in which the site is situated does not produce enough annual soil loss (RSP) for any on site GLU to be considered a source of Coarse Critical Sediment. This is based on evaluation of the ground cover, underlying geology and the average slope of the local site area. Also the specific GLU areas evaluated do not meet the geographical requirements of a coarse critical sediment yield area. These findings are based on The RUSLE Equation indicates that the overall local site annual soil loss is LOW, which means the area does not produce sediment to be considered "Critical" in the overall than the generally established criteria for a Critical Coarse Sediment Yield Area (CCSYA) and So even though there is coarse sediment onsite, this sediment is not established as "Critical Coarse Sediment" and warrants no protection or further action.

If there are questions or concerns as related to this report, please contact Excel Engineering.

References

1) San Diego Region BMP Design Manual Chapter 6, February 2016

2) San Diego Region BMP Design Manual, Appendix H, February 2016

3) GEOLOGIC MAP OF THE OCEANSIDE 30'X60' QUADRANGLE, CALIFORNIA, California Geological Survey, Regional Geologic Map No. 2, 1:100,000 scale, Compiled by: Michael P. Kennedy and Siang S. Tan, 2002. http://www.quake.ca.gov/gmaps/RGM/oceanside/oceanside.html#

End of Report

Appendix A

JUNE 2016

Carlsbad Watershed Management Area
Water Quality Improvement Plan

Prepared for:

- City of Carlsbad
- City of Encinitas
- City of Escondido
- City of Oceanside
- City of San Marcos
- City of Solana Beach
- City of Vista
- County of San Diego

Prepared by:

MOE

In conjunction with:

- AMEC
- ESA
- Paradigm Environmental
- Tetra-Tech
- Katz & Associates

Carlsbad Watershed Management Area Water Quality Improvement Plan

San Diego Regional Water Quality Control Board Order R9-2013-0001

June 30, 2016

Prepared and Submitted by the
Carlsbad Watershed Management Area Responsible Agencies

City of Carlsbad
City of Encinitas
City of Escondido
City of Oceanside
City of San Marcos
City of Solana Beach
City of Vista
County of San Diego

December 12, 2016

CARLSBAD WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN PROVISION B SUBMITTAL, STATEMENT OF CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Matthew Little
Deputy City Manager

12/12/16
Date

Carlsbad Watershed Management Area Analysis

Lake Henshaw

September 8, 2014

Prepared for:
San Diego County Copermittees

Prepared by:

Geosyntec consultants
engineers | scientists | innovators

RICK ENGINEERING COMPANY

Attachment 2D:

Flow Control Facility Design

```
[TITLE]
;;Project Title/Notes

[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           09/24/1964
START_TIME           00:00:00
REPORT_START_DATE    09/24/1964
REPORT_START_TIME    00:00:00
END_DATE             05/23/2008
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:15:00
WET_STEP             00:15:00
DRY_STEP             24:00:00
ROUTING_STEP         0:00:15
RULE_STEP            01:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
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          0.06   0.08   0.11   0.16   0.18   0.21   0.21   0.2    0.16   0.12   0.08   0.06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Escondido        INTENSITY 1:00     1.0      TIMESERIES Escondido

```

```
[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
dma-1            Escondido        poc-1            3.7409   0        415      25.5     0
dma-2            Escondido        poc-1            2.7233   0        602      22       0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
dma-1            0.012      0.038      0.05       0.1        25         OUTLET
dma-2            0.012      0.038      0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
dma-1            9          0.025      0.33
dma-2            9          0.025      0.33

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

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Escondido        FILE "R:\_Storm\HydMOD\Rain gauge Data\Escondido\Escondido.prn"

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

[TAGS]

[MAP]
DIMENSIONS -2500.000 0.000 12500.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
poc-1            7467.917           3672.261

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

```
dma-1            3884.501           5083.909
dma-2            5493.583           6140.178

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Escondido        1811.451           7907.206


[BACKDROP]
FILE       "V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 PRE HYDMOD.jpg"
DIMENSIONS -2500.000 0.000 12500.000 10000.000

```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
-------------------------------------------------------------


***********************************************************
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 ............ 09/24/1964 00:00:00
Ending Date .............. 05/23/2008 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:15:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 00:00:00


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......       329.114       610.960
Evaporation Loss .........        21.781        40.433
Infiltration Loss ........       246.715       457.997
Surface Runoff ...........        77.590       144.037
Final Storage ............         0.000         0.000
Continuity Error (%) .....        -5.157


**************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------      ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        77.590        25.284
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        77.590        25.284
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 in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
dma-1	610.96	0.00	40.58	458.81	0.00	142.72	142.72	14.50	3.05	0.234
dma-2	610.96	0.00	40.23	456.88	0.00	145.85	145.85	10.79	2.22	0.239

Analysis begun on: Fri Feb 10 15:33:06 2023
Analysis ended on: Fri Feb 10 15:34:43 2023
Total elapsed time: 00:01:37

```
[TITLE]
;;Project Title/Notes

[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           09/24/1964
START_TIME           00:00:00
REPORT_START_DATE    09/24/1964
REPORT_START_TIME    00:00:00
END_DATE             05/23/2008
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:15:00
WET_STEP             00:15:00
DRY_STEP             24:00:00
ROUTING_STEP         0:00:15
RULE_STEP            01:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
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          0.06   0.08   0.11   0.16   0.18   0.21   0.21   0.2    0.16   0.12   0.08   0.06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Escondido        INTENSITY 1:00     1.0      TIMESERIES Escondido

```

```
[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
dma-1            Escondido        Sto-1            1.0560   100      95       1.1      0
dma-2            Escondido        bmp-a            1.5889   88       122      0.8      0
dma-3            Escondido        poc-1            0.1541   0        87       12       0
dma-21           Escondido        poc-1            0.1487   20       40       16.35    0
dma-5            Escondido        poc-1            0.1943   0        72       16.4     0
dma-6            Escondido        poc-1            0.4550   0        40       1.3      0
dma-7            Escondido        poc-1            0.9452   0        454      28.5     0
dma-8            Escondido        poc-1            0.6285   0        181      30       0
bmp-a            Escondido        Sto-BMP-A        0.083    0        71       0        0
bmp-b            Escondido        poc-1            0.0508   0        9        0        0
dma-15           Escondido        poc-1            0.2461   0        182      10.3     0
dma-16           Escondido        poc-1            0.0927   0        90       2.2      0
dma-19           Escondido        poc-1            0.1651   0        120      15       0
dma-20           Escondido        poc-1            0.2509   0        46       17       0
dma-4            Escondido        bmp-b            0.3703   100      32       18.1     0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
dma-1            0.012      0.05       0.05       0.1        25         OUTLET
dma-2            0.012      0.05       0.05       0.1        25         OUTLET
dma-3            0.012      0.12       0.05       0.1        25         OUTLET
dma-21           0.012      0.12       0.05       0.1        25         OUTLET
dma-5            0.012      0.12       0.05       0.1        25         OUTLET
dma-6            0.012      0.12       0.05       0.1        25         OUTLET
dma-7            0.012      0.038      0.05       0.1        25         OUTLET
dma-8            0.012      0.038      0.05       0.1        25         OUTLET
bmp-a            0.012      0.12       0.05       0.1        25         OUTLET
bmp-b            0.012      0.12       0.05       0.1        25         OUTLET
dma-15           0.012      0.12       0.05       0.1        25         OUTLET
dma-16           0.012      0.12       0.05       0.1        25         OUTLET
dma-19           0.012      0.12       0.05       0.1        25         OUTLET
dma-20           0.012      0.038      0.05       0.1        25         OUTLET
dma-4            0.012      0.05       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
dma-1            9          0.01875    0.33
dma-2            9          0.01875    0.33
dma-3            9          0.01875    0.33
dma-21           9          0.01875    0.33
dma-5            6          0.075      0.32
dma-6            6          0.075      0.32
dma-7            9          0.025      0.33
dma-8            9          0.025      0.33
bmp-a            9          0.01875    0.33
bmp-b            9          0.01875    0.33
dma-15           6          0.075      0.32
```

```
dma-16           6          0.075      0.32
dma-19           9          0.01875    0.33
dma-20           9          0.025      0.33
dma-4            9          0.01875    0.33

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
bmp-a            BC
bmp-a            SURFACE    6          0.0        0.1        1.0        5
bmp-a            SOIL       21         0.4        0.2        0.1        5          5          1.5
bmp-a            STORAGE    12         0.67       0          0
bmp-a            DRAIN      0.362333696778649 0.5        3          6          0          0

bmp-b            BC
bmp-b            SURFACE    6          0.0        0.1        1.0        5
bmp-b            SOIL       21         0.4        0.2        0.1        5          5          1.5
bmp-b            STORAGE    12         0.67       0          0
bmp-b            DRAIN      0.0370029618529353 0.5        6          6          0          0

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp    ToPerv
    RptFile                 DrainTo          FromPerv
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ----------
    ------------------------ ---------------- ----------
bmp-a            bmp-a            1       1875       0          0          0          0
*                       Poc-1            0
bmp-b            bmp-b            1       2212.85    0          0          0          0
*                       *                0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
poc-1            0          FREE                        NO
dischargepoint   0          FREE                        NO       bmp-a

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi
    Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------
    -------- --------
sto-1            703.96   4          0          TABULAR    sto-1                        0        0
Sto-BMP-A        0        3.58       0          TABULAR    BMP-A                        0        1

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
4                sto-1            dischargepoint   0          TABULAR/HEAD    Pipe-Det-to-bmp-A             NO
5                Sto-BMP-A        poc-1            0          TABULAR/HEAD    BMP-A-Discharge               NO

[CURVES]
;;Name           Type       X-Value    Y-Value
```

```
;;-------------- ---------- ---------- ----------
BMP-A-Discharge  Rating     0.000000   0.000000
BMP-A-Discharge             0.041667   0.035155
BMP-A-Discharge             0.083333   0.099433
BMP-A-Discharge             0.125000   0.182669
BMP-A-Discharge             0.166667   0.281238
BMP-A-Discharge             0.208333   0.393042
BMP-A-Discharge             0.250000   0.516667
BMP-A-Discharge             0.291667   0.651074
BMP-A-Discharge             0.333333   0.795460
BMP-A-Discharge             0.375000   0.949177
BMP-A-Discharge             0.416667   1.087828
BMP-A-Discharge             0.458333   1.174989
BMP-A-Discharge             0.500000   1.256116
BMP-A-Discharge             0.541667   1.332312
BMP-A-Discharge             0.583333   1.404380
BMP-A-Discharge             0.625000   1.472926
BMP-A-Discharge             0.666667   1.538421
BMP-A-Discharge             0.708333   1.601240
BMP-A-Discharge             0.750000   1.661685
BMP-A-Discharge             0.791667   1.720007
BMP-A-Discharge             0.833333   1.776416
BMP-A-Discharge             0.875000   1.831087
BMP-A-Discharge             0.916667   1.884173
BMP-A-Discharge             0.958333   1.935804
BMP-A-Discharge             1.000000   1.986093
BMP-A-Discharge             1.041667   2.035140
BMP-A-Discharge             1.083333   2.083032
BMP-A-Discharge             1.125000   2.129848
BMP-A-Discharge             1.166667   2.175656
BMP-A-Discharge             1.208333   2.220520
BMP-A-Discharge             1.250000   2.264495
BMP-A-Discharge             1.291667   2.307632
BMP-A-Discharge             1.333333   2.349977
BMP-A-Discharge             1.375000   2.391573
BMP-A-Discharge             1.416667   2.432457
BMP-A-Discharge             1.458333   2.472666
BMP-A-Discharge             1.500000   2.512231
BMP-A-Discharge             1.541667   2.551183
BMP-A-Discharge             1.583333   2.589549
BMP-A-Discharge             1.625000   2.627354
BMP-A-Discharge             1.666667   3.663858
BMP-A-Discharge             1.708333   4.114509
BMP-A-Discharge             1.750000   4.468364
BMP-A-Discharge             1.791667   4.771896
BMP-A-Discharge             1.833333   5.043115
BMP-A-Discharge             2.083333   5.246414
BMP-A-Discharge             2.125000   5.492236
BMP-A-Discharge             2.166667   5.720567
BMP-A-Discharge             2.208333   5.934988
BMP-A-Discharge             2.250000   6.137991
BMP-A-Discharge             2.291667   6.753248
```

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BMP-A-Discharge             2.333333   7.709753
BMP-A-Discharge             2.375000   8.886604
BMP-A-Discharge             2.416667   10.241126
BMP-A-Discharge             2.458333   11.748854
BMP-A-Discharge             2.500000   13.393386
BMP-A-Discharge             2.541667   15.162740
BMP-A-Discharge             2.583333   17.047666
BMP-A-Discharge             2.625000   19.040745
BMP-A-Discharge             2.666667   21.135850
BMP-A-Discharge             2.708333   23.327812
BMP-A-Discharge             2.750000   25.612191
BMP-A-Discharge             2.791667   27.985119
BMP-A-Discharge             2.833333   30.443187
BMP-A-Discharge             2.875000   32.983359
BMP-A-Discharge             2.916667   35.602907
BMP-A-Discharge             2.958333   38.299367
BMP-A-Discharge             3.000000   41.070491
BMP-A-Discharge             3.041667   43.914226
BMP-A-Discharge             3.083333   46.828678
BMP-A-Discharge             3.125000   49.812098
BMP-A-Discharge             3.166667   52.862865
BMP-A-Discharge             3.208333   55.979466
BMP-A-Discharge             3.250000   59.160488
BMP-A-Discharge             3.291667   62.404608
BMP-A-Discharge             3.333333   65.710582
BMP-A-Discharge             3.375000   69.077237
BMP-A-Discharge             3.416667   72.503466
BMP-A-Discharge             3.458333   75.988220
BMP-A-Discharge             3.500000   79.530507
;
Pipe-Det-to-bmp-A Rating     0.0000000  0.0000000
Pipe-Det-to-bmp-A            0.0416670  0.0219720
Pipe-Det-to-bmp-A            0.0833330  0.0621450
Pipe-Det-to-bmp-A            0.1250000  0.1141700
Pipe-Det-to-bmp-A            0.1666700  0.1757700
Pipe-Det-to-bmp-A            0.2083300  0.2456500
Pipe-Det-to-bmp-A            0.2500000  0.3229200
Pipe-Det-to-bmp-A            0.2916700  0.4069200
Pipe-Det-to-bmp-A            0.3333300  0.4971600
Pipe-Det-to-bmp-A            0.3750000  0.5932400
Pipe-Det-to-bmp-A            0.4166700  0.6948100
Pipe-Det-to-bmp-A            0.4583300  0.8015900
Pipe-Det-to-bmp-A            0.5000000  0.9133500
Pipe-Det-to-bmp-A            0.5833300  1.1509000
Pipe-Det-to-bmp-A            0.6250000  1.2764000
Pipe-Det-to-bmp-A            0.6666700  1.4062001
Pipe-Det-to-bmp-A            0.7083300  1.5401000
Pipe-Det-to-bmp-A            0.7500000  1.6779000
Pipe-Det-to-bmp-A            0.7916700  1.8197000
Pipe-Det-to-bmp-A            0.8333300  1.9651999
Pipe-Det-to-bmp-A            0.8750000  2.1143999
Pipe-Det-to-bmp-A            0.9166700  2.2672000
```

255	Pipe-Det-to-bmp-A	0.9583300	2.4236000
256	Pipe-Det-to-bmp-A	1.0000000	2.5833001
257	Pipe-Det-to-bmp-A	1.0417000	2.7465000
258	Pipe-Det-to-bmp-A	1.0833000	2.9129000
259	Pipe-Det-to-bmp-A	1.1250000	3.0825000
260	Pipe-Det-to-bmp-A	1.1667000	3.2553999
261	Pipe-Det-to-bmp-A	1.2083000	3.4312999
262	Pipe-Det-to-bmp-A	1.2500000	3.5328000
263	Pipe-Det-to-bmp-A	1.2917000	3.6296000
264	Pipe-Det-to-bmp-A	1.3333000	3.7239001
265	Pipe-Det-to-bmp-A	1.3750000	3.8159001
266	Pipe-Det-to-bmp-A	1.4167000	3.9057000
267	Pipe-Det-to-bmp-A	1.4583000	3.9935000
268	Pipe-Det-to-bmp-A	1.5000000	4.0794001
269	Pipe-Det-to-bmp-A	1.5417000	4.1634998
270	Pipe-Det-to-bmp-A	1.5833000	4.2459002
271	Pipe-Det-to-bmp-A	1.6250000	4.3267999
272	Pipe-Det-to-bmp-A	1.6667000	4.4061999
273	Pipe-Det-to-bmp-A	1.7083000	4.4842000
274	Pipe-Det-to-bmp-A	1.7500000	4.5609002
275	Pipe-Det-to-bmp-A	1.7917000	4.6362000
276	Pipe-Det-to-bmp-A	1.8333000	4.7104001
277	Pipe-Det-to-bmp-A	1.8750000	4.7835002
278	Pipe-Det-to-bmp-A	1.9167000	4.8554001
279	Pipe-Det-to-bmp-A	1.9583000	4.9263000
280	Pipe-Det-to-bmp-A	2.0000000	4.9962001
281	Pipe-Det-to-bmp-A	2.0416999	5.0651002
282	Pipe-Det-to-bmp-A	2.0833001	5.1331000
283	Pipe-Det-to-bmp-A	2.1250000	5.2002001
284	Pipe-Det-to-bmp-A	2.1666999	5.2663999
285	Pipe-Det-to-bmp-A	2.2083001	5.3318000
286	Pipe-Det-to-bmp-A	2.2500000	5.3965001
287	Pipe-Det-to-bmp-A	2.2916999	5.4603000
288	Pipe-Det-to-bmp-A	2.3333001	5.5235000
289	Pipe-Det-to-bmp-A	2.3750000	5.5858998
290	Pipe-Det-to-bmp-A	2.4166999	5.6476002
291	Pipe-Det-to-bmp-A	2.4583001	5.7087002
292	Pipe-Det-to-bmp-A	2.5000000	5.7691002
293	Pipe-Det-to-bmp-A	2.5416999	6.1452999
294	Pipe-Det-to-bmp-A	2.5833001	6.7828999
295	Pipe-Det-to-bmp-A	2.6250000	7.5907001
296	Pipe-Det-to-bmp-A	2.6666999	8.5358000
297	Pipe-Det-to-bmp-A	2.7083001	9.5994997
298	Pipe-Det-to-bmp-A	2.7500000	10.7690001
299	Pipe-Det-to-bmp-A	2.7916999	12.0349998
300	Pipe-Det-to-bmp-A	2.8333001	13.3900003
301	Pipe-Det-to-bmp-A	2.8750000	14.8290005
302	Pipe-Det-to-bmp-A	2.9166999	16.3470001
303	Pipe-Det-to-bmp-A	2.9583001	17.9389992
304	Pipe-Det-to-bmp-A	3.0000000	19.6019993
305	Pipe-Det-to-bmp-A	3.0416999	21.3339996
306	Pipe-Det-to-bmp-A	3.0833001	23.1299992

307	Pipe-Det-to-bmp-A	3.1250000	24.9899998
308	Pipe-Det-to-bmp-A	3.1666999	26.9109993
309	Pipe-Det-to-bmp-A	3.2083001	28.8899994
310	Pipe-Det-to-bmp-A	3.2500000	30.9270000
311	Pipe-Det-to-bmp-A	3.2916999	33.0190010
312	Pipe-Det-to-bmp-A	3.3333001	35.1660004
313	Pipe-Det-to-bmp-A	3.3750000	37.3650017
314	Pipe-Det-to-bmp-A	3.4166999	39.6150017
315	Pipe-Det-to-bmp-A	3.4583001	41.9160004
316	Pipe-Det-to-bmp-A	3.5000000	44.2659988
317	Pipe-Det-to-bmp-A	3.5416999	46.6640015
318	Pipe-Det-to-bmp-A	3.5833001	49.1090012
319	Pipe-Det-to-bmp-A	3.6250000	51.5999985
320	Pipe-Det-to-bmp-A	3.6666999	54.1370010
321	Pipe-Det-to-bmp-A	3.7083001	56.7179985
322	Pipe-Det-to-bmp-A	3.7500000	59.3429985
323	Pipe-Det-to-bmp-A	3.7916999	62.0110016
324	Pipe-Det-to-bmp-A	3.8333001	64.7210007
325	Pipe-Det-to-bmp-A	3.8750000	67.4729996
326	Pipe-Det-to-bmp-A	3.9166999	70.2659988
327	Pipe-Det-to-bmp-A	3.9583001	73.0989990
328	Pipe-Det-to-bmp-A	4.0000000	75.9729996
329	Pipe-Det-to-bmp-A	4.0416999	78.8850021
330	Pipe-Det-to-bmp-A	4.0833001	81.8359985
331	Pipe-Det-to-bmp-A	4.1250000	84.8259964
332	Pipe-Det-to-bmp-A	4.1666999	87.8529968
333	Pipe-Det-to-bmp-A	4.2083001	90.9179993
334	Pipe-Det-to-bmp-A	4.2500000	94.0189972
335	Pipe-Det-to-bmp-A	4.2916999	97.1569977
336	Pipe-Det-to-bmp-A	4.3333001	100.3300018
337	Pipe-Det-to-bmp-A	4.3750000	103.5400009
338	Pipe-Det-to-bmp-A	4.4166999	106.7799988
339	Pipe-Det-to-bmp-A	4.4583001	110.0599976
340	Pipe-Det-to-bmp-A	4.5000000	113.3799973
341	Pipe-Det-to-bmp-A	4.5416999	116.7200012
342	Pipe-Det-to-bmp-A	4.5833001	120.0999985
343	Pipe-Det-to-bmp-A	4.6250000	123.5199966
344	Pipe-Det-to-bmp-A	4.6666999	126.9700012
345	Pipe-Det-to-bmp-A	4.7083001	130.4499969
346	Pipe-Det-to-bmp-A	4.7500000	133.9600067
347	Pipe-Det-to-bmp-A	4.7916999	137.5000000
348	Pipe-Det-to-bmp-A	4.8333001	141.0800018
349	Pipe-Det-to-bmp-A	4.8750000	144.6900024
350	Pipe-Det-to-bmp-A	4.9166999	148.3300018
351	Pipe-Det-to-bmp-A	4.9583001	152.0000000
352	Pipe-Det-to-bmp-A	5.0000000	155.6999969
353	Pipe-Det-to-bmp-A	5.0416999	159.4299927
354	Pipe-Det-to-bmp-A	5.0833001	163.1900024
355	Pipe-Det-to-bmp-A	5.1250000	166.9799957
356	Pipe-Det-to-bmp-A	5.1666999	170.8099976
357	Pipe-Det-to-bmp-A	5.2083001	174.6600037
358	Pipe-Det-to-bmp-A	5.2500000	178.5399933

359	Pipe-Det-to-bmp-A	5.2916999	182.4499969
360	Pipe-Det-to-bmp-A	5.3333001	186.3800049
361	Pipe-Det-to-bmp-A	5.3750000	190.3500061
362	Pipe-Det-to-bmp-A	5.4166999	194.3399963
363	Pipe-Det-to-bmp-A	5.4583001	198.3699951
364	Pipe-Det-to-bmp-A	5.5000000	202.4199982
365	Pipe-Det-to-bmp-A	5.5416999	206.5000000
366	Pipe-Det-to-bmp-A	5.5833001	210.6000061
367	Pipe-Det-to-bmp-A	5.6250000	214.7400055
368	Pipe-Det-to-bmp-A	5.6666999	218.8999939
369	Pipe-Det-to-bmp-A	5.7083001	223.0899963
370	Pipe-Det-to-bmp-A	5.7500000	227.3000031
371	Pipe-Det-to-bmp-A	5.7916999	231.5399933
372	Pipe-Det-to-bmp-A	5.8333001	235.8099976
373	Pipe-Det-to-bmp-A	5.8750000	240.1100006
374	Pipe-Det-to-bmp-A	5.9166999	244.4299927
375	Pipe-Det-to-bmp-A	5.9583001	248.7799988
376	Pipe-Det-to-bmp-A	6.0000000	253.1499939
377	Pipe-Det-to-bmp-A	6.0416999	257.5499878
378	Pipe-Det-to-bmp-A	6.0833001	261.9700012
379	Pipe-Det-to-bmp-A	6.1250000	266.4200134
380	Pipe-Det-to-bmp-A	6.1666999	270.8999939
381	Pipe-Det-to-bmp-A	6.2083001	275.3999939
382	Pipe-Det-to-bmp-A	6.2500000	279.9200134
383	Pipe-Det-to-bmp-A	6.2916999	284.4700012
384	Pipe-Det-to-bmp-A	6.3333001	289.0499878
385	Pipe-Det-to-bmp-A	6.3750000	293.6499939
386	Pipe-Det-to-bmp-A	6.4166999	298.2699890
387	Pipe-Det-to-bmp-A	6.4583001	302.9200134
388	Pipe-Det-to-bmp-A	6.5000000	307.5899963
389	Pipe-Det-to-bmp-A	6.5416999	312.2900085
390	Pipe-Det-to-bmp-A	6.5833001	317.0100098
391	Pipe-Det-to-bmp-A	6.6250000	321.7500000
392	Pipe-Det-to-bmp-A	6.6666999	326.5199890
393	Pipe-Det-to-bmp-A	6.7083001	331.3099976
394	Pipe-Det-to-bmp-A	6.7500000	336.1300049
395	Pipe-Det-to-bmp-A	6.7916999	340.9700012
396	Pipe-Det-to-bmp-A	6.8333001	345.8299866
397	Pipe-Det-to-bmp-A	6.8750000	350.7200012
398	Pipe-Det-to-bmp-A	6.9166999	355.6199951
399	Pipe-Det-to-bmp-A	6.9583001	360.5599976
400	Pipe-Det-to-bmp-A	7.0000000	365.5100098
401	Pipe-Det-to-bmp-A	7.0416999	370.4899902
402	Pipe-Det-to-bmp-A	7.0833001	375.4899902
403	Pipe-Det-to-bmp-A	7.1250000	380.5100098
404	Pipe-Det-to-bmp-A	7.1666999	385.5499878
405	Pipe-Det-to-bmp-A	7.2083001	390.6199951
406	Pipe-Det-to-bmp-A	7.2500000	395.7099915
407	Pipe-Det-to-bmp-A	7.2916999	400.8200073
408	Pipe-Det-to-bmp-A	7.3333001	405.9500122
409	Pipe-Det-to-bmp-A	7.3750000	411.1099854
410	Pipe-Det-to-bmp-A	7.4166999	416.2799988

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Pipe-Det-to-bmp-A            7.4699998  421.4800110
;
Pipe-Det-Sto-2   Rating     0.000000   0.000000
Pipe-Det-Sto-2              0.041667   0.003190
Pipe-Det-Sto-2              0.083333   0.043043
Pipe-Det-Sto-2              0.166667   0.151509
Pipe-Det-Sto-2              0.208333   0.184755
Pipe-Det-Sto-2              0.250000   0.212855
Pipe-Det-Sto-2              0.291667   0.237649
Pipe-Det-Sto-2              0.333333   0.260087
Pipe-Det-Sto-2              0.375000   0.280735
Pipe-Det-Sto-2              0.416667   0.299965
Pipe-Det-Sto-2              0.458333   0.318033
Pipe-Det-Sto-2              0.500000   0.335128
Pipe-Det-Sto-2              0.541667   0.351393
Pipe-Det-Sto-2              0.583333   0.366936
Pipe-Det-Sto-2              0.625000   0.381848
Pipe-Det-Sto-2              0.666667   0.396198
Pipe-Det-Sto-2              0.708333   0.410047
Pipe-Det-Sto-2              0.750000   0.423442
Pipe-Det-Sto-2              0.791667   0.436427
Pipe-Det-Sto-2              0.833333   0.449037
Pipe-Det-Sto-2              0.875000   0.461301
Pipe-Det-Sto-2              0.916667   0.473248
Pipe-Det-Sto-2              0.958333   0.484901
Pipe-Det-Sto-2              1.000000   0.496280
Pipe-Det-Sto-2              1.041667   0.507404
Pipe-Det-Sto-2              1.083333   0.518289
Pipe-Det-Sto-2              1.125000   0.528951
Pipe-Det-Sto-2              1.166667   0.539401
Pipe-Det-Sto-2              1.208333   0.549653
Pipe-Det-Sto-2              1.250000   0.559717
Pipe-Det-Sto-2              1.291667   0.569604
Pipe-Det-Sto-2              1.333333   0.579321
Pipe-Det-Sto-2              1.375000   0.588879
Pipe-Det-Sto-2              1.416667   0.598283
Pipe-Det-Sto-2              1.458333   0.607542
Pipe-Det-Sto-2              1.500000   0.616662
Pipe-Det-Sto-2              1.541667   0.678382
Pipe-Det-Sto-2              1.583333   0.783658
Pipe-Det-Sto-2              1.625000   0.917251
Pipe-Det-Sto-2              1.666667   1.073725
Pipe-Det-Sto-2              1.708333   1.249939
Pipe-Det-Sto-2              1.750000   1.443776
Pipe-Det-Sto-2              1.791667   1.653683
Pipe-Det-Sto-2              1.833333   1.878458
Pipe-Det-Sto-2              1.875000   2.117132
Pipe-Det-Sto-2              1.916667   2.368905
Pipe-Det-Sto-2              1.958333   2.633103
Pipe-Det-Sto-2              2.000000   2.909143
Pipe-Det-Sto-2              2.041667   3.512914
Pipe-Det-Sto-2              2.083333   4.389684
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463   Pipe-Det-Sto-2              2.125000   5.447577
464   Pipe-Det-Sto-2              2.166667   6.653594
465   Pipe-Det-Sto-2              2.208333   7.988546
466   Pipe-Det-Sto-2              2.250000   9.439408
467   Pipe-Det-Sto-2              2.291667   10.996569
468   Pipe-Det-Sto-2              2.333333   12.652540
469   Pipe-Det-Sto-2              2.375000   14.401268
470   Pipe-Det-Sto-2              2.416667   16.237722
471   Pipe-Det-Sto-2              2.458333   18.157632
472   Pipe-Det-Sto-2              2.500000   20.157312
473   Pipe-Det-Sto-2              2.541667   22.233537
474   Pipe-Det-Sto-2              2.583333   24.383453
475   Pipe-Det-Sto-2              2.625000   26.604508
476   Pipe-Det-Sto-2              2.666667   28.894406
477   Pipe-Det-Sto-2              2.708333   31.251063
478   Pipe-Det-Sto-2              2.750000   33.672577
479   Pipe-Det-Sto-2              2.791667   36.157202
480   Pipe-Det-Sto-2              2.833333   38.703328
481   Pipe-Det-Sto-2              2.875000   41.309466
482   Pipe-Det-Sto-2              2.916667   43.974230
483   Pipe-Det-Sto-2              2.958333   46.696328
484   Pipe-Det-Sto-2              3.000000   49.474551
485   Pipe-Det-Sto-2              3.041667   52.307763
486   Pipe-Det-Sto-2              3.083333   55.194896
487   Pipe-Det-Sto-2              3.125000   58.134944
488   Pipe-Det-Sto-2              3.166667   61.126954
489   Pipe-Det-Sto-2              3.208333   64.170024
490   Pipe-Det-Sto-2              3.250000   67.263298
491   Pipe-Det-Sto-2              3.291667   70.405962
492   Pipe-Det-Sto-2              3.333333   73.597240
493   Pipe-Det-Sto-2              3.375000   76.836393
494   Pipe-Det-Sto-2              3.416667   80.122714
495   Pipe-Det-Sto-2              3.458333   83.455528
496   Pipe-Det-Sto-2              3.500000   86.834186
497   Pipe-Det-Sto-2              3.541667   90.258068
498   Pipe-Det-Sto-2              3.583333   93.726578
499   Pipe-Det-Sto-2              3.625000   97.239144
500   Pipe-Det-Sto-2              3.666667   100.795212
501   Pipe-Det-Sto-2              3.708333   104.394253
502   Pipe-Det-Sto-2              3.750000   108.035755
503   Pipe-Det-Sto-2              3.791667   111.719223
504   Pipe-Det-Sto-2              3.833333   115.444181
505   Pipe-Det-Sto-2              3.875000   119.210168
506   Pipe-Det-Sto-2              3.916667   123.016738
507   Pipe-Det-Sto-2              3.958333   126.863459
508   Pipe-Det-Sto-2              4.000000   130.749914
509   Pipe-Det-Sto-2              4.041666667 134.6756965
510   ;
511   sto-1           Storage     0.00       0.0000000
512   sto-1                       0.75       166.6666718
513   sto-1                       1.49       445.9459534
514   sto-1                       2.24       1124.0000000
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sto-1                          2.99       2420.0000000
sto-1                          3.74       3878.6667480
sto-1                          4.48       5408.1079102
sto-1                          5.23       6632.0000000
sto-1                          5.98       7316.0000000
sto-1                          6.72       7691.8920898
sto-1                          7.47       7756.0000000
;
sto-2              Storage     0.00       0.000000
sto-2                          0.41       50.000000
sto-2                          0.81       256.500000
sto-2                          1.22       672.195129
sto-2                          1.63       1233.170776
sto-2                          2.03       1894.000000
sto-2                          2.44       2462.438965
sto-2                          2.85       3020.975586
sto-2                          3.26       3440.487793
sto-2                          3.66       3531.500000
sto-2                          4.07       3690.487793
;
Sto-BMP-A          Storage     0.00       2313.31
Sto-BMP-A                      0.10       2352.23
Sto-BMP-A                      0.20       2391.40
Sto-BMP-A                      0.30       2430.82
Sto-BMP-A                      0.40       2470.49
Sto-BMP-A                      0.50       2510.41
Sto-BMP-A                      0.60       2550.59
Sto-BMP-A                      0.70       2591.01
Sto-BMP-A                      0.80       2631.69
Sto-BMP-A                      0.90       2672.61
Sto-BMP-A                      1.00       2713.79
Sto-BMP-A                      1.10       2755.22
Sto-BMP-A                      1.20       2796.90
Sto-BMP-A                      1.30       2838.83
Sto-BMP-A                      1.40       2881.02
Sto-BMP-A                      1.50       2923.45
Sto-BMP-A                      1.60       2966.14
Sto-BMP-A                      1.70       3009.07
Sto-BMP-A                      1.80       3052.26
Sto-BMP-A                      1.90       3095.70
Sto-BMP-A                      2.00       3139.39
Sto-BMP-A                      2.10       3183.33
Sto-BMP-A                      2.20       3227.52
Sto-BMP-A                      2.30       3271.97
Sto-BMP-A                      2.40       3316.66
Sto-BMP-A                      2.50       3361.61
Sto-BMP-A                      2.60       3406.80
Sto-BMP-A                      2.70       3452.25
Sto-BMP-A                      2.80       3497.95
Sto-BMP-A                      2.90       3543.90
Sto-BMP-A                      3.00       3590.11
Sto-BMP-A                      3.10       3636.56
```

```
Sto-BMP-A                  3.20       3683.26
Sto-BMP-A                  3.30       3730.22
Sto-BMP-A                  3.40       3777.43
Sto-BMP-A                  3.50       3824.88
;
BMP-A            Storage   0.00       1954.36
BMP-A                      0.04       1968.44
BMP-A                      0.14       2003.81
BMP-A                      0.24       2039.41
BMP-A                      0.34       2075.26
BMP-A                      0.44       2111.34
BMP-A                      0.54       2147.67
BMP-A                      0.64       2184.24
BMP-A                      0.74       2221.06
BMP-A                      0.84       2258.11
BMP-A                      0.94       2295.40
BMP-A                      1.04       2332.94
BMP-A                      1.14       2370.72
BMP-A                      1.24       2408.74
BMP-A                      1.34       2447.00
BMP-A                      1.44       2485.50
BMP-A                      1.54       2524.25
BMP-A                      1.64       2563.24
BMP-A                      1.74       2602.46
BMP-A                      1.84       2641.93
BMP-A                      1.94       2681.64
BMP-A                      2.04       2721.60
BMP-A                      2.14       2761.79
BMP-A                      2.24       2802.22
BMP-A                      2.34       2842.90
BMP-A                      2.44       2883.82
BMP-A                      2.54       2924.98
BMP-A                      2.64       2966.38
BMP-A                      2.74       3008.02
BMP-A                      2.84       3049.91
BMP-A                      2.94       3092.04
BMP-A                      3.04       3134.40
BMP-A                      3.14       3177.01
BMP-A                      3.24       3219.86
BMP-A                      3.34       3262.96
BMP-A                      3.44       3306.29
BMP-A                      3.54       3349.86

[TIMESERIES]
;;Name            Date       Time       Value
;;--------------- ---------- ---------- ----------
Escondido        FILE "R:\_Storm\HydMOD\Rain gauge Data\Escondido\Escondido.prn"

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

```
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -2500.000 0.000 12500.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
poc-1            8178.677           2388.944
dischargepoint   1505.429           3297.137
sto-1            3775.913           4698.914
Sto-BMP-A        1960.591           3852.217

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
4                3832.512           5901.478
4                2837.438           6275.862
5                2453.202           2955.665
5                3458.128           2413.793

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
dma-1            5157.947           4689.042
dma-2            6016.782           4175.716
dma-3            3341.560           3297.137
dma-21           5389.931           2613.524
dma-5            4002.962           3494.571
dma-6            5352.912           3779.615
dma-7            7260.612           3395.854
dma-8            7724.580           3889.437
bmp-a            3034.483           4492.457
bmp-b            5236.920           2815.893
dma-15           6461.007           3810.464
dma-16           7477.789           4007.897
dma-19           5799.605           3139.191
dma-20           3785.785           2823.297
dma-4            5286.278           3013.327

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Escondido        1811.451           7907.206


[BACKDROP]
FILE       "22027 POST HYDMOD.jpg"
DIMENSIONS -2500.000 0.000 12500.000 10000.000
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)
-------------------------------------------------------------


***************
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 ........... 09/24/1964 00:00:00
Ending Date ............. 05/23/2008 06:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ........ 00:15:00
Wet Time Step ........... 00:15:00
Dry Time Step ........... 00:00:00
Routing Time Step ....... 15.00 sec


*************************        Volume         Depth
Runoff Quantity Continuity    acre-feet        inches
*************************    ---------       -------
Initial LID Storage .....         0.016         0.031
Total Precipitation .....       327.352       610.960
Outfall Runon ...........        46.007        85.866
Evaporation Loss ........        38.455        71.771
Infiltration Loss .......       171.329       319.762
Surface Runoff ..........        81.969       152.985
LID Drainage ............        14.468        27.003
Final Storage ...........        69.972       130.593
Continuity Error (%) ....        -0.755


*************************        Volume        Volume
Flow Routing Continuity       acre-feet     10^6 gal
*************************    ---------     ---------
Dry Weather Inflow ......         0.000         0.000
Wet Weather Inflow ......        96.438        31.426
Groundwater Inflow ......         0.000         0.000
RDII Inflow .............         0.000         0.000
External Inflow .........         0.000         0.000
External Outflow ........        96.324        31.389
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 (%) 0.118

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

****
Routing Time Step Summary
****
Minimum Time Step : 15.00 sec
Average Time Step : 15.00 sec
Maximum Time Step : 15.00 sec
% of Time in Steady State : 0.00
Average Iterations per Step : 1.00
% of Steps 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 in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
dma-1	610.96	0.00	91.81	0.00	524.10	0.00	524.10	15.03	0.93	0.858
dma-2	610.96	0.00	84.54	50.56	459.68	20.64	480.32	20.72	1.36	0.786
dma-3	610.96	0.00	22.30	420.31	0.00	173.90	173.90	0.73	0.13	0.285
dma-21	610.96	0.00	34.16	337.08	108.46	137.54	246.00	0.99	0.12	0.403
dma-5	610.96	0.00	5.97	548.10	0.00	59.40	59.40	0.31	0.15	0.097
dma-6	610.96	0.00	6.39	561.75	0.00	43.66	43.66	0.54	0.30	0.071

```
dma-7                   610.96       0.00      17.31     454.40       0.00     147.36     147.36        3.78
0.77   0.241
dma-8                   610.96       0.00      17.35     455.04       0.00     145.52     145.52        2.48
0.51   0.238
bmp-a                   610.96   15846.54    1275.42    4986.53       0.00       0.00      81.69        0.18
0.02   0.005
bmp-b                   610.96    3896.88     840.93       0.00       0.00       0.00    3666.69        5.06
0.36   0.813
dma-15                  610.96       0.00       5.92     547.32       0.00      60.72      60.72        0.41
0.19   0.099
dma-16                  610.96       0.00       5.96     548.28       0.00      59.19      59.19        0.15
0.07   0.097
dma-19                  610.96       0.00      22.06     419.52       0.00     175.73     175.73        0.79
0.14   0.288
dma-20                  610.96       0.00      17.48     456.22       0.00     142.62     142.62        0.97
0.20   0.233
dma-4                   610.96       0.00      85.64       0.00     534.60       0.00     534.60        5.38
0.33   0.875


**********************
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           %
-------------------------------------------------------------------------------------------------------------
bmp-a             bmp-a              610.96    453.43      0.00      0.00    157.53       2.10      2.10       -0.00
bmp-b             bmp-b             4507.84    840.96      0.00    382.45   3284.37       2.10      2.32       -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     0.00     0.00     0.00     0  00:00        0.00
dischargepoint       OUTFALL     0.00     0.00     0.00     0  00:00        0.00
sto-1                STORAGE     0.00     0.50   704.46  15676  07:00        0.50
Sto-BMP-A            STORAGE     0.00     0.00     0.00     0  00:00        0.00


******************
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-1	OUTFALL	2.95	2.95	10332 17:00	16.4	16.4	0.000
dischargepoint	OUTFALL	0.00	0.93	15676 07:00	0	15	0.000
sto-1	STORAGE	0.93	0.93	15676 07:00	15	15	0.248
Sto-BMP-A	STORAGE	0.00	0.00	0 00:00	0	0	0.000 gal

****
Node Flooding Summary
****

No nodes were flooded.

****
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
sto-1	0.000	0	0	0	0.028	0	15676 07:00	0.93
Sto-BMP-A	0.000	0	0	0	0.000	0	0 00:00	0.00

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
poc-1	8.86	0.02	2.95	16.395
dischargepoint	2.72	0.05	0.93	14.991
System	5.79	0.07	3.84	31.386

****
Link Flow Summary
****

	Maximum	Time of Max	Maximum	Max/	Max/

```
                                    |Flow|   Occurrence   |Veloc|    Full    Full
Link                 Type             CFS  days hr:min    ft/sec    Flow   Depth
--------------------------------------------------------------------------------
4                    DUMMY           0.93  15676  07:00
5                    DUMMY           0.00      0  00:00


*************************
Conduit Surcharge Summary
*************************

No conduits were surcharged.


Analysis begun on:  Mon Feb 13 13:34:17 2023
Analysis ended on:  Mon Feb 13 13:36:05 2023
Total elapsed time: 00:01:48
```

STATISTICS ANALYSIS OF THE SWMM FILES FOR:

DISCHARGE NODE: POC-1

ANALYSIS DETAILS

Stream Susceptibility to Channel Erosion: High
Low Flow Threshold = (0.1)Q2 = (0.1)3.020 = Qlf = 0.3020 (cfs)
Flow Control Upper Limit = Q10 = 4.240 (cfs)
Assumed time between storms (hours): 24

PRE-DEVELOPMENT SWMM FILE

SWMM file name: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 pre hydromod.out
SWMM file time stamp: 9/14/2022 3:04:49 PM
Selected Node to Analyze: poc-1

POST-DEVELOPMENT MITIGATED SWMM FILE

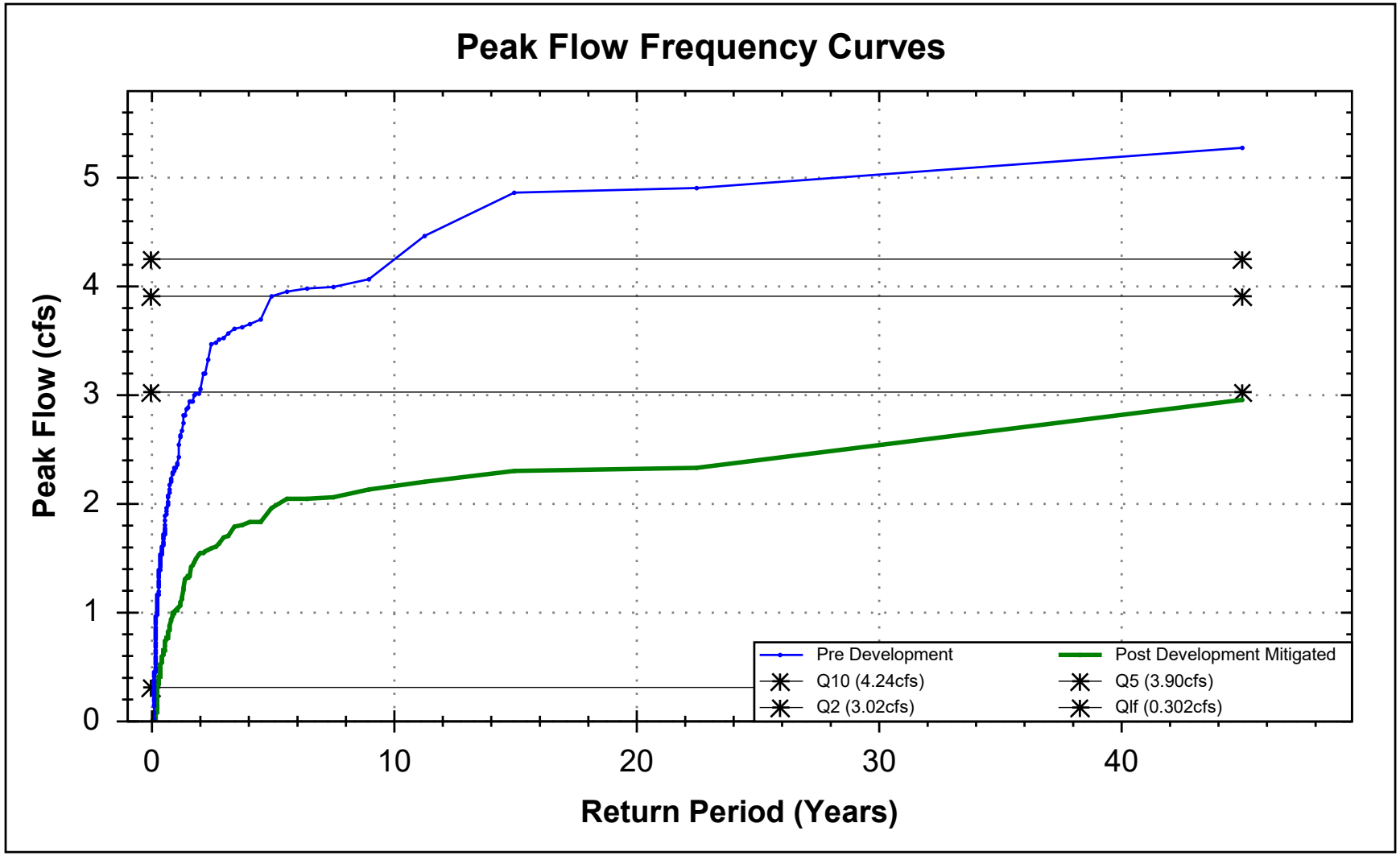
SWMM file name: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 post hydromod.out
SWMM file time stamp: 2/9/2023 10:24:07 AM
Selected Node to Analyze: poc-1

MITIGATED CONDITIONS RESULTS

For the Mitigated Conditions:
Peak Flow Conditions PASS
Flow Duration Conditions PASS

The Mitigated Conditions peak flow frequency curve is composed of 376 points. Of the points, 0 point(s) are above the flow control upper limit (Q10 = 4.24 (cfs)), 213 point(s) are below the low flow threshold value (Qlf = 0.302 (cfs)). Of the points within the flow control range (Qlf to Q10), 163 point(s) have a lower peak flow rate than pre-development conditions. These points all pass. There are no points that failed, therefore the peak flow requirements have been met.

The Mitigated Conditions flow duration curve is composed of 100 flow bins (points). Each point represents the number of hours where the discharge was equal to or greater than the discharge value, but less than the next greater discharge value. Within the flow control range, comparing the post-development flow duration curve to the pre-development flow duration curve, 100 post-development curve point(s) have a lower flow duration than pre-development conditions. These points all pass. There are no points that failed, therefore the flow duration requirements have been met.


Peak Flow Frequency Curves
Peak Flow (cfs)
0
1
2
3
4
5
0
10
20
30
40
Return Period (Years)
Pre Development
Post Development Mitigated
Q10 (4.24cfs)
Q5 (3.90cfs)
Q2 (3.02cfs)
Qlf (0.302cfs)

Compare Post-Development Curve to Pre-Development Curve
Flow Control Upper Limit: 4.24 (cfs)
Flow Control Lower Limit: 0.302 (cfs)

post-development SWMM file: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 post hydromod.out
post-development time stamp: 2/9/2023 10:24:07 AM
Compared to:
pre-development SWMM file: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 pre hydromod.out
pre-development time stamp: 9/14/2022 3:04:49 PM

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
0	45.00	2.95	5.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
1	22.50	2.32	4.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
2	15.00	2.29	4.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
3	11.25	2.20	4.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
4	9.00	2.13	4.06	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
5	7.50	2.05	3.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
6	6.43	2.04	3.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
7	5.63	2.04	3.94	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
8	5.00	1.96	3.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
9	4.50	1.82	3.69	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
10	4.09	1.82	3.65	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
11	3.75	1.80	3.62	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
12	3.46	1.78	3.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
13	3.21	1.70	3.56	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
14	3.00	1.69	3.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
15	2.81	1.63	3.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
16	2.65	1.60	3.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
17	2.50	1.58	3.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
18	2.37	1.57	3.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
19	2.25	1.56	3.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
20	2.14	1.54	3.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
21	2.05	1.54	3.05	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
22	1.96	1.52	3.00	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
23	1.88	1.49	3.00	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
24	1.80	1.46	2.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
25	1.73	1.43	2.94	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
26	1.67	1.41	2.94	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
27	1.61	1.33	2.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
28	1.55	1.33	2.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
29	1.50	1.32	2.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
30	1.45	1.31	2.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
31	1.41	1.30	2.81	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
32	1.36	1.22	2.81	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
33	1.32	1.20	2.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
34	1.29	1.13	2.67	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
35	1.25	1.11	2.66	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
36	1.22	1.09	2.62	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
37	1.18	1.06	2.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
38	1.15	1.05	2.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
39	1.13	1.04	2.42	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
40	1.10	1.03	2.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
41	1.07	1.02	2.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
42	1.05	1.01	2.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
43	1.02	1.01	2.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
44	1.00	1.01	2.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
45	0.98	1.00	2.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
46	0.96	0.99	2.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
47	0.94	0.99	2.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
48	0.92	0.98	2.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
49	0.90	0.97	2.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
50	0.88	0.97	2.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
51	0.87	0.96	2.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
52	0.85	0.93	2.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
53	0.83	0.92	2.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
54	0.82	0.91	2.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
55	0.80	0.91	2.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
56	0.79	0.87	2.17	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
57	0.78	0.86	2.17	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
58	0.76	0.85	2.17	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
59	0.75	0.84	2.12	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
60	0.74	0.83	2.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
61	0.73	0.81	2.07	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
62	0.71	0.80	2.06	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
63	0.70	0.80	2.05	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
64	0.69	0.79	2.01	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
65	0.68	0.78	1.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
66	0.67	0.76	1.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
67	0.66	0.76	1.96	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
68	0.65	0.75	1.96	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
69	0.64	0.75	1.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
70	0.63	0.74	1.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
71	0.63	0.74	1.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
72	0.62	0.74	1.89	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
73	0.61	0.74	1.89	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
74	0.60	0.73	1.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
75	0.59	0.73	1.84	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
76	0.58	0.71	1.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
77	0.58	0.69	1.77	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
78	0.57	0.69	1.76	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
79	0.56	0.65	1.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
80	0.56	0.65	1.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
81	0.55	0.64	1.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
82	0.54	0.64	1.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
83	0.54	0.64	1.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
84	0.53	0.63	1.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
85	0.52	0.62	1.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
86	0.52	0.62	1.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
87	0.51	0.61	1.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
88	0.51	0.61	1.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
89	0.50	0.61	1.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
90	0.50	0.61	1.67	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
91	0.49	0.60	1.64	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
92	0.48	0.60	1.63	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
93	0.48	0.60	1.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
94	0.47	0.60	1.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
95	0.47	0.59	1.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
96	0.46	0.58	1.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
97	0.46	0.58	1.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
98	0.46	0.57	1.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
99	0.45	0.57	1.58	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
100	0.45	0.56	1.58	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
101	0.44	0.56	1.57	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
102	0.44	0.56	1.56	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
103	0.43	0.56	1.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
104	0.43	0.54	1.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
105	0.43	0.54	1.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
106	0.42	0.54	1.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
107	0.42	0.53	1.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
108	0.41	0.53	1.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
109	0.41	0.52	1.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
110	0.41	0.52	1.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
111	0.40	0.50	1.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
112	0.40	0.50	1.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
113	0.40	0.50	1.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
114	0.39	0.49	1.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
115	0.39	0.48	1.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
116	0.39	0.48	1.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
117	0.38	0.48	1.48	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
118	0.38	0.48	1.48	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
119	0.38	0.46	1.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
120	0.37	0.46	1.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
121	0.37	0.44	1.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
122	0.37	0.43	1.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
123	0.36	0.42	1.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
124	0.36	0.42	1.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
125	0.36	0.42	1.43	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
126	0.35	0.41	1.42	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
127	0.35	0.41	1.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
128	0.35	0.41	1.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
129	0.35	0.41	1.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
130	0.34	0.40	1.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
131	0.34	0.40	1.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
132	0.34	0.40	1.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
133	0.34	0.40	1.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
134	0.33	0.39	1.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
135	0.33	0.39	1.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
136	0.33	0.39	1.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
137	0.33	0.39	1.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
138	0.32	0.38	1.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
139	0.32	0.38	1.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
140	0.32	0.38	1.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
141	0.32	0.38	1.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
142	0.32	0.38	1.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
143	0.31	0.38	1.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
144	0.31	0.37	1.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
145	0.31	0.37	1.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
146	0.31	0.37	1.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
147	0.30	0.37	1.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
148	0.30	0.37	1.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
149	0.30	0.36	1.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
150	0.30	0.35	1.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
151	0.30	0.35	1.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
152	0.29	0.35	1.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
153	0.29	0.35	1.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
154	0.29	0.34	1.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
155	0.29	0.34	1.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
156	0.29	0.34	1.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
157	0.29	0.34	1.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
158	0.28	0.33	1.16	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
159	0.28	0.32	1.15	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
160	0.28	0.32	1.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
161	0.28	0.32	1.13	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
162	0.28	0.31	1.11	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
163	0.27	0.30	1.11	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
164	0.27	0.30	1.10	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
165	0.27	0.29	1.10	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
166	0.27	0.29	1.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
167	0.27	0.29	1.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
168	0.27	0.29	1.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
169	0.27	0.29	1.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
170	0.26	0.28	1.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
171	0.26	0.28	1.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
172	0.26	0.26	1.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
173	0.26	0.26	1.06	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
174	0.26	0.26	1.06	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
175	0.26	0.25	1.06	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
176	0.25	0.24	1.06	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
177	0.25	0.24	1.05	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
178	0.25	0.24	1.05	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
179	0.25	0.24	1.05	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
180	0.25	0.24	1.05	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
181	0.25	0.23	1.04	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
182	0.25	0.21	1.04	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
183	0.25	0.21	1.04	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
184	0.24	0.20	1.04	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
185	0.24	0.20	1.03	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
186	0.24	0.19	1.03	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
187	0.24	0.19	1.03	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
188	0.24	0.18	1.02	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
189	0.24	0.18	1.02	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
190	0.24	0.17	1.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
191	0.23	0.15	1.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
192	0.23	0.14	1.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
193	0.23	0.14	1.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
194	0.23	0.13	1.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
195	0.23	0.13	1.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
196	0.23	0.13	1.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
197	0.23	0.12	0.99	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
198	0.23	0.12	0.99	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
199	0.23	0.12	0.99	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
200	0.22	0.11	0.98	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
201	0.22	0.08	0.98	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
202	0.22	0.08	0.98	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
203	0.22	0.07	0.98	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
204	0.22	0.07	0.98	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
205	0.22	0.07	0.97	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
206	0.22	0.07	0.96	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
207	0.22	0.06	0.96	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
208	0.22	0.06	0.96	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
209	0.21	0.06	0.96	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
210	0.21	0.06	0.96	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
211	0.21	0.06	0.96	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
212	0.21	0.06	0.95	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
213	0.21	0.05	0.94	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
214	0.21	0.04	0.94	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
215	0.21	0.04	0.93	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
216	0.21	0.04	0.93	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
217	0.21	0.04	0.93	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
218	0.21	0.04	0.92	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
219	0.21	0.03	0.92	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
220	0.20	0.03	0.92	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
221	0.20	0.03	0.91	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
222	0.20	0.03	0.91	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
223	0.20	0.03	0.91	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
224	0.20	0.03	0.90	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
225	0.20	0.03	0.90	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
226	0.20	0.03	0.89	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
227	0.20	0.03	0.89	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
228	0.20	0.02	0.89	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
229	0.20	0.02	0.89	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
230	0.19	0.02	0.88	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
231	0.19	0.02	0.88	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
232	0.19	0.02	0.86	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
233	0.19	0.02	0.85	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
234	0.19	0.01	0.83	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
235	0.19	0.01	0.83	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
236	0.19	0.01	0.83	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
237	0.19	0.01	0.81	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
238	0.19	0.01	0.80	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
239	0.19	0.01	0.79	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
240	0.18	0.01	0.78	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
241	0.18	0.01	0.77	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
242	0.18	0.01	0.76	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
243	0.18	0.01	0.76	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
244	0.18	0.01	0.76	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
245	0.18	0.01	0.75	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
246	0.18	0.01	0.74	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
247	0.18	0.01	0.74	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
248	0.18	0.01	0.72	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
249	0.18	0.01	0.71	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
250	0.17	0.01	0.71	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
251	0.17	0.01	0.70	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
252	0.17	0.01	0.70	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
253	0.17	0.01	0.69	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
254	0.17	0.01	0.69	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
255	0.17	0.01	0.68	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
256	0.17	0.01	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
257	0.17	0.01	0.63	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
258	0.17	0.01	0.62	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
259	0.17	0.01	0.59	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
260	0.16	0.01	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
261	0.16	0.01	0.55	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
262	0.16	0.01	0.53	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
263	0.16	0.01	0.52	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
264	0.16	0.01	0.51	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
265	0.16	0.01	0.49	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
266	0.16	0.01	0.49	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
267	0.16	0.01	0.47	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
268	0.16	0.01	0.46	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
269	0.16	0.01	0.45	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
270	0.15	0.01	0.45	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
271	0.15	0.01	0.44	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
272	0.15	0.01	0.42	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
273	0.15	0.01	0.41	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
274	0.15	0.01	0.41	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
275	0.15	0.01	0.40	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
276	0.15	0.01	0.38	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
277	0.15	0.01	0.37	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
278	0.15	0.01	0.37	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
279	0.15	0.01	0.36	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
280	0.14	0.01	0.35	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
281	0.14	0.01	0.35	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
282	0.14	0.01	0.34	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
283	0.14	0.01	0.31	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
284	0.14	0.01	0.30	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
285	0.14	0.01	0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
286	0.14	0.01	0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
287	0.14	0.01	0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
288	0.14	0.01	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
289	0.14	0.01	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
290	0.13	0.01	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
291	0.13	0.01	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
292	0.13	0.01	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
293	0.13	0.01	0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
294	0.13	0.01	0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
295	0.13	0.00	0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
296	0.13	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
297	0.13	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
298	0.13	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
299	0.13	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
300	0.13	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
301	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
302	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
303	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
304	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
305	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
306	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
307	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
308	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
309	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
310	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
311	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
312	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
313	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
314	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
315	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
316	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
317	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
318	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
319	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
320	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
321	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
322	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
323	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
324	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
325	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
326	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
327	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
328	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
329	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
330	0.10	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
331	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
332	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
333	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
334	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
335	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
336	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
337	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
338	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
339	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
340	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
341	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
342	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
343	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
344	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
345	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
346	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
347	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
348	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
349	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
350	0.08	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
351	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
352	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
353	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
354	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
355	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
356	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
357	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
358	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
359	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
360	0.07	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
361	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
362	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
363	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
364	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
365	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
366	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
367	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
368	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
369	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
370	0.06	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
371	0.05	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
372	0.05	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
373	0.05	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
374	0.05	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))
375	0.05	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.302 (cfs))

SWMM.out file name: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 pre hydromod.out
SWMM.out time stamp: 9/14/2022 3:04:49 PM

Q10: 4.240 (cfs)
Q5: 3.900 (cfs)
Q2: 3.020 (cfs)

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1993/01/06 16:00:00	1993/01/08 02:00:00	69	5.27	0.29%	45
2	1971/02/23 04:30:00	1971/02/23 12:00:00	16	4.9	0.57%	22.5
3	1986/02/15 01:00:00	1986/02/15 11:30:00	22	4.86	0.86%	15
4	1995/01/25 08:00:00	1995/01/25 22:30:00	30	4.46	1.14%	11.25
5	1995/01/04 14:30:00	1995/01/04 22:30:00	17	4.06	1.43%	9
6	1998/02/14 14:00:00	1998/02/15 01:30:00	24	3.99	1.71%	7.5
7	2007/08/26 06:30:00	2007/08/26 08:30:00	5	3.98	2.00%	6.43
8	1983/12/25 05:30:00	1983/12/25 20:00:00	30	3.94	2.29%	5.63
9	1967/11/19 06:30:00	1967/11/20 03:30:00	43	3.9	2.57%	5
10	1978/01/16 05:30:00	1978/01/16 13:30:00	17	3.69	2.86%	4.5
11	1988/04/21 06:00:00	1988/04/21 22:30:00	34	3.65	3.14%	4.09
12	1966/12/05 00:30:00	1966/12/06 23:30:00	95	3.62	3.43%	3.75
13	1978/03/16 22:00:00	1978/03/17 17:30:00	40	3.6	3.71%	3.46
14	1983/03/01 14:00:00	1983/03/01 18:30:00	10	3.56	4.00%	3.21
15	1981/02/09 04:30:00	1981/02/09 08:30:00	9	3.52	4.29%	3
16	1972/11/14 13:00:00	1972/11/14 15:30:00	6	3.5	4.57%	2.81
17	1983/11/25 00:00:00	1983/11/25 03:30:00	8	3.47	4.86%	2.65
18	2007/01/30 23:30:00	2007/01/31 00:30:00	3	3.46	5.14%	2.5
19	1967/04/11 09:30:00	1967/04/12 05:30:00	41	3.32	5.43%	2.37
20	2005/01/09 03:30:00	2005/01/09 23:00:00	40	3.19	5.71%	2.25
21	2005/01/11 01:30:00	2005/01/11 09:30:00	17	3.19	6.00%	2.14
22	1969/01/24 07:00:00	1969/01/25 17:30:00	70	3.05	6.29%	2.05
23	1993/01/08 14:30:00	1993/01/10 01:30:00	71	3	6.57%	1.96
24	1998/01/09 15:30:00	1998/01/09 22:00:00	14	3	6.86%	1.88
25	1980/02/19 01:30:00	1980/02/20 01:30:00	49	2.99	7.14%	1.8
26	1967/12/18 14:30:00	1967/12/19 12:30:00	45	2.94	7.43%	1.73
27	1993/01/12 19:00:00	1993/01/14 06:00:00	71	2.94	7.71%	1.67
28	1980/01/28 08:00:00	1980/01/29 21:30:00	76	2.93	8.00%	1.61
29	1992/02/15 13:00:00	1992/02/15 18:30:00	12	2.88	8.29%	1.55
30	2007/11/30 10:00:00	2007/12/01 00:30:00	30	2.88	8.57%	1.5
31	1991/03/20 06:30:00	1991/03/21 02:30:00	41	2.86	8.86%	1.45
32	1980/03/02 20:30:00	1980/03/03 03:30:00	15	2.81	9.14%	1.41
33	2004/10/18 09:00:00	2004/10/18 11:30:00	6	2.81	9.43%	1.36
34	1998/02/03 16:00:00	1998/02/03 21:00:00	11	2.74	9.71%	1.32
35	2004/10/20 10:30:00	2004/10/20 16:30:00	13	2.67	10.00%	1.29
36	1993/02/08 00:30:00	1993/02/08 11:30:00	23	2.66	10.29%	1.25
37	1965/11/22 03:30:00	1965/11/23 06:00:00	54	2.62	10.57%	1.22
38	1985/11/25 00:00:00	1985/11/25 06:30:00	14	2.61	10.86%	1.18
39	1981/03/19 20:30:00	1981/03/19 22:30:00	5	2.54	11.14%	1.15

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	1974/12/04 08:30:00	1974/12/04 10:30:00	5	2.42	11.43%	1.13
41	1982/03/18 01:30:00	1982/03/19 03:30:00	53	2.37	11.71%	1.1
42	1980/02/20 17:00:00	1980/02/21 00:00:00	15	2.36	12.00%	1.07
43	2006/04/04 18:00:00	2006/04/05 09:30:00	32	2.35	12.29%	1.05
44	1993/11/14 16:30:00	1993/11/14 17:30:00	3	2.33	12.57%	1.02
45	1980/01/30 17:30:00	1980/01/30 19:30:00	5	2.32	12.86%	1
46	1980/02/17 21:00:00	1980/02/18 08:30:00	24	2.32	13.14%	0.98
47	1978/02/05 19:30:00	1978/02/06 22:30:00	55	2.3	13.43%	0.96
48	2004/10/27 03:30:00	2004/10/27 09:30:00	13	2.29	13.71%	0.94
49	1980/02/16 17:30:00	1980/02/17 00:30:00	15	2.28	14.00%	0.92
50	2003/02/25 16:30:00	2003/02/25 18:30:00	5	2.28	14.29%	0.9
51	1970/03/04 22:00:00	1970/03/05 01:30:00	8	2.27	14.57%	0.88
52	1979/01/17 11:30:00	1979/01/17 13:00:00	4	2.26	14.86%	0.87
53	1970/11/29 13:30:00	1970/11/30 00:00:00	22	2.23	15.14%	0.85
54	1976/04/14 10:30:00	1976/04/14 11:30:00	3	2.21	15.43%	0.83
55	1983/02/27 16:30:00	1983/02/27 19:30:00	7	2.2	15.71%	0.82
56	1980/01/10 22:30:00	1980/01/11 14:30:00	33	2.19	16.00%	0.8
57	1973/02/11 04:30:00	1973/02/11 06:30:00	5	2.17	16.29%	0.79
58	1979/01/05 23:00:00	1979/01/06 07:30:00	18	2.17	16.57%	0.78
59	2003/02/12 16:30:00	2003/02/12 20:00:00	8	2.17	16.86%	0.76
60	1974/01/04 18:30:00	1974/01/05 03:30:00	19	2.12	17.14%	0.75
61	1978/12/17 19:00:00	1978/12/17 21:30:00	6	2.1	17.43%	0.74
62	1969/02/06 07:30:00	1969/02/06 11:30:00	9	2.07	17.71%	0.73
63	1982/01/01 09:00:00	1982/01/01 11:30:00	6	2.06	18.00%	0.71
64	2004/02/26 06:00:00	2004/02/26 09:30:00	8	2.05	18.29%	0.7
65	1976/03/02 23:30:00	1976/03/03 02:30:00	7	2.01	18.57%	0.69
66	1995/03/11 02:00:00	1995/03/12 01:30:00	48	1.99	18.86%	0.68
67	1977/05/08 18:30:00	1977/05/08 22:30:00	9	1.98	19.14%	0.67
68	1970/02/28 16:00:00	1970/03/01 06:30:00	30	1.96	19.43%	0.66
69	1991/02/28 15:30:00	1991/03/01 13:30:00	45	1.96	19.71%	0.65
70	1982/12/22 22:30:00	1982/12/23 00:30:00	5	1.95	20.00%	0.64
71	1995/03/05 08:00:00	1995/03/06 01:30:00	36	1.93	20.29%	0.63
72	1965/12/13 00:30:00	1965/12/13 02:00:00	4	1.9	20.57%	0.63
73	1965/12/09 06:00:00	1965/12/09 15:30:00	20	1.89	20.86%	0.62
74	2004/02/22 13:30:00	2004/02/23 03:30:00	29	1.89	21.14%	0.61
75	1991/03/19 00:00:00	1991/03/19 04:30:00	10	1.88	21.43%	0.6
76	1998/02/08 15:30:00	1998/02/08 22:30:00	15	1.84	21.71%	0.59
77	1985/11/29 08:00:00	1985/11/29 18:30:00	22	1.79	22.00%	0.58
78	1976/12/31 08:30:00	1976/12/31 12:30:00	9	1.77	22.29%	0.58
79	1994/02/07 14:30:00	1994/02/07 21:30:00	15	1.76	22.57%	0.57
80	1983/03/23 17:30:00	1983/03/23 22:30:00	11	1.74	22.86%	0.56
81	1994/03/25 14:30:00	1994/03/25 15:30:00	3	1.74	23.14%	0.56
82	1965/04/09 11:00:00	1965/04/10 00:30:00	28	1.72	23.43%	0.55
83	1978/01/14 15:30:00	1978/01/15 05:30:00	29	1.71	23.71%	0.54
84	1981/03/01 04:30:00	1981/03/01 17:00:00	26	1.71	24.00%	0.54
85	1983/03/20 19:30:00	1983/03/21 03:30:00	17	1.7	24.29%	0.53
86	1992/02/06 16:30:00	1992/02/07 00:30:00	17	1.7	24.57%	0.52

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	1974/03/08 01:30:00	1974/03/08 14:30:00	27	1.68	24.86%	0.52
88	1991/12/29 15:30:00	1991/12/29 18:30:00	7	1.68	25.14%	0.51
89	2003/03/15 16:30:00	2003/03/15 18:30:00	5	1.68	25.43%	0.51
90	2003/04/14 16:30:00	2003/04/14 17:30:00	3	1.68	25.71%	0.5
91	1970/12/21 03:00:00	1970/12/21 10:30:00	16	1.67	26.00%	0.5
92	1998/02/23 16:00:00	1998/02/23 21:30:00	12	1.64	26.29%	0.49
93	1983/03/02 14:00:00	1983/03/03 08:30:00	38	1.63	26.57%	0.48
94	1972/12/04 14:30:00	1972/12/04 19:30:00	11	1.61	26.86%	0.48
95	1980/03/06 00:30:00	1980/03/06 14:30:00	29	1.61	27.14%	0.47
96	1983/01/27 08:00:00	1983/01/27 14:30:00	14	1.6	27.43%	0.47
97	1976/02/08 14:30:00	1976/02/09 03:30:00	27	1.59	27.71%	0.46
98	1979/03/01 13:00:00	1979/03/01 20:30:00	16	1.59	28.00%	0.46
99	2006/01/02 13:30:00	2006/01/02 15:00:00	4	1.59	28.29%	0.46
100	1965/12/29 19:30:00	1965/12/29 21:30:00	5	1.58	28.57%	0.45
101	1988/12/24 21:30:00	1988/12/25 02:30:00	11	1.58	28.86%	0.45
102	1991/03/27 01:30:00	1991/03/27 12:30:00	23	1.57	29.14%	0.44
103	1982/03/15 13:30:00	1982/03/16 00:30:00	23	1.56	29.43%	0.44
104	1992/01/05 15:00:00	1992/01/06 03:30:00	26	1.55	29.71%	0.43
105	1996/01/31 17:30:00	1996/02/01 04:30:00	23	1.55	30.00%	0.43
106	1967/01/24 18:00:00	1967/01/25 00:30:00	14	1.54	30.29%	0.43
107	1970/03/02 03:30:00	1970/03/02 07:30:00	9	1.54	30.57%	0.42
108	1967/11/21 12:30:00	1967/11/21 14:30:00	5	1.53	30.86%	0.42
109	1992/02/12 18:00:00	1992/02/13 07:00:00	27	1.53	31.14%	0.41
110	1996/11/21 20:00:00	1996/11/22 03:30:00	16	1.53	31.43%	0.41
111	1975/03/08 08:30:00	1975/03/08 13:30:00	11	1.52	31.71%	0.41
112	1978/12/18 11:30:00	1978/12/18 13:30:00	5	1.51	32.00%	0.4
113	1987/01/07 07:30:00	1987/01/07 08:30:00	3	1.51	32.29%	0.4
114	1994/02/17 11:30:00	1994/02/17 14:00:00	6	1.51	32.57%	0.4
115	1998/02/17 16:30:00	1998/02/17 20:00:00	8	1.51	32.86%	0.39
116	1983/11/20 11:30:00	1983/11/20 12:30:00	3	1.5	33.14%	0.39
117	2004/02/02 23:30:00	2004/02/03 01:30:00	5	1.5	33.43%	0.39
118	1976/02/06 04:30:00	1976/02/06 07:30:00	7	1.48	33.71%	0.38
119	2005/01/03 07:30:00	2005/01/03 10:30:00	7	1.48	34.00%	0.38
120	1978/11/13 22:30:00	1978/11/13 23:30:00	3	1.47	34.29%	0.38
121	1973/01/16 19:30:00	1973/01/16 22:30:00	7	1.46	34.57%	0.37
122	1973/03/11 12:30:00	1973/03/11 17:30:00	11	1.45	34.86%	0.37
123	2002/12/20 16:30:00	2002/12/20 20:30:00	9	1.45	35.14%	0.37
124	1966/12/03 08:00:00	1966/12/03 20:30:00	26	1.44	35.43%	0.36
125	1978/03/13 07:00:00	1978/03/13 22:30:00	32	1.44	35.71%	0.36
126	1994/04/27 23:30:00	1994/04/28 01:30:00	5	1.43	36.00%	0.36
127	1969/01/14 07:00:00	1969/01/14 12:30:00	12	1.42	36.29%	0.35
128	1964/11/17 17:30:00	1964/11/17 23:30:00	13	1.41	36.57%	0.35
129	1967/01/22 19:00:00	1967/01/23 01:30:00	14	1.38	36.86%	0.35
130	1986/11/17 22:00:00	1986/11/18 02:30:00	10	1.38	37.14%	0.35
131	1993/01/15 13:00:00	1993/01/16 21:00:00	65	1.38	37.43%	0.34
132	1998/02/06 16:30:00	1998/02/06 20:30:00	9	1.37	37.71%	0.34
133	2006/03/10 17:00:00	2006/03/11 04:30:00	24	1.37	38.00%	0.34

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	1980/02/14 01:00:00	1980/02/14 09:30:00	18	1.36	38.29%	0.34
135	1988/01/17 11:30:00	1988/01/17 21:30:00	21	1.36	38.57%	0.33
136	1996/12/09 18:00:00	1996/12/09 20:30:00	6	1.36	38.86%	0.33
137	1998/03/28 16:30:00	1998/03/28 20:30:00	9	1.36	39.14%	0.33
138	1990/01/17 02:30:00	1990/01/17 04:30:00	5	1.34	39.43%	0.33
139	1973/11/22 22:30:00	1973/11/23 02:30:00	9	1.33	39.71%	0.32
140	1993/03/28 02:30:00	1993/03/28 03:30:00	3	1.33	40.00%	0.32
141	1993/01/17 23:00:00	1993/01/18 18:30:00	40	1.32	40.29%	0.32
142	2005/02/22 18:30:00	2005/02/23 11:30:00	35	1.32	40.57%	0.32
143	1987/11/04 16:30:00	1987/11/04 23:30:00	15	1.31	40.86%	0.32
144	2002/12/16 16:30:00	2002/12/16 20:00:00	8	1.31	41.14%	0.31
145	2005/02/21 03:00:00	2005/02/21 14:30:00	24	1.31	41.43%	0.31
146	2001/11/24 16:30:00	2001/11/24 18:00:00	4	1.29	41.71%	0.31
147	1980/01/09 05:00:00	1980/01/09 19:30:00	30	1.27	42.00%	0.31
148	1998/05/12 16:30:00	1998/05/12 19:30:00	7	1.27	42.29%	0.3
149	2001/01/11 04:00:00	2001/01/11 09:30:00	12	1.27	42.57%	0.3
150	2002/11/08 16:30:00	2002/11/08 17:30:00	3	1.27	42.86%	0.3
151	1965/11/16 17:30:00	1965/11/16 23:30:00	13	1.26	43.14%	0.3
152	1986/03/10 15:30:00	1986/03/10 20:30:00	11	1.26	43.43%	0.3
153	1966/11/07 16:00:00	1966/11/07 18:30:00	6	1.25	43.71%	0.29
154	1992/12/29 14:00:00	1992/12/29 20:30:00	14	1.25	44.00%	0.29
155	1995/02/14 08:30:00	1995/02/14 10:30:00	5	1.25	44.29%	0.29
156	1965/04/08 14:00:00	1965/04/08 19:30:00	12	1.24	44.57%	0.29
157	1994/02/20 15:30:00	1994/02/20 16:30:00	3	1.23	44.86%	0.29
158	2003/02/13 16:30:00	2003/02/13 18:30:00	5	1.19	45.14%	0.29
159	1991/02/27 18:00:00	1991/02/27 23:30:00	12	1.16	45.43%	0.28
160	1968/03/08 09:30:00	1968/03/08 13:30:00	9	1.15	45.71%	0.28
161	1986/02/08 05:00:00	1986/02/08 07:30:00	6	1.14	46.00%	0.28
162	2008/02/22 03:30:00	2008/02/22 10:30:00	15	1.13	46.29%	0.28
163	1987/12/16 19:00:00	1987/12/16 23:00:00	9	1.11	46.57%	0.28
164	2004/12/29 01:30:00	2004/12/29 06:30:00	11	1.11	46.86%	0.27
165	1969/02/25 05:00:00	1969/02/25 23:30:00	38	1.1	47.14%	0.27
166	1974/01/06 12:30:00	1974/01/08 04:30:00	81	1.1	47.43%	0.27
167	1995/03/23 11:30:00	1995/03/23 13:30:00	5	1.09	47.71%	0.27
168	2005/01/07 14:00:00	2005/01/07 16:30:00	6	1.09	48.00%	0.27
169	1969/02/23 22:30:00	1969/02/24 08:30:00	21	1.08	48.29%	0.27
170	1987/01/04 16:30:00	1987/01/04 23:30:00	15	1.08	48.57%	0.27
171	1969/01/21 07:30:00	1969/01/21 16:30:00	19	1.07	48.86%	0.26
172	1969/02/22 02:00:00	1969/02/22 07:30:00	12	1.07	49.14%	0.26
173	1970/03/08 12:00:00	1970/03/08 19:30:00	16	1.07	49.43%	0.26
174	1975/03/10 11:00:00	1975/03/10 22:30:00	24	1.06	49.71%	0.26
175	1983/01/29 01:30:00	1983/01/29 04:30:00	7	1.06	50.00%	0.26
176	1983/02/08 04:00:00	1983/02/08 06:30:00	6	1.06	50.29%	0.26
177	2008/02/03 10:30:00	2008/02/03 16:00:00	12	1.06	50.57%	0.25
178	1973/03/08 13:00:00	1973/03/08 20:30:00	16	1.05	50.86%	0.25
179	1985/11/11 10:00:00	1985/11/11 16:30:00	14	1.05	51.14%	0.25
180	1990/01/14 04:00:00	1990/01/14 06:30:00	6	1.05	51.43%	0.25

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	1995/01/07 19:00:00	1995/01/08 04:30:00	20	1.05	51.71%	0.25
182	1972/11/16 12:00:00	1972/11/16 17:30:00	12	1.04	52.00%	0.25
183	1982/02/10 10:00:00	1982/02/10 21:30:00	24	1.04	52.29%	0.25
184	1983/03/18 04:00:00	1983/03/18 19:30:00	32	1.04	52.57%	0.25
185	2003/02/11 17:00:00	2003/02/11 17:30:00	2	1.04	52.86%	0.24
186	1975/04/08 03:00:00	1975/04/09 01:30:00	46	1.03	53.14%	0.24
187	1980/01/18 18:00:00	1980/01/19 01:00:00	15	1.03	53.43%	0.24
188	2008/01/06 06:00:00	2008/01/06 07:30:00	4	1.03	53.71%	0.24
189	1967/03/13 15:30:00	1967/03/13 22:30:00	15	1.02	54.00%	0.24
190	1993/02/19 18:00:00	1993/02/20 00:00:00	13	1.02	54.29%	0.24
191	1965/12/14 14:30:00	1965/12/14 17:00:00	6	1.01	54.57%	0.24
192	1992/12/07 10:30:00	1992/12/07 17:30:00	15	1.01	54.86%	0.23
193	1998/02/24 16:30:00	1998/02/24 19:30:00	7	1.01	55.14%	0.23
194	2000/02/21 16:30:00	2000/02/21 19:30:00	7	1.01	55.43%	0.23
195	2002/11/29 16:30:00	2002/11/29 19:30:00	7	1.01	55.71%	0.23
196	1971/12/27 14:00:00	1971/12/27 18:30:00	10	1	56.00%	0.23
197	1976/03/01 16:30:00	1976/03/01 19:30:00	7	1	56.29%	0.23
198	1976/11/12 01:30:00	1976/11/12 09:30:00	17	0.99	56.57%	0.23
199	1979/03/27 21:30:00	1979/03/28 03:30:00	13	0.99	56.86%	0.23
200	1998/01/10 16:30:00	1998/01/10 18:30:00	5	0.99	57.14%	0.23
201	1971/12/25 04:30:00	1971/12/25 23:30:00	39	0.98	57.43%	0.22
202	1988/12/21 06:30:00	1988/12/21 07:30:00	3	0.98	57.71%	0.22
203	1991/03/26 01:00:00	1991/03/26 06:30:00	12	0.98	58.00%	0.22
204	1997/01/12 16:00:00	1997/01/13 12:30:00	42	0.98	58.29%	0.22
205	1998/04/11 16:30:00	1998/04/11 19:30:00	7	0.98	58.57%	0.22
206	1996/02/25 10:00:00	1996/02/25 10:30:00	2	0.97	58.86%	0.22
207	1973/02/12 01:00:00	1973/02/12 02:30:00	4	0.96	59.14%	0.22
208	1979/03/17 05:30:00	1979/03/17 08:30:00	7	0.96	59.43%	0.22
209	1980/03/10 18:00:00	1980/03/10 20:30:00	6	0.96	59.71%	0.22
210	1981/03/05 06:30:00	1981/03/05 15:30:00	19	0.96	60.00%	0.21
211	1986/03/15 21:30:00	1986/03/16 18:30:00	43	0.96	60.29%	0.21
212	1988/11/25 10:30:00	1988/11/25 11:30:00	3	0.96	60.57%	0.21
213	1973/01/18 20:30:00	1973/01/19 02:30:00	13	0.95	60.86%	0.21
214	1997/12/06 16:30:00	1997/12/06 19:00:00	6	0.94	61.14%	0.21
215	1998/02/22 16:30:00	1998/02/22 19:00:00	6	0.94	61.43%	0.21
216	1968/04/01 20:00:00	1968/04/01 20:30:00	2	0.93	61.71%	0.21
217	1972/11/11 08:00:00	1972/11/11 09:30:00	4	0.93	62.00%	0.21
218	1992/03/02 11:00:00	1992/03/02 11:30:00	2	0.93	62.29%	0.21
219	1976/09/10 06:00:00	1976/09/10 21:30:00	32	0.92	62.57%	0.21
220	1998/03/25 16:30:00	1998/03/25 18:30:00	5	0.92	62.86%	0.21
221	2004/03/02 03:00:00	2004/03/02 04:30:00	4	0.92	63.14%	0.2
222	1978/03/14 20:30:00	1978/03/15 03:30:00	15	0.91	63.43%	0.2
223	1979/01/31 07:00:00	1979/01/31 10:30:00	8	0.91	63.71%	0.2
224	1982/11/30 12:00:00	1982/11/30 19:30:00	16	0.91	64.00%	0.2
225	1970/12/19 02:00:00	1970/12/19 06:30:00	10	0.9	64.29%	0.2
226	1971/05/07 19:30:00	1971/05/07 21:30:00	5	0.9	64.57%	0.2
227	1973/03/21 23:30:00	1973/03/22 02:30:00	7	0.89	64.86%	0.2

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	1979/01/05 07:30:00	1979/01/05 08:30:00	3	0.89	65.14%	0.2
229	1983/04/30 04:00:00	1983/04/30 05:30:00	4	0.89	65.43%	0.2
230	1993/02/23 23:00:00	1993/02/24 05:30:00	14	0.89	65.71%	0.2
231	1996/01/21 19:00:00	1996/01/21 20:30:00	4	0.89	66.00%	0.2
232	1969/01/20 09:00:00	1969/01/20 09:30:00	2	0.88	66.29%	0.19
233	1986/03/12 13:30:00	1986/03/12 14:30:00	3	0.88	66.57%	0.19
234	1979/01/18 07:00:00	1979/01/18 16:30:00	20	0.86	66.86%	0.19
235	1978/03/18 14:00:00	1978/03/18 14:30:00	2	0.85	67.14%	0.19
236	1977/08/17 01:00:00	1977/08/17 10:30:00	20	0.84	67.43%	0.19
237	1965/12/16 05:30:00	1965/12/16 09:00:00	8	0.83	67.71%	0.19
238	1969/02/18 18:00:00	1969/02/18 19:30:00	4	0.83	68.00%	0.19
239	1995/01/12 09:00:00	1995/01/12 15:00:00	13	0.83	68.29%	0.19
240	1992/01/07 20:00:00	1992/01/07 22:30:00	6	0.82	68.57%	0.19
241	2003/03/16 17:00:00	2003/03/16 18:00:00	3	0.81	68.86%	0.19
242	1976/04/12 23:30:00	1976/04/13 04:30:00	11	0.8	69.14%	0.19
243	1967/04/22 03:00:00	1967/04/22 05:30:00	6	0.79	69.43%	0.19
244	1965/04/01 22:00:00	1965/04/02 02:30:00	10	0.78	69.71%	0.18
245	2006/02/28 00:00:00	2006/02/28 07:30:00	16	0.77	70.00%	0.18
246	2008/01/05 04:30:00	2008/01/05 11:30:00	15	0.77	70.29%	0.18
247	1982/11/10 11:00:00	1982/11/10 12:30:00	4	0.76	70.57%	0.18
248	1982/11/11 01:00:00	1982/11/11 01:30:00	2	0.76	70.86%	0.18
249	1986/09/25 03:00:00	1986/09/25 06:30:00	8	0.76	71.14%	0.18
250	2002/03/17 23:00:00	2002/03/17 23:30:00	2	0.76	71.43%	0.18
251	1977/12/26 04:00:00	1977/12/26 18:30:00	30	0.75	71.71%	0.18
252	1979/02/21 05:30:00	1979/02/21 18:30:00	27	0.75	72.00%	0.18
253	1978/04/07 01:00:00	1978/04/07 02:30:00	4	0.74	72.29%	0.18
254	1993/01/31 02:00:00	1993/01/31 02:30:00	2	0.74	72.57%	0.18
255	1978/11/21 19:00:00	1978/11/21 20:30:00	4	0.72	72.86%	0.18
256	1982/01/20 23:00:00	1982/01/21 01:30:00	6	0.72	73.14%	0.18
257	1988/04/20 07:30:00	1988/04/20 13:30:00	13	0.71	73.43%	0.18
258	1995/12/20 17:00:00	1995/12/20 17:30:00	2	0.71	73.71%	0.17
259	1975/04/06 12:00:00	1975/04/06 13:30:00	4	0.7	74.00%	0.17
260	1978/03/31 02:30:00	1978/03/31 03:30:00	3	0.7	74.29%	0.17
261	1983/05/01 07:00:00	1983/05/01 08:30:00	4	0.7	74.57%	0.17
262	1994/04/26 21:00:00	1994/04/26 21:30:00	2	0.69	74.86%	0.17
263	1995/04/18 10:00:00	1995/04/18 11:30:00	4	0.69	75.14%	0.17
264	2008/01/06 23:30:00	2008/01/07 05:30:00	13	0.69	75.43%	0.17
265	1982/03/28 18:00:00	1982/03/28 18:30:00	2	0.68	75.71%	0.17
266	2000/02/13 17:00:00	2000/02/13 18:30:00	4	0.68	76.00%	0.17
267	1969/03/13 14:00:00	1969/03/13 18:30:00	10	0.67	76.29%	0.17
268	2006/03/28 22:00:00	2006/03/29 01:30:00	8	0.64	76.57%	0.17
269	2005/03/22 22:30:00	2005/03/23 00:00:00	4	0.63	76.86%	0.17
270	1973/03/20 08:30:00	1973/03/20 11:30:00	7	0.62	77.14%	0.17
271	1978/01/30 12:00:00	1978/01/30 13:30:00	4	0.62	77.43%	0.17
272	2006/03/21 02:00:00	2006/03/21 03:00:00	3	0.59	77.71%	0.17
273	2001/12/21 17:00:00	2001/12/21 18:30:00	4	0.58	78.00%	0.17
274	1979/10/20 13:30:00	1979/10/20 15:30:00	5	0.56	78.29%	0.16

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1965/11/25 11:00:00	1965/11/25 13:30:00	6	0.55	78.57%	0.16
276	1994/12/25 03:00:00	1994/12/25 03:30:00	2	0.55	78.86%	0.16
277	1991/03/25 07:00:00	1991/03/25 09:00:00	5	0.53	79.14%	0.16
278	1996/12/11 14:00:00	1996/12/11 16:30:00	6	0.53	79.43%	0.16
279	1997/01/25 23:00:00	1997/01/26 09:30:00	22	0.52	79.71%	0.16
280	1998/03/26 17:00:00	1998/03/26 18:30:00	4	0.52	80.00%	0.16
281	1985/12/02 23:00:00	1985/12/03 03:30:00	10	0.51	80.29%	0.16
282	1990/06/10 04:00:00	1990/06/10 05:30:00	4	0.49	80.57%	0.16
283	1995/01/10 21:30:00	1995/01/10 23:30:00	5	0.49	80.86%	0.16
284	2008/02/14 12:00:00	2008/02/14 13:30:00	4	0.49	81.14%	0.16
285	1992/03/23 03:30:00	1992/03/23 04:30:00	3	0.48	81.43%	0.16
286	1970/03/11 12:00:00	1970/03/11 16:30:00	10	0.47	81.71%	0.16
287	1980/03/26 00:00:00	1980/03/26 01:30:00	4	0.47	82.00%	0.16
288	2003/12/25 18:30:00	2003/12/25 19:30:00	3	0.46	82.29%	0.16
289	2005/02/12 00:00:00	2005/02/12 12:30:00	26	0.46	82.57%	0.16
290	1965/02/06 18:00:00	1965/02/06 18:30:00	2	0.45	82.86%	0.16
291	1969/01/26 18:30:00	1969/01/26 20:30:00	5	0.45	83.14%	0.16
292	2001/01/12 09:00:00	2001/01/12 09:30:00	2	0.45	83.43%	0.15
293	2002/11/09 17:00:00	2002/11/09 17:30:00	2	0.45	83.71%	0.15
294	1997/01/15 19:30:00	1997/01/15 20:30:00	3	0.44	84.00%	0.15
295	1969/01/28 19:30:00	1969/01/28 20:30:00	3	0.43	84.29%	0.15
296	1973/02/12 23:00:00	1973/02/13 01:30:00	6	0.42	84.57%	0.15
297	1993/01/10 17:30:00	1993/01/10 18:30:00	3	0.42	84.86%	0.15
298	1972/12/08 12:30:00	1972/12/08 14:30:00	5	0.41	85.14%	0.15
299	1979/03/19 01:00:00	1979/03/19 05:30:00	10	0.41	85.43%	0.15
300	1981/02/25 21:30:00	1981/02/25 22:30:00	3	0.41	85.71%	0.15
301	1970/03/06 21:30:00	1970/03/07 01:30:00	9	0.4	86.00%	0.15
302	1975/03/11 12:00:00	1975/03/11 14:30:00	6	0.4	86.29%	0.15
303	1983/03/22 12:30:00	1983/03/22 15:30:00	7	0.4	86.57%	0.15
304	2005/01/04 04:00:00	2005/01/04 12:30:00	18	0.38	86.86%	0.15
305	1973/03/06 23:00:00	1973/03/07 01:30:00	6	0.37	87.14%	0.15
306	1979/02/02 15:30:00	1979/02/02 16:30:00	3	0.37	87.43%	0.15
307	1982/04/02 12:00:00	1982/04/02 16:30:00	10	0.37	87.71%	0.15
308	1983/12/03 17:00:00	1983/12/03 17:30:00	2	0.37	88.00%	0.15
309	1969/03/21 20:00:00	1969/03/21 20:30:00	2	0.36	88.29%	0.15
310	1971/12/28 13:00:00	1971/12/28 15:30:00	6	0.36	88.57%	0.15
311	1975/02/10 02:00:00	1975/02/10 03:30:00	4	0.35	88.86%	0.15
312	1977/01/03 23:00:00	1977/01/04 00:30:00	4	0.35	89.14%	0.14
313	1987/11/02 03:00:00	1987/11/02 04:30:00	4	0.35	89.43%	0.14
314	1994/03/25 00:00:00	1994/03/25 01:30:00	4	0.35	89.71%	0.14
315	2007/12/08 07:00:00	2007/12/08 08:00:00	3	0.35	90.00%	0.14
316	1979/02/01 11:00:00	1979/02/01 11:30:00	2	0.34	90.29%	0.14
317	1979/03/20 03:00:00	1979/03/20 03:30:00	2	0.34	90.57%	0.14
318	1965/04/03 07:30:00	1965/04/03 20:30:00	27	0.32	90.86%	0.14
319	1965/12/10 04:30:00	1965/12/10 10:30:00	13	0.31	91.14%	0.14
320	1973/02/28 05:00:00	1973/02/28 06:30:00	4	0.3	91.43%	0.14
321	2005/02/18 05:30:00	2005/02/18 07:30:00	5	0.3	91.71%	0.14

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1976/04/15 16:30:00	1976/04/15 17:30:00	3	0.29	92.00%	0.14
323	1998/01/29 17:00:00	1998/01/29 18:30:00	4	0.28	92.29%	0.14
324	2003/05/03 17:00:00	2003/05/03 18:00:00	3	0.28	92.57%	0.14
325	1976/02/07 07:00:00	1976/02/07 09:30:00	6	0.26	92.86%	0.14
326	1981/11/28 22:00:00	1981/11/28 23:30:00	4	0.26	93.14%	0.14
327	2000/02/17 17:00:00	2000/02/17 18:00:00	3	0.24	93.43%	0.14
328	1995/12/23 10:00:00	1995/12/23 10:30:00	2	0.23	93.71%	0.14
329	1983/11/21 10:00:00	1983/11/21 10:30:00	2	0.2	94.00%	0.14
330	1998/03/29 17:00:00	1998/03/29 18:00:00	3	0.19	94.29%	0.14
331	2004/10/19 16:00:00	2004/10/19 16:30:00	2	0.19	94.57%	0.14
332	1996/02/25 23:00:00	1996/02/26 01:00:00	5	0.18	94.86%	0.14
333	1974/04/02 05:00:00	1974/04/02 07:30:00	6	0.17	95.14%	0.14
334	1986/03/13 17:00:00	1986/03/13 20:00:00	7	0.15	95.43%	0.14
335	1986/12/06 17:30:00	1986/12/06 18:30:00	3	0.13	95.71%	0.13
336	2004/12/31 16:00:00	2004/12/31 17:30:00	4	0.13	96.00%	0.13
337	1974/10/29 05:00:00	1974/10/29 08:30:00	8	0.08	96.29%	0.13
338	1978/03/12 14:00:00	1978/03/12 14:30:00	2	0.08	96.57%	0.13
339	1975/12/11 23:00:00	1975/12/11 23:30:00	2	0.07	96.86%	0.13
340	1978/03/22 05:00:00	1978/03/22 05:30:00	2	0.07	97.14%	0.13
341	1983/02/25 00:00:00	1983/02/25 00:30:00	2	0.07	97.43%	0.13
342	2005/02/19 00:00:00	2005/02/19 00:30:00	2	0.07	97.71%	0.13
343	1992/03/26 19:00:00	1992/03/26 19:30:00	2	0.06	98.00%	0.13
344	2005/04/28 09:00:00	2005/04/28 09:30:00	2	0.02	98.29%	0.13
345	1976/02/05 06:00:00	1976/02/05 06:30:00	2	0.01	98.57%	0.13
346	1996/02/27 22:00:00	1996/02/27 22:30:00	2	0.01	98.86%	0.13
347	2008/01/23 22:00:00	2008/01/23 22:30:00	2	0.01	99.14%	0.13
348	1994/03/19 04:00:00	1994/03/19 04:30:00	2	0	99.43%	0.13
349	2000/10/30 00:00:00	2000/10/30 00:30:00	2	0	99.71%	0.13
--End of Data----------						

SWMM.out file name: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 post hydromod.out
SWMM.out time stamp: 2/9/2023 10:24:07 AM

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1993/01/06 01:15:00	1993/01/23 10:15:00	1669	2.95	0.11%	45
2	1995/01/03 06:15:00	1995/01/19 14:45:00	1571	2.32	0.22%	22.5
3	1971/02/23 03:15:00	1971/02/28 06:00:00	492	2.29	0.34%	15
4	1986/02/14 22:15:00	1986/02/20 09:45:00	527	2.2	0.45%	11.25
5	1995/01/23 20:15:00	1995/01/30 07:15:00	621	2.13	0.56%	9
6	1978/01/14 13:15:00	1978/01/21 04:30:00	638	2.05	0.67%	7.5
7	1966/12/03 04:15:00	1966/12/11 14:30:00	810	2.04	0.78%	6.43
8	1978/03/11 16:15:00	1978/03/25 13:45:00	1335	2.04	0.89%	5.63
9	1998/02/14 01:15:00	1998/02/28 14:00:00	1396	1.96	1.01%	5
10	1967/11/19 02:15:00	1967/11/26 14:00:00	720	1.82	1.12%	4.5
11	2007/08/26 06:15:00	2007/08/29 21:45:00	351	1.82	1.23%	4.09
12	1983/02/24 08:15:00	1983/03/09 03:45:00	1231	1.8	1.34%	3.75
13	1983/12/24 18:15:00	1983/12/30 21:45:00	591	1.78	1.45%	3.46
14	1969/01/13 16:15:00	1969/01/31 17:00:00	1732	1.7	1.56%	3.21
15	1988/04/19 22:15:00	1988/04/26 10:30:00	626	1.69	1.68%	3
16	1980/01/27 19:15:00	1980/02/04 10:30:00	734	1.63	1.79%	2.81
17	1980/02/13 11:15:00	1980/02/25 21:15:00	1193	1.6	1.90%	2.65
18	1981/02/08 16:15:00	1981/02/14 02:00:00	520	1.58	2.01%	2.5
19	2007/01/30 10:15:00	2007/02/03 19:45:00	423	1.57	2.12%	2.37
20	1972/11/14 11:15:00	1972/11/20 19:30:00	610	1.56	2.23%	2.25
21	1967/04/11 07:15:00	1967/04/15 21:15:00	441	1.54	2.35%	2.14
22	1983/11/24 22:15:00	1983/11/28 15:45:00	359	1.54	2.46%	2.05
23	2007/11/30 06:15:00	2007/12/05 16:30:00	522	1.52	2.57%	1.96
24	2004/12/28 05:15:00	2005/01/16 05:45:00	1827	1.49	2.68%	1.88
25	1965/11/21 21:15:00	1965/11/28 18:00:00	660	1.46	2.79%	1.8
26	1998/01/09 01:15:00	1998/01/16 00:45:00	671	1.43	2.91%	1.73
27	2004/10/18 04:15:00	2004/10/25 05:30:00	678	1.41	3.02%	1.67
28	1967/12/16 12:15:00	1967/12/24 09:30:00	758	1.33	3.13%	1.61
29	1991/03/18 23:15:00	1991/04/01 08:00:00	1284	1.33	3.24%	1.55
30	1992/02/12 17:15:00	1992/02/19 17:45:00	675	1.32	3.35%	1.5
31	1980/03/02 19:15:00	1980/03/14 03:15:00	1089	1.31	3.46%	1.45
32	1998/02/03 01:15:00	1998/02/12 22:30:00	950	1.3	3.58%	1.41
33	1993/02/07 11:15:00	1993/02/13 12:45:00	583	1.22	3.69%	1.36
34	1979/01/05 06:15:00	1979/01/11 23:30:00	646	1.2	3.80%	1.32
35	1985/11/24 14:15:00	1985/12/06 12:30:00	1146	1.13	3.91%	1.29
36	2003/02/25 01:15:00	2003/03/02 20:15:00	557	1.11	4.02%	1.25
37	1995/03/03 04:15:00	1995/03/10 19:00:00	732	1.09	4.13%	1.22
38	1982/03/15 11:15:00	1982/03/24 10:00:00	860	1.06	4.25%	1.18
39	1974/12/04 02:15:00	1974/12/08 09:00:00	412	1.05	4.36%	1.15

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	2004/10/27 01:15:00	2004/11/01 13:00:00	528	1.04	4.47%	1.13
41	1970/02/28 12:15:00	1970/03/14 23:15:00	1389	1.03	4.58%	1.1
42	1978/02/04 23:15:00	1978/02/11 02:00:00	588	1.02	4.69%	1.07
43	1979/01/15 13:15:00	1979/01/21 21:30:00	610	1.01	4.80%	1.05
44	1980/01/08 23:15:00	1980/01/17 03:15:00	785	1.01	4.92%	1.02
45	1991/02/27 12:15:00	1991/03/06 03:30:00	638	1.01	5.03%	1
46	2003/02/11 01:15:00	2003/02/18 20:15:00	749	1	5.14%	0.98
47	1981/12/30 06:15:00	1982/01/07 09:15:00	781	0.99	5.25%	0.96
48	1993/11/14 16:15:00	1993/11/16 02:45:00	139	0.99	5.36%	0.94
49	2004/02/21 14:15:00	2004/03/05 03:00:00	1204	0.98	5.47%	0.92
50	1970/11/28 19:15:00	1970/12/04 18:15:00	573	0.97	5.59%	0.9
51	2006/04/04 17:15:00	2006/04/09 04:15:00	429	0.97	5.70%	0.88
52	1969/02/05 02:15:00	1969/02/10 12:15:00	521	0.96	5.81%	0.87
53	1981/03/19 19:15:00	1981/03/23 08:45:00	343	0.93	5.92%	0.85
54	1978/12/16 21:15:00	1978/12/23 18:15:00	661	0.92	6.03%	0.83
55	1967/01/22 15:15:00	1967/01/29 15:30:00	674	0.91	6.15%	0.82
56	1976/04/12 17:15:00	1976/04/18 11:45:00	555	0.91	6.26%	0.8
57	1973/02/10 21:15:00	1973/02/16 08:45:00	527	0.87	6.37%	0.79
58	1976/03/01 07:15:00	1976/03/07 07:30:00	578	0.86	6.48%	0.78
59	1965/12/09 03:15:00	1965/12/19 12:00:00	996	0.85	6.59%	0.76
60	2003/04/14 01:15:00	2003/04/18 23:30:00	474	0.84	6.70%	0.75
61	1974/01/04 16:15:00	1974/01/13 01:45:00	807	0.83	6.82%	0.74
62	1977/05/08 09:15:00	1977/05/14 07:45:00	571	0.81	6.93%	0.73
63	1965/03/31 13:15:00	1965/04/14 07:45:00	1323	0.8	7.04%	0.71
64	2006/01/01 20:15:00	2006/01/05 22:15:00	393	0.8	7.15%	0.7
65	1994/02/03 19:15:00	1994/02/11 20:45:00	775	0.79	7.26%	0.69
66	1974/03/06 18:15:00	1974/03/13 04:45:00	619	0.78	7.37%	0.68
67	1992/02/06 07:15:00	1992/02/12 06:30:00	574	0.76	7.49%	0.67
68	2003/03/15 01:15:00	2003/03/20 06:15:00	501	0.76	7.60%	0.66
69	1976/02/04 03:15:00	1976/02/14 11:30:00	994	0.75	7.71%	0.65
70	1982/12/22 17:15:00	1982/12/26 18:15:00	389	0.75	7.82%	0.64
71	1965/12/29 07:15:00	1966/01/02 15:45:00	419	0.74	7.93%	0.63
72	1970/12/16 21:15:00	1970/12/25 17:45:00	851	0.74	8.04%	0.63
73	1983/03/17 03:15:00	1983/03/27 13:45:00	1003	0.74	8.16%	0.62
74	1994/03/24 20:15:00	1994/03/28 17:45:00	375	0.74	8.27%	0.61
75	1976/12/30 12:15:00	1977/01/09 07:00:00	940	0.73	8.38%	0.6
76	1981/02/25 19:15:00	1981/03/08 13:45:00	1035	0.73	8.49%	0.59
77	1991/12/27 23:15:00	1992/01/02 00:15:00	485	0.71	8.60%	0.58
78	1987/01/04 12:15:00	1987/01/11 06:30:00	650	0.69	8.72%	0.58
79	1992/01/02 22:15:00	1992/01/11 18:30:00	850	0.69	8.83%	0.57
80	1996/01/31 03:15:00	1996/02/05 21:45:00	555	0.65	8.94%	0.56
81	1996/11/21 15:15:00	1996/11/27 00:45:00	519	0.65	9.05%	0.56
82	1972/12/04 11:15:00	1972/12/11 20:45:00	711	0.64	9.16%	0.55
83	1995/03/11 01:15:00	1995/03/16 10:30:00	518	0.64	9.27%	0.54
84	2002/11/08 01:15:00	2002/11/13 01:15:00	481	0.64	9.39%	0.54
85	1979/03/01 06:15:00	1979/03/05 14:15:00	417	0.63	9.50%	0.53
86	1975/03/05 21:15:00	1975/03/16 11:00:00	1016	0.62	9.61%	0.52

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	2005/02/18 03:15:00	2005/02/28 03:30:00	962	0.62	9.72%	0.52
88	1965/11/14 06:15:00	1965/11/21 10:45:00	691	0.61	9.83%	0.51
89	1983/01/27 06:15:00	1983/02/01 09:30:00	494	0.61	9.94%	0.51
90	1990/01/14 02:15:00	1990/01/19 23:45:00	567	0.61	10.06%	0.5
91	2002/12/20 01:15:00	2002/12/24 10:00:00	420	0.61	10.17%	0.5
92	1978/11/10 17:15:00	1978/11/17 01:45:00	611	0.6	10.28%	0.49
93	1986/03/08 14:15:00	1986/03/20 11:15:00	1141	0.6	10.39%	0.48
94	1996/12/09 14:15:00	1996/12/15 04:45:00	539	0.6	10.50%	0.48
95	2001/11/24 01:15:00	2001/11/27 05:30:00	306	0.6	10.61%	0.47
96	1988/12/15 06:15:00	1988/12/28 23:15:00	1317	0.59	10.73%	0.47
97	1969/02/18 08:15:00	1969/03/03 08:30:00	1250	0.58	10.84%	0.46
98	1987/11/04 14:15:00	1987/11/08 15:30:00	390	0.58	10.95%	0.46
99	1998/03/25 01:15:00	1998/04/04 00:30:00	958	0.57	11.06%	0.46
100	2004/02/02 22:15:00	2004/02/05 21:45:00	287	0.57	11.17%	0.45
101	1973/01/16 14:15:00	1973/01/22 13:00:00	572	0.56	11.28%	0.45
102	1973/03/03 23:15:00	1973/03/16 03:15:00	1169	0.56	11.40%	0.44
103	1983/11/20 08:15:00	1983/11/24 03:15:00	365	0.56	11.51%	0.44
104	1994/02/17 10:15:00	1994/02/23 10:15:00	577	0.56	11.62%	0.43
105	1992/12/27 15:15:00	1993/01/04 14:30:00	766	0.54	11.73%	0.43
106	1995/02/13 09:15:00	1995/02/18 13:45:00	499	0.54	11.84%	0.43
107	2006/03/10 12:15:00	2006/03/15 04:45:00	451	0.54	11.96%	0.42
108	1986/11/17 17:15:00	1986/11/21 19:00:00	392	0.53	12.07%	0.42
109	1994/04/25 14:15:00	1994/04/30 11:45:00	471	0.53	12.18%	0.41
110	1964/11/17 12:15:00	1964/11/21 11:45:00	383	0.52	12.29%	0.41
111	1966/11/07 13:15:00	1966/11/11 07:30:00	362	0.52	12.40%	0.41
112	1988/01/17 02:15:00	1988/01/21 22:00:00	464	0.5	12.51%	0.4
113	1998/05/12 01:15:00	1998/05/15 06:15:00	309	0.5	12.63%	0.4
114	2008/02/20 08:15:00	2008/02/26 19:00:00	620	0.5	12.74%	0.4
115	1993/03/26 12:15:00	1993/03/30 10:30:00	378	0.49	12.85%	0.39
116	1971/12/22 04:15:00	1972/01/02 01:30:00	1046	0.48	12.96%	0.39
117	1973/11/22 18:15:00	1973/11/26 16:30:00	378	0.48	13.07%	0.39
118	1995/03/21 08:15:00	1995/03/26 08:30:00	482	0.48	13.18%	0.38
119	2002/12/16 01:15:00	2002/12/19 17:45:00	355	0.48	13.30%	0.38
120	1983/02/05 16:15:00	1983/02/11 17:15:00	581	0.46	13.41%	0.38
121	2001/01/10 19:15:00	2001/01/15 21:15:00	489	0.46	13.52%	0.37
122	1968/03/07 20:15:00	1968/03/12 08:45:00	435	0.44	13.63%	0.37
123	1985/11/11 02:15:00	1985/11/15 20:45:00	459	0.43	13.74%	0.37
124	1968/04/01 18:15:00	1968/04/04 20:00:00	296	0.42	13.85%	0.36
125	1986/02/07 18:15:00	1986/02/12 09:30:00	446	0.42	13.97%	0.36
126	1996/02/25 08:15:00	1996/03/01 04:45:00	467	0.42	14.08%	0.36
127	1976/09/09 18:15:00	1976/09/15 05:00:00	524	0.41	14.19%	0.35
128	1987/12/16 11:15:00	1987/12/22 01:15:00	537	0.41	14.30%	0.35
129	1995/12/20 16:15:00	1995/12/21 18:15:00	105	0.41	14.41%	0.35
130	2008/01/05 00:15:00	2008/01/11 20:30:00	658	0.41	14.53%	0.35
131	1986/09/24 17:15:00	1986/09/28 13:45:00	371	0.4	14.64%	0.34
132	1993/02/18 12:15:00	1993/02/28 04:45:00	931	0.4	14.75%	0.34
133	1995/04/16 05:15:00	1995/04/21 14:30:00	518	0.4	14.86%	0.34

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	2008/02/03 05:15:00	2008/02/07 11:15:00	409	0.4	14.97%	0.34
135	1972/11/11 00:15:00	1972/11/13 21:30:00	278	0.39	15.08%	0.33
136	1992/03/02 00:15:00	1992/03/06 08:15:00	417	0.39	15.20%	0.33
137	1996/01/21 17:15:00	1996/01/26 13:45:00	467	0.39	15.31%	0.33
138	2000/02/21 01:15:00	2000/02/25 09:00:00	416	0.39	15.42%	0.33
139	1967/03/13 10:15:00	1967/03/17 10:30:00	386	0.38	15.53%	0.32
140	1975/04/05 20:15:00	1975/04/13 10:00:00	728	0.38	15.64%	0.32
141	1976/11/11 21:15:00	1976/11/15 21:45:00	387	0.38	15.75%	0.32
142	1982/02/09 15:15:00	1982/02/14 17:15:00	489	0.38	15.87%	0.32
143	1997/01/12 12:15:00	1997/01/18 22:00:00	616	0.38	15.98%	0.32
144	1998/04/11 01:15:00	1998/04/17 02:00:00	580	0.38	16.09%	0.31
145	1977/08/16 13:15:00	1977/08/21 06:30:00	454	0.37	16.20%	0.31
146	1979/03/27 02:15:00	1979/04/01 08:30:00	506	0.37	16.31%	0.31
147	1980/01/18 03:15:00	1980/01/21 22:00:00	364	0.37	16.42%	0.31
148	1988/11/25 04:15:00	1988/11/28 16:00:00	336	0.37	16.54%	0.3
149	1992/12/07 07:15:00	1992/12/11 06:00:00	380	0.37	16.65%	0.3
150	2006/02/27 18:15:00	2006/03/04 01:00:00	412	0.36	16.76%	0.3
151	1967/04/18 18:15:00	1967/04/25 09:00:00	636	0.35	16.87%	0.3
152	1969/03/10 01:15:00	1969/03/16 04:30:00	590	0.35	16.98%	0.3
153	1971/05/07 17:15:00	1971/05/10 17:00:00	288	0.35	17.09%	0.29
154	1979/03/17 04:15:00	1979/03/23 03:15:00	573	0.35	17.21%	0.29
155	1973/03/20 07:15:00	1973/03/25 00:15:00	453	0.34	17.32%	0.29
156	1979/01/30 23:15:00	1979/02/05 14:15:00	541	0.34	17.43%	0.29
157	1982/11/29 14:15:00	1982/12/04 21:15:00	509	0.34	17.54%	0.29
158	2002/03/17 19:15:00	2002/03/19 02:30:00	126	0.34	17.65%	0.29
159	1977/12/25 10:15:00	1977/12/31 15:00:00	596	0.33	17.77%	0.28
160	1978/03/30 22:15:00	1978/04/03 13:30:00	350	0.32	17.88%	0.28
161	1982/11/09 12:15:00	1982/11/14 06:30:00	458	0.32	17.99%	0.28
162	1983/04/29 01:15:00	1983/05/04 00:00:00	476	0.32	18.10%	0.28
163	1993/01/31 00:15:00	1993/02/02 18:30:00	266	0.31	18.21%	0.28
164	1978/11/21 17:15:00	1978/11/26 05:00:00	432	0.3	18.32%	0.27
165	2002/11/29 01:15:00	2002/12/02 05:30:00	306	0.3	18.44%	0.27
166	1979/02/21 00:15:00	1979/02/25 18:30:00	458	0.29	18.55%	0.27
167	1982/01/20 02:15:00	1982/01/25 05:30:00	494	0.29	18.66%	0.27
168	1982/03/26 20:15:00	1982/04/06 04:45:00	995	0.29	18.77%	0.27
169	2000/02/13 01:15:00	2000/02/14 01:15:00	97	0.29	18.88%	0.27
170	2003/12/24 22:15:00	2003/12/28 18:00:00	368	0.29	18.99%	0.27
171	1978/01/30 06:15:00	1978/02/02 14:00:00	320	0.28	19.11%	0.26
172	1997/12/06 01:15:00	1997/12/09 17:15:00	353	0.28	19.22%	0.26
173	1978/04/07 00:15:00	1978/04/10 01:45:00	295	0.26	19.33%	0.26
174	1990/06/10 03:15:00	1990/06/11 21:45:00	171	0.26	19.44%	0.26
175	2001/12/21 01:15:00	2001/12/24 03:15:00	297	0.26	19.55%	0.26
176	2005/02/11 00:15:00	2005/02/16 18:45:00	555	0.25	19.66%	0.26
177	1965/02/05 23:15:00	1965/02/10 07:45:00	419	0.24	19.78%	0.25
178	1979/10/19 21:15:00	1979/10/23 21:00:00	384	0.24	19.89%	0.25
179	2005/03/22 18:15:00	2005/03/25 12:15:00	265	0.24	20.00%	0.25
180	2006/03/21 01:15:00	2006/03/23 00:15:00	189	0.24	20.11%	0.25

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	2006/03/28 19:15:00	2006/03/31 18:45:00	287	0.24	20.22%	0.25
182	1997/01/23 02:15:00	1997/01/30 04:00:00	680	0.23	20.34%	0.25
183	1965/03/11 06:15:00	1965/03/11 23:00:00	68	0.21	20.45%	0.25
184	1973/02/27 22:15:00	1973/03/03 02:15:00	305	0.21	20.56%	0.25
185	1992/03/20 15:15:00	1992/03/25 10:30:00	462	0.2	20.67%	0.24
186	1994/12/24 23:15:00	1994/12/27 12:15:00	245	0.2	20.78%	0.24
187	1987/10/30 23:15:00	1987/11/04 03:30:00	402	0.19	20.89%	0.24
188	2008/02/14 10:15:00	2008/02/17 15:00:00	308	0.19	21.01%	0.24
189	1981/11/28 05:15:00	1981/12/02 09:15:00	401	0.18	21.12%	0.24
190	2007/02/19 00:15:00	2007/02/22 13:45:00	343	0.18	21.23%	0.24
191	1998/01/29 01:15:00	1998/01/31 23:15:00	281	0.17	21.34%	0.24
192	2000/02/17 01:15:00	2000/02/19 22:15:00	277	0.15	21.45%	0.23
193	1980/03/25 21:15:00	1980/03/28 12:45:00	255	0.14	21.56%	0.23
194	2007/12/07 03:15:00	2007/12/11 07:15:00	401	0.14	21.68%	0.23
195	1975/02/09 05:15:00	1975/02/13 00:15:00	365	0.13	21.79%	0.23
196	2001/01/26 10:15:00	2001/01/30 01:45:00	351	0.13	21.90%	0.23
197	2003/05/03 01:15:00	2003/05/04 01:15:00	97	0.13	22.01%	0.23
198	1971/01/02 03:15:00	1971/01/05 02:30:00	286	0.12	22.12%	0.23
199	1974/04/02 00:15:00	1974/04/05 04:30:00	306	0.12	22.23%	0.23
200	1983/12/03 14:15:00	1983/12/06 11:15:00	277	0.12	22.35%	0.23
201	1969/03/21 12:15:00	1969/03/24 04:45:00	259	0.11	22.46%	0.22
202	1975/12/11 22:15:00	1975/12/15 08:15:00	329	0.08	22.57%	0.22
203	1986/04/06 04:15:00	1986/04/08 22:45:00	267	0.08	22.68%	0.22
204	1970/04/30 08:15:00	1970/04/30 09:45:00	7	0.07	22.79%	0.22
205	1989/03/25 08:15:00	1989/03/29 00:00:00	352	0.07	22.91%	0.22
206	2000/10/29 19:15:00	2000/10/30 00:30:00	22	0.07	23.02%	0.22
207	2005/04/28 06:15:00	2005/04/30 09:15:00	205	0.07	23.13%	0.22
208	1966/10/10 11:15:00	1966/10/10 13:30:00	10	0.06	23.24%	0.22
209	1978/09/05 16:15:00	1978/09/07 03:15:00	141	0.06	23.35%	0.22
210	1986/12/06 02:15:00	1986/12/10 16:30:00	442	0.06	23.46%	0.21
211	1987/12/04 20:15:00	1987/12/07 11:30:00	254	0.06	23.58%	0.21
212	1992/03/26 15:15:00	1992/03/29 00:30:00	230	0.06	23.69%	0.21
213	2005/03/04 23:15:00	2005/03/07 08:45:00	231	0.06	23.80%	0.21
214	1974/10/28 04:15:00	1974/11/02 17:45:00	535	0.05	23.91%	0.21
215	1977/03/24 23:15:00	1977/03/28 09:00:00	328	0.04	24.02%	0.21
216	1983/11/11 21:15:00	1983/11/15 09:00:00	336	0.04	24.13%	0.21
217	1991/01/09 08:15:00	1991/01/11 21:15:00	245	0.04	24.25%	0.21
218	1994/03/19 01:15:00	1994/03/23 12:15:00	429	0.04	24.36%	0.21
219	2008/01/23 18:15:00	2008/01/26 11:00:00	260	0.04	24.47%	0.21
220	1964/12/27 06:15:00	1964/12/31 09:15:00	397	0.03	24.58%	0.21
221	1971/02/16 15:15:00	1971/02/18 20:15:00	213	0.03	24.69%	0.2
222	1975/11/27 16:15:00	1975/12/01 15:45:00	383	0.03	24.80%	0.2
223	1982/12/07 22:15:00	1982/12/11 21:30:00	382	0.03	24.92%	0.2
224	1983/04/20 00:15:00	1983/04/23 15:45:00	351	0.03	25.03%	0.2
225	1987/02/23 22:15:00	1987/02/28 09:15:00	429	0.03	25.14%	0.2
226	1988/02/02 02:15:00	1988/02/06 02:00:00	384	0.03	25.25%	0.2
227	1990/02/17 09:15:00	1990/02/21 16:00:00	412	0.03	25.36%	0.2

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	1995/12/23 09:15:00	1995/12/25 08:45:00	191	0.03	25.47%	0.2
229	1996/03/12 16:15:00	1996/03/16 11:45:00	367	0.03	25.59%	0.2
230	1966/10/04 13:15:00	1966/10/04 14:15:00	5	0.02	25.70%	0.2
231	1967/03/31 09:15:00	1967/04/03 21:45:00	339	0.02	25.81%	0.2
232	1968/02/13 21:15:00	1968/02/15 23:30:00	202	0.02	25.92%	0.19
233	1968/12/25 17:15:00	1968/12/28 18:45:00	295	0.02	26.03%	0.19
234	1979/11/07 18:15:00	1979/11/11 02:00:00	320	0.02	26.15%	0.19
235	1982/01/28 16:15:00	1982/01/31 04:00:00	240	0.02	26.26%	0.19
236	1983/10/07 06:15:00	1983/10/09 17:30:00	238	0.02	26.37%	0.19
237	1964/09/24 13:15:00	1964/09/24 14:15:00	5	0.01	26.48%	0.19
238	1964/10/15 08:15:00	1964/10/15 14:15:00	25	0.01	26.59%	0.19
239	1964/11/09 11:15:00	1964/11/14 00:15:00	437	0.01	26.70%	0.19
240	1965/12/21 22:15:00	1965/12/24 19:30:00	278	0.01	26.82%	0.19
241	1966/02/06 09:15:00	1966/02/11 11:45:00	491	0.01	26.93%	0.19
242	1967/04/04 15:15:00	1967/04/06 13:15:00	185	0.01	27.04%	0.19
243	1967/08/31 01:15:00	1967/08/31 07:15:00	25	0.01	27.15%	0.19
244	1967/11/30 15:15:00	1967/12/02 17:00:00	200	0.01	27.26%	0.18
245	1968/03/18 12:15:00	1968/03/20 02:15:00	153	0.01	27.37%	0.18
246	1968/12/20 08:15:00	1968/12/20 19:15:00	45	0.01	27.49%	0.18
247	1969/11/06 17:15:00	1969/11/07 09:45:00	67	0.01	27.60%	0.18
248	1969/11/09 23:15:00	1969/11/12 00:00:00	196	0.01	27.71%	0.18
249	1970/01/16 15:15:00	1970/01/19 13:00:00	280	0.01	27.82%	0.18
250	1970/02/10 00:15:00	1970/02/13 16:45:00	355	0.01	27.93%	0.18
251	1970/10/03 13:15:00	1970/10/03 15:15:00	9	0.01	28.04%	0.18
252	1971/01/12 18:15:00	1971/01/14 15:30:00	182	0.01	28.16%	0.18
253	1971/03/13 05:15:00	1971/03/14 23:00:00	168	0.01	28.27%	0.18
254	1971/04/14 10:15:00	1971/04/14 15:15:00	21	0.01	28.38%	0.18
255	1971/05/28 00:15:00	1971/05/30 21:45:00	279	0.01	28.49%	0.18
256	1971/10/16 03:15:00	1971/10/18 20:45:00	263	0.01	28.60%	0.18
257	1971/12/07 00:15:00	1971/12/08 14:30:00	154	0.01	28.72%	0.18
258	1972/01/09 08:15:00	1972/01/11 20:45:00	243	0.01	28.83%	0.17
259	1972/04/30 03:15:00	1972/04/30 10:15:00	29	0.01	28.94%	0.17
260	1972/05/20 03:15:00	1972/05/21 07:45:00	115	0.01	29.05%	0.17
261	1972/10/19 02:15:00	1972/10/19 03:15:00	5	0.01	29.16%	0.17
262	1973/01/04 00:15:00	1973/01/06 15:15:00	253	0.01	29.27%	0.17
263	1973/01/09 09:15:00	1973/01/11 23:15:00	249	0.01	29.39%	0.17
264	1973/02/03 12:15:00	1973/02/05 15:15:00	205	0.01	29.50%	0.17
265	1973/02/06 00:15:00	1973/02/08 13:00:00	244	0.01	29.61%	0.17
266	1973/04/30 04:15:00	1973/04/30 11:15:00	29	0.01	29.72%	0.17
267	1973/11/17 14:15:00	1973/11/20 18:45:00	307	0.01	29.83%	0.17
268	1973/12/01 14:15:00	1973/12/02 22:45:00	131	0.01	29.94%	0.17
269	1974/01/01 03:15:00	1974/01/04 03:45:00	291	0.01	30.06%	0.17
270	1974/03/03 10:15:00	1974/03/05 01:15:00	157	0.01	30.17%	0.17
271	1974/03/27 08:15:00	1974/03/27 10:45:00	11	0.01	30.28%	0.17
272	1974/12/28 05:15:00	1974/12/31 15:00:00	328	0.01	30.39%	0.17
273	1975/02/03 08:15:00	1975/02/07 06:15:00	377	0.01	30.50%	0.17
274	1975/03/22 07:15:00	1975/03/24 13:45:00	219	0.01	30.61%	0.16

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1975/03/31 20:15:00	1975/04/02 17:30:00	182	0.01	30.73%	0.16
276	1976/04/11 18:15:00	1976/04/11 19:15:00	5	0.01	30.84%	0.16
277	1976/10/22 19:15:00	1976/10/22 20:15:00	5	0.01	30.95%	0.16
278	1976/11/27 03:15:00	1976/11/29 04:00:00	196	0.01	31.06%	0.16
279	1977/03/16 11:15:00	1977/03/19 14:30:00	302	0.01	31.17%	0.16
280	1977/12/18 00:15:00	1977/12/18 19:30:00	78	0.01	31.28%	0.16
281	1978/01/10 16:15:00	1978/01/13 15:15:00	285	0.01	31.40%	0.16
282	1979/02/14 02:15:00	1979/02/16 05:30:00	206	0.01	31.51%	0.16
283	1980/03/21 18:15:00	1980/03/23 17:30:00	190	0.01	31.62%	0.16
284	1980/12/04 12:15:00	1980/12/07 00:15:00	241	0.01	31.73%	0.16
285	1980/12/07 10:15:00	1980/12/09 01:00:00	156	0.01	31.84%	0.16
286	1981/01/28 05:15:00	1981/02/02 02:00:00	468	0.01	31.96%	0.16
287	1981/03/26 21:15:00	1981/03/28 16:45:00	175	0.01	32.07%	0.16
288	1981/11/26 17:15:00	1981/11/27 02:15:00	37	0.01	32.18%	0.16
289	1982/01/10 17:15:00	1982/01/12 17:45:00	195	0.01	32.29%	0.16
290	1982/11/19 01:15:00	1982/11/22 00:45:00	287	0.01	32.40%	0.16
291	1983/01/22 23:15:00	1983/01/26 08:45:00	327	0.01	32.51%	0.16
292	1983/02/02 11:15:00	1983/02/04 22:30:00	238	0.01	32.63%	0.15
293	1983/08/16 14:15:00	1983/08/16 17:15:00	13	0.01	32.74%	0.15
294	1983/10/01 03:15:00	1983/10/01 05:15:00	9	0.01	32.85%	0.15
295	1983/12/09 17:15:00	1983/12/11 19:00:00	200	0.01	32.96%	0.15
296	1984/12/07 22:15:00	1984/12/08 01:30:00	14	0.01	33.07%	0.15
297	1985/02/02 03:15:00	1985/02/05 10:00:00	316	0.01	33.18%	0.15
298	1985/02/09 04:15:00	1985/02/11 23:45:00	271	0.01	33.30%	0.15
299	1985/03/27 07:15:00	1985/03/30 12:00:00	308	0.01	33.41%	0.15
300	1985/09/18 07:15:00	1985/09/18 12:15:00	21	0.01	33.52%	0.15
301	1985/10/07 13:15:00	1985/10/07 14:15:00	5	0.01	33.63%	0.15
302	1985/10/09 11:15:00	1985/10/09 20:15:00	37	0.01	33.74%	0.15
303	1985/12/10 20:15:00	1985/12/13 15:45:00	271	0.01	33.85%	0.15
304	1986/01/30 00:15:00	1986/02/03 07:30:00	414	0.01	33.97%	0.15
305	1986/09/23 19:15:00	1986/09/24 01:15:00	25	0.01	34.08%	0.15
306	1986/10/09 17:15:00	1986/10/12 18:00:00	292	0.01	34.19%	0.15
307	1987/10/22 15:15:00	1987/10/24 08:15:00	165	0.01	34.30%	0.15
308	1988/01/05 12:15:00	1988/01/08 04:15:00	257	0.01	34.41%	0.15
309	1988/04/14 17:15:00	1988/04/16 13:30:00	178	0.01	34.53%	0.15
310	1989/01/04 07:15:00	1989/01/08 18:30:00	430	0.01	34.64%	0.15
311	1989/02/04 03:15:00	1989/02/06 09:30:00	218	0.01	34.75%	0.15
312	1990/01/02 00:15:00	1990/01/02 13:15:00	53	0.01	34.86%	0.14
313	1990/01/30 23:15:00	1990/02/02 00:30:00	198	0.01	34.97%	0.14
314	1990/06/09 06:15:00	1990/06/09 11:15:00	21	0.01	35.08%	0.14
315	1991/01/03 11:15:00	1991/01/06 12:45:00	295	0.01	35.20%	0.14
316	1991/03/13 16:15:00	1991/03/17 13:30:00	374	0.01	35.31%	0.14
317	1991/10/26 19:15:00	1991/10/27 01:15:00	25	0.01	35.42%	0.14
318	1992/12/17 21:15:00	1992/12/20 07:00:00	232	0.01	35.53%	0.14
319	1993/11/22 21:15:00	1993/11/24 21:45:00	195	0.01	35.64%	0.14
320	1994/01/24 23:15:00	1994/01/29 04:45:00	407	0.01	35.75%	0.14
321	1994/03/06 14:15:00	1994/03/10 04:45:00	347	0.01	35.87%	0.14

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1994/11/10 10:15:00	1994/11/10 13:15:00	13	0.01	35.98%	0.14
323	1995/01/21 01:15:00	1995/01/22 20:30:00	174	0.01	36.09%	0.14
324	1996/10/30 12:15:00	1996/10/30 21:30:00	38	0.01	36.20%	0.14
325	1997/01/05 08:15:00	1997/01/07 10:45:00	203	0.01	36.31%	0.14
326	1997/02/27 10:15:00	1997/03/01 20:15:00	233	0.01	36.42%	0.14
327	1997/04/04 09:15:00	1997/04/04 10:15:00	5	0.01	36.54%	0.14
328	2000/04/17 15:15:00	2000/04/19 21:00:00	216	0.01	36.65%	0.14
329	2001/05/29 14:15:00	2001/05/29 15:15:00	5	0.01	36.76%	0.14
330	2001/12/09 01:15:00	2001/12/11 21:00:00	272	0.01	36.87%	0.14
331	2004/02/18 15:15:00	2004/02/20 11:00:00	176	0.01	36.98%	0.14
332	2004/04/01 21:15:00	2004/04/02 01:15:00	17	0.01	37.09%	0.14
333	2004/10/17 07:15:00	2004/10/17 17:15:00	41	0.01	37.21%	0.14
334	2004/11/21 04:15:00	2004/11/23 02:15:00	185	0.01	37.32%	0.14
335	2004/12/05 02:15:00	2004/12/08 07:15:00	309	0.01	37.43%	0.13
336	2005/01/28 14:15:00	2005/01/30 15:00:00	196	0.01	37.54%	0.13
337	2005/10/16 15:15:00	2005/10/16 20:15:00	21	0.01	37.65%	0.13
338	2005/10/17 23:15:00	2005/10/20 12:00:00	244	0.01	37.77%	0.13
339	2006/05/22 03:15:00	2006/05/23 07:00:00	112	0.01	37.88%	0.13
340	2006/12/09 21:15:00	2006/12/11 09:45:00	147	0.01	37.99%	0.13
341	2006/12/16 19:15:00	2006/12/18 16:15:00	181	0.01	38.10%	0.13
342	2007/02/12 21:15:00	2007/02/15 15:45:00	267	0.01	38.21%	0.13
343	2007/02/22 20:15:00	2007/02/24 23:00:00	204	0.01	38.32%	0.13
344	2007/04/20 13:15:00	2007/04/20 16:15:00	13	0.01	38.44%	0.13
345	2007/12/18 23:15:00	2007/12/22 23:00:00	384	0.01	38.55%	0.13
346	2008/01/26 20:15:00	2008/01/30 15:45:00	367	0.01	38.66%	0.13
347	1964/11/26 11:15:00	1964/11/26 18:15:00	29	0	38.77%	0.13
348	1965/01/07 09:15:00	1965/01/08 08:45:00	95	0	38.88%	0.13
349	1965/01/24 05:15:00	1965/01/25 23:15:00	169	0	38.99%	0.13
350	1965/03/07 00:15:00	1965/03/07 10:15:00	41	0	39.11%	0.13
351	1965/03/13 05:15:00	1965/03/14 00:45:00	79	0	39.22%	0.13
352	1965/03/15 01:15:00	1965/03/16 12:45:00	143	0	39.33%	0.13
353	1965/03/24 08:15:00	1965/03/24 17:15:00	37	0	39.44%	0.13
354	1965/05/23 01:15:00	1965/05/23 02:15:00	5	0	39.55%	0.13
355	1965/05/23 13:15:00	1965/05/23 15:15:00	9	0	39.66%	0.13
356	1965/05/24 06:15:00	1965/05/24 09:15:00	13	0	39.78%	0.13
357	1965/06/25 05:15:00	1965/06/25 08:15:00	13	0	39.89%	0.13
358	1965/09/05 17:15:00	1965/09/05 18:15:00	5	0	40.00%	0.13
359	1966/01/19 15:15:00	1966/01/20 01:30:00	42	0	40.11%	0.13
360	1966/02/25 02:15:00	1966/02/25 03:15:00	5	0	40.22%	0.13
361	1966/03/02 09:15:00	1966/03/02 10:15:00	5	0	40.34%	0.13
362	1966/03/13 14:15:00	1966/03/13 15:15:00	5	0	40.45%	0.12
363	1966/03/24 18:15:00	1966/03/24 19:15:00	5	0	40.56%	0.12
364	1966/05/10 04:15:00	1966/05/10 05:15:00	5	0	40.67%	0.12
365	1966/09/29 23:15:00	1966/09/30 00:15:00	5	0	40.78%	0.12
366	1966/09/30 10:15:00	1966/09/30 11:15:00	5	0	40.89%	0.12
367	1966/10/03 23:15:00	1966/10/04 00:15:00	5	0	41.01%	0.12
368	1966/10/05 13:15:00	1966/10/05 14:15:00	5	0	41.12%	0.12

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
369	1966/10/18 11:15:00	1966/10/18 12:15:00	5	0	41.23%	0.12
370	1967/01/31 03:15:00	1967/01/31 23:30:00	82	0	41.34%	0.12
371	1967/03/03 23:15:00	1967/03/04 02:15:00	13	0	41.45%	0.12
372	1967/03/04 09:15:00	1967/03/04 10:15:00	5	0	41.56%	0.12
373	1967/03/11 08:15:00	1967/03/11 09:15:00	5	0	41.68%	0.12
374	1967/03/29 05:15:00	1967/03/29 06:15:00	5	0	41.79%	0.12
375	1967/04/28 18:15:00	1967/04/28 19:15:00	5	0	41.90%	0.12
376	1967/06/09 06:15:00	1967/06/09 07:15:00	5	0	42.01%	0.12
377	1967/06/13 11:15:00	1967/06/13 16:15:00	21	0	42.12%	0.12
378	1967/07/26 20:15:00	1967/07/26 21:15:00	5	0	42.23%	0.12
379	1967/09/02 20:15:00	1967/09/02 21:15:00	5	0	42.35%	0.12
380	1967/09/29 20:15:00	1967/09/30 01:15:00	21	0	42.46%	0.12
381	1967/11/28 09:15:00	1967/11/29 02:00:00	68	0	42.57%	0.12
382	1967/12/08 00:15:00	1967/12/08 13:00:00	52	0	42.68%	0.12
383	1967/12/13 09:15:00	1967/12/14 22:15:00	149	0	42.79%	0.12
384	1968/01/10 04:15:00	1968/01/10 05:30:00	6	0	42.91%	0.12
385	1968/01/27 06:15:00	1968/01/27 07:30:00	6	0	43.02%	0.12
386	1968/01/27 20:15:00	1968/01/29 14:30:00	170	0	43.13%	0.12
387	1968/02/10 03:15:00	1968/02/10 04:15:00	5	0	43.24%	0.12
388	1968/02/13 08:15:00	1968/02/13 09:15:00	5	0	43.35%	0.12
389	1968/03/13 21:15:00	1968/03/14 09:45:00	51	0	43.46%	0.12
390	1968/03/17 01:15:00	1968/03/17 17:00:00	64	0	43.58%	0.12
391	1968/05/12 04:15:00	1968/05/12 08:15:00	17	0	43.69%	0.12
392	1968/06/07 06:15:00	1968/06/07 07:15:00	5	0	43.80%	0.12
393	1968/07/09 20:15:00	1968/07/09 22:15:00	9	0	43.91%	0.12
394	1968/09/13 10:15:00	1968/09/13 11:15:00	5	0	44.02%	0.11
395	1968/10/30 09:15:00	1968/10/30 10:15:00	5	0	44.13%	0.11
396	1968/11/15 05:15:00	1968/11/15 19:15:00	57	0	44.25%	0.11
397	1968/12/01 10:15:00	1968/12/01 11:30:00	6	0	44.36%	0.11
398	1968/12/19 13:15:00	1968/12/19 14:30:00	6	0	44.47%	0.11
399	1969/02/15 17:15:00	1969/02/17 01:45:00	131	0	44.58%	0.11
400	1969/04/03 01:15:00	1969/04/03 02:15:00	5	0	44.69%	0.11
401	1969/04/05 19:15:00	1969/04/05 21:15:00	9	0	44.80%	0.11
402	1969/06/11 08:15:00	1969/06/11 12:15:00	17	0	44.92%	0.11
403	1969/06/17 08:15:00	1969/06/17 09:15:00	5	0	45.03%	0.11
404	1969/08/10 04:15:00	1969/08/10 05:15:00	5	0	45.14%	0.11
405	1969/09/06 23:15:00	1969/09/07 00:15:00	5	0	45.25%	0.11
406	1969/11/15 20:15:00	1969/11/16 06:45:00	43	0	45.36%	0.11
407	1969/12/08 18:15:00	1969/12/09 00:30:00	26	0	45.47%	0.11
408	1969/12/26 09:15:00	1969/12/26 10:30:00	6	0	45.59%	0.11
409	1970/01/10 00:15:00	1970/01/10 01:30:00	6	0	45.70%	0.11
410	1970/01/11 13:15:00	1970/01/13 08:00:00	172	0	45.81%	0.11
411	1970/01/15 01:15:00	1970/01/15 23:00:00	88	0	45.92%	0.11
412	1970/11/25 22:15:00	1970/11/26 11:15:00	53	0	46.03%	0.11
413	1970/12/09 04:15:00	1970/12/10 17:30:00	150	0	46.15%	0.11
414	1971/02/19 16:15:00	1971/02/21 09:00:00	164	0	46.26%	0.11
415	1971/04/15 21:15:00	1971/04/15 23:15:00	9	0	46.37%	0.11

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
416	1971/04/16 08:15:00	1971/04/17 01:45:00	71	0	46.48%	0.11
417	1971/04/23 06:15:00	1971/04/23 23:30:00	70	0	46.59%	0.11
418	1971/05/03 08:15:00	1971/05/03 09:15:00	5	0	46.70%	0.11
419	1971/05/06 05:15:00	1971/05/06 11:15:00	25	0	46.82%	0.11
420	1971/06/02 11:15:00	1971/06/02 12:15:00	5	0	46.93%	0.11
421	1971/06/05 13:15:00	1971/06/05 14:15:00	5	0	47.04%	0.11
422	1971/10/22 12:15:00	1971/10/22 13:15:00	5	0	47.15%	0.11
423	1971/10/24 10:15:00	1971/10/25 03:00:00	68	0	47.26%	0.11
424	1971/10/25 12:15:00	1971/10/26 10:30:00	90	0	47.37%	0.11
425	1971/10/30 09:15:00	1971/10/30 10:15:00	5	0	47.49%	0.11
426	1971/11/13 12:15:00	1971/11/13 13:15:00	5	0	47.60%	0.11
427	1971/11/15 15:15:00	1971/11/15 16:15:00	5	0	47.71%	0.11
428	1971/11/29 05:15:00	1971/11/29 06:15:00	5	0	47.82%	0.11
429	1971/12/02 23:15:00	1971/12/03 00:30:00	6	0	47.93%	0.11
430	1971/12/03 23:15:00	1971/12/05 05:15:00	121	0	48.04%	0.11
431	1972/02/05 07:15:00	1972/02/05 08:15:00	5	0	48.16%	0.1
432	1972/02/05 18:15:00	1972/02/05 19:15:00	5	0	48.27%	0.1
433	1972/02/06 07:15:00	1972/02/06 17:00:00	40	0	48.38%	0.1
434	1972/04/13 02:15:00	1972/04/13 08:15:00	25	0	48.49%	0.1
435	1972/04/21 08:15:00	1972/04/21 09:15:00	5	0	48.60%	0.1
436	1972/05/19 03:15:00	1972/05/19 04:15:00	5	0	48.72%	0.1
437	1972/05/19 12:15:00	1972/05/19 20:15:00	33	0	48.83%	0.1
438	1972/06/07 03:15:00	1972/06/07 04:15:00	5	0	48.94%	0.1
439	1972/06/10 01:15:00	1972/06/10 02:15:00	5	0	49.05%	0.1
440	1972/06/22 12:15:00	1972/06/22 13:15:00	5	0	49.16%	0.1
441	1972/09/06 04:15:00	1972/09/06 05:15:00	5	0	49.27%	0.1
442	1972/09/06 20:15:00	1972/09/06 21:15:00	5	0	49.39%	0.1
443	1972/10/11 14:15:00	1972/10/11 15:15:00	5	0	49.50%	0.1
444	1972/10/17 08:15:00	1972/10/17 09:15:00	5	0	49.61%	0.1
445	1972/10/19 21:15:00	1972/10/20 02:15:00	21	0	49.72%	0.1
446	1972/10/20 12:15:00	1972/10/20 15:15:00	13	0	49.83%	0.1
447	1972/11/08 00:15:00	1972/11/08 01:15:00	5	0	49.94%	0.1
448	1973/01/25 20:15:00	1973/01/26 13:00:00	68	0	50.06%	0.1
449	1973/01/30 12:15:00	1973/01/31 06:45:00	75	0	50.17%	0.1
450	1973/02/21 08:15:00	1973/02/21 09:15:00	5	0	50.28%	0.1
451	1973/03/27 02:15:00	1973/03/29 19:00:00	260	0	50.39%	0.1
452	1973/04/21 09:15:00	1973/04/21 10:15:00	5	0	50.50%	0.1
453	1973/05/23 14:15:00	1973/05/23 15:15:00	5	0	50.61%	0.1
454	1973/05/28 09:15:00	1973/05/28 10:15:00	5	0	50.73%	0.1
455	1973/05/31 08:15:00	1973/05/31 09:15:00	5	0	50.84%	0.1
456	1973/11/17 05:15:00	1973/11/17 06:15:00	5	0	50.95%	0.1
457	1973/12/16 14:15:00	1973/12/16 15:30:00	6	0	51.06%	0.1
458	1973/12/20 13:15:00	1973/12/20 14:30:00	6	0	51.17%	0.1
459	1973/12/22 02:15:00	1973/12/23 00:45:00	91	0	51.28%	0.1
460	1974/01/20 16:15:00	1974/01/22 03:00:00	140	0	51.40%	0.1
461	1974/02/18 15:15:00	1974/02/18 16:15:00	5	0	51.51%	0.1
462	1974/02/19 18:15:00	1974/02/19 19:15:00	5	0	51.62%	0.1

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
463	1974/03/02 09:15:00	1974/03/03 01:00:00	64	0	51.73%	0.1
464	1974/06/08 11:15:00	1974/06/08 12:15:00	5	0	51.84%	0.1
465	1974/11/03 15:15:00	1974/11/04 13:45:00	91	0	51.96%	0.1
466	1975/01/30 17:15:00	1975/01/31 13:30:00	82	0	52.07%	0.1
467	1975/02/14 04:15:00	1975/02/14 22:45:00	75	0	52.18%	0.1
468	1975/03/05 13:15:00	1975/03/05 14:15:00	5	0	52.29%	0.1
469	1975/03/25 09:15:00	1975/03/26 23:00:00	152	0	52.40%	0.1
470	1975/04/17 02:15:00	1975/04/17 23:15:00	85	0	52.51%	0.1
471	1975/04/18 12:15:00	1975/04/19 08:30:00	82	0	52.63%	0.1
472	1975/04/23 14:15:00	1975/04/23 15:15:00	5	0	52.74%	0.1
473	1975/05/20 01:15:00	1975/05/20 02:15:00	5	0	52.85%	0.1
474	1975/06/07 13:15:00	1975/06/07 14:15:00	5	0	52.96%	0.1
475	1975/10/28 21:15:00	1975/10/28 22:15:00	5	0	53.07%	0.1
476	1975/12/19 23:15:00	1975/12/20 12:45:00	55	0	53.18%	0.1
477	1976/02/03 16:15:00	1976/02/03 17:15:00	5	0	53.30%	0.09
478	1976/04/04 08:15:00	1976/04/04 09:15:00	5	0	53.41%	0.09
479	1976/04/04 23:15:00	1976/04/05 00:15:00	5	0	53.52%	0.09
480	1976/09/03 16:15:00	1976/09/03 17:15:00	5	0	53.63%	0.09
481	1976/10/23 13:15:00	1976/10/23 14:15:00	5	0	53.74%	0.09
482	1977/01/21 14:15:00	1977/01/21 15:30:00	6	0	53.85%	0.09
483	1977/01/28 16:15:00	1977/01/29 21:45:00	119	0	53.97%	0.09
484	1977/02/22 00:15:00	1977/02/22 02:15:00	9	0	54.08%	0.09
485	1977/02/23 11:15:00	1977/02/23 12:15:00	5	0	54.19%	0.09
486	1977/02/24 00:15:00	1977/02/25 00:15:00	97	0	54.30%	0.09
487	1977/03/24 10:15:00	1977/03/24 11:15:00	5	0	54.41%	0.09
488	1977/04/02 00:15:00	1977/04/02 01:15:00	5	0	54.53%	0.09
489	1977/05/05 20:15:00	1977/05/05 21:15:00	5	0	54.64%	0.09
490	1977/05/24 05:15:00	1977/05/24 09:15:00	17	0	54.75%	0.09
491	1977/08/12 10:15:00	1977/08/12 11:15:00	5	0	54.86%	0.09
492	1977/10/06 02:15:00	1977/10/06 03:15:00	5	0	54.97%	0.09
493	1977/11/06 01:15:00	1977/11/06 02:15:00	5	0	55.08%	0.09
494	1977/12/23 02:15:00	1977/12/24 15:45:00	151	0	55.20%	0.09
495	1978/01/26 09:15:00	1978/01/26 21:00:00	48	0	55.31%	0.09
496	1978/03/30 13:15:00	1978/03/30 14:15:00	5	0	55.42%	0.09
497	1978/04/15 19:15:00	1978/04/17 06:30:00	142	0	55.53%	0.09
498	1978/04/26 08:15:00	1978/04/26 09:15:00	5	0	55.64%	0.09
499	1978/05/01 10:15:00	1978/05/01 11:15:00	5	0	55.75%	0.09
500	1978/09/07 11:15:00	1978/09/08 06:00:00	76	0	55.87%	0.09
501	1978/09/19 12:15:00	1978/09/19 13:15:00	5	0	55.98%	0.09
502	1979/01/29 08:15:00	1979/01/29 09:30:00	6	0	56.09%	0.09
503	1979/03/13 09:15:00	1979/03/13 10:15:00	5	0	56.20%	0.09
504	1979/03/15 21:15:00	1979/03/15 22:15:00	5	0	56.31%	0.09
505	1979/05/19 14:15:00	1979/05/19 15:15:00	5	0	56.42%	0.09
506	1979/08/13 14:15:00	1979/08/13 15:15:00	5	0	56.54%	0.09
507	1979/11/04 06:15:00	1979/11/04 07:15:00	5	0	56.65%	0.09
508	1979/11/05 13:15:00	1979/11/05 14:15:00	5	0	56.76%	0.09
509	1979/12/22 09:15:00	1979/12/22 10:30:00	6	0	56.87%	0.09

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
510	1980/01/07 13:15:00	1980/01/07 14:30:00	6	0	56.98%	0.09
511	1980/01/08 01:15:00	1980/01/08 02:30:00	6	0	57.09%	0.09
512	1980/03/18 07:15:00	1980/03/18 08:15:00	5	0	57.21%	0.09
513	1980/03/18 18:15:00	1980/03/19 15:00:00	84	0	57.32%	0.09
514	1980/04/21 03:15:00	1980/04/21 04:15:00	5	0	57.43%	0.09
515	1980/04/22 14:15:00	1980/04/22 15:15:00	5	0	57.54%	0.09
516	1980/04/23 02:15:00	1980/04/23 04:15:00	9	0	57.65%	0.09
517	1980/04/24 11:15:00	1980/04/24 12:15:00	5	0	57.77%	0.09
518	1980/04/28 16:15:00	1980/04/29 00:15:00	33	0	57.88%	0.09
519	1980/04/29 19:15:00	1980/04/29 20:15:00	5	0	57.99%	0.09
520	1980/05/01 22:15:00	1980/05/01 23:15:00	5	0	58.10%	0.09
521	1980/05/10 10:15:00	1980/05/10 12:15:00	9	0	58.21%	0.09
522	1980/10/26 09:15:00	1980/10/26 10:15:00	5	0	58.32%	0.09
523	1980/12/11 13:15:00	1980/12/12 08:45:00	79	0	58.44%	0.09
524	1981/01/11 16:15:00	1981/01/11 17:30:00	6	0	58.55%	0.09
525	1981/02/25 04:15:00	1981/02/25 05:15:00	5	0	58.66%	0.09
526	1981/03/14 01:15:00	1981/03/14 02:15:00	5	0	58.77%	0.09
527	1981/04/02 05:15:00	1981/04/02 06:15:00	5	0	58.88%	0.09
528	1981/04/02 20:15:00	1981/04/03 11:45:00	63	0	58.99%	0.09
529	1981/04/18 12:15:00	1981/04/18 13:15:00	5	0	59.11%	0.09
530	1981/04/18 20:15:00	1981/04/19 01:15:00	21	0	59.22%	0.09
531	1981/04/19 08:15:00	1981/04/19 09:15:00	5	0	59.33%	0.09
532	1981/05/16 10:15:00	1981/05/16 11:15:00	5	0	59.44%	0.09
533	1981/05/27 00:15:00	1981/05/27 01:15:00	5	0	59.55%	0.08
534	1981/10/01 01:15:00	1981/10/01 02:15:00	5	0	59.66%	0.08
535	1981/10/11 05:15:00	1981/10/11 07:15:00	9	0	59.78%	0.08
536	1981/10/28 22:15:00	1981/10/28 23:15:00	5	0	59.89%	0.08
537	1981/12/21 03:15:00	1981/12/21 04:30:00	6	0	60.00%	0.08
538	1982/02/05 13:15:00	1982/02/05 14:15:00	5	0	60.11%	0.08
539	1982/02/08 02:15:00	1982/02/08 22:30:00	82	0	60.22%	0.08
540	1982/02/16 08:15:00	1982/02/17 01:30:00	70	0	60.34%	0.08
541	1982/03/02 18:15:00	1982/03/03 06:15:00	49	0	60.45%	0.08
542	1982/03/12 13:15:00	1982/03/12 14:15:00	5	0	60.56%	0.08
543	1982/05/11 07:15:00	1982/05/11 08:15:00	5	0	60.67%	0.08
544	1982/05/26 12:15:00	1982/05/26 13:15:00	5	0	60.78%	0.08
545	1982/09/16 12:15:00	1982/09/16 13:15:00	5	0	60.89%	0.08
546	1982/09/22 12:15:00	1982/09/22 13:15:00	5	0	61.01%	0.08
547	1982/09/26 00:15:00	1982/09/26 09:15:00	37	0	61.12%	0.08
548	1982/09/26 16:15:00	1982/09/26 17:15:00	5	0	61.23%	0.08
549	1982/10/26 09:15:00	1982/10/26 10:15:00	5	0	61.34%	0.08
550	1982/10/31 14:15:00	1982/10/31 15:15:00	5	0	61.45%	0.08
551	1982/12/29 18:15:00	1982/12/31 12:45:00	171	0	61.56%	0.08
552	1983/01/19 03:15:00	1983/01/20 16:30:00	150	0	61.68%	0.08
553	1983/03/15 09:15:00	1983/03/15 10:15:00	5	0	61.79%	0.08
554	1983/04/10 22:15:00	1983/04/11 04:15:00	25	0	61.90%	0.08
555	1983/04/12 03:15:00	1983/04/12 11:15:00	33	0	62.01%	0.08
556	1983/04/12 23:15:00	1983/04/13 13:45:00	59	0	62.12%	0.08

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
557	1983/04/17 21:15:00	1983/04/19 16:00:00	172	0	62.23%	0.08
558	1983/08/07 08:15:00	1983/08/07 09:15:00	5	0	62.35%	0.08
559	1983/08/18 08:15:00	1983/08/18 16:15:00	33	0	62.46%	0.08
560	1983/10/01 16:15:00	1983/10/01 18:15:00	9	0	62.57%	0.08
561	1983/11/18 01:15:00	1983/11/18 15:15:00	57	0	62.68%	0.08
562	1983/12/22 10:15:00	1983/12/22 11:15:00	5	0	62.79%	0.08
563	1984/01/16 15:15:00	1984/01/17 10:15:00	77	0	62.91%	0.08
564	1984/03/24 12:15:00	1984/03/24 13:15:00	5	0	63.02%	0.08
565	1984/04/06 05:15:00	1984/04/06 06:15:00	5	0	63.13%	0.08
566	1984/04/06 14:15:00	1984/04/06 15:15:00	5	0	63.24%	0.08
567	1984/10/17 07:15:00	1984/10/17 08:15:00	5	0	63.35%	0.08
568	1984/11/13 09:15:00	1984/11/13 10:15:00	5	0	63.46%	0.08
569	1984/11/22 15:15:00	1984/11/22 16:15:00	5	0	63.58%	0.08
570	1984/11/24 15:15:00	1984/11/24 16:15:00	5	0	63.69%	0.08
571	1984/12/12 22:15:00	1984/12/12 23:15:00	5	0	63.80%	0.08
572	1984/12/14 13:15:00	1984/12/14 14:30:00	6	0	63.91%	0.08
573	1984/12/16 03:15:00	1984/12/16 04:30:00	6	0	64.02%	0.08
574	1984/12/18 13:15:00	1984/12/18 14:30:00	6	0	64.13%	0.08
575	1984/12/18 22:15:00	1984/12/19 07:15:00	37	0	64.25%	0.08
576	1984/12/19 17:15:00	1984/12/20 14:45:00	87	0	64.36%	0.08
577	1985/01/09 12:15:00	1985/01/09 13:30:00	6	0	64.47%	0.08
578	1985/02/01 14:15:00	1985/02/01 15:15:00	5	0	64.58%	0.08
579	1985/02/20 19:15:00	1985/02/21 20:00:00	100	0	64.69%	0.08
580	1985/03/02 12:15:00	1985/03/02 13:15:00	5	0	64.80%	0.08
581	1985/03/02 23:15:00	1985/03/04 11:00:00	144	0	64.92%	0.08
582	1985/03/12 10:15:00	1985/03/12 11:15:00	5	0	65.03%	0.08
583	1985/04/21 13:15:00	1985/04/21 14:15:00	5	0	65.14%	0.08
584	1985/04/22 01:15:00	1985/04/22 02:15:00	5	0	65.25%	0.08
585	1985/05/30 14:15:00	1985/05/30 16:15:00	9	0	65.36%	0.08
586	1985/06/02 21:15:00	1985/06/03 02:15:00	21	0	65.47%	0.08
587	1985/07/18 15:15:00	1985/07/18 16:15:00	5	0	65.59%	0.08
588	1985/08/10 13:15:00	1985/08/10 14:15:00	5	0	65.70%	0.08
589	1985/09/04 10:15:00	1985/09/04 12:15:00	9	0	65.81%	0.08
590	1985/10/21 23:15:00	1985/10/22 01:15:00	9	0	65.92%	0.08
591	1985/12/09 15:15:00	1985/12/09 16:15:00	5	0	66.03%	0.08
592	1985/12/10 12:15:00	1985/12/10 13:15:00	5	0	66.15%	0.08
593	1986/01/02 14:15:00	1986/01/02 16:15:00	9	0	66.26%	0.08
594	1986/02/13 08:15:00	1986/02/13 09:15:00	5	0	66.37%	0.08
595	1986/05/22 09:15:00	1986/05/22 10:15:00	5	0	66.48%	0.08
596	1986/07/19 11:15:00	1986/07/19 16:15:00	21	0	66.59%	0.08
597	1986/07/22 13:15:00	1986/07/22 16:15:00	13	0	66.70%	0.08
598	1986/08/18 05:15:00	1986/08/18 06:15:00	5	0	66.82%	0.08
599	1986/09/18 10:15:00	1986/09/18 11:15:00	5	0	66.93%	0.08
600	1986/10/08 15:15:00	1986/10/08 16:15:00	5	0	67.04%	0.08
601	1986/12/20 05:15:00	1986/12/21 13:00:00	128	0	67.15%	0.08
602	1986/12/30 15:15:00	1986/12/30 16:15:00	5	0	67.26%	0.08
603	1987/02/01 00:15:00	1987/02/01 01:15:00	5	0	67.37%	0.08

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
604	1987/02/13 18:15:00	1987/02/14 01:15:00	29	0	67.49%	0.08
605	1987/02/15 14:15:00	1987/02/15 15:15:00	5	0	67.60%	0.07
606	1987/02/23 12:15:00	1987/02/23 14:15:00	9	0	67.71%	0.07
607	1987/03/06 11:15:00	1987/03/06 12:15:00	5	0	67.82%	0.07
608	1987/03/15 00:15:00	1987/03/15 01:15:00	5	0	67.93%	0.07
609	1987/03/21 15:15:00	1987/03/21 21:15:00	25	0	68.04%	0.07
610	1987/03/23 20:15:00	1987/03/23 21:15:00	5	0	68.16%	0.07
611	1987/04/03 03:15:00	1987/04/03 07:15:00	17	0	68.27%	0.07
612	1987/04/03 20:15:00	1987/04/04 00:15:00	17	0	68.38%	0.07
613	1987/05/01 00:15:00	1987/05/01 01:15:00	5	0	68.49%	0.07
614	1987/05/20 07:15:00	1987/05/20 08:15:00	5	0	68.60%	0.07
615	1987/07/17 23:15:00	1987/07/18 00:15:00	5	0	68.72%	0.07
616	1987/08/14 08:15:00	1987/08/14 09:15:00	5	0	68.83%	0.07
617	1987/09/01 00:15:00	1987/09/01 01:15:00	5	0	68.94%	0.07
618	1987/09/13 04:15:00	1987/09/13 05:15:00	5	0	69.05%	0.07
619	1987/10/07 08:15:00	1987/10/07 09:15:00	5	0	69.16%	0.07
620	1987/10/12 17:15:00	1987/10/12 20:15:00	13	0	69.27%	0.07
621	1987/10/28 18:15:00	1987/10/30 12:30:00	170	0	69.39%	0.07
622	1987/11/14 01:15:00	1987/11/14 12:00:00	44	0	69.50%	0.07
623	1987/11/17 20:15:00	1987/11/18 00:15:00	17	0	69.61%	0.07
624	1987/11/20 15:15:00	1987/11/21 05:45:00	59	0	69.72%	0.07
625	1987/12/29 14:15:00	1987/12/30 21:00:00	124	0	69.83%	0.07
626	1988/02/01 00:15:00	1988/02/01 01:15:00	5	0	69.94%	0.07
627	1988/02/29 21:15:00	1988/03/03 18:30:00	278	0	70.06%	0.07
628	1988/05/05 21:15:00	1988/05/05 22:15:00	5	0	70.17%	0.07
629	1988/05/29 03:15:00	1988/05/29 07:15:00	17	0	70.28%	0.07
630	1988/05/31 15:15:00	1988/05/31 16:15:00	5	0	70.39%	0.07
631	1988/11/14 04:15:00	1988/11/14 10:15:00	25	0	70.50%	0.07
632	1988/11/23 21:15:00	1988/11/24 01:15:00	17	0	70.61%	0.07
633	1989/01/28 13:15:00	1989/01/28 14:15:00	5	0	70.73%	0.07
634	1989/02/02 09:15:00	1989/02/02 13:15:00	17	0	70.84%	0.07
635	1989/03/02 18:15:00	1989/03/03 01:15:00	29	0	70.95%	0.07
636	1989/03/08 19:15:00	1989/03/08 20:15:00	5	0	71.06%	0.07
637	1989/04/12 05:15:00	1989/04/12 06:15:00	5	0	71.17%	0.07
638	1989/04/26 02:15:00	1989/04/26 03:15:00	5	0	71.28%	0.07
639	1989/05/15 11:15:00	1989/05/15 12:15:00	5	0	71.40%	0.07
640	1989/09/17 03:15:00	1989/09/17 06:15:00	13	0	71.51%	0.07
641	1989/09/17 15:15:00	1989/09/17 16:15:00	5	0	71.62%	0.07
642	1989/09/19 09:15:00	1989/09/19 11:15:00	9	0	71.73%	0.07
643	1989/10/21 22:15:00	1989/10/22 06:15:00	33	0	71.84%	0.07
644	1989/10/25 19:15:00	1989/10/25 20:15:00	5	0	71.96%	0.07
645	1989/11/26 07:15:00	1989/11/26 18:15:00	45	0	72.07%	0.07
646	1990/01/13 02:15:00	1990/01/13 19:15:00	69	0	72.18%	0.07
647	1990/02/04 10:15:00	1990/02/05 22:00:00	144	0	72.29%	0.07
648	1990/03/05 15:15:00	1990/03/05 16:15:00	5	0	72.40%	0.07
649	1990/03/11 00:15:00	1990/03/11 03:15:00	13	0	72.51%	0.07
650	1990/03/12 11:15:00	1990/03/12 19:15:00	33	0	72.63%	0.07

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
651	1990/03/28 17:15:00	1990/03/28 18:15:00	5	0	72.74%	0.07
652	1990/04/04 08:15:00	1990/04/04 13:15:00	21	0	72.85%	0.07
653	1990/04/05 07:15:00	1990/04/05 12:15:00	21	0	72.96%	0.07
654	1990/04/16 20:15:00	1990/04/17 02:15:00	25	0	73.07%	0.07
655	1990/04/17 11:15:00	1990/04/17 12:15:00	5	0	73.18%	0.07
656	1990/04/18 18:15:00	1990/04/18 19:15:00	5	0	73.30%	0.07
657	1990/04/19 18:15:00	1990/04/19 19:15:00	5	0	73.41%	0.07
658	1990/04/24 23:15:00	1990/04/25 00:15:00	5	0	73.52%	0.07
659	1990/05/28 03:15:00	1990/05/28 14:15:00	45	0	73.63%	0.07
660	1990/05/29 04:15:00	1990/05/29 05:15:00	5	0	73.74%	0.07
661	1990/07/13 11:15:00	1990/07/13 12:15:00	5	0	73.85%	0.07
662	1990/08/05 23:15:00	1990/08/06 00:15:00	5	0	73.97%	0.07
663	1990/08/09 15:15:00	1990/08/09 16:15:00	5	0	74.08%	0.07
664	1990/11/19 21:15:00	1990/11/20 06:15:00	37	0	74.19%	0.07
665	1990/11/26 01:15:00	1990/11/26 08:15:00	29	0	74.30%	0.07
666	1990/12/15 21:15:00	1990/12/15 22:15:00	5	0	74.41%	0.07
667	1990/12/19 12:15:00	1990/12/21 03:15:00	157	0	74.53%	0.07
668	1991/03/11 01:15:00	1991/03/12 04:15:00	109	0	74.64%	0.07
669	1991/04/21 02:15:00	1991/04/21 03:15:00	5	0	74.75%	0.07
670	1991/07/31 10:15:00	1991/07/31 11:15:00	5	0	74.86%	0.07
671	1991/09/20 16:15:00	1991/09/20 18:15:00	9	0	74.97%	0.07
672	1991/11/29 18:15:00	1991/11/29 19:15:00	5	0	75.08%	0.07
673	1991/12/08 16:15:00	1991/12/08 17:15:00	5	0	75.20%	0.07
674	1991/12/09 22:15:00	1991/12/10 08:15:00	41	0	75.31%	0.07
675	1991/12/11 05:15:00	1991/12/11 08:15:00	13	0	75.42%	0.07
676	1991/12/17 10:15:00	1991/12/17 12:15:00	9	0	75.53%	0.07
677	1991/12/17 19:15:00	1991/12/18 05:15:00	41	0	75.64%	0.07
678	1991/12/19 05:15:00	1991/12/19 23:45:00	75	0	75.75%	0.07
679	1992/03/06 17:15:00	1992/03/06 18:15:00	5	0	75.87%	0.07
680	1992/03/07 10:15:00	1992/03/07 11:15:00	5	0	75.98%	0.07
681	1992/03/07 21:15:00	1992/03/09 04:45:00	127	0	76.09%	0.07
682	1992/03/29 10:15:00	1992/03/29 11:15:00	5	0	76.20%	0.07
683	1992/03/31 15:15:00	1992/04/01 13:15:00	89	0	76.31%	0.07
684	1992/05/05 21:15:00	1992/05/05 22:15:00	5	0	76.42%	0.07
685	1992/05/22 16:15:00	1992/05/22 19:15:00	13	0	76.54%	0.07
686	1992/08/13 15:15:00	1992/08/13 17:15:00	9	0	76.65%	0.07
687	1992/10/21 15:15:00	1992/10/21 16:15:00	5	0	76.76%	0.07
688	1992/10/23 03:15:00	1992/10/23 07:15:00	17	0	76.87%	0.07
689	1992/10/28 22:15:00	1992/10/29 03:15:00	21	0	76.98%	0.07
690	1992/10/30 16:15:00	1992/10/30 19:15:00	13	0	77.09%	0.07
691	1992/11/20 15:15:00	1992/11/20 16:15:00	5	0	77.21%	0.07
692	1992/11/22 22:15:00	1992/11/22 23:15:00	5	0	77.32%	0.07
693	1992/12/03 22:15:00	1992/12/04 00:15:00	9	0	77.43%	0.07
694	1992/12/04 13:15:00	1992/12/04 19:15:00	25	0	77.54%	0.07
695	1992/12/11 16:15:00	1992/12/12 18:30:00	106	0	77.65%	0.07
696	1993/03/25 23:15:00	1993/03/26 05:15:00	25	0	77.77%	0.07
697	1993/06/05 12:15:00	1993/06/05 17:15:00	21	0	77.88%	0.07

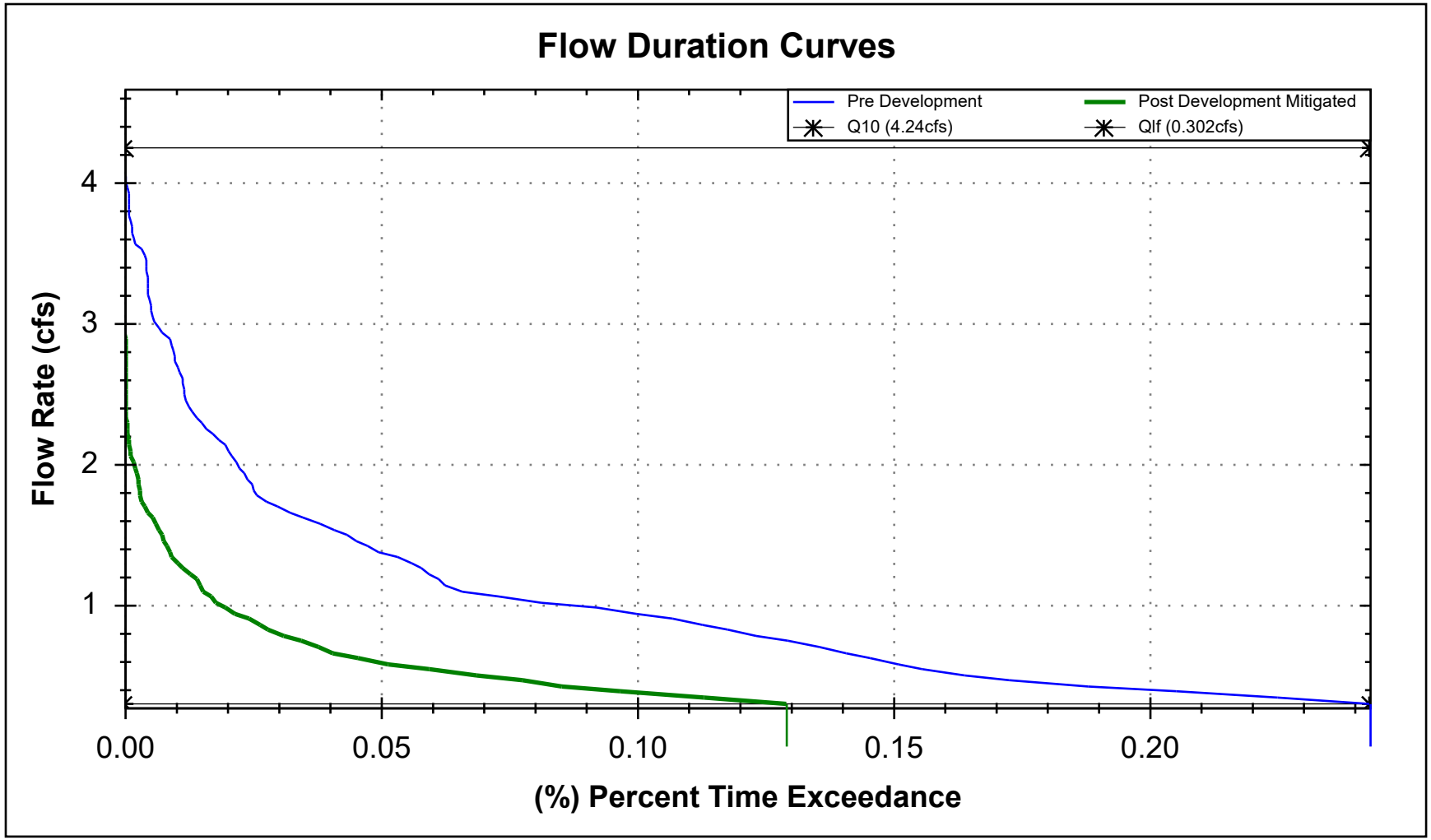
Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
698	1993/10/16 05:15:00	1993/10/16 06:15:00	5	0	77.99%	0.06
699	1993/11/11 04:15:00	1993/11/11 09:15:00	21	0	78.10%	0.06
700	1993/11/11 17:15:00	1993/11/11 18:15:00	5	0	78.21%	0.06
701	1993/11/12 01:15:00	1993/11/12 08:15:00	29	0	78.32%	0.06
702	1993/11/12 16:15:00	1993/11/12 17:15:00	5	0	78.44%	0.06
703	1993/11/14 05:15:00	1993/11/14 06:15:00	5	0	78.55%	0.06
704	1993/11/30 03:15:00	1993/12/01 04:00:00	100	0	78.66%	0.06
705	1993/12/11 15:15:00	1993/12/13 22:00:00	220	0	78.77%	0.06
706	1993/12/14 16:15:00	1993/12/16 16:30:00	194	0	78.88%	0.06
707	1993/12/19 03:15:00	1993/12/19 17:30:00	58	0	78.99%	0.06
708	1994/03/06 04:15:00	1994/03/06 05:15:00	5	0	79.11%	0.06
709	1994/04/09 04:15:00	1994/04/10 18:00:00	152	0	79.22%	0.06
710	1994/04/24 03:15:00	1994/04/24 05:15:00	9	0	79.33%	0.06
711	1994/05/08 08:15:00	1994/05/08 09:15:00	5	0	79.44%	0.06
712	1994/05/15 01:15:00	1994/05/15 02:15:00	5	0	79.55%	0.06
713	1994/11/16 07:15:00	1994/11/16 09:15:00	9	0	79.66%	0.06
714	1994/11/18 02:15:00	1994/11/18 05:15:00	13	0	79.78%	0.06
715	1994/11/26 10:15:00	1994/11/26 11:15:00	5	0	79.89%	0.06
716	1994/12/13 05:15:00	1994/12/13 06:15:00	5	0	80.00%	0.06
717	1994/12/17 14:15:00	1994/12/17 16:15:00	9	0	80.11%	0.06
718	1994/12/22 06:15:00	1994/12/22 07:15:00	5	0	80.22%	0.06
719	1994/12/22 19:15:00	1994/12/22 21:15:00	9	0	80.34%	0.06
720	1994/12/24 04:15:00	1994/12/24 12:30:00	34	0	80.45%	0.06
721	1995/04/07 09:15:00	1995/04/07 11:15:00	9	0	80.56%	0.06
722	1995/05/06 01:15:00	1995/05/06 10:15:00	37	0	80.67%	0.06
723	1995/05/13 06:15:00	1995/05/13 12:15:00	25	0	80.78%	0.06
724	1995/05/14 20:15:00	1995/05/15 02:15:00	25	0	80.89%	0.06
725	1995/05/23 12:15:00	1995/05/23 13:15:00	5	0	81.01%	0.06
726	1995/06/15 20:15:00	1995/06/16 01:15:00	21	0	81.12%	0.06
727	1995/06/16 12:15:00	1995/06/16 16:15:00	17	0	81.23%	0.06
728	1995/06/16 23:15:00	1995/06/17 00:15:00	5	0	81.34%	0.06
729	1995/06/17 12:15:00	1995/06/17 13:15:00	5	0	81.45%	0.06
730	1995/07/16 07:15:00	1995/07/16 08:15:00	5	0	81.56%	0.06
731	1995/10/01 00:15:00	1995/10/01 01:15:00	5	0	81.68%	0.06
732	1995/11/01 02:15:00	1995/11/01 08:15:00	25	0	81.79%	0.06
733	1995/12/13 03:15:00	1995/12/13 10:15:00	29	0	81.90%	0.06
734	1995/12/13 21:15:00	1995/12/13 22:30:00	6	0	82.01%	0.06
735	1995/12/14 07:15:00	1995/12/14 08:15:00	5	0	82.12%	0.06
736	1996/01/16 18:15:00	1996/01/17 13:45:00	79	0	82.23%	0.06
737	1996/01/28 07:15:00	1996/01/28 08:15:00	5	0	82.35%	0.06
738	1996/02/21 01:15:00	1996/02/21 02:15:00	5	0	82.46%	0.06
739	1996/02/21 09:15:00	1996/02/23 09:15:00	193	0	82.57%	0.06
740	1996/03/04 16:15:00	1996/03/06 17:30:00	198	0	82.68%	0.06
741	1996/04/17 23:15:00	1996/04/18 07:15:00	33	0	82.79%	0.06
742	1996/05/24 14:15:00	1996/05/24 16:15:00	9	0	82.91%	0.06
743	1996/07/10 13:15:00	1996/07/10 14:15:00	5	0	83.02%	0.06
744	1996/07/19 09:15:00	1996/07/19 10:15:00	5	0	83.13%	0.06

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
745	1996/10/25 21:15:00	1996/10/25 22:15:00	5	0	83.24%	0.06
746	1996/11/29 01:15:00	1996/11/29 08:15:00	29	0	83.35%	0.06
747	1996/12/05 21:15:00	1996/12/08 01:30:00	210	0	83.46%	0.06
748	1996/12/22 14:15:00	1996/12/23 21:45:00	127	0	83.58%	0.06
749	1996/12/27 15:15:00	1996/12/29 11:30:00	178	0	83.69%	0.06
750	1997/01/02 00:15:00	1997/01/02 18:45:00	75	0	83.80%	0.06
751	1997/02/10 18:15:00	1997/02/11 23:00:00	116	0	83.91%	0.06
752	1997/02/17 17:15:00	1997/02/17 18:15:00	5	0	84.02%	0.06
753	1997/02/18 12:15:00	1997/02/18 13:15:00	5	0	84.13%	0.06
754	1997/04/03 16:15:00	1997/04/03 17:15:00	5	0	84.25%	0.06
755	1997/04/08 09:15:00	1997/04/08 10:15:00	5	0	84.36%	0.06
756	1997/05/24 06:15:00	1997/05/24 07:15:00	5	0	84.47%	0.06
757	1997/12/18 14:15:00	1997/12/18 18:15:00	17	0	84.58%	0.06
758	1997/12/21 07:15:00	1997/12/22 17:45:00	139	0	84.69%	0.06
759	1998/01/02 15:15:00	1998/01/02 17:15:00	9	0	84.80%	0.06
760	1998/01/03 15:15:00	1998/01/03 17:15:00	9	0	84.92%	0.06
761	1998/01/04 07:15:00	1998/01/05 18:00:00	140	0	85.03%	0.06
762	1998/01/16 15:15:00	1998/01/16 22:15:00	29	0	85.14%	0.06
763	1998/01/19 03:15:00	1998/01/21 08:15:00	213	0	85.25%	0.06
764	1998/03/01 16:15:00	1998/03/01 17:15:00	5	0	85.36%	0.06
765	1998/03/06 03:15:00	1998/03/07 19:30:00	162	0	85.47%	0.06
766	1998/03/15 10:15:00	1998/03/15 19:15:00	37	0	85.59%	0.06
767	1998/04/06 16:15:00	1998/04/06 17:15:00	5	0	85.70%	0.06
768	1998/04/07 14:15:00	1998/04/07 18:15:00	17	0	85.81%	0.06
769	1998/04/19 14:15:00	1998/04/19 18:15:00	17	0	85.92%	0.06
770	1998/04/28 10:15:00	1998/04/28 19:15:00	37	0	86.03%	0.06
771	1998/05/04 15:15:00	1998/05/04 17:15:00	9	0	86.15%	0.06
772	1998/05/05 01:15:00	1998/05/06 01:15:00	97	0	86.26%	0.06
773	1998/05/06 15:15:00	1998/05/06 17:15:00	9	0	86.37%	0.06
774	1998/05/26 16:15:00	1998/05/26 17:15:00	5	0	86.48%	0.06
775	1998/06/12 16:15:00	1998/06/12 17:15:00	5	0	86.59%	0.06
776	2000/01/01 08:15:00	2000/01/01 21:15:00	53	0	86.70%	0.06
777	2000/01/02 14:15:00	2000/01/02 17:15:00	13	0	86.82%	0.06
778	2000/01/17 16:15:00	2000/01/17 17:15:00	5	0	86.93%	0.06
779	2000/01/25 11:15:00	2000/01/25 19:15:00	33	0	87.04%	0.06
780	2000/02/11 08:15:00	2000/02/11 20:15:00	49	0	87.15%	0.06
781	2000/02/14 14:15:00	2000/02/14 17:15:00	13	0	87.26%	0.06
782	2000/02/28 14:15:00	2000/02/28 17:15:00	13	0	87.37%	0.06
783	2000/04/14 21:15:00	2000/04/14 22:15:00	5	0	87.49%	0.06
784	2000/04/21 18:15:00	2000/04/21 19:15:00	5	0	87.60%	0.06
785	2000/04/22 04:15:00	2000/04/22 05:15:00	5	0	87.71%	0.06
786	2000/05/25 22:15:00	2000/05/26 00:15:00	9	0	87.82%	0.06
787	2000/09/23 01:15:00	2000/09/23 02:15:00	5	0	87.93%	0.06
788	2000/10/06 12:15:00	2000/10/06 13:15:00	5	0	88.04%	0.06
789	2000/10/10 07:15:00	2000/10/10 10:15:00	13	0	88.16%	0.06
790	2000/10/11 08:15:00	2000/10/11 09:15:00	5	0	88.27%	0.06
791	2000/10/21 17:15:00	2000/10/21 18:15:00	5	0	88.38%	0.06

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
792	2000/10/26 08:15:00	2000/10/26 09:15:00	5	0	88.49%	0.06
793	2000/10/27 01:15:00	2000/10/27 02:15:00	5	0	88.60%	0.06
794	2000/11/10 03:15:00	2000/11/10 09:15:00	25	0	88.72%	0.06
795	2000/11/10 22:15:00	2000/11/12 05:15:00	125	0	88.83%	0.06
796	2000/11/22 20:15:00	2000/11/22 21:15:00	5	0	88.94%	0.06
797	2001/01/08 15:15:00	2001/01/08 18:30:00	14	0	89.05%	0.06
798	2001/01/09 03:15:00	2001/01/09 04:15:00	5	0	89.16%	0.06
799	2001/04/20 23:15:00	2001/04/21 13:15:00	57	0	89.27%	0.06
800	2001/08/20 14:15:00	2001/08/20 18:15:00	17	0	89.39%	0.06
801	2001/08/21 16:15:00	2001/08/21 17:15:00	5	0	89.50%	0.06
802	2001/11/04 15:15:00	2001/11/04 17:15:00	9	0	89.61%	0.06
803	2001/11/12 16:15:00	2001/11/12 17:15:00	5	0	89.72%	0.06
804	2001/11/13 10:15:00	2001/11/13 19:15:00	37	0	89.83%	0.06
805	2001/11/29 08:15:00	2001/11/30 20:45:00	147	0	89.94%	0.06
806	2001/12/03 04:15:00	2001/12/05 06:00:00	200	0	90.06%	0.06
807	2001/12/14 10:15:00	2001/12/15 17:15:00	125	0	90.17%	0.06
808	2001/12/30 15:15:00	2001/12/30 17:15:00	9	0	90.28%	0.06
809	2002/01/03 16:15:00	2002/01/03 17:15:00	5	0	90.39%	0.06
810	2002/01/28 02:15:00	2002/01/28 05:15:00	13	0	90.50%	0.06
811	2002/01/28 18:15:00	2002/01/29 09:15:00	61	0	90.61%	0.06
812	2002/02/17 16:15:00	2002/02/17 17:15:00	5	0	90.73%	0.06
813	2002/02/18 15:15:00	2002/02/18 17:15:00	9	0	90.84%	0.06
814	2002/03/07 10:15:00	2002/03/07 16:15:00	25	0	90.95%	0.06
815	2002/03/07 23:15:00	2002/03/08 02:15:00	13	0	91.06%	0.06
816	2002/03/16 05:15:00	2002/03/16 08:15:00	13	0	91.17%	0.06
817	2002/03/24 01:15:00	2002/03/24 04:15:00	13	0	91.28%	0.06
818	2002/04/15 08:15:00	2002/04/15 09:15:00	5	0	91.40%	0.06
819	2002/04/24 10:15:00	2002/04/24 14:15:00	17	0	91.51%	0.06
820	2002/04/26 08:15:00	2002/04/26 09:15:00	5	0	91.62%	0.06
821	2002/05/20 22:15:00	2002/05/20 23:15:00	5	0	91.73%	0.06
822	2002/09/06 15:15:00	2002/09/06 17:15:00	9	0	91.84%	0.06
823	2002/12/29 15:15:00	2002/12/29 17:15:00	9	0	91.96%	0.06
824	2003/03/04 15:15:00	2003/03/04 17:15:00	9	0	92.07%	0.06
825	2003/04/05 16:15:00	2003/04/05 17:15:00	5	0	92.18%	0.06
826	2003/04/13 14:15:00	2003/04/13 18:15:00	17	0	92.29%	0.05
827	2003/05/07 16:15:00	2003/05/07 17:15:00	5	0	92.40%	0.05
828	2003/06/10 16:15:00	2003/06/10 17:15:00	5	0	92.51%	0.05
829	2003/06/11 16:15:00	2003/06/11 17:15:00	5	0	92.63%	0.05
830	2003/06/20 16:15:00	2003/06/20 17:15:00	5	0	92.74%	0.05
831	2003/07/30 06:15:00	2003/07/30 07:15:00	5	0	92.85%	0.05
832	2003/11/01 04:15:00	2003/11/01 05:15:00	5	0	92.96%	0.05
833	2003/11/03 17:15:00	2003/11/03 23:15:00	25	0	93.07%	0.05
834	2003/11/12 02:15:00	2003/11/12 12:15:00	41	0	93.18%	0.05
835	2003/11/16 00:15:00	2003/11/16 03:15:00	13	0	93.30%	0.05
836	2003/12/07 20:15:00	2003/12/08 00:15:00	17	0	93.41%	0.05
837	2003/12/11 16:15:00	2003/12/11 17:15:00	5	0	93.52%	0.05
838	2004/01/02 18:15:00	2004/01/03 23:15:00	117	0	93.63%	0.05

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
839	2004/01/19 07:15:00	2004/01/19 10:15:00	13	0	93.74%	0.05
840	2004/01/25 02:15:00	2004/01/25 03:15:00	5	0	93.85%	0.05
841	2004/01/28 04:15:00	2004/01/29 01:45:00	87	0	93.97%	0.05
842	2004/01/31 06:15:00	2004/01/31 07:15:00	5	0	94.08%	0.05
843	2004/03/26 09:15:00	2004/03/26 10:15:00	5	0	94.19%	0.05
844	2004/04/02 14:15:00	2004/04/02 16:15:00	9	0	94.30%	0.05
845	2004/04/17 12:15:00	2004/04/17 15:15:00	13	0	94.41%	0.05
846	2004/11/12 11:15:00	2004/11/12 12:15:00	5	0	94.53%	0.05
847	2004/11/29 11:15:00	2004/11/30 10:15:00	93	0	94.64%	0.05
848	2004/12/04 13:15:00	2004/12/04 14:15:00	5	0	94.75%	0.05
849	2005/01/26 01:15:00	2005/01/26 02:15:00	5	0	94.86%	0.05
850	2005/01/26 21:15:00	2005/01/27 00:15:00	13	0	94.97%	0.05
851	2005/02/07 07:15:00	2005/02/07 08:15:00	5	0	95.08%	0.05
852	2005/03/04 14:15:00	2005/03/04 15:15:00	5	0	95.20%	0.05
853	2005/03/18 16:15:00	2005/03/19 07:15:00	61	0	95.31%	0.05
854	2005/03/19 23:15:00	2005/03/20 05:15:00	25	0	95.42%	0.05
855	2005/05/06 01:15:00	2005/05/06 02:15:00	5	0	95.53%	0.05
856	2005/07/23 04:15:00	2005/07/23 05:15:00	5	0	95.64%	0.05
857	2005/09/20 01:15:00	2005/09/20 03:15:00	9	0	95.75%	0.05
858	2005/10/17 13:15:00	2005/10/17 15:15:00	9	0	95.87%	0.05
859	2005/12/03 01:15:00	2005/12/03 02:15:00	5	0	95.98%	0.05
860	2005/12/31 15:15:00	2005/12/31 22:15:00	29	0	96.09%	0.05
861	2006/02/17 22:15:00	2006/02/18 04:15:00	25	0	96.20%	0.05
862	2006/02/19 01:15:00	2006/02/19 05:15:00	17	0	96.31%	0.05
863	2006/03/07 00:15:00	2006/03/07 01:15:00	5	0	96.42%	0.05
864	2006/03/07 20:15:00	2006/03/09 01:00:00	116	0	96.54%	0.05
865	2006/03/17 19:15:00	2006/03/19 18:30:00	190	0	96.65%	0.05
866	2006/03/20 03:15:00	2006/03/20 04:15:00	5	0	96.76%	0.05
867	2006/03/25 23:15:00	2006/03/26 03:15:00	17	0	96.87%	0.05
868	2006/03/28 01:15:00	2006/03/28 02:15:00	5	0	96.98%	0.05
869	2006/04/14 12:15:00	2006/04/16 19:00:00	220	0	97.09%	0.05
870	2006/04/23 05:15:00	2006/04/23 06:15:00	5	0	97.21%	0.05
871	2006/07/28 23:15:00	2006/07/29 05:15:00	25	0	97.32%	0.05
872	2006/07/30 07:15:00	2006/07/30 08:15:00	5	0	97.43%	0.05
873	2006/07/31 06:15:00	2006/07/31 07:15:00	5	0	97.54%	0.05
874	2006/10/13 19:15:00	2006/10/14 04:15:00	37	0	97.65%	0.05
875	2006/10/14 11:15:00	2006/10/14 12:15:00	5	0	97.77%	0.05
876	2006/11/27 09:15:00	2006/11/27 12:15:00	13	0	97.88%	0.05
877	2006/11/27 22:15:00	2006/11/28 00:15:00	9	0	97.99%	0.05
878	2006/12/22 07:15:00	2006/12/22 08:15:00	5	0	98.10%	0.05
879	2006/12/27 06:15:00	2006/12/28 09:15:00	109	0	98.21%	0.05
880	2007/01/04 21:15:00	2007/01/05 02:15:00	21	0	98.32%	0.05
881	2007/01/29 21:15:00	2007/01/29 23:15:00	9	0	98.44%	0.05
882	2007/02/11 11:15:00	2007/02/11 13:15:00	9	0	98.55%	0.05
883	2007/02/26 23:15:00	2007/02/27 00:15:00	5	0	98.66%	0.05
884	2007/02/28 04:15:00	2007/03/01 11:00:00	124	0	98.77%	0.05
885	2007/03/21 03:15:00	2007/03/21 10:15:00	29	0	98.88%	0.05

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
886	2007/03/27 04:15:00	2007/03/27 05:15:00	5	0	98.99%	0.05
887	2007/03/27 15:15:00	2007/03/27 16:15:00	5	0	99.11%	0.05
888	2007/04/22 22:15:00	2007/04/23 02:15:00	17	0	99.22%	0.05
889	2007/05/23 00:15:00	2007/05/23 02:15:00	9	0	99.33%	0.05
890	2007/09/22 10:15:00	2007/09/22 11:15:00	5	0	99.44%	0.05
891	2007/10/13 02:15:00	2007/10/13 07:15:00	21	0	99.55%	0.05
892	2007/10/17 08:15:00	2007/10/17 09:15:00	5	0	99.66%	0.05
893	2008/01/21 07:15:00	2008/01/21 09:30:00	10	0	99.78%	0.05
894	2008/05/22 14:15:00	2008/05/22 15:15:00	5	0	99.89%	0.05
-End of Data----------						


Flow Duration Curves
Pre Development
Post Development Mitigated
Q10 (4.24cfs)
Qlf (0.302cfs)
Flow Rate (cfs)
4
3
2
1
0.00
0.05
0.10
0.15
0.20
(%) Percent Time Exceedance

Compare Post-Development Curve to Pre-Development Curve
Flow Control Upper Limit: 4.24 (cfs)
Flow Control Lower Limit: 0.302 (cfs)

post-development SWMM file: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 post hydromod.out
post-development time stamp: 2/9/2023 10:24:07 AM
Compared to:
pre-development SWMM file: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 pre hydromod.out
pre-development time stamp: 9/14/2022 3:04:49 PM

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
0	0.30	0.13	0.24	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
1	0.34	0.11	0.22	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
2	0.38	0.10	0.21	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
3	0.42	0.09	0.19	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
4	0.46	0.08	0.17	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
5	0.50	0.07	0.16	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
6	0.54	0.06	0.16	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
7	0.58	0.05	0.15	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
8	0.62	0.05	0.15	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
9	0.66	0.04	0.14	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
10	0.70	0.04	0.14	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
11	0.74	0.03	0.13	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
12	0.78	0.03	0.12	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
13	0.82	0.03	0.12	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
14	0.86	0.03	0.11	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
15	0.90	0.02	0.11	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
16	0.94	0.02	0.10	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
17	0.98	0.02	0.09	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
18	1.02	0.02	0.08	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
19	1.06	0.02	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
20	1.10	0.02	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
21	1.14	0.01	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
22	1.18	0.01	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
23	1.22	0.01	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
24	1.26	0.01	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
25	1.30	0.01	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
26	1.34	0.01	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
27	1.38	0.01	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
28	1.42	0.01	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
29	1.46	0.01	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
30	1.50	0.01	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
31	1.54	0.01	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
32	1.57	0.01	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
33	1.61	0.01	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
34	1.65	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
35	1.69	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
36	1.73	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
37	1.77	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
38	1.81	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
39	1.85	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
40	1.89	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
41	1.93	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
42	1.97	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
43	2.01	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
44	2.05	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
45	2.09	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
46	2.13	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
47	2.17	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
48	2.21	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
49	2.25	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
50	2.29	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
51	2.33	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
52	2.37	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
53	2.41	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
54	2.45	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
55	2.49	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
56	2.53	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
57	2.57	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
58	2.61	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
59	2.65	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
60	2.69	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
61	2.73	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
62	2.77	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
63	2.81	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
64	2.85	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
65	2.89	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
66	2.93	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
67	2.97	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
68	3.01	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
69	3.05	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
70	3.09	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
71	3.13	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
72	3.17	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
73	3.21	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
74	3.25	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
75	3.29	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
76	3.33	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
77	3.36	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
78	3.40	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
79	3.44	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
80	3.48	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
81	3.52	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
82	3.56	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
83	3.60	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
84	3.64	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
85	3.68	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
86	3.72	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
87	3.76	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
88	3.80	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
89	3.84	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
90	3.88	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
91	3.92	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
92	3.96	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
93	4.00	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
94	4.04	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
95	4.08	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
96	4.12	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
97	4.16	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
98	4.20	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
99	4.24	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Duration Table Summary at Project Discharge Point

file name: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 pre hydromod.out
time stamp: 9/14/2022 3:04:49 PM

DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	0.30	138	1860	0.243
2	0.34	150	1722	0.225
3	0.38	133	1572	0.205
4	0.42	117	1439	0.188
5	0.46	66	1322	0.173
6	0.50	65	1256	0.164
7	0.54	36	1191	0.156
8	0.58	41	1155	0.151
9	0.62	36	1114	0.146
10	0.66	41	1078	0.141
11	0.70	47	1037	0.135
12	0.74	46	990	0.129
13	0.78	43	944	0.123
14	0.82	38	901	0.118
15	0.86	45	863	0.113
16	0.90	54	818	0.107
17	0.94	58	764	0.100
18	0.98	84	706	0.092
19	1.02	64	622	0.081
20	1.06	54	558	0.073
21	1.10	26	504	0.066
22	1.14	9	478	0.062
23	1.18	13	469	0.061
24	1.22	13	456	0.060
25	1.26	13	443	0.058
26	1.30	23	430	0.056
27	1.34	27	407	0.053
28	1.38	16	380	0.050
29	1.42	18	364	0.048
30	1.46	13	346	0.045
31	1.50	19	333	0.044
32	1.54	23	314	0.041
33	1.57	25	291	0.038
34	1.61	19	266	0.035
35	1.65	18	247	0.032
36	1.69	18	229	0.030
37	1.73	13	211	0.028
38	1.77	5	198	0.026
39	1.81	3	193	0.025
40	1.85	6	190	0.025
41	1.89	6	184	0.024
42	1.93	7	178	0.023
43	1.97	4	171	0.022
44	2.01	7	167	0.022
45	2.05	6	160	0.021
46	2.09	4	154	0.020
47	2.13	10	150	0.020
48	2.17	8	140	0.018
49	2.21	9	132	0.017
50	2.25	8	123	0.016
51	2.29	7	115	0.015

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	2.33	7	108	0.014
53	2.37	6	101	0.013
54	2.41	4	95	0.012
55	2.45	1	91	0.012
56	2.49	1	90	0.012
57	2.53	2	89	0.012
58	2.57	1	87	0.011
59	2.61	3	86	0.011
60	2.65	4	83	0.011
61	2.69	3	79	0.010
62	2.73	2	76	0.010
63	2.77	2	74	0.010
64	2.81	1	72	0.009
65	2.85	4	71	0.009
66	2.89	10	67	0.009
67	2.93	6	57	0.007
68	2.97	6	51	0.007
69	3.01	2	45	0.006
70	3.05	4	43	0.006
71	3.09	0	39	0.005
72	3.13	1	39	0.005
73	3.17	3	38	0.005
74	3.21	0	35	0.005
75	3.25	0	35	0.005
76	3.29	1	35	0.005
77	3.33	1	34	0.004
78	3.36	1	33	0.004
79	3.40	0	32	0.004
80	3.44	3	32	0.004
81	3.48	4	29	0.004
82	3.52	8	25	0.003
83	3.56	3	17	0.002
84	3.60	2	14	0.002
85	3.64	2	12	0.002
86	3.68	2	10	0.001
87	3.72	1	8	0.001
88	3.76	0	7	0.001
89	3.80	0	7	0.001
90	3.84	0	7	0.001
91	3.88	1	7	0.001
92	3.92	2	6	0.001
93	3.96	2	4	0.001
94	4.00	1	2	0.000
95	4.04	1	1	0.000
96	4.08	0	0	0.000
97	4.12	0	0	0.000
98	4.16	0	0	0.000
99	4.20	0	0	0.000
100	4.24	0	0	0.000
---------End of Data----------				

Duration Table Summary at Project Discharge Point

file name: V:\22\22027\Engineering\TM\Storm\Working Files\Hydmod\22027 post hydromod.out
time stamp: 2/9/2023 10:24:07 AM

DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	0.30	244	1976	0.129
2	0.34	250	1732	0.113
3	0.38	174	1482	0.097
4	0.42	121	1308	0.085
5	0.46	137	1187	0.078
6	0.50	140	1050	0.069
7	0.54	122	910	0.059
8	0.58	91	788	0.051
9	0.62	73	697	0.046
10	0.66	46	624	0.041
11	0.70	50	578	0.038
12	0.74	51	528	0.034
13	0.78	50	477	0.031
14	0.82	23	427	0.028
15	0.86	32	404	0.026
16	0.90	44	372	0.024
17	0.94	29	328	0.021
18	0.98	28	299	0.020
19	1.02	13	271	0.018
20	1.06	22	258	0.017
21	1.10	13	236	0.015
22	1.14	9	223	0.015
23	1.18	19	214	0.014
24	1.22	21	195	0.013
25	1.26	15	174	0.011
26	1.30	18	159	0.010
27	1.34	5	141	0.009
28	1.38	9	136	0.009
29	1.42	11	127	0.008
30	1.46	6	116	0.008
31	1.50	6	110	0.007
32	1.54	11	104	0.007
33	1.57	10	93	0.006
34	1.61	14	83	0.005
35	1.65	7	69	0.005
36	1.69	10	62	0.004
37	1.73	4	52	0.003
38	1.77	3	48	0.003
39	1.81	4	45	0.003
40	1.85	2	41	0.003
41	1.89	1	39	0.003
42	1.93	4	38	0.002
43	1.97	7	34	0.002
44	2.01	10	27	0.002
45	2.05	1	17	0.001
46	2.09	3	16	0.001
47	2.13	1	13	0.001
48	2.17	3	12	0.001
49	2.21	1	9	0.001
50	2.25	0	8	0.001
51	2.29	4	8	0.001

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	2.33	0	4	0.000
53	2.37	0	4	0.000
54	2.41	0	4	0.000
55	2.45	1	4	0.000
56	2.49	0	3	0.000
57	2.53	0	3	0.000
58	2.57	0	3	0.000
59	2.61	0	3	0.000
60	2.65	0	3	0.000
61	2.69	0	3	0.000
62	2.73	0	3	0.000
63	2.77	0	3	0.000
64	2.81	1	3	0.000
65	2.85	0	2	0.000
66	2.89	1	2	0.000
67	2.93	1	1	0.000
68	2.97	0	0	0.000
69	3.01	0	0	0.000
70	3.05	0	0	0.000
71	3.09	0	0	0.000
72	3.13	0	0	0.000
73	3.17	0	0	0.000
74	3.21	0	0	0.000
75	3.25	0	0	0.000
76	3.29	0	0	0.000
77	3.33	0	0	0.000
78	3.36	0	0	0.000
79	3.40	0	0	0.000
80	3.44	0	0	0.000
81	3.48	0	0	0.000
82	3.52	0	0	0.000
83	3.56	0	0	0.000
84	3.60	0	0	0.000
85	3.64	0	0	0.000
86	3.68	0	0	0.000
87	3.72	0	0	0.000
88	3.76	0	0	0.000
89	3.80	0	0	0.000
90	3.84	0	0	0.000
91	3.88	0	0	0.000
92	3.92	0	0	0.000
93	3.96	0	0	0.000
94	4.00	0	0	0.000
95	4.04	0	0	0.000
96	4.08	0	0	0.000
97	4.12	0	0	0.000
98	4.16	0	0	0.000
99	4.20	0	0	0.000
100	4.24	0	0	0.000
---------End of Data----------				

END OF STATISTICS ANALYSIS

BMP Sizing Spreadsheet V3.1

Project Name:	Cornerstone Communities Woodward
Project Applicant:	Cornerstone Communities Woodward
Jurisdiction:	San Marcos
Parcel (APN):	220-210-49
Hydrologic Unit:	Carlsbad 904
Rain Gauge:	Lake Wohlford
Total Project Area (sf):	373,309
Channel Susceptibility:	High

BMP Sizing Spreadsheet V3.1			
Project Name:	ornerstone Communities Woodwar	Hydrologic Unit:	Carlsbad 904
Project Applicant:	ornerstone Communities Woodwar	Rain Gauge:	Lake Wohlford
Jurisdiction:	San Marcos	Total Project Area:	373,309
Parcel (APN):	220-210-49	Low Flow Threshold:	0.1Q2
BMP Name:	Enter BMP Name	BMP Type:	Cistern
BMP Native Soil Type:	D	BMP Infiltration Rate (in/hr):	NA

Areas Draining to BMP						HMP Sizing Factors	Minimum BMP Size
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1)[1]	Volume	Volume (CF)
						0	0
DMA-13	63,575	D	Steep	Landscape	0.1	0.12	763
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
BMP Tributary Area	63,575					Minimum BMP Size	763
						Proposed BMP Size*	3958

* Assumes standard configuration

Standard Cistern Depth (Overflow Elevation)	3.5	ft
Provided Cistern Depth (Overflow Elevation)	3.0	ft
Minimum Required Cistern Footprint)	254	CF

Notes:

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

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

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

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

BMP Sizing Spreadsheet V3.1			
Project Name:	rnerstone Communities Woodwa	Hydrologic Unit:	Carlsbad 904
Project Applicant:	rnerstone Communities Woodwa	Rain Gauge:	Lake Wohlford
Jurisdiction:	San Marcos	Total Project Area:	373,309
Parcel (APN):	220-210-49	Low Flow Threshold:	0.1Q2
BMP Name	Enter BMP Name	BMP Type:	Cistern

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	Orifice Area (in^2)
		Soil Type	Slope				
DMA-13	Lake Wohlford	D	Steep	0.556	1.459	0.081	**1.29**

3.00	**0.081**	**1.29**	**1.28**
Max Orifice Head (feet)	**Max Tot. Allowable Orifice Flow (cfs)**	**Max Tot. Allowable Orifice Area (in^2)**	**Max Orifice Diameter (in)**

Provide Hand Calc.	**0.040**	**0.64**	**0.900**
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in^2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	Provide Hand Calculation

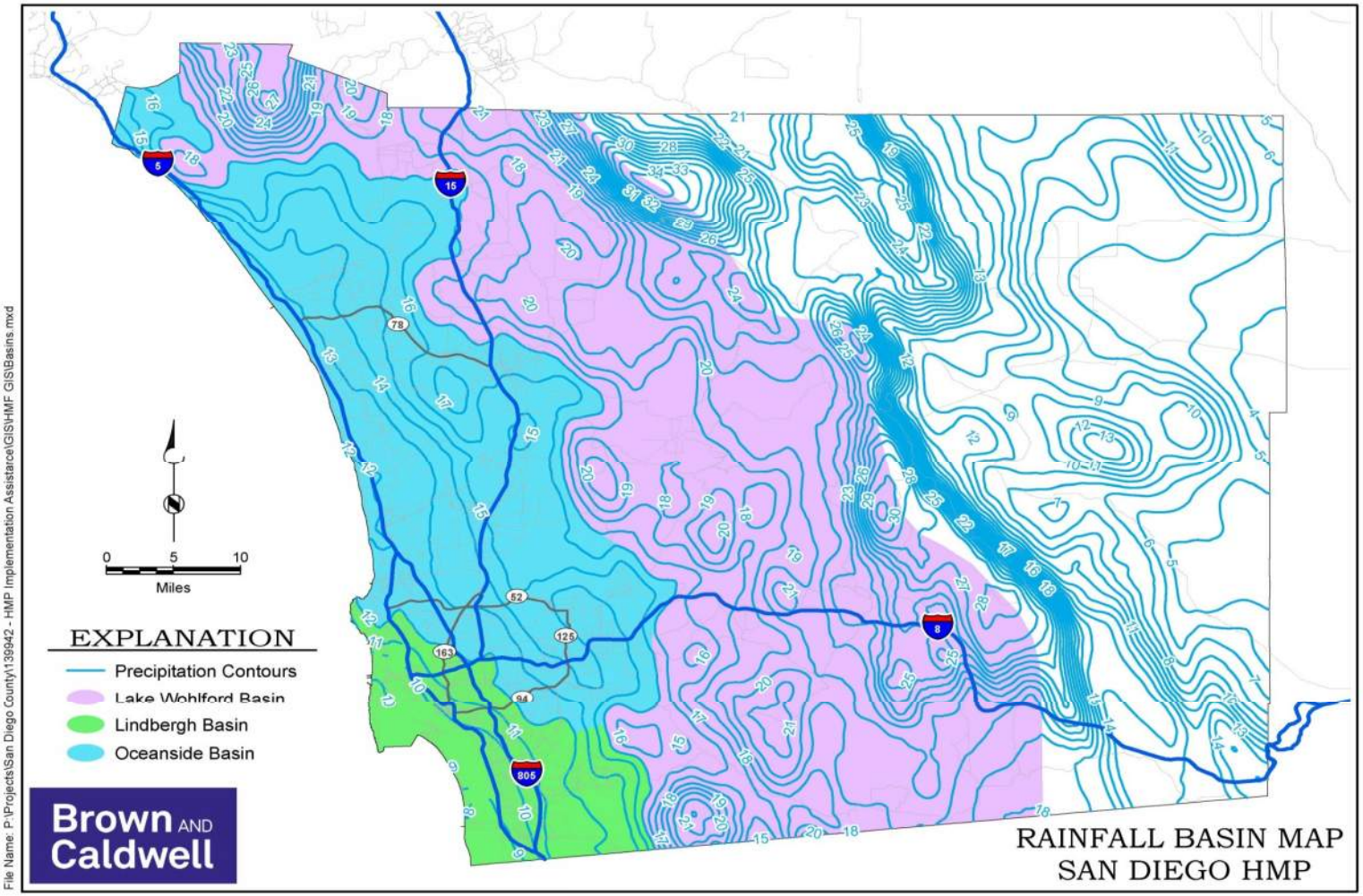

0
5
10
Miles
EXPLANATION
Precipitation Contours
Lake Wohlford Basin
Lindbergh Basin
Oceanside Basin
Brown AND Caldwell
RAINFALL BASIN MAP
SAN DIEGO HMP
File Name: P:\Projects\San Diego County\139942 - HMP Implementation Assistance\GIS\HMF GIS\Basins.mxd

Table G.2-3: Sizing Factors for Hydromodification Flow Control Infiltration BMPs Designed Using Sizing Factor Method				
Lower Flow Threshold	Soil Group	Slope	Rain Gauge	A
0.1Q2	A	Flat	Lindbergh	0.055
0.1Q2	A	Moderate	Lindbergh	0.055
0.1Q2	A	Steep	Lindbergh	0.055
0.1Q2	B	Flat	Lindbergh	0.045
0.1Q2	B	Moderate	Lindbergh	0.045
0.1Q2	B	Steep	Lindbergh	0.045
0.1Q2	C	Flat	Lindbergh	0.035
0.1Q2	C	Moderate	Lindbergh	0.035
0.1Q2	C	Steep	Lindbergh	0.035
0.1Q2	D	Flat	Lindbergh	0.03
0.1Q2	D	Moderate	Lindbergh	0.03
0.1Q2	D	Steep	Lindbergh	0.03
0.1Q2	A	Flat	Oceanside	0.06
0.1Q2	A	Moderate	Oceanside	0.06
0.1Q2	A	Steep	Oceanside	0.06
0.1Q2	B	Flat	Oceanside	0.05
0.1Q2	B	Moderate	Oceanside	0.05
0.1Q2	B	Steep	Oceanside	0.05
0.1Q2	C	Flat	Oceanside	0.05
0.1Q2	C	Moderate	Oceanside	0.05
0.1Q2	C	Steep	Oceanside	0.045
0.1Q2	D	Flat	Oceanside	0.035
0.1Q2	D	Moderate	Oceanside	0.035
0.1Q2	D	Steep	Oceanside	0.035
0.1Q2	A	Flat	Lake Wohlford	0.085
0.1Q2	A	Moderate	Lake Wohlford	0.085
0.1Q2	A	Steep	Lake Wohlford	0.085
0.1Q2	B	Flat	Lake Wohlford	0.07
0.1Q2	B	Moderate	Lake Wohlford	0.07
0.1Q2	B	Steep	Lake Wohlford	0.07
0.1Q2	C	Flat	Lake Wohlford	0.055
0.1Q2	C	Moderate	Lake Wohlford	0.055
0.1Q2	C	Steep	Lake Wohlford	0.055
0.1Q2	D	Flat	Lake Wohlford	0.04
0.1Q2	D	Moderate	Lake Wohlford	0.04
0.1Q2	D	Steep	Lake Wohlford	0.04

Table G.2-4: Sizing Factors for Hydromodification Flow Control Biofiltration with Partial Retention Designed Using Sizing Factor Method					
Lower Flow Threshold	Soil Group	Slope	below low orifice inv(	Rain Gauge	A
0.1Q2	A	Flat	18	Lindbergh	0.08
0.1Q2	A	Moderate	18	Lindbergh	0.08
0.1Q2	A	Steep	18	Lindbergh	0.08
0.1Q2	B	Flat	18	Lindbergh	0.065
0.1Q2	B	Moderate	18	Lindbergh	0.065
0.1Q2	B	Steep	18	Lindbergh	0.06
0.1Q2	C	Flat	6	Lindbergh	0.05
0.1Q2	C	Moderate	6	Lindbergh	0.05
0.1Q2	C	Steep	6	Lindbergh	0.05
0.1Q2	D	Flat	3	Lindbergh	0.05
0.1Q2	D	Moderate	3	Lindbergh	0.05
0.1Q2	D	Steep	3	Lindbergh	0.05
0.1Q2	A	Flat	18	Oceanside	0.08
0.1Q2	A	Moderate	18	Oceanside	0.075
0.1Q2	A	Steep	18	Oceanside	0.075
0.1Q2	B	Flat	18	Oceanside	0.07
0.1Q2	B	Moderate	18	Oceanside	0.07
0.1Q2	B	Steep	18	Oceanside	0.07
0.1Q2	C	Flat	6	Oceanside	0.07
0.1Q2	C	Moderate	6	Oceanside	0.07
0.1Q2	C	Steep	6	Oceanside	0.07
0.1Q2	D	Flat	3	Oceanside	0.07
0.1Q2	D	Moderate	3	Oceanside	0.07
0.1Q2	D	Steep	3	Oceanside	0.07
0.1Q2	A	Flat	18	Lake Wohlford	0.11
0.1Q2	A	Moderate	18	Lake Wohlford	0.11
0.1Q2	A	Steep	18	Lake Wohlford	0.105
0.1Q2	B	Flat	18	Lake Wohlford	0.09
0.1Q2	B	Moderate	18	Lake Wohlford	0.085
0.1Q2	B	Steep	18	Lake Wohlford	0.085
0.1Q2	C	Flat	6	Lake Wohlford	0.065
0.1Q2	C	Moderate	6	Lake Wohlford	0.065
0.1Q2	C	Steep	6	Lake Wohlford	0.065
0.1Q2	D	Flat	3	Lake Wohlford	0.06
0.1Q2	D	Moderate	3	Lake Wohlford	0.06
0.1Q2	D	Steep	3	Lake Wohlford	0.06

Table G.2-5: Sizing Factors for Hydromodification Flow Control Biofiltration BMPs Designed Using Sizing Factor Method				
Lower Flow Threshold	Soil Group	Slope	Rain Gauge	A
0.1Q2	A	Flat	Lindbergh	0.32
0.1Q2	A	Moderate	Lindbergh	0.3
0.1Q2	A	Steep	Lindbergh	0.285
0.1Q2	B	Flat	Lindbergh	0.105

0.1Q2	B	Moderate	Lindbergh	0.1
0.1Q2	B	Steep	Lindbergh	0.095
0.1Q2	C	Flat	Lindbergh	0.055
0.1Q2	C	Moderate	Lindbergh	0.05
0.1Q2	C	Steep	Lindbergh	0.05
0.1Q2	D	Flat	Lindbergh	0.05
0.1Q2	D	Moderate	Lindbergh	0.05
0.1Q2	D	Steep	Lindbergh	0.05
0.1Q2	A	Flat	Oceanside	0.15
0.1Q2	A	Moderate	Oceanside	0.14
0.1Q2	A	Steep	Oceanside	0.135
0.1Q2	B	Flat	Oceanside	0.085
0.1Q2	B	Moderate	Oceanside	0.085
0.1Q2	B	Steep	Oceanside	0.085
0.1Q2	C	Flat	Oceanside	0.075
0.1Q2	C	Moderate	Oceanside	0.075
0.1Q2	C	Steep	Oceanside	0.075
0.1Q2	D	Flat	Oceanside	0.07
0.1Q2	D	Moderate	Oceanside	0.07
0.1Q2	D	Steep	Oceanside	0.07
0.1Q2	A	Flat	Lake Wohlford	0.285
0.1Q2	A	Moderate	Lake Wohlford	0.275
0.1Q2	A	Steep	Lake Wohlford	0.27
0.1Q2	B	Flat	Lake Wohlford	0.15
0.1Q2	B	Moderate	Lake Wohlford	0.145
0.1Q2	B	Steep	Lake Wohlford	0.145
0.1Q2	C	Flat	Lake Wohlford	0.07
0.1Q2	C	Moderate	Lake Wohlford	0.07
0.1Q2	C	Steep	Lake Wohlford	0.07
0.1Q2	D	Flat	Lake Wohlford	0.06
0.1Q2	D	Moderate	Lake Wohlford	0.06
0.1Q2	D	Steep	Lake Wohlford	0.06

Table G.2-6: Sizing Factors for Hydromodification Flow Control Cistern Facilities Designed Using Sizing Factor Method

Lower Flow Threshold	Soil Group	Slope	Rain Gauge	V
0.1Q2	A	Flat	Lindbergh	0.54
0.1Q2	A	Moderate	Lindbergh	0.51
0.1Q2	A	Steep	Lindbergh	0.49
0.1Q2	B	Flat	Lindbergh	0.19
0.1Q2	B	Moderate	Lindbergh	0.18
0.1Q2	B	Steep	Lindbergh	0.18
0.1Q2	C	Flat	Lindbergh	0.11
0.1Q2	C	Moderate	Lindbergh	0.11
0.1Q2	C	Steep	Lindbergh	0.11
0.1Q2	D	Flat	Lindbergh	0.09
0.1Q2	D	Moderate	Lindbergh	0.09

0.1Q2	D	Steep	Lindbergh	0.09
0.1Q2	A	Flat	Oceanside	0.26
0.1Q2	A	Moderate	Oceanside	0.25
0.1Q2	A	Steep	Oceanside	0.25
0.1Q2	B	Flat	Oceanside	0.16
0.1Q2	B	Moderate	Oceanside	0.16
0.1Q2	B	Steep	Oceanside	0.16
0.1Q2	C	Flat	Oceanside	0.14
0.1Q2	C	Moderate	Oceanside	0.14
0.1Q2	C	Steep	Oceanside	0.14
0.1Q2	D	Flat	Oceanside	0.12
0.1Q2	D	Moderate	Oceanside	0.12
0.1Q2	D	Steep	Oceanside	0.12
0.1Q2	A	Flat	Lake Wohlford	0.53
0.1Q2	A	Moderate	Lake Wohlford	0.49
0.1Q2	A	Steep	Lake Wohlford	0.49
0.1Q2	B	Flat	Lake Wohlford	0.28
0.1Q2	B	Moderate	Lake Wohlford	0.28
0.1Q2	B	Steep	Lake Wohlford	0.28
0.1Q2	C	Flat	Lake Wohlford	0.14
0.1Q2	C	Moderate	Lake Wohlford	0.14
0.1Q2	C	Steep	Lake Wohlford	0.14
0.1Q2	D	Flat	Lake Wohlford	0.12
0.1Q2	D	Moderate	Lake Wohlford	0.12
0.1Q2	D	Steep	Lake Wohlford	0.12

ATTACHMENT 3
Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	**Contents**	**Checklist**
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☑ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Maintenance Agreement (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.

☐ I **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)

☐ I How to access the structural BMP(s) to inspect and perform maintenance

☐ I Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)

☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable

☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)

☐ Recommended equipment to perform maintenance

☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b shall include a draft maintenance agreement in the local jurisdiction's standard format (PDP applicant to contact the [City Engineer] to obtain the current maintenance agreement forms).

BF-1
Biofiltration

BMP MAINTENANCE FACT SHEET
FOR
STRUCTURAL BMP BF-1 BIOFILTRATION

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

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

Normal Expected Maintenance

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

Non-Standard Maintenance or BMP Failure

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

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

Other Special Considerations

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

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BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-A
Permit No.:	APN(s): 220-210-49-00	
Property / Development Name:	Responsible Party Name and Phone Number:	
Property Address of BMP:	Responsible Party Address:	

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

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-A
Permit No.:	APN(s): 220-210-49-00	

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-A
Permit No.:	APN(s): 220-210-49-00	

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-A
Permit No.:	APN(s): 220-210-49-00	

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-A
Permit No.:	APN(s): 220-210-49-00	

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

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

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-B
Permit No.:	APN(s): 220-210-49-00	
Property / Development Name:	Responsible Party Name and Phone Number:	
Property Address of BMP:	Responsible Party Address:	

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

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-B
Permit No.:	APN(s): 220-210-49-00	

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-B
Permit No.:	APN(s): 220-210-49-00	

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-B
Permit No.:	APN(s): 220-210-49-00	

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.: BMP-B
Permit No.:	APN(s): 220-210-49-00	

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

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

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

If These Sources Will Be on the Project Site …	… Then Your SWQMP Must Consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **A.** Onsite storm drain inlets ☐ Not Applicable	☑ Locations of inlets.	☑ Mark all inlets with the words "No Dumping! Flows to Bay" or similar. See stencil template provided in Appendix I-4	☑ Maintain and periodically repaint or replace inlet markings. ☑ Provide storm water pollution prevention information to new site owners, lessees, or operators. ☑ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Storm Water Quality Handbooks at www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook. ☑ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **B.** Interior floor drains and elevator shaft sump pumps ☐ Not Applicable		☑ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☑ Inspect and maintain drains to prevent blockages and overflow.
☑ **C.** Interior parking garages ☐ Not Applicable		☑ State that parking garage floor drains will be plumbed to the sanitary sewer.	☑ Inspect and maintain drains to prevent blockages and overflow.
☑ **D1.** Need for future indoor & structural pest control ☐ Not Applicable		☑ Note building design features that discourage entry of pests.	☑ Provide Integrated Pest Management information to owners, lessees, and operators.

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **D2.** Landscape/ Outdoor Pesticide Use ☐ Not Applicable	☑ Show locations of existing trees or areas of shrubs and ground cover to be undisturbed and retained. Show self-retaining landscape areas, if any. Show storm water treatment facilities.	State that final landscape plans will accomplish all of the following. ☑ Preserve existing drought tolerant trees, shrubs, and ground cover to the maximum extent possible. ☑ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution. ☑ Where landscaped areas are used to retain or detain storm water, specify plants that are tolerant of periodic saturated soil conditions. ☑ Consider using pest-resistant plants, especially adjacent to hardscape. ☑ To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☑ Maintain landscaping using minimum or no pesticides. ☑ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Storm Water Quality Handbooks at www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook. ☑ Provide IPM information to new owners, lessees and operators.

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☐ **E.** Pools, spas, ponds, decorative fountains, and other water features. ☑ Not Applicable	☐ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	☐ If the local municipality requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	☐ See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Storm Water Quality Handbooks at www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook.
☐ **F.** Food service ☑ Not Applicable	☐ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer. All cleaning for restaurant facility will be done indoors. Indoor kitchen area is connected to grease interceptor.	☐ Describe the location and features of the designated cleaning area. ☐ Describe the items to be cleaned in this facility and how it has been sized to ensure that the largest items can be accommodated.	

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☑ **G.** Refuse areas ☐ Not Applicable	☑ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ☑ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. Also show how the designated area will be protected from wind dispersal. ☑ Any drains from dumpsters, compactors, and tallow bin areas must be connected to a grease removal device before discharge to sanitary sewer.	☑ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☑ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	☑ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on- site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Storm Water Quality Handbooks at www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook.

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative Table and Narrative**
☐ **H.** Industrial processes. ☑ Not Applicable	☐ Show process area.	☐ If industrial processes are to be located onsite, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	☐ See Fact Sheet SC-10, "Non-Storm Water Discharges" in the CASQA Storm Water Quality Handbooks at https://www.casqa.org/resources/bmp-handbooks.
☐ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.) ☑ Not Applicable	☐ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or runoff from area and protected from wind dispersal. ☐ Storage of non-hazardous liquids must be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ☐ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	☐ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. ☐ Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release Prevention Program ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank	☐ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials" in the CASQA Storm Water Quality Handbooks at www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook.

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☐ **J.** Vehicle and Equipment Cleaning ☑ Not Applicable	☐ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle /equipment cleaning needs must either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes must have a paved, bermed, and covered car wash area (unless car washing is prohibited onsite and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment must be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities must be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility must discharge to the sanitary sewer, or a wastewater reclamation system must be installed.	☐ If a car wash area is not provided, describe measures taken to discourage onsite car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ☐ Washwater from vehicle and equipment washing operations must not be discharged to the storm drain system. ☐ Car dealerships and similar may rinse cars with water only. ☐ See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Storm Water Quality Handbooks at www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook.

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
K. ☐ Vehicle/Equipment Repair and Maintenance ☑ Not Applicable	☐ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to protect from rainfall, run-on runoff, and wind dispersal. ☐ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains must not be installed within the secondary containment areas. ☐ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	☐ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ☐ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ☐ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the report, note that all of the following restrictions apply to use the site: ☐ No person must dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ☐ No vehicle fluid removal must be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids must be contained or drained from the vehicle immediately. ☐ No person must leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☐ **L.** Fuel Dispensing Areas ☑ Not Applicable	☐ Fueling areas[16] must have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are (1) graded at the minimum slope necessary to prevent ponding; and (2) separated from the rest of the site by a grade break that prevents run-on of storm water to the MEP. ☐ Fueling areas must be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area1.] ☐ The canopy [or cover] must not drain onto the fueling area.		☐ The property owner must dry sweep the fueling area routinely. See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Storm Water Quality Handbooks at https://www.casqa.org/resources/bmp-handbooks.

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

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in**	**4** **Operational BMPs—Include in Table and Narrative**
M. Loading Docks ☑ Not Applicable	☐ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks must be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts must be positioned to direct storm water away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited. ☐ Loading dock areas draining directly to the sanitary sewer must be equipped with a spill control valve or equivalent device, which must be kept closed during periods of operation. ☐ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		☐ Move loaded and unloaded items indoors as soon as possible. ☐ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Storm Water Quality Handbooks at www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook.

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☑ **N.** Fire Sprinkler Test Water ☐ Not Applicable		☑ Provide a means to drain fire sprinkler test water to the sanitary sewer.	☑ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Storm Water Quality Handbooks at www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook
O. Miscellaneous Drain or Wash Water ☐ Boiler drain lines ☑ Condensate drain lines ☑ Rooftop equipment ☐ Drainage sumps ☐ Roofing, gutters, and trim ☐ Not Applicable		☐ Boiler drain lines must be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ☑ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ☑ Rooftop mounted equipment with potential to produce pollutants must be roofed and/or have secondary containment. ☐ Any drainage sumps onsite must feature a sediment sump to reduce the quantity of sediment in pumped water. ☐ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	

If These Sources Will Be on the Project Site …	… Then Your SWQMP must consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **P.** Plazas, sidewalks, and parking lots. ☐ Not Applicable			☑ Plazas, sidewalks, and parking lots must be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing must be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser must be collected and discharged to the sanitary sewer and not discharged to a storm drain.

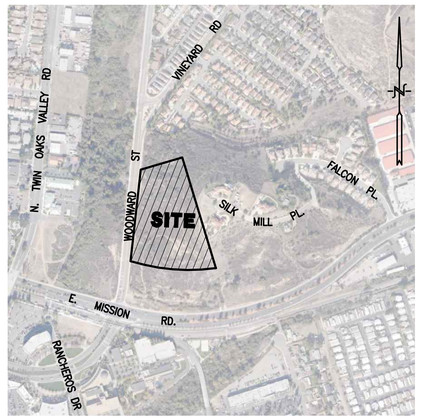
ATTACHMENT 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

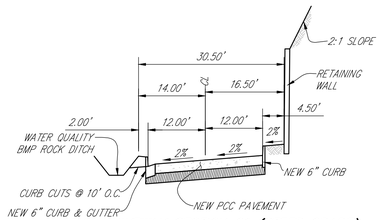
Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

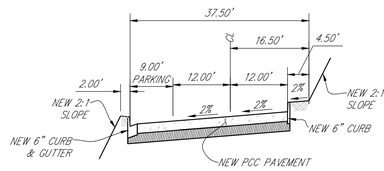
- ☑ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- ☑ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- ☑ Details and specifications for construction of structural BMP(s)
- ☑ Signage indicating 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 proprietary BMPs are used, site-specific cross section with outflow, inflow, and model number shall be provided. Photocopies of general brochures are not acceptable.



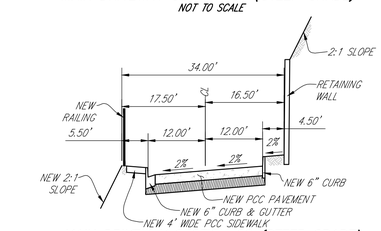
VICINITY MAP
NOT TO SCALE



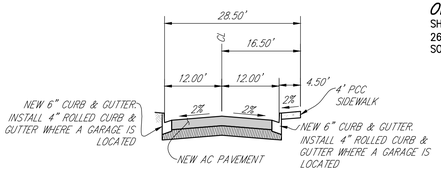
MAIN DRIVEWAY SECTION 01 (STEEP GRADE)
NOT TO SCALE



MAIN DRIVEWAY SECTION 03 (STEEP GRADE)



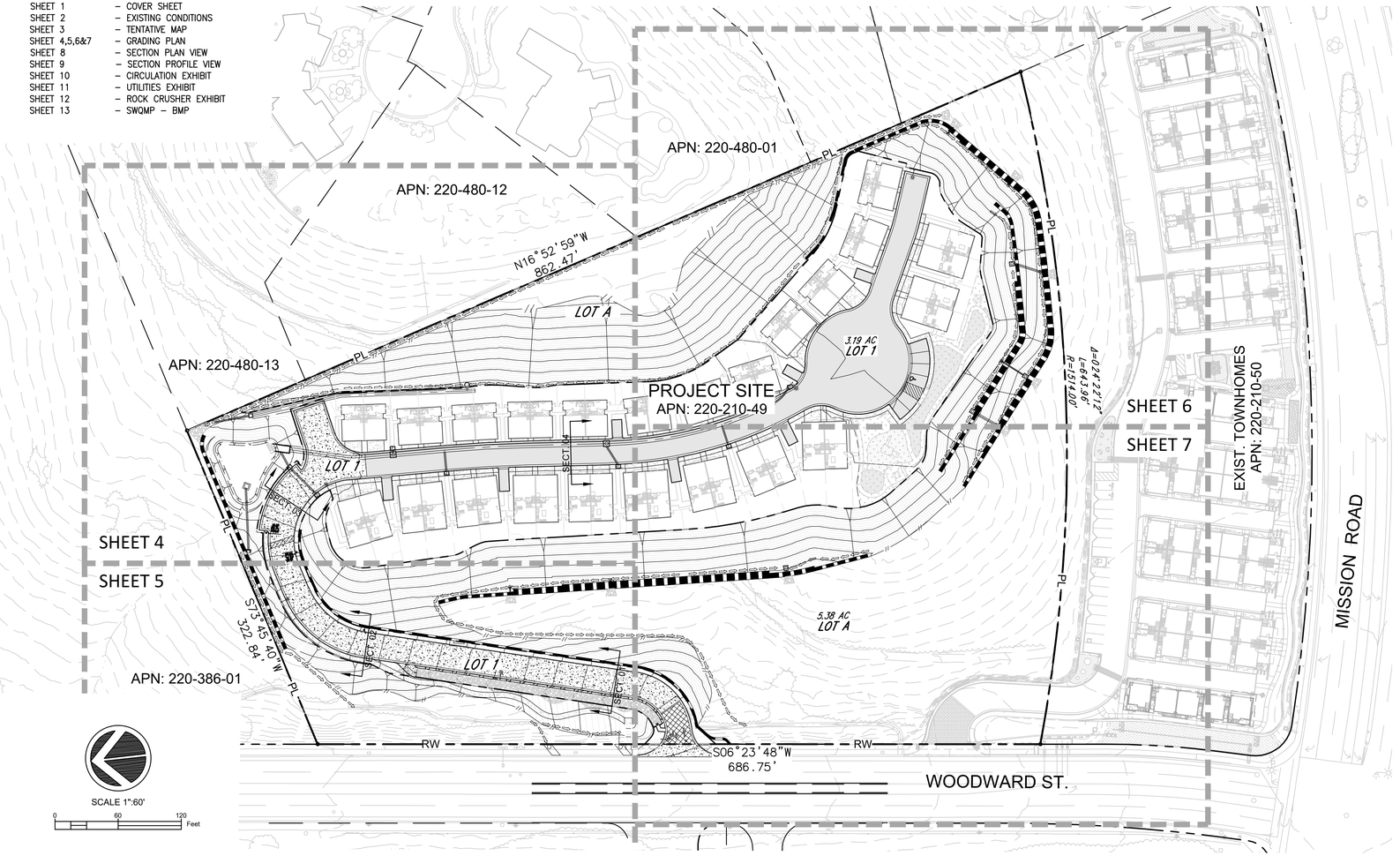
MAIN DRIVEWAY SECTION 02 (STEEP GRADE)
NOT TO SCALE



MAIN DRIVEWAY SECTION 04
NOT TO SCALE

SHEET INDEX

SHEET 1	– COVER SHEET
SHEET 2	– EXISTING CONDITIONS
SHEET 3	– TENTATIVE MAP
SHEET 4,5,6&7	– GRADING PLAN
SHEET 8	– SECTION PLAN VIEW
SHEET 9	– SECTION PROFILE VIEW
SHEET 10	– CIRCULATION EXHIBIT
SHEET 11	– UTILITIES EXHIBIT
SHEET 12	– ROCK CRUSHER EXHIBIT
SHEET 13	– SWQMP – BMP



SCALE 1":60'
0 60 120 Feet

DEVELOPER / APPLICANT

CORNERSTONE COMMUNITIES CORPORATION
1241 CAVE STREET, SUITE 200
LA JOLLA, CA 92037

JACK ROBSON – VP, LAND PLANNING AND DEVELOPMENT

OWNER'S CERTIFICATE

WE HEREBY CERTIFY THAT WE ARE THE RECORD OWNERS OF THE PROPERTY SHOWN ON THE ATTACHED TENTATIVE MAP AND THAT SAID MAP SHOWS OUR ENTIRE CONTIGUOUS OWNERSHIP. WE UNDERSTAND THAT PROPERTY IS CONSIDERED CONTIGUOUS EVEN IF IT IS SEPARATED BY ROADS, STREETS UTILITY EASEMENTS OR RAILROAD RIGHT OF WAY.

APPLICANT /AGENT FOR OWNERS DATE

SEE AGREEMENT DOC. NO. _____
DATED: _____

OWNER

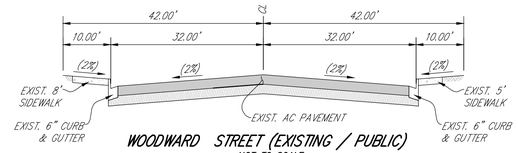
SHERA CROCKETT, INC
261 N. HIGHWAY 101 #1019
SOLANA BEACH CA 92075

~ CORNERSTONE COMMUNITIES ~

WOODWARD

AT SAN MARCOS

TENTATIVE SUBDIVISION MAP FOR CONDOMINIUM PURPOSES
FOR A TOTAL OF 46 RESIDENTIAL AIRSPACE UNITS.



WOODWARD STREET (EXISTING / PUBLIC)
NOT TO SCALE

LEGAL DESCRIPTION FOR APN 220-210-49-00

PARCEL B OF CERTIFICATE OF COMPLIANCE RECORDED FEBRUARY 29, 2008 AS INSTRUMENT NO. 2008-0107275 OF OFFICIAL RECORDS AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

LOT 5 IN BLOCK 52 OF RANCHO LOS VALLECITOS DE SAN MARCOS, IN THE CITY OF SAN MARCOS, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 806, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DECEMBER 21, 1895.

EXCEPTING THEREFROM THE SOUTHERLY233.00 FEET OF SAID LOT 5, MEASURED CONCENTRIC TO THE NORTHERLY RIGHT-OF-WAY OF MISSION ROAD THEREOF.

SOURCE OF TOPOGRAPHY

THE EXISTING TOPOGRAPHY SHOWN HEREON IS A COMBINATION OF THE FIELD TOPOGRAPHIC SURVEY CONDUCTED BY REPRESENTATIVE OF EXCEL ENGINEERING ON NOVEMBER 31, 2017, AERIAL SURVEY PERFORMED BY ANALYTICAL PHOTOGRAMMETRIC SURVEYS, INC. JULY 2013 & THE APPROVED PRECISE GRADING PLAN OF MISSION VILLAS (GP20-00016)

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS PROJECT IS BETWEEN SURVEY CONTROL POINT #1024 "SMVC024" AND SURVEY CONTROL POINT #1077 "SMVC077" AS SHOWN ON RECORD OF SURVEY 13928, RECORDED OCTOBER 1, 1992 AS FILE NO. 92-625379.

THE COMBINED FACTOR FOR THIS PROJECT IS BASED ON SURVEY CONTROL POINT #1024, BEING 0.999938891 GROUND TO GRID.

(IE N 54° 45' 30" E)

BENCHMARK

THE BENCHMARK FOR THIS SITE IS FROM THE CITY OF SAN MARCOS SURVEY CONTROL MAP, AS SHOWN ON RECORD OF SURVEY 13928, RECORDED OCTOBER 1, 1992 AS FILE NO. 92-625379 AND UPDATED PER THE CITY OF SAN MARCOS BENCHMARK CONVERSION TABLE DATED SEPTEMBER 21, 2011.

POINT #1024 "SMVC024" – A 3" BRASS DISC IN STANDARD STREET WELL MONUMENT ENCLOSURE, PUNCHED, NOT STAMPED, LOCATED AT THE INTERSECTION OF SAN MARCOS BOULEVARD AND GRAND AVENUE.

ELEVATION = 551.909 FEET (NORTH AMERICAN VERTICAL DATUM OF 1988)

EXISTING EASEMENTS

SEE SHEET 2 FOR DESCRIPTIONS & LOCATIONS.

PROPERTY ADDRESS

274 E MISSION ROAD
SAN MARCOS, CA 92069

EXISTING ZONING

SPECIFIC PLAN AREA (SPA)

PROPOSED ZONING

SP

SOILS REPORT

A SOILS REPORT ENTITLED "PRELIMINARY GEOTECHNICAL EVALUATION FOR PROPOSED RESIDENTIAL DEVELOPMENT APN 220-210-49-00" BY GEOTEK, INC, DATED MAY 16, 2019.

EARTHWORK QUANTITIES

PRISMOIDAL METHOD OF EARTHWORK VOLUME CALCULATIONS WAS USED IN THIS ESTIMATE. SECTIONS OF DRIVE AISLE, PARKING, WATER QUALITY BASIN & OTHER ITEMS WERE ALSO CONSIDERED IN THE PROCESS.

SUMMARY		
TOTAL CUT VOLUME (COMMON EXCAVATION/EMBANKMENT)	41,989	CY
TOTAL ON-SITE MATERIALS AVAILABLE FOR FILL (INCLUDES OVEREXCAVATION & BULKING)	50,270	CY
TOTAL FILL VOLUME	50,285	CY
SELECT FILLS FOR GEOGRID WALLS & WQ BASIN	5,312	CY
ESTIMATED OVER EXCAVATION VOLUME	11,240	CY
ESTIMATED BLASTING VOLUME	7,329	CY

UTILITIES

FIRE	SAN MARCOS FIRE PROTECTION DISTRICT
SCHOOL	SAN MARCOS UNIFIED SCHOOL DISTRICT
SEWER	VALLECITOS WATER DISTRICT
WATER	VALLECITOS WATER DISTRICT
TELEPHONE	COX COMMUNICATIONS
GAS	SAN DIEGO GAS & ELECTRIC
ELECTRIC	SAN DIEGO GAS & ELECTRIC

PROPOSED ONSITE UTILITIES

WATER	PRIVATE
FIRE SYSTEM	PRIVATE
SEWER	PRIVATE
STORM DRAIN	PRIVATE

CONDOMINIUM STATEMENT

THIS TENTATIVE MAP IS A CONDOMINIUM PROJECT AS DEFINED IN SECTION 4125 OF THE CIVIL CODE OF THE STATE OF CALIFORNIA AND IS FILED PURSUANT TO THE SUBDIVISION MAP ACT THAT PROPOSES 1 LOT WITH 46 AIR SPACE RESIDENTIAL CONDOMINIUMS.

LOTS

TOTAL LOTS EXISTING: 1
TOTAL LOTS PROPOSED: 2
RESIDENTIAL "LOT 1" = 3.19 AC
OPEN SPACE "LOT A" = 5.38 AC

MAP PREPARED BY

EXCEL ENGINEERING
440 STATE PLACE
ESCONDIDO, CA 92029
(760)745-8118

SURVEYING BY: _____
MICHAEL D. LEVIN DATE: 06-22-2023

ENGINEERING BY: _____
ROBERT D. DENTINO DATE: 6/22/2023

MAP PREPARATION DATE

FEBRUARY 2023

LAND AREA

GROSS = 8.57 ACRES
NET = 8.57 ACRES

APN

APN 220-210-49

FLOOD ZONE DESIGNATION

FLOOD ZONE INFORMATION PER THE FEDERAL EMERGENCY MANAGEMENT AGENCY WEBSITE.

THIS SITE IS PART OF FEMA FLOOD PANEL NOS. 06073C-0793G AND 06073C-0794G, AND IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
BOTH MAPS WERE REVISED: MAY 16, 2012

THE PROPERTY IS LOCATED WITHIN ZONE X – AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

	DATE	REMARKS
	06/2023	PLANNING SUBMITTAL

EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • GPS SURVEYING
440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-8334

SHEET 1 OF 13 SHEETS
COVER SHEET

CORNERSTONE COMMUNITIES
WOODWARD
APN 220-210-49
WOODWARD ST, SAN MARCOS CA

| |Excelsior\projects\31\21\22027\Engineering\IM\IM01\IM-P02\22027 COVER SHEET.dwg 6/22/2023 9:49 AM ORIGINAL PLOT SIZE: ----

EXISTING EASEMENTS

E-01 AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES RECORDED OCTOBER 19, 1948, IN BOOK 2985, PAGE 237 OF OFFICIAL RECORDS, IN FAVOR OF THE SAN DIEGO GAS & ELECTRIC COMPANY. THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

E-02 AN EASEMENT FOR DRAINAGE, SLOPE, PUBLIC STREET UTILITY AND RIGHTS INCIDENTAL THERETO RECORDED MARCH 26, 2002, AS DOCUMENT NO. 2002-0251944 OF OFFICIAL RECORDS, IN FAVOR OF THE CITY OF SAN MARCOS.

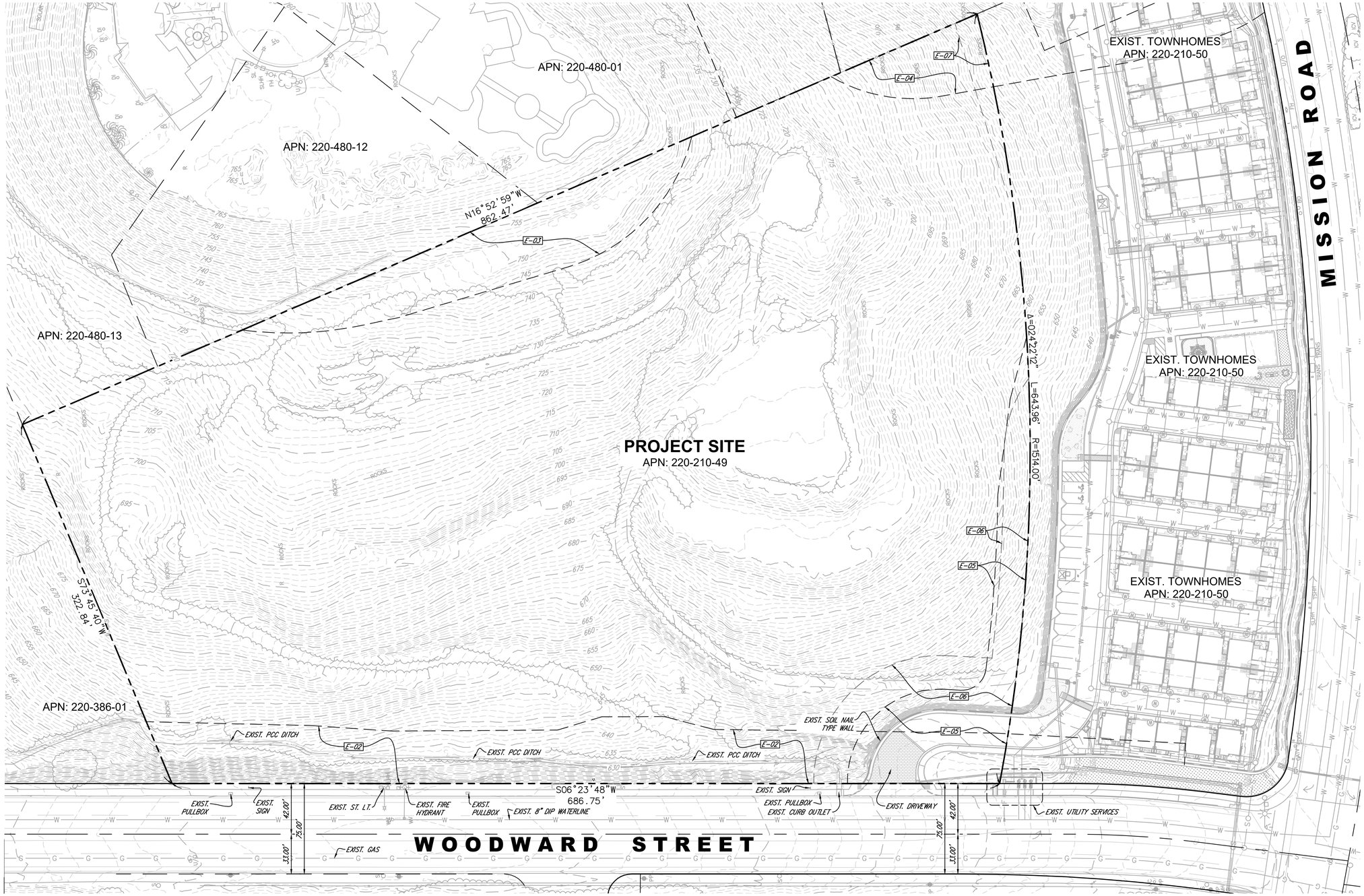
E-03 AN EASEMENT FOR ENTRY, VEGETATION, CLEARING AND REMOVAL OF COMBUSTIBLE MATERIALS AND RIGHTS INCIDENTAL THERETO RECORDED AUGUST 31, 2007, AS DOCUMENT NO. 2007-0580764 & 2007-0581460 OF OFFICIAL RECORDS, IN FAVOR OF PETE DE JONG, A MARRIED MAN.

E-04 AN EASEMENT FOR ENTRY, VEGETATION, CLEARING AND REMOVAL OF COMBUSTIBLE MATERIALS AND RIGHTS INCIDENTAL THERETO RECORDED MAY 6, 2015, AS DOCUMENT NO. 2015-0225378 & 2015-0225379 OF OFFICIAL RECORDS, IN FAVOR OF KB HOME CAPITAL LLC.

E-05 THE TERMS AND PROVISIONS CONTAINED IN THE DOCUMENT ENTITLED GRANT OF EASEMENT, RECORDED MARCH 4, 2020 AS INSTRUMENT NO. 2020-0113186 OF OFFICIAL RECORDS.

E-06 THE TERMS AND PROVISIONS CONTAINED IN THE DOCUMENT ENTITLED GRANT OF VEHICULAR AND PEDESTRIAN ACCESS EASEMENT, RECORDED MARCH 4, 2020 AS INSTRUMENT NO. 2020-0113187 OF OFFICIAL RECORDS.

E-07 AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES RECORDED OCTOBER 20, 1948, IN BOOK 2988, PAGE 440 OF OFFICIAL RECORDS, IN FAVOR OF THE SAN DIEGO GAS & ELECTRIC COMPANY.



LEGEND

RIGHT OF WAY	-RW-
PROPERTY LINE	-PL-
PROJECT BOUNDARY	
EXIST MAJOR CONTOUR	100
EXIST MINOR CONTOUR	
EXIST WATER MAIN	W
EXIST SEWER MAIN	S
FLOW LINE	
PCC BROW DITCH	

SCALE 1":40'

0 40 80 Feet

SHEET 2 OF 13 SHEETS

EXISTING CONDITIONS

DATE	REMARKS
06/2023	PLANNING SUBMITTAL

EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • GIS • SURVEYING
440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-8134

CORNERSTONE COMMUNITIES

WOODWARD

APN 220-210-49

WOODWARD ST, SAN MARCOS CA

\\Excelsc1\projects3\22\22027\Engineering\TM\TM01\TM-PGP\22027 EXISTING CONDITIONS.dwg 6/22/2023 9:50 AM ORIGINAL PLOT SIZE: ----

EXISTING EASEMENTS

E-01 AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES RECORDED OCTOBER 19, 1948, IN BOOK 2985, PAGE 237 OF OFFICIAL RECORDS, IN FAVOR OF THE SAN DIEGO GAS & ELECTRIC COMPANY. THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

E-02 AN EASEMENT FOR DRAINAGE, SLOPE, PUBLIC STREET UTILITY AND RIGHTS INCIDENTAL THERETO RECORDED MARCH 26, 2002, AS DOCUMENT NO. 2002-0251944 OF OFFICIAL RECORDS, IN FAVOR OF THE CITY OF SAN MARCOS. PORTIONS TO BE VACATED ON THE FINAL MAP.

E-03 AN EASEMENT FOR ENTRY, VEGETATION, CLEARING AND REMOVAL OF COMBUSTIBLE MATERIALS AND RIGHTS INCIDENTAL THERETO RECORDED AUGUST 31, 2007, AS DOCUMENT NO. 2007-0580764 OF OFFICIAL RECORDS, IN FAVOR OF PETE DE JONG, A MARRIED MAN.

E-04 AN EASEMENT FOR ENTRY, VEGETATION, CLEARING AND REMOVAL OF COMBUSTIBLE MATERIALS AND RIGHTS INCIDENTAL THERETO RECORDED MAY 6, 2015, AS DOCUMENT NO. 2015-0225378 OF OFFICIAL RECORDS, IN FAVOR OF KB HOME CAPITAL LLC.

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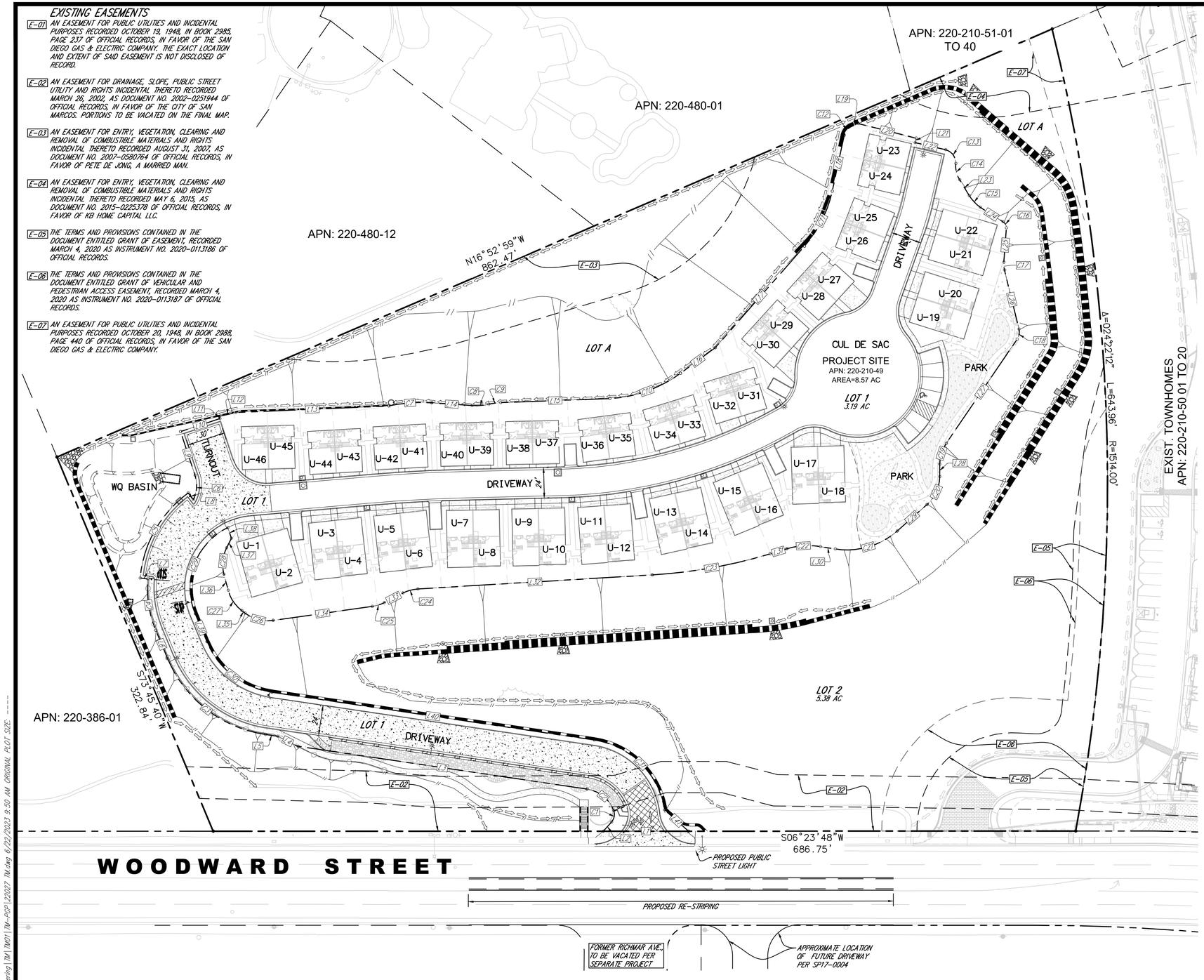
E-06 THE TERMS AND PROVISIONS CONTAINED IN THE DOCUMENT ENTITLED GRANT OF VEHICULAR AND PEDESTRIAN ACCESS EASEMENT, RECORDED MARCH 4, 2020 AS INSTRUMENT NO. 2020-0113187 OF OFFICIAL RECORDS.

E-07 AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES RECORDED OCTOBER 20, 1948, IN BOOK 2988, PAGE 440 OF OFFICIAL RECORDS, IN FAVOR OF THE SAN DIEGO GAS & ELECTRIC COMPANY.



PL LINE DATA TABLE

NO	DELTA/ BRG	LENGTH
L1	N06°23'48"E	67.92'
L2	S41°32'49"E	9.76'
L3	N14°49'44"E	232.60'
L4	N32°32'54"E	18.07'
L5	N14°49'44"E	9.76'
L6	N73°45'40"E	24.14'
L7	N13°15'28"E	6.00'
L8	S58°54'39"W	6.67'
L9	N78°01'34"E	36.70'
L10	S11°58'26"E	33.00'
L11	N78°01'34"E	1.88'
L12	S06°15'01"E	13.77'
L13	S03°57'24"W	121.72'
L14	S10°16'45"W	32.15'
L15	S04°14'58"W	87.04'
L16	S29°52'26"E	34.41'
L17	S42°19'13"E	107.61'
L18	S71°21'14"E	45.55'
L19	S16°52'59"E	5.79'
L20	S20°35'45"W	47.51'
L21	N70°28'27"W	3.61'
L22	S19°31'49"W	24.93'
L23	S84°53'53"W	14.71'
L24	S38°59'08"W	21.40'
L25	N79°29'37"W	27.53'
L26	S82°39'12"W	48.45'
L27	N49°23'40"W	100.29'
L28	N83°03'50"W	10.03'
L29	N35°09'26"W	31.71'
L30	N15°32'04"E	11.97'
L31	N10°24'09"W	13.74'
L32	N02°57'23"E	186.93'
L33	N20°44'17"W	16.70'
L34	N01°38'45"W	79.74'
L35	N43°48'10"E	3.19'
L36	N81°35'45"E	13.29'
L37	S57°14'12"E	8.51'
L38	N78°10'03"E	8.98'
L39	S73°45'40"W	24.14'
L40	S14°49'44"W	259.57'
L41	S47°59'01"W	25.59'

PL CURVE DATA TABLE

NO	DELTA	RADIUS	LENGTH
C1	Δ=063°08'22"	9.00'	9.92'
C2	Δ=060°29'07"	27.00'	28.50'
C3	Δ=058°55'55"	100.50'	103.37'
C4	Δ=027°20'32"	87.50'	41.76'
C5	Δ=049°12'05"	93.50'	80.29'
C6	Δ=044°32'18"	25.50'	19.82'
C7	Δ=016°26'09"	120.00'	34.42'
C8	Δ=016°52'36"	46.00'	13.55'
C9	Δ=010°50'48"	50.00'	9.47'
C10	Δ=033°17'07"	104.00'	60.42'
C11	Δ=029°02'02"	98.00'	49.66'
C12	Δ=054°28'15"	10.00'	9.51'
C13	Δ=075°59'59"	11.02'	14.62'
C14	Δ=036°44'12"	21.27'	13.64'
C15	Δ=022°52'39"	32.19'	12.85'
C16	Δ=067°32'39"	5.00'	5.89'
C17	Δ=017°51'11"	20.00'	6.23'
C18	Δ=047°57'08"	10.00'	8.37'
C19	Δ=033°40'10"	30.00'	17.63'
C20	Δ=047°54'23"	30.00'	25.08'
C21	Δ=050°41'30"	60.00'	53.08'
C22	Δ=025°56'13"	60.00'	27.16'
C23	Δ=013°21'32"	410.00'	95.59'
C24	Δ=023°41'40"	30.00'	12.41'
C25	Δ=019°05'32"	30.00'	10.00'
C26	Δ=045°26'55"	30.00'	23.80'
C27	Δ=037°47'35"	30.00'	19.79'
C28	Δ=041°10'03"	30.00'	21.56'
C29	Δ=086°42'28"	53.50'	80.96'
C30	Δ=058°55'55"	66.50'	68.40'
C31	Δ=072°45'40"	66.50'	84.45'

LEGEND

PROJECT BOUNDARY	
PROPERTY LINE	-PL-
RIGHT OF WAY	-RW-
EXIST MAJOR CONTOUR	100
EXIST MINOR CONTOUR	
PROPOSE MAJOR CONTOUR	100
PROPOSE MINOR CONTOUR	
GEOGRID TYPE RETAINING	
CMU TYPE RETAINING	
SOIL NAIL TYPE RETAINING	
EXIST WATER MAIN	W
EXIST SEWER MAIN	S
NEW WATER MAIN	W
NEW SEWER MAIN	S
FLOW LINE	
PCC BROW DITCH	
EXIST. FIRE LINE	F
FIRE HYDRANT	
STREET/PARKING LIGHT	
STORM DRAIN INLETS/CLEANOUTS	
WATER SERVICE LATERAL	W
SEWER SERVICE LATERAL	S
FIRE SERVICE LATERAL	F
PCC CURB	
PCC CURB & GUTTER	
BLDG UNIT NUMBER	U-18

SCALE 1":40'
0 40 80 Feet

FUTURE EASEMENT NOTE:
A PROPOSED BLANKET EMERGENCY & MUNICIPAL ACCESS EASEMENT DEDICATED TO THE CITY OF SAN MARCOS SHALL BE BE GRANTED ON THE FINAL MAP.

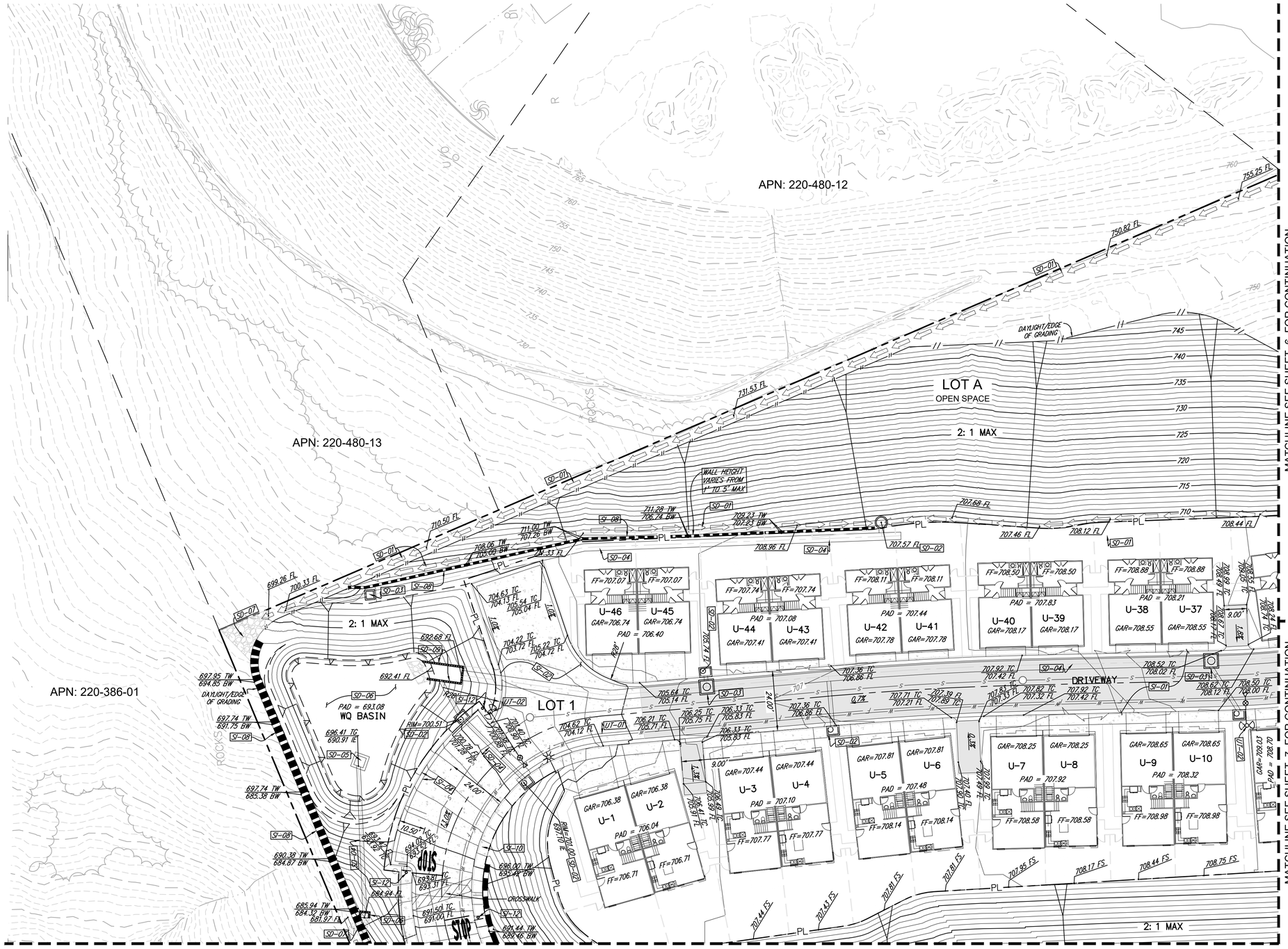
	DATE	REMARKS
	06/2023	PLANNING SUBMITTAL

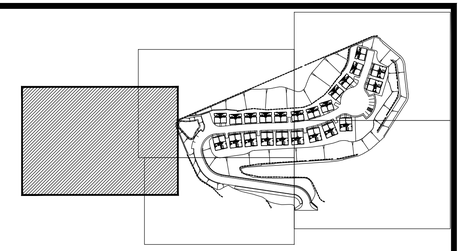
EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • 2PSURVEYING
440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-8334

SHEET 3 OF 13 SHEETS
TENTATIVE MAP

CORNERSTONE COMMUNITIES
WOODWARD
APN 220-210-49
WOODWARD ST, SAN MARCOS CA

I:\Excel\projects3\22\22027\Engineering\PA\DWG\TM-PDP\22027 TM.dwg 6/20/2023 9:50 AM ORIGINAL (4.01 SIZE)





CONSTRUCTION NOTES

SURFACE IMPROVEMENTS

- SI-01 AC PAVEMENT (DRIVE AISLE)
- SI-02 PCC PAVEMENT WITH BROOM FINISH
- SI-03 6" PCC CURB
- SI-04 6" PCC CURB & GUTTER
- SI-05 3' WIDE PCC RIBBON GUTTER
- SI-06 NEW GEOGRID TYPE RETAINING WALL
- SI-07 SOIL NAIL TYPE RETAINING WALL
- SI-08 CMU RETAINING WALL
- SI-09 CURB CUTS
- SI-10 PCC SIDEWALK
- SI-11 STAIRS
- SI-12 TRAFFIC SIGN ("STOP" OR "CROSSWALK AHEAD")

UTILITY IMPROVEMENTS

- UT-01 FIRELINE MAIN
- UT-02 FIRE HYDRANT
- UT-03 FIRE SERVICE LATERAL
- UT-04 DOMESTIC WATERLINE MAIN
- UT-05 SEWERLINE MAIN

STORM DRAIN / WATER QUALITY IMPROVEMENTS

- SD-01 PCC BROW DITCH
- SD-02 STORM DRAIN INLET
- SD-03 STORM DRAIN BOX/CLEANOUT
- SD-04 STORM DRAIN PIPE
- SD-05 WQ BASIN OUTLET. SEE DETAIL ON SHEET 13
- SD-06 WATER QUALITY BASIN
- SD-07 RIPRAP
- SD-08 WQ ROCK DITCH BIOFILTRATION. SEE DETAILS ON SHEET 13.
- SD-09 HEADWALL
- SD-10 INSTALL PVC CLEANOUT AT BEND
- SD-11 INSTALL CURB OUTLET

LEGEND

- PROJECT BOUNDARY
- PROPERTY LINE -PL-
- RIGHT OF WAY -RW-
- EXIST MAJOR CONTOUR 100
- EXIST MINOR CONTOUR
- PROPOSE MAJOR CONTOUR 100
- PROPOSE MINOR CONTOUR
- GEOGRID TYPE RETAINING
- CMU TYPE RETAINING
- SOIL NAIL TYPE RETAINING
- EXIST WATER MAIN W
- EXIST SEWER MAIN S
- NEW WATER MAIN W
- NEW SEWER MAIN S
- FLOW LINE
- PCC BROW DITCH
- EXIST. FIRE LINE F
- FIRE HYDRANT
- STREET/PARKING LIGHT
- STORM DRAIN INLETS/CLEANOUTS
- WATER SERVICE LATERAL W
- SEWER SERVICE LATERAL S
- FIRE SERVICE LATERAL F
- PCC CURB
- PCC CURB & GUTTER

SCALE 1":20'

0 20 40 Feet

ALL ON-SITE STORM DRAIN SYSTEM IS PRIVATELY OWNED & MAINTAINED UNLESS NOTED IN THE PLANS

SEE SHEET 11 FOR UTILITIES EXHIBIT AND 13 FOR SWQMP - BMP

DATE	REMARKS
06/2023	PLANNING SUBMITTAL

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440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-8134

SHEET 4 OF 13 SHEETS

GRADING PLAN

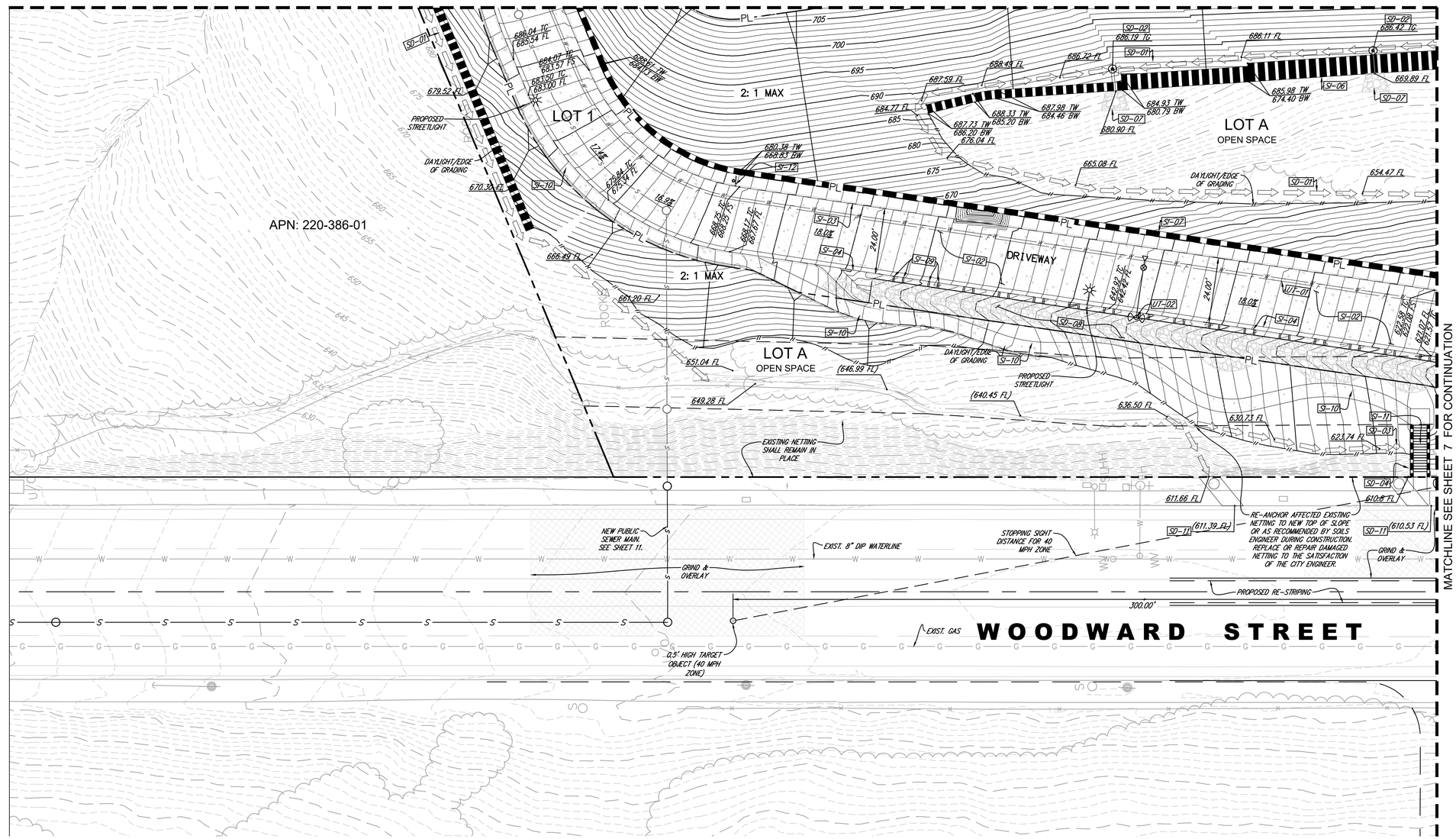
CORNERSTONE COMMUNITIES

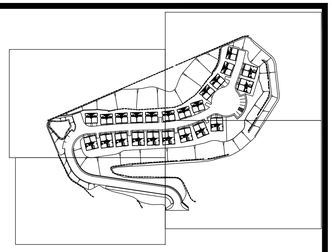
WOODWARD

APN 220-210-49

WOODWARD ST, SAN MARCOS CA

\\Excelde1\projects3\22\22027\Engineering\TM\TM01\TM-PGP\22027 GRADING PLAN.dwg 6/22/2023 9:51 AM ORIGINAL PLOT SIZE: ----





CONSTRUCTION NOTES

SURFACE IMPROVEMENTS

- SI-01 AC PAVEMENT (DRIVE AISLE)
- SI-02 PCC PAVEMENT WITH BROOM FINISH
- SI-03 6" PCC CURB
- SI-04 6" PCC CURB & GUTTER
- SI-05 3' WIDE PCC RIBBON GUTTER
- SI-06 NEW GEOGRID TYPE RETAINING WALL
- SI-07 SOIL NAIL TYPE RETAINING WALL
- SI-08 CMU RETAINING WALL
- SI-09 CURB CUTS
- SI-10 PCC SIDEWALK
- SI-11 STAIRS
- SI-12 TRAFFIC SIGN ("STOP" OR "CROSSWALK AHEAD")

UTILITY IMPROVEMENTS

- UT-01 FIRELINE MAIN
- UT-02 FIRE HYDRANT
- UT-03 FIRE SERVICE LATERAL
- UT-04 DOMESTIC WATERLINE MAIN
- UT-05 SEWERLINE MAIN

STORM DRAIN / WATER QUALITY IMPROVEMENTS

- SD-01 PCC BROW DITCH
- SD-02 STORM DRAIN INLET
- SD-03 STORM DRAIN BOX/CLEANOUT
- SD-04 STORM DRAIN PIPE
- SD-05 WQ BASIN OUTLET. SEE DETAIL ON SHEET 13
- SD-06 WATER QUALITY BASIN
- SD-07 RIPRAP
- SD-08 WQ ROCK DITCH BIOFILTRATION. SEE DETAILS ON SHEET 13.
- SD-09 HEADWALL
- SD-10 INSTALL PVC CLEANOUT AT BEND
- SD-11 INSTALL CURB OUTLET

LEGEND

- PROJECT BOUNDARY
- PROPERTY LINE — -PL-
- RIGHT OF WAY — -RW-
- EXIST MAJOR CONTOUR — 100
- EXIST MINOR CONTOUR
- PROPOSE MAJOR CONTOUR — 100
- PROPOSE MINOR CONTOUR
- GEOGRID TYPE RETAINING
- CMU TYPE RETAINING
- SOIL NAIL TYPE RETAINING
- EXIST WATER MAIN — W
- EXIST SEWER MAIN — S
- NEW WATER MAIN — W
- NEW SEWER MAIN — S
- FLOW LINE
- PCC BROW DITCH
- EXIST. FIRE LINE — F
- FIRE HYDRANT
- STREET/PARKING LIGHT
- STORM DRAIN INLETS/CLEANOUTS
- WATER SERVICE LATERAL — W
- SEWER SERVICE LATERAL — S
- FIRE SERVICE LATERAL — F
- PCC CURB
- PCC CURB & GUTTER

SCALE 1":20'

0 20 40 Feet

MAIN DRIVEWAY VERTICAL PROFILE INFORMATION									
NO.	PVI STATION	PVI ELEVATION	GRADE IN	GRADE OUT	A (GRADE CHANGE)	PROFILE CURVE TYPE	PROFILE CURVE LENGTH	K VALUE	Curve Radius
1	1+31.69'	609.60'		5.56%					
2	1+64.30'	611.41'	5.56%	17.95%	12.39%	Sag	40.00'	3.23	322.76'
3	6+92.84'	706.29'	17.95%	0.74%	17.21%	Crest	190.00'	11.04	1103.92'
4	14+11.59'	711.61'	0.74%						

SEE SHEET 11 FOR UTILITIES EXHIBIT AND 13 FOR SWQMP - BMP

ALL ON-SITE STORM DRAIN SYSTEM IS PRIVATELY OWNED & MAINTAINED UNLESS NOTED IN THE PLANS

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06/2023	PLANNING SUBMITTAL

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SHEET 5 OF 13 SHEETS

GRADING PLAN

CORNERSTONE COMMUNITIES

WOODWARD

APN 220-210-49

WOODWARD ST, SAN MARCOS CA

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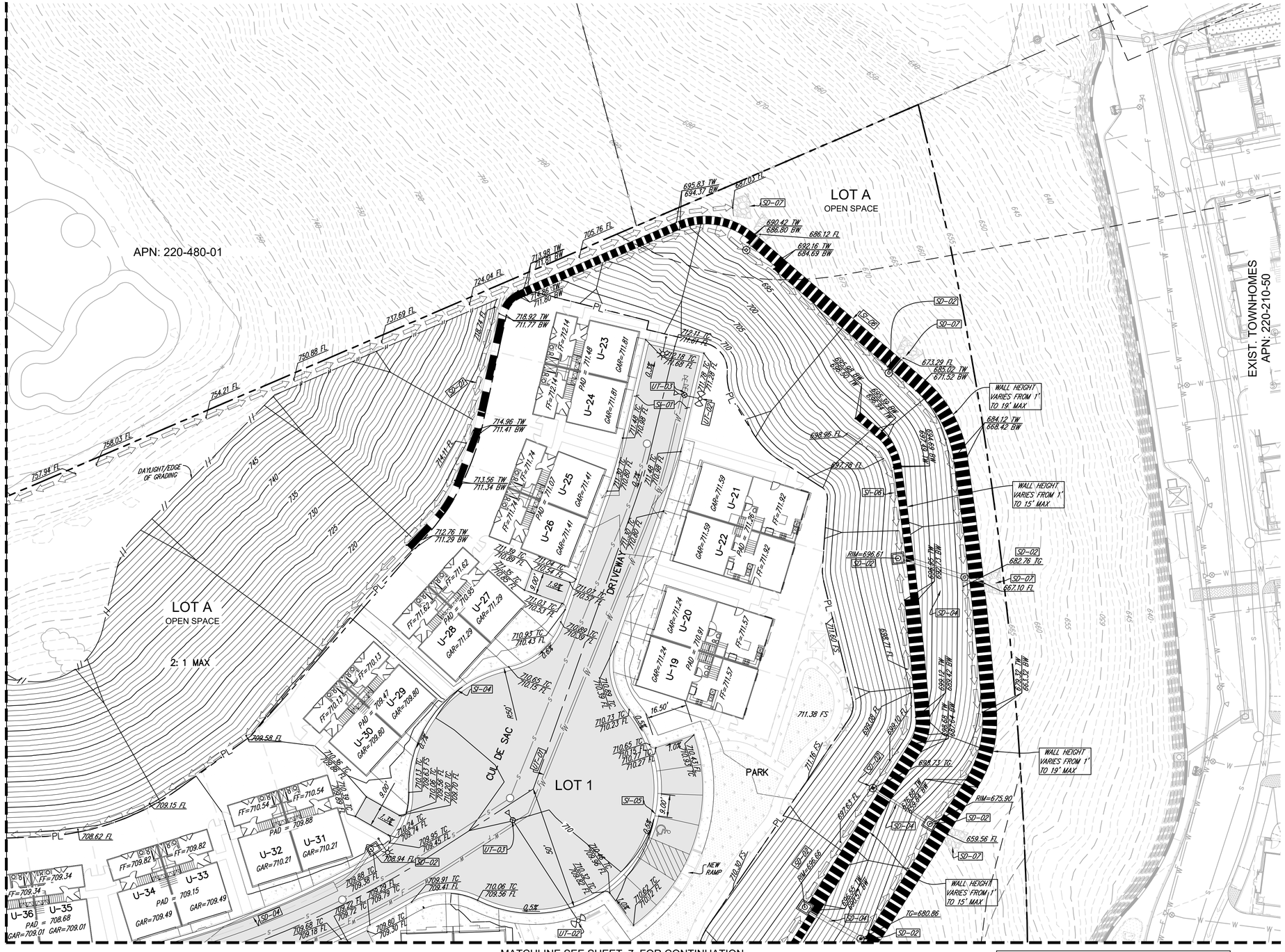
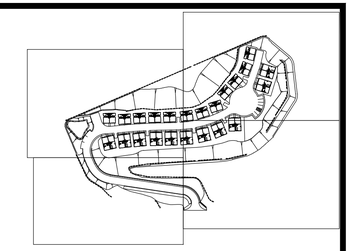


MATCHLINE SEE SHEET 7 FOR CONTINUATION



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- SD-11 INSTALL CURB OUTLET

LEGEND

- PROJECT BOUNDARY
- PROPERTY LINE -PL-
- RIGHT OF WAY -RW-
- EXIST MAJOR CONTOUR 100
- EXIST MINOR CONTOUR
- PROPOSE MAJOR CONTOUR 100
- PROPOSE MINOR CONTOUR
- GEOGRID TYPE RETAINING
- CMU TYPE RETAINING
- SOIL NAIL TYPE RETAINING
- EXIST WATER MAIN W
- EXIST SEWER MAIN S
- NEW WATER MAIN W
- NEW SEWER MAIN S
- FLOW LINE
- PCC BROW DITCH
- EXIST. FIRE LINE F
- FIRE HYDRANT
- STREET/PARKING LIGHT
- STORM DRAIN INLETS/CLEANOUTS
- WATER SERVICE LATERAL W
- SEWER SERVICE LATERAL S
- FIRE SERVICE LATERAL F
- PCC CURB
- PCC CURB & GUTTER

ALL ON-SITE STORM DRAIN SYSTEM IS PRIVATELY OWNED & MAINTAINED UNLESS NOTED IN THE PLANS

SCALE 1":20'

0 20 40 Feet

SEE SHEET 11 FOR UTILITIES EXHIBIT AND 13 FOR SWQMP - BMP

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SHEET 6 OF 13 SHEETS

GRADING PLAN

CORNERSTONE COMMUNITIES

WOODWARD

APN 220-210-49

WOODWARD ST, SAN MARCOS CA

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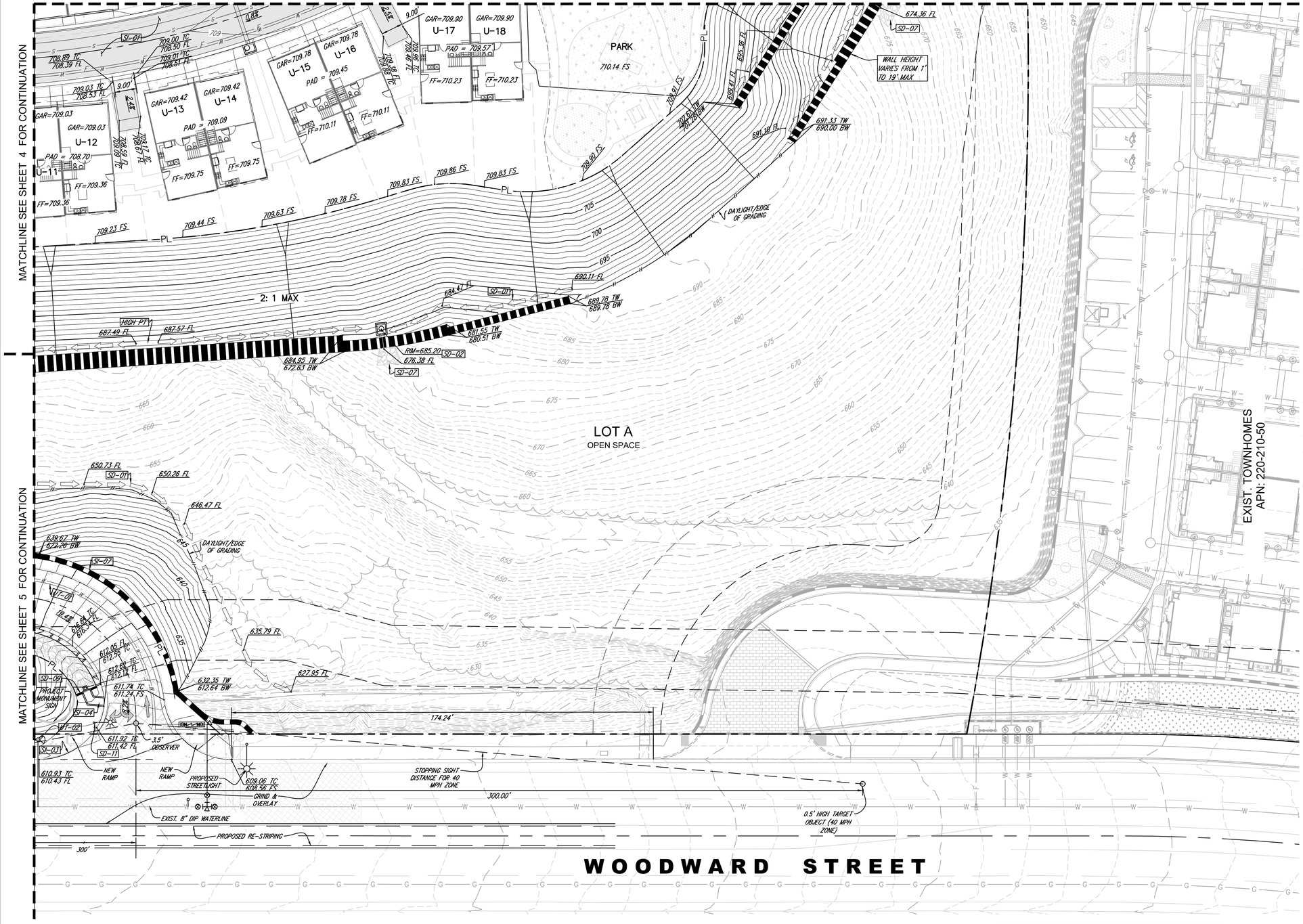
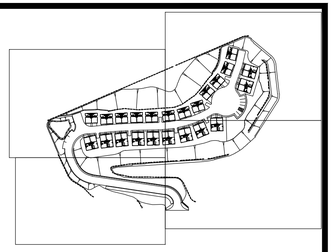
MATCHLINE SEE SHEET # FOR CONTINUATION

MATCHLINE SEE SHEET 4 FOR CONTINUATION

MATCHLINE SEE SHEET 5 FOR CONTINUATION





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- PROJECT BOUNDARY
- PROPERTY LINE (-PL-)
- RIGHT OF WAY (-RW-)
- EXIST MAJOR CONTOUR (100)
- EXIST MINOR CONTOUR
- PROPOSE MAJOR CONTOUR (100)
- PROPOSE MINOR CONTOUR
- GEOGRID TYPE RETAINING
- CMU TYPE RETAINING
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- EXIST SEWER MAIN (S)
- NEW WATER MAIN (W)
- NEW SEWER MAIN (S)
- FLOW LINE
- PCC BROW DITCH
- EXIST. FIRE LINE (F)
- FIRE HYDRANT
- STREET/PARKING LIGHT
- STORM DRAIN INLETS/CLEANOUTS
- WATER SERVICE LATERAL (W)
- SEWER SERVICE LATERAL (S)
- FIRE SERVICE LATERAL (F)
- PCC CURB
- PCC CURB & GUTTER

SCALE 1":20'

0 20 40 Feet

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SHEET 7 OF 13 SHEETS

GRADING PLAN

CORNERSTONE COMMUNITIES

WOODWARD

APN 220-210-49

WOODWARD ST, SAN MARCOS CA

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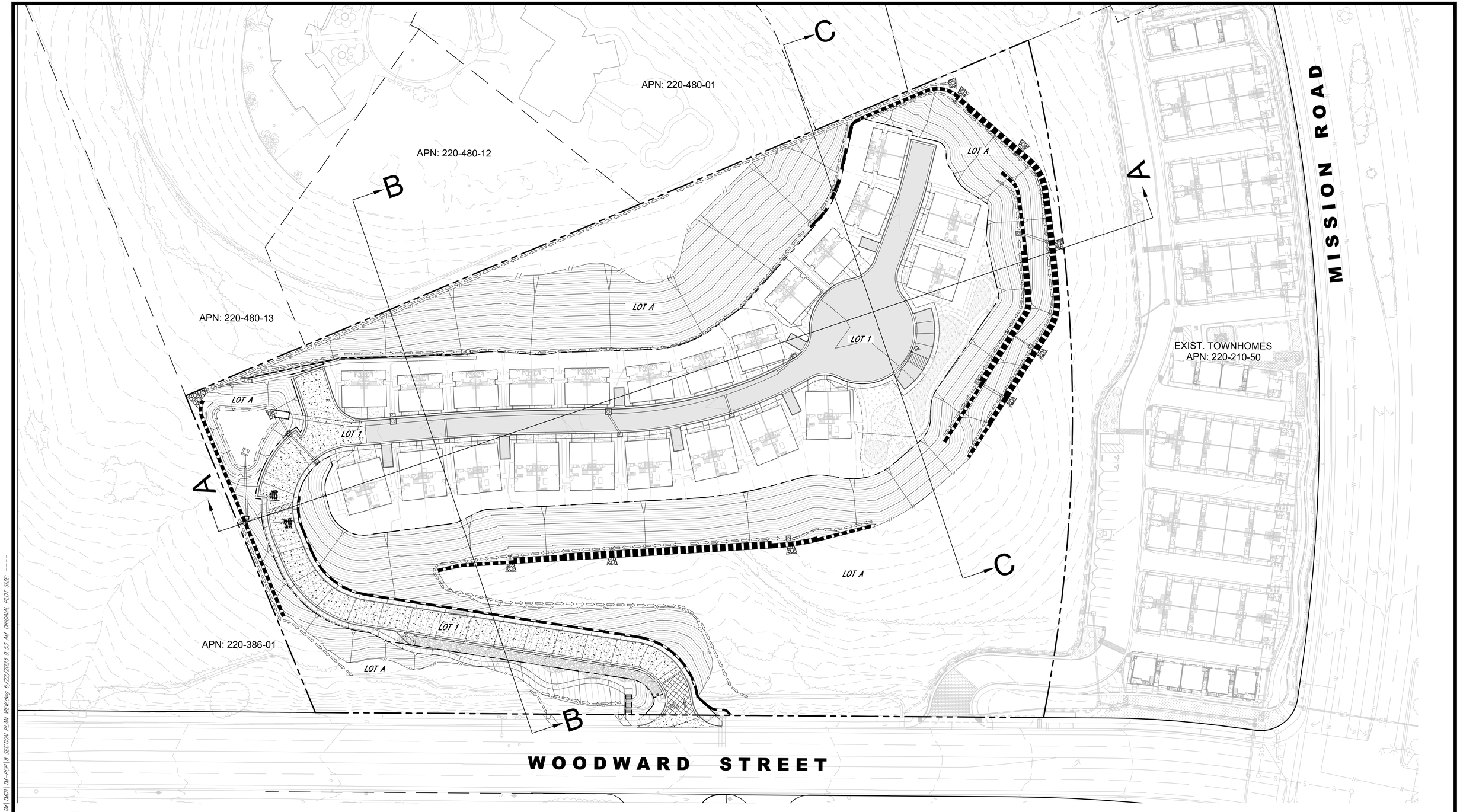

SCALE 1":40'

0 40 80 Feet

SEE SHEET 9 FOR SECTION PROFILE VIEW

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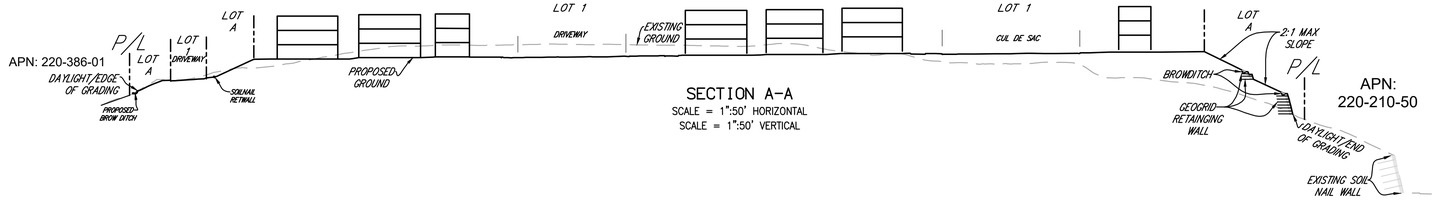
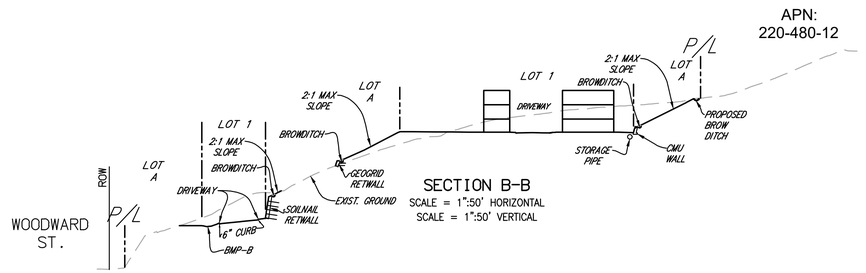
SHEET 8 OF 13 SHEETS
SECTION PLAN VIEW

CORNERSTONE COMMUNITIES
WOODWARD
APN 220-210-49
WOODWARD ST, SAN MARCOS CA

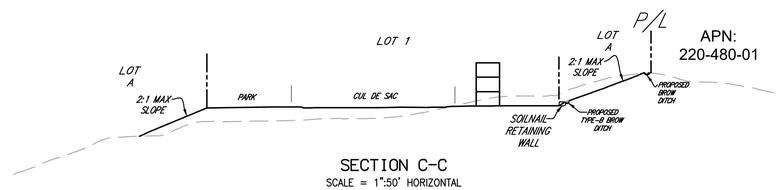
\\Excelde1\projects3\22\22027\Engineering\TM\TM01\TM-PGP\8 SECTION PLAN VIEW.dwg 6/22/2023 9:53 AM ORIGINAL PLOT SIZE: ----



SECTION A-A
SCALE = 1":50' HORIZONTAL
SCALE = 1":50' VERTICAL



SECTION B-B
SCALE = 1":50' HORIZONTAL
SCALE = 1":50' VERTICAL



SECTION C-C
SCALE = 1":50' HORIZONTAL
SCALE = 1":50' VERTICAL

SEE SHEET 8 FOR SECTION PLAN VIEW

SHEET 9 OF 13 SHEETS

DATE	REMARKS
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CORNERSTONE COMMUNITIES
WOODWARD
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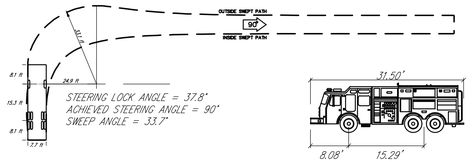
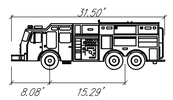
\\Excelsc1\projects3\22\22027\Engineering\TM\TM01\TM-PGP\8 SECTION PLAN VIEW.dwg 6/22/2023 9:53 AM ORIGINAL PLOT SIZE: ----



COSM PIERCE PUMPER
CITY FIRE & RESCUE (CUSTOM)

(C) 2022 TRANSOFT SOLUTIONS, INC. ALL RIGHTS RESERVED.

0ft 10ft 20ft



COSM PIERCE PUMPER
WIDTH = 7.69'
TRACTOR TRACK = 7.69'
LOCK TO LOCK TIME = 6.0
STEERING ANGLE = 37.8

EMERGENCY VEHICLE USED IN THIS AUTOTURN SIMULATION

APN: 220-480-01

APN: 220-480-12

APN: 220-480-13

APN: 220-386-01

LOT A

LOT 1

EMERGENCY VEHICLE TURNAROUND AREA

EMERGENCY VEHICLE ENVELOPE (TYP)

FIRE HYDRANT (TYP)

R28'

30'

24'

MISSION ROAD

EXIST. TOWNHOMES
APN: 220-210-50

WOODWARD STREET

SCALE 1":40'

0 40 80 Feet

DATE	REMARKS
06/2023	PLANNING SUBMITTAL

SHEET 10 OF 13 SHEETS
CIRCULATION EXHIBIT

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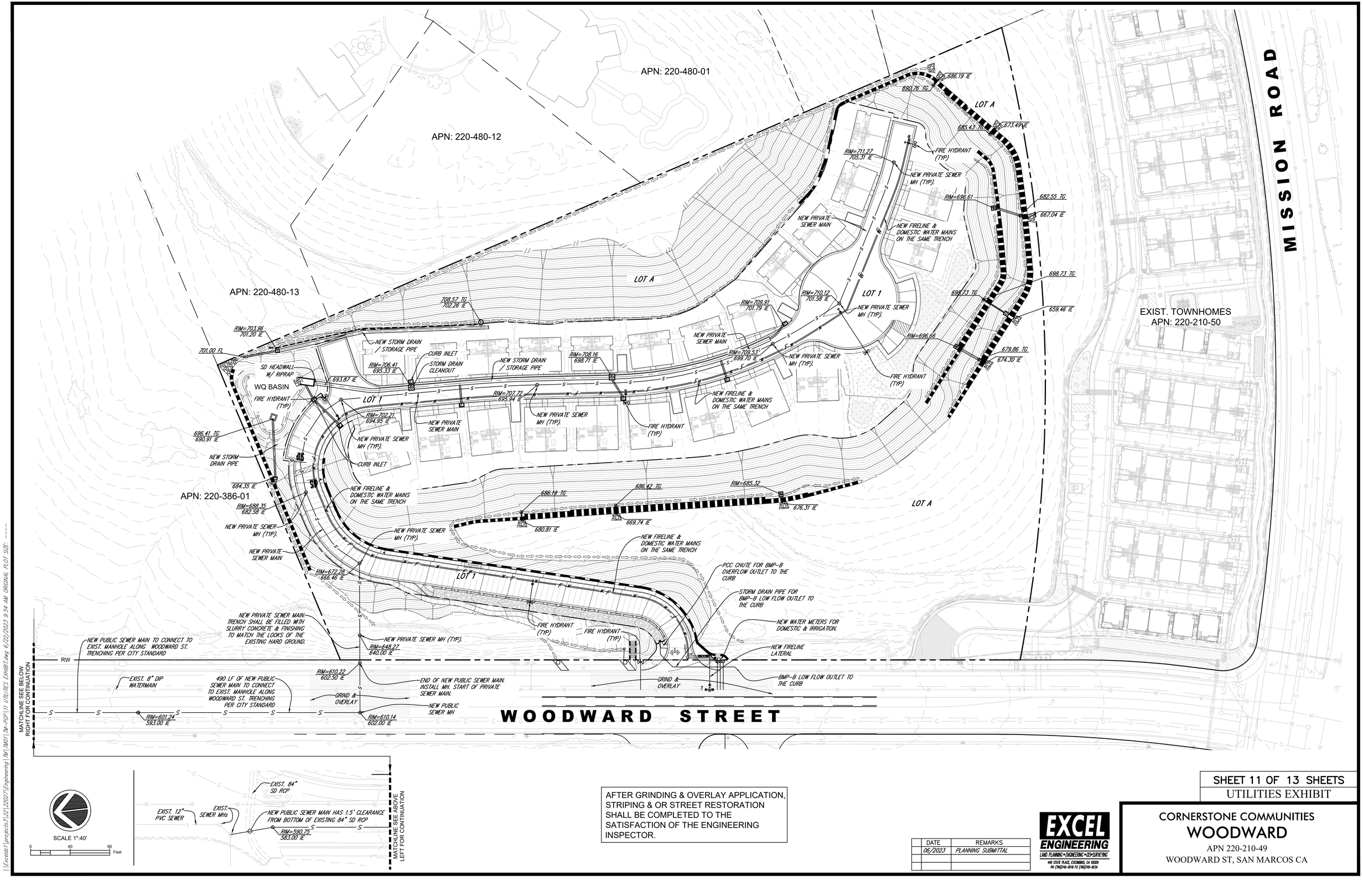
CORNERSTONE COMMUNITIES
WOODWARD
APN 220-210-49
WOODWARD ST, SAN MARCOS CA

I:\Excel\projects\22\220027\Engineering\PW\PW01\PW-PDP\10 CIRCULATION EXHIBIT.dwg 6/22/2023 9:53 AM ORIGINAL PLOT SIZE: ---



AFTER GRINDING & OVERLAY APPLICATION, STRIPING & OR STREET RESTORATION SHALL BE COMPLETED TO THE SATISFACTION OF THE ENGINEERING INSPECTOR.

DATE	REMARKS
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SHEET 11 OF 13 SHEETS
UTILITIES EXHIBIT

CORNERSTONE COMMUNITIES
WOODWARD
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WOODWARD ST, SAN MARCOS CA

\\Excelde1\projects3\22\22027\Engineering\TM\TM01\TM-PGP\11 UTILITIES EXHIBIT.dwg 6/22/2023 9:54 AM ORIGINAL PLOT SIZE: ----

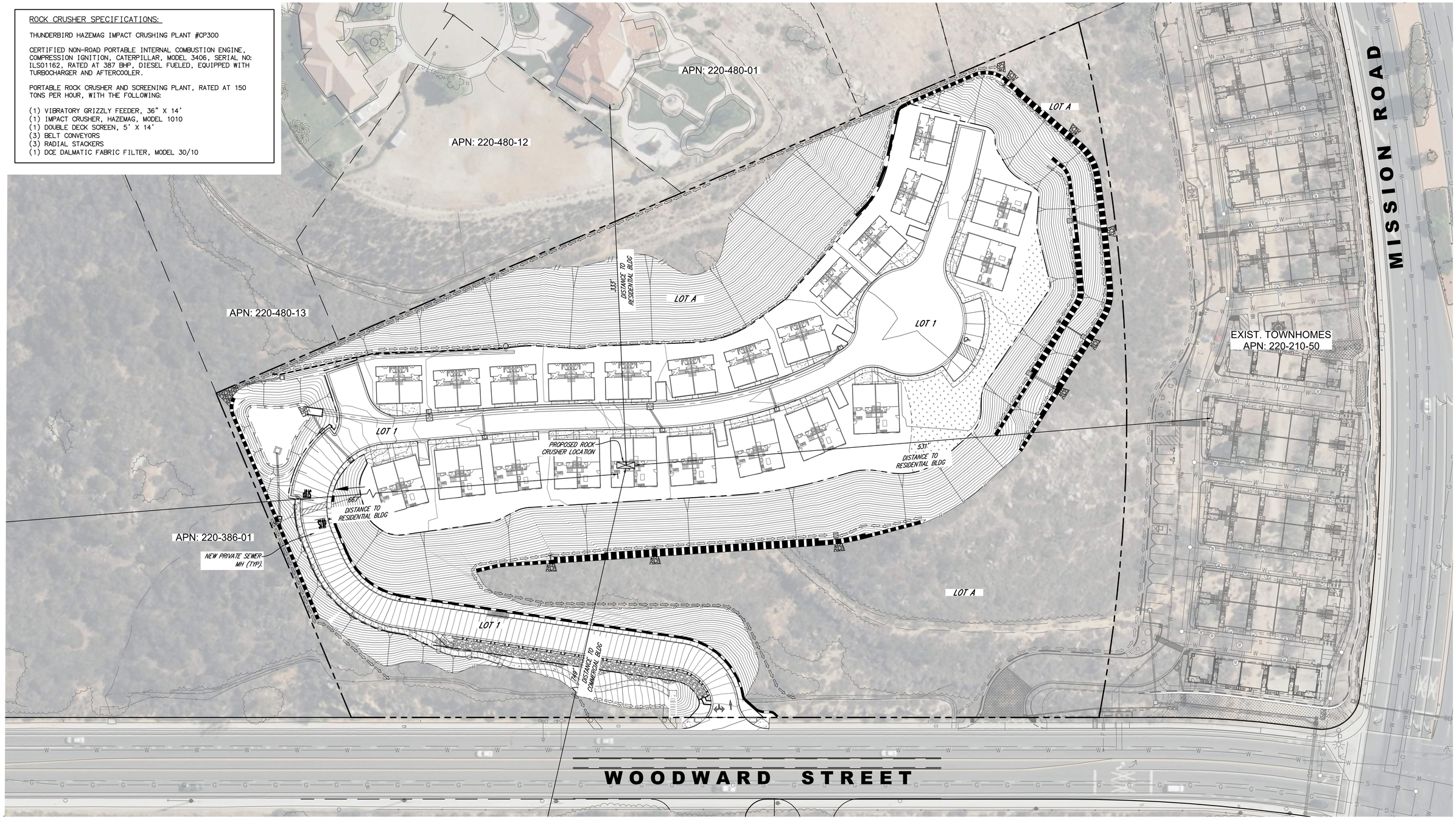
ROCK CRUSHER SPECIFICATIONS:

THUNDERBIRD HAZEMAG IMPACT CRUSHING PLANT #CP300

CERTIFIED NON-ROAD PORTABLE INTERNAL COMBUSTION ENGINE, COMPRESSION IGNITION, CATERPILLAR, MODEL 3406, SERIAL NO: ILS01162, RATED AT 387 BHP, DIESEL FUELED, EQUIPPED WITH TURBOCHARGER AND AFTERCOOLER.

PORTABLE ROCK CRUSHER AND SCREENING PLANT, RATED AT 150 TONS PER HOUR, WITH THE FOLLOWING:

(1) VIBRATORY GRIZZLY FEEDER, 36" X 14'
(1) IMPACT CRUSHER, HAZEMAG, MODEL 1010
(1) DOUBLE DECK SCREEN, 5' X 14'
(3) BELT CONVEYORS
(3) RADIAL STACKERS
(1) DCE DALMATIC FABRIC FILTER, MODEL 30/10



SCALE 1":40'

0 40 80 Feet

SHEET 12 OF 13 SHEETS

ROCK CRUSHER EXHIBIT

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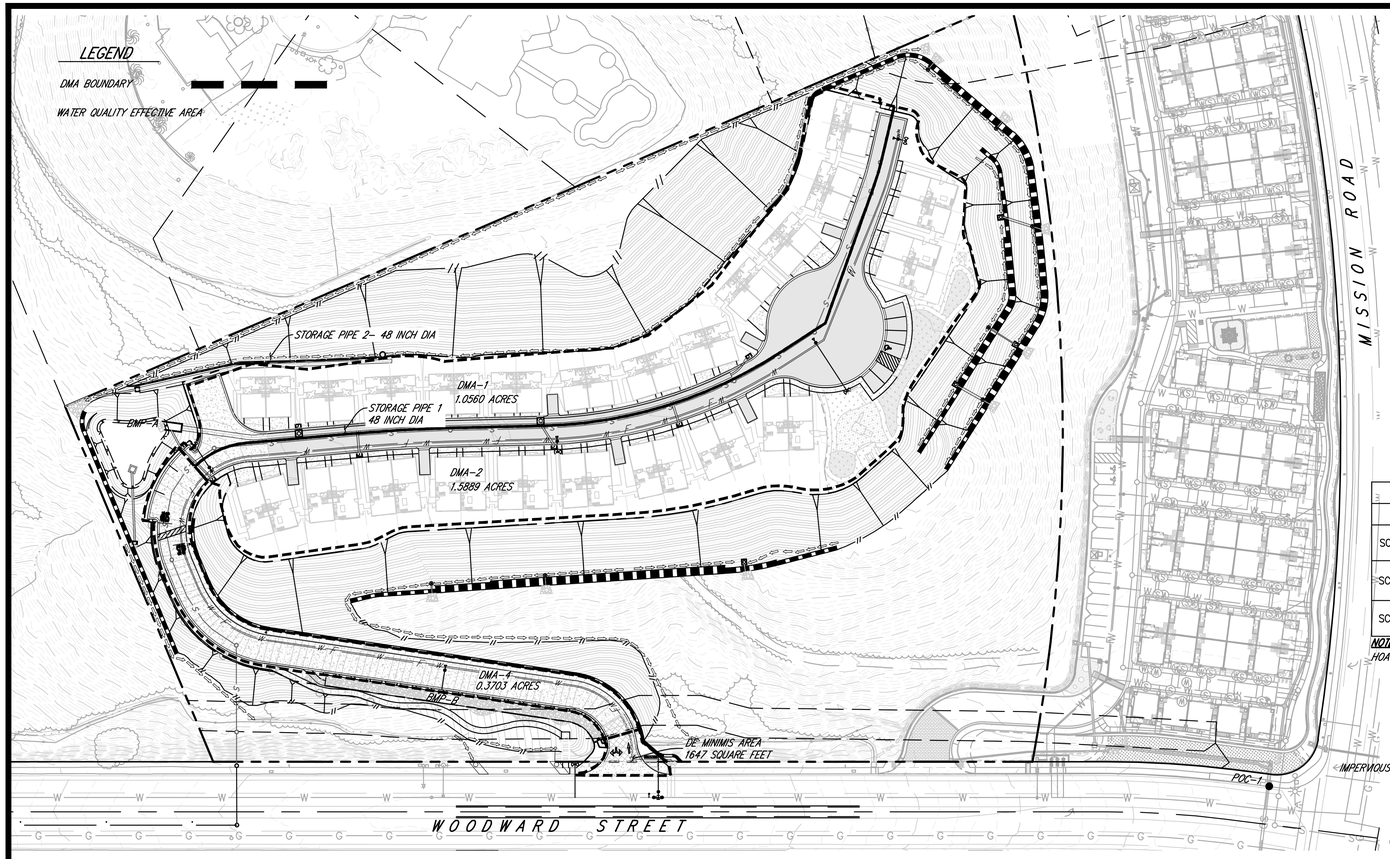
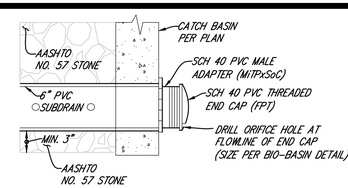
\\Excelsc1\projects3\22\22027\Engineering\TM\TM01\TM-PGP\12 ROCK CRUSHER EXHIBIT.dwg 6/22/2023 9:54 AM ORIGINAL PLOT SIZE: ----





LOWER ORIFICE DETAIL
NOT TO SCALE

PERMANENT WATER QUALITY TREATMENT FACILITY

KEEPING OUR WATER WAYS CLEAN
MAINTAIN WITH CARE – NO MODIFICATIONS WITHOUT AGENCY APPROVAL

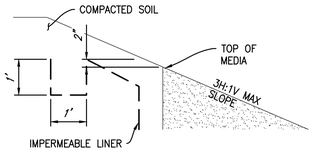
DETAIL
WATER QUALITY SIGN– PLACED AT EACH BIOFILTRATION BASIN

NOTE: ALL BIOFILTRATION AREAS WILL HAVE A SIGN POSTED TO BE VISIBLE AT ALL TIMES.

6" PVC PIPE PERFORATION LAYOUT DETAIL
NOT TO SCALE

DETAIL
"NO DUMPING" AT CATCH BASINS

NOTE: ALL CATCH BASINS WITH GRATES SHALL BE STENCILED WITH CITY REQUIRED ITEM PER ABOVE DETAIL (DAS MANUFACTURING #SDO OR EQUIVALENT).



IMPERMEABLE LINER EDGE ANCHOR DETAIL
NOT TO SCALE

HYDROLOGIC SOIL GROUP

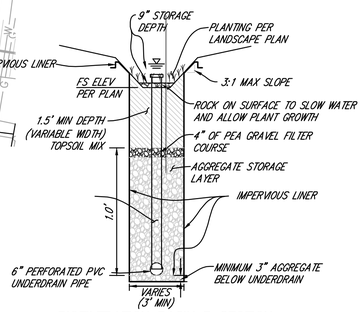
THE ONSITE HYDROLOGICAL SOIL GROUP FOR THIS SITE IS TYPE D.

EXISTING SITE FEATURES:

- THE APPROXIMATE DEPTH TO GROUNDWATER IS GREATER THAN 20 FEET.
- THERE ARE NO NATURAL HYDROLOGIC FEATURES ON THE SITE.
- THE SITE PROPOSES TO CONNECT TO THE EXISTING PUBLIC STORM DRAIN SYSTEM LOCATED IN THE SOUTH EDGE OF THE SITE.
- BASED ON WATERSHED MAPPING OF POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS (CCSYA), THERE ARE NO CCSYA LOCATED WITHIN THE PROJECT BOUNDARY OR TRIBUTARY TO THE RUNOFF BYPASSED AROUND THE SITE.

SOURCE CONTROL			
	SOURCE CONTROL REQUIREMENT	NODE	IMPLEMENTAION
SC-1	PREVENTION OF ILLICIT DISCHARGES	SC-1	EFFECTIVE IRRIGATION WILL BE IMPLEMENTED AND VEHICLE WASHING IS PROHIBITED
SC-2	STORM DRAIN STENCILING OR SIGNAGE	SC-2	STENCIL EVERY INLET WITH PROHIBITIVE WORDS: "NO DUMPING! DRAINS TO WATERWAYS" AND "NO CONTAMINE" IN SPANISH.
SC-5	PROTECT TRASH STORAGE	SC-5	TRASH ENCLOSURE WILL BE PROTECTED BY LID OR BE WALLED WITH ROOF TO AVOID STORMWATER GET CONTAMINATED

NOTE:
HOA WILL BE THE FINAL OWNER OF BMPS, MAINTAIN BMPS INTO PERPETUITY, AND FUNDING MECHANISM FOR MAINTENANCE.



BIOFILTRATION BASIN B SECTION
TYPICAL SECTION
NOT TO SCALE

WATER QUALITY BASIN INSTALLATION NOTES:

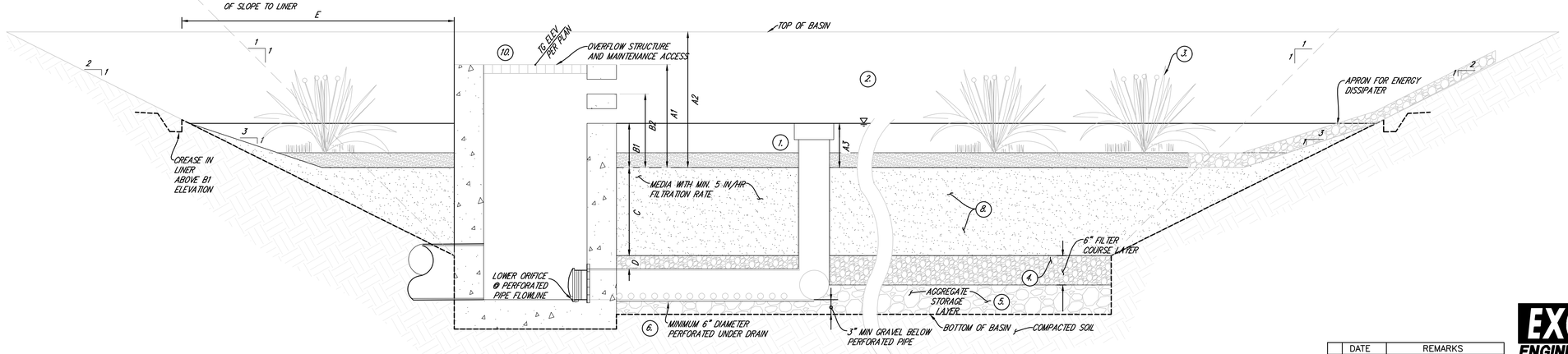
1. 3 INCHES OF WELL-AGED, SHREDDED HARDWOOD MULCH.
2. AN UNDERDRAIN CLEANOUT WITH A MINIMUM 6-INCH DIAMETER AND LOCKABLE CAP IS PLACED EVERY 250 TO 300FEET AS REQUIRED BASED ON UNDERDRAIN LENGTH.
3. VEGETATION USED SHOULD BE SUITABLE FOR THE CLIMATE PER LANDSCAPE PLANS
4. FILTER COARSE IS A MINIMUM OF 6 INCHES PROVIDED IN TWO SEPARATE 3 INCH LAYERS. THE TOP LAYER SHALL BE MADE OF ASTM C33 CHOKER SAND AND THE BOTTOM LAYER BE OF ASTM NO. 8 AGGREGATE. MARKERS STAKES SHALL BE USED TO ENSURE UNIFORM LIFT THICKNESS.
5. AASHTO NO. 57 STONE OR CLASS 2 PERMEABLE PER CAL TRANS SPECIFICATION 68-1.025 IS RECOMMENDED FOR THE AGGREGATE STORAGE LAYER. WASHED, OPEN-GRADED CRUSHED ROCK MAY BE USED, HOWEVER, A 4 INCH MINIMUM WASHED PEA GRAVEL FILTER COURSE LAYER AT THE TOP OF THE CRUSHED ROCK IS REQUIRED.
6. IMPERMEABLE LINER SHALL BE INSTALLED WHEN THE BIOFILTRATION BASIN IS WITHIN 10 FEET OF RETAINING WALLS OR BUILDING FOUNDATIONS, OR AS RECOMMENDED BY THE SOILS ENGINEER, OR REQUIRED BY THESE PLANS. IMPERMEABLE LINER SHALL BE 30 MIL THICK (PER COUNTY OF SAN DIEGO GREEN STREETS DESIGN STANDARD DRAWING GS-3.00 AND COUNTY GREEN STREETS SUPPLEMENT TO CAL TRANS SPECIFICATIONS 20-11.08B) CONFIGURED TO ENTIRELY ENCOMPASS THE SIDES OF THE WATER QUALITY BASIN.
7. IMPERMEABLE LINER BE CONSTRUCTED IN COMPLIANCE WITH THE COUNTY OF SAN DIEGO GREEN STREETS SUPPLEMENT TO CAL TRANS SPECIFICATIONS 20-11.08B.
8. BIOFILTRATION SOIL MEDIA LAYER (BSM) SHALL CONSIST OF 60% TO 80% BY VOLUME SAND, UP TO 20% BY VOLUME TOPSOIL, AND UP 20% BY VOLUME COMPOST (PER COUNTY OF SAN DIEGO BMP DESIGN MANUAL SEPTEMBER 2020 APPENDIX F.2 SECTION 803-2 BLENDED BSM CRITERIA AND TESTING REQUIREMENTS) PLACED IN 6" LIFTS AND COMPACTED WITH WATER PRIOR TO THE NEXT LIFT. INITIAL PERMEABILITY SHALL BE 8" PER HOUR (WITH ASSUMED STABILIZED PERMEABILITY OF 5" PER HOUR).
9. THE AGGREGATE STORAGE LAYER SHALL BE COMPACTED IN ACCORDANCE WITH SOILS ENGINEER'S RECOMMENDATIONS.
10. MP B WILL HAVE A BOX THAT IS USED FOR A PUMP SIZED BELOW THE 0.10Z STORM EVENT TO PUMP OUT LOW FLOW WATER AFTER CLEANING. PEAK FLOW WILL DISCHARGE THROUGH D-25 TO WOODWARD STREET.
11. ALL LINER INSTALLATIONS, FIELD WELDING OF SEAMS, AND OBSERVATION OF SOIL MIX PLACEMENT SHALL REQUIRE SPECIAL INSPECTION BY THE PROJECT GEOTECHNICAL ENGINEER OR OTHER QUALIFIED PERSON. A LETTER CERTIFYING PROPER INSTALLATION SHALL BE PROVIDED TO THE ENGINEER OF RECORD TO ACCEPTANCE OF THE FACILITIES.
12. SPECIAL INSPECTION SHALL BE REQUIRED FOR CONSTRUCTION OF ALL BIOFILTRATION BASINS. INSPECTION SHALL BE PERFORMED BY A QUALIFIED INDIVIDUAL (SUCH AS: ENGINEER OF RECORD, QSD). INSPECTION SHALL INCLUDE:
    - VERIFICATION OF OVERALL DIMENSIONS PRIOR TO PLACEMENT OF MATERIALS;
    - PLACEMENT OF THE LINER, IF REQUIRED; AND SEAMS OR PENETRATIONS
    - PLACEMENT OF THE GRAVEL, FILTER MATERIALS, AND FILTER MEDIA;
    - ALL INLET AND OUTLET STRUCTURES INCLUDING UNDERDRAINS, IF REQUIRED.
    - CONTRACTOR SHALL TAKE PICTURES AT EACH STAGE OF INSTALLATION AND SUBMITTED TO ENGINEER FOR VERIFICATION OF INSTALL.

    INSPECTOR SHALL BE GIVEN A MINIMUM OF 48 HOURS PRIOR TO INSPECTION. UPON COMPLETION THE INSPECTOR SHALL PROVIDE A CERTIFICATION TO THE ENGINEER OF WORK.
13. PROPOSED MATERIALS, SUCH AS AGGREGATE, FILTER MATERIAL, AND FILTER MEDIA SHALL BE SUBMITTED TO THE ENGINEER OF WORK FOR APPROVAL.

STRUCTURAL BIO-BASIN SUMMARY TABLE														
DMA NAME	DMA TYPE	BMP NAME	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) WATER QUALITY	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B1 (INCH) UPPER ORIFICE	B2 (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (INCH) OFFSET	BOX RISER OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER: UPPER B1 H X W (INCH)	ORIFICES DIAMETER: UPPER B2 H X W (INCH)	ORIFICES DIAMETER: LOWER (INCH)	IMPERMEABLE LINER ?
DMA-1+ DMA-2	DRAINS TO BMP	BMP-A	BIOFILTRATION	1490	36	51.48	9	9	28.5	18	12	3	48X48	4 X 3 – 4 BARRELS	6 X 12 – 2 BARRELS	1.4375	YES
DMA-4	DRAINS TO BMP	BMP-B	BIOFILTRATION	436	9	12	9	–	–	18	12	3	18x18	–	–	0.5	YES

NOTE:
-ONLY DMA-1, DMA-2, AND DMA-4 ARE FOR WATER QUALITY. OTHER AREAS ARE SELF-MITIGATING AND CONTAIN NO STRUCTURAL BMPS.
-FREEBOARD IS CALCULATED AS A2-A1
-BMP B WILL HAVE A BOX THAT IS USED FOR A PUMP SIZED BELOW THE 0.10Z STORM EVENT TO PUMP OUT LOW FLOW WATER AFTER CLEANING. PEAK FLOW WILL DISCHARGE THROUGH D-25 TO WOODWARD STREET.

SCALE: 1'=60"
0 60 120 180 240



BIOFILTRATION BASIN DETAIL
NOT TO SCALE

DATE	REMARKS
06/2023	PLANNING SUBMITTAL

EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • GPS • SURVEYING
440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-8334

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SWQMP - BMP

CORNERSTONE COMMUNITIES
WOODWARD
APN 220-210-49
WOODWARD ST, SAN MARCOS CA

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