

HYDROMODIFICATION MANAGEMENT STUDY SWEETWATER VISTAS

March 2017

County of San Diego, CA

prepared for:

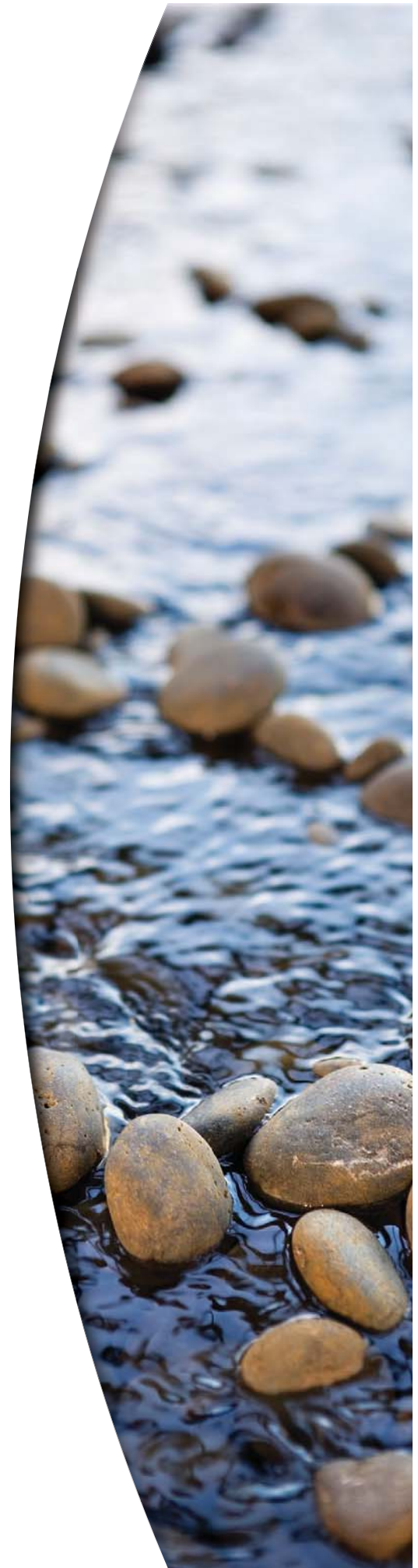
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HYDROMODIFICATION MANAGEMENT STUDY

Sweetwater Vistas

Record ID: PDS2015-MPA-15-002

PROJECT ADDRESS: Sweetwater Springs and Jamacha Blvd

APN: 505-672-03, 07, 09, 10, 11, 23 & 37

TRUST ACCOUNT NO.: 2030222-D-02695

COUNTY OF SAN DIEGO, CA

Prepared By:

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For

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March 2017

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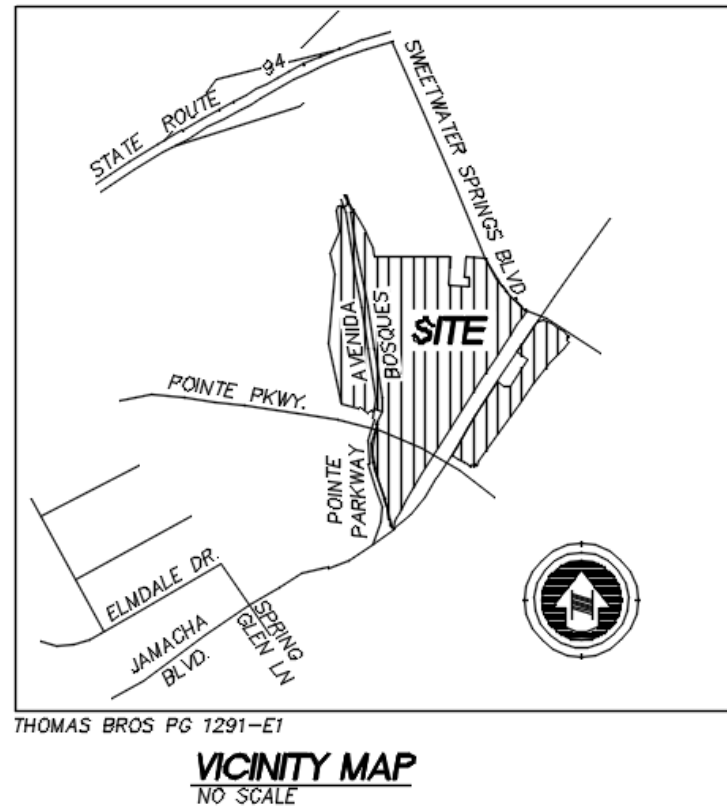


Figure 1 Vicinity Map

1.0 PROJECT DESCRIPTION

This Preliminary Hydromodification Management Study analyzes and proposes mitigation for the hydromodification impacts of the Sweetwater Vistas Project. This Study is required per the 2007 San Diego Regional Water Quality Control Board's municipal stormwater NPDES permit to San Diego area municipal Copermitees. Although municipal stormwater permit has been updated per Regional Water Quality Control Board Order Number R9-2013-001, per Provision E.3.d of that order, the project is subject to the requirements of the 2016 County of San Diego BMP Design Manual.

The Sweetwater Vistas project consists of approximately 52.0 acres and is located in the unincorporated area of Spring Valley. Approximately 43.5 acres of the project are located at the northwest corner of Jamacha Boulevard and Sweetwater Springs Boulevard (the "Western Parcel"). Approximately 8.5 acres of the project are located at the southeast corner of Jamacha Boulevard and Sweetwater Springs Boulevard, directly west of the Otay Water District offices (the "Eastern Parcel"). These sites are bisected by Jamacha Boulevard. The project proposes the development of a new master planned community consisting of 243 multi-family residential units on three pads and the extension of Avenida Bosques, all in the Western Parcel. Approximately 25.9 acres of the total project will be proposed for reservation as biological open space.

2.0 SITE INFORMATION

The following sections summarize the site conditions which relate to drainage and hydromodification, including the geotechnical conditions, drainage basins, and the low flow threshold determination.

2.1 GEOTECHNICAL CONDITIONS

The Hydrologic Soils Group for the project was determined from the SANGIS Hydromod BMP Website. The site for this project is a mix of Hydrologic Soil Group C and Group D.

Please refer to Appendix 1 for the soils map.

2.2 DRAINAGE BASINS

The site receives run-on from multiple adjacent parcels. The outlet locations of the adjacent parcels are at the following streets: Avenida Bosques, California Waters Drive, Foothill Court and Fabled Waters Court. The runoff from these streets convey into a nature flow path that drains into a large existing detention basin, which is then picked up by an existing 84" storm drain. The proposed design consists of a dual system, which is made up of a bypass storm drain that is not treated and a second storm drain system to be treated within the bio-filtration basins. The runoff from the adjacent parcels is being directed into the bypass storm drain system that extends along the proposed road (Avenida Bosques extension) and outlets into the large existing detention basin. The second storm drain system picks up runoff from the proposed road and lot 2, then is treated by the bio-filtration basin and outflows across the natural terrain into the large existing detention basin. Lots 1 and 3 are also treated by bio-filtration basins and convey into a natural flow path. All natural flow paths lead into the large existing detention basin, where it is then discharged through the existing 84" storm drain system that extends below Jamacha Blvd.

It is the intent of the new design to detain and treat runoff from the project and provide a new low flow outlet from the basin to drawdown the stored water. To accomplish this, the portion of the site draining to the basin was delineated into a Drainage Management Area (DMA), and the hydromodification mitigation facility is designed to reduce flows from this DMA to non-erosive levels.

2.3 LOW FLOW THRESHOLD DETERMINATION

An assessment of the susceptibility of the receiving channels to erosion was not performed for this project at this time. Therefore, the low flow threshold corresponding to a highly susceptible channel, $0.1Q_2$, was used.

3.0 METHODOLOGY

The hydromodification analysis for Sweetwater Vistas has been done in accordance with the Final Hydromodification Management Plan, dated March 2011.

3.1 DRAINAGE MANAGEMENT STRATEGY

The drainage management strategy for the project utilizes a multifunction BMP to provide water quality treatment and hydromodification mitigation for the site. A Point of Compliance (POC) has been identified where the proposed storm drain system will discharge.

To size the BMPs, the area tributary to the BMP was delineated as a Drainage Management Area (DMA). Refer to the Hydromodification Management Exhibit in Appendix 5 for the location of each

POC, BMP, and DMA. There are areas of existing landscaped slopes and other landscaped areas which are pervious. The remainder of the project will be constructed primarily of impervious surfaces, such as paving, hardscape and rooftops.

The following table lists the areas, soil type, and pre-project slopes for the DMA.

DMA	Pre-Project Cover	Post-Project Cover	Soil Type	Slope	Area (ac)
1.1	Pervious	Pervious	C	Flat	0.05
	Pervious	Pervious	C	Moderate	0.12
	Pervious	Pervious	C	Steep	0.22
	Pervious	Impervious	C	Flat	0.10
	Pervious	Impervious	C	Moderate	0.21
	Pervious	Impervious	C	Steep	0.40
1.2	Pervious	Pervious	C	Flat	0.10
	Pervious	Pervious	C	Moderate	0.21
	Pervious	Pervious	C	Steep	0.40
	Pervious	Impervious	C	Flat	0.18
	Pervious	Impervious	C	Moderate	0.40
	Pervious	Impervious	C	Steep	0.74
1.3	Pervious	Pervious	C	Flat	0.08
	Pervious	Pervious	C	Moderate	0.17
	Pervious	Pervious	C	Steep	0.32
	Pervious	Impervious	C	Flat	0.19
	Pervious	Impervious	C	Moderate	0.42
	Pervious	Impervious	C	Steep	0.78
2	Pervious	Pervious	C	Flat	0.33
	Pervious	Pervious	C	Moderate	0.40
	Pervious	Pervious	C	Steep	0.43
	Pervious	Impervious	C	Flat	0.61
	Pervious	Impervious	C	Moderate	0.73
	Pervious	Impervious	C	Steep	0.79
3	Pervious	Pervious	C	Flat	0.37
	Pervious	Pervious	C	Moderate	0.16
	Pervious	Pervious	C	Steep	0.17
	Pervious	Impervious	C	Flat	0.69
	Pervious	Impervious	C	Moderate	0.31
	Pervious	Impervious	C	Steep	0.31
	Pervious	Pervious	D	Flat	0.62
	Pervious	Pervious	D	Moderate	0.21
	Pervious	Pervious	D	Steep	0.19
	Pervious	Impervious	D	Flat	1.16
	Pervious	Impervious	D	Moderate	0.38
	Pervious	Impervious	D	Steep	0.36

DMA	Pre-Project Cover	Post-Project Cover	Soil Type	Slope	Area (ac)
4	Pervious	Pervious	C	Flat	0.05
	Pervious	Pervious	C	Moderate	0.19
	Pervious	Pervious	C	Steep	0.63
	Pervious	Impervious	C	Flat	0.09
	Pervious	Impervious	C	Moderate	0.34
	Pervious	Impervious	C	Steep	1.17
	Pervious	Pervious	D	Flat	0.04
	Pervious	Pervious	D	Moderate	0.06
	Pervious	Pervious	D	Steep	0.19
	Pervious	Impervious	D	Flat	0.04
	Pervious	Impervious	D	Moderate	0.06
	Pervious	Impervious	D	Steep	0.20

Hydromodification treatment and attenuation will be accomplished within the project by a biofiltration area paired with storage in the proposed basins. Runoff will be directed to these BMPs via the onsite storm drain system, gutters, and concrete ditches. The bottom of the basin will be lined to prevent saturation of adjacent fill slopes.

The BMP Sizing Spreadsheet V1.03 has been utilized to size the BMPs. Results are attached in Appendix 3.

3.2 BIO-FILTRATION PLUS CISTERN

As mentioned above, the proposed bio-filtration basins will treat runoff from the proposed project. Bio-filtration is the preferred method of treatment for the project because of the medium to high level of treatment provided. To provide hydromodification mitigation, two types of BMP will be utilized on this site. The first BMP type is Bio-filtration plus Cistern which will be utilized in DMA areas 1 and 2. Two pre-treatment cisterns will be utilized on each of the lots to store the required volume of runoff upstream of the bio-filtration areas. A modular storage structure is proposed as the pre-treatment cistern storage, providing void space of over 90%. Runoff will be directed to the pre-treatment cisterns by the private on-site drainage system. An outlet pipe will be installed at the bottom of the pre-treatment cistern tank, draining through a headwall to the bio-filtration area. The outlet pipe will be fitted with an end cap with drilled orifice corresponding to the orifice size determined by the BMP Sizing Spreadsheet. This water will outlet into the bio-filtration treatment area with a one-foot maximum ponding. The bio-filtration area is located at the low point of the basin to ensure that all runoff is captured. Bio-filtration soil media will comply with the soil specifications given in the County of San Diego BMP Design Manual. Once the water has been treated in the bio-filtration basin, the treated water will outlet onto the natural terrain.

The bio-filtration basin and cistern storage volume are designed in accordance with the County of San Diego BMP Design Manual. The depth of the cistern storage tanks is based on the required volume (calculated by the BMP sizing spreadsheet) divided by the cistern tank square footage. Please refer to the cross section of the basin in Appendix 5.

The second BMP is a slightly different bio-filtration plus cistern design which will be utilized in DMA areas 3 and 4. These systems will utilize cistern storage under the proposed bio-filtration treatment basins. The bio-filtration area is located at the low point of the basin to ensure that all runoff captured. A one-foot maximum ponding will be allowed above the bio-filtration area. Below the bio-filtration area, an 18" of bio-filtration soil media will be provided as a growing media. Bio-filtration soil media will comply with the soil specifications given in the County of San Diego BMP Design Manual. This will

be underlain by a cistern of open-graded gravel with 40% void space which will store the now treated runoff.

The bio-filtration basin and cistern storage volume have been designed in accordance with the County of San Diego BMP Design Manual. A subdrain will be installed at the bottom of the gravel layer. The subdrain will be connected to a headwall, and will be fitted with an end cap with drilled orifice corresponding to the orifice size determined by the BMP Sizing Spreadsheet. Please refer to the cross section of the basin in Appendix 5.

4.0 CALCULATIONS/RESULTS

The section below summarizes the sizing calculations for the BMP. BMP Sizing Spreadsheet output can be found in Appendix 3. Please refer to the Hydromodification Management Exhibit in Appendix 4 for a graphical depiction of these areas.

4.1 BIO-FILTRATION PLUS CISTERN

As described in Section 3.2, the hydromodification mitigation for DMA areas 1 and 2 of the project have been design as a bio-filtration plus cistern BMPs. Site flows from DMAs 1 and 2 receive hydromodification management controls before discharging to the treatment control basins (biofiltration basins 1.1-2, 1.3 and 2). DMA 1 is divided into sub-DMAs 1.1, 1.2 and 1.3. Sub-DMAs 1.1 and 1.2 are pre-treated for hydromodification management flows by 3 cisterns that outlet to Biofiltration Basin 1.1-2 for treatment control. Sub-DMA 1.3 is pretreated by a cistern before discharging to Biofiltration Basin 1.3. DMA2 is pretreated by a cistern before discharging to Biofiltration Basin 2. A removable threaded end cap with drilled orifice at pipe flow line will be placed on the outlet pipe of the cistern to the biofiltration basin. The provided cistern volume is based on a 90% voids matrix tank.

Hydromodification mitigation for DMAs 3 and 4 is provided by cisterns located physically below the biofiltration basins. In these conditions, runoff will be treated by the biofiltration basins before they are treated for hydromodification mitigation within the cistern. The provided cistern volume is based on a 40% void gravel storage area. A subdrain with orifice control will be provided and will outlet to the overflow-inlet structure of the basin as shown in details located in attachment 4 of this Hydromodification Management Study.

The table below summarizes the required and provided area, volume, and orifice diameter for the bio-filtration plus cistern BMPs.

Table 4.1 – BMP Sizing Requirements and Area Provided

DMA	BMP Sizing Requirements			BMP Size Provided			
	Biofiltratio n Surface Area	Storage Volume	Maximum Orifice Dia.	Biofiltratio n Surface Area	Cistern/ Storage Volume	Orifice Dia.	Drawdown
	(sf)	(cf)	(in)	(sf)	(cf)	(in)	(hrs)
1.1	804	9,095	0.62	1,085	11,160	0.6	219*
1.2	1,410	15,954	0.75	1,907	16,065	0.7	197*
1.3	1,260	12,980	0.84	1,720	14,250	0.8	168*
2	1,772	21,069	1.05	2,670	22,100	1.0	165*
3	3,230	35,104	.99	6,000	37,200**	0.9	215*
4	1,761	18,600	0.96	4,000	26,400***	0.9	149*

*Drawdown hours exceed the maximum 96 hours, however, the cisterns are constructed below ground.

** Cistern Volume accounting for 40% Voids: $35,104/0.4 = 87,760$ CF
 Depth: $87,760/6,000 = 14.6 = 15.5$ FT
 Cistern Volume Provided = $15.5 \times 6,000 = 93,000$ CF
 $93,000 \times 0.4 = 37,200$ CF

*** Cistern Volume accounting for 40% Voids: $18,600/0.4 = 46,500$ CF
 Depth: $46,500/4,000 = 11.625$ FT
 Note: a depth of 16.5 feet was used to comply with hydrology requirements. See Drainage Study.
 Cistern Volume Provided = $16.5 \times 4,000 = 66,000$ CF
 $66,000 \times 0.4 = 26,400$ CF

5.0 MAINTENANCE

Maintenance of the proposed BMP will be performed by the to-be-formed Sweetwater Vistas Homeowner's Association. Until the formation of the homeowner's association, Sweetwater Vistas, LLC or the current owner of the property will be responsible for maintenance. The required maintenance of the BMP is summarized in the table below. Please refer to the Storm Water Management Plan for further information on maintenance of the BMP.

TASK	FREQUENCY	INDICATOR MAINTENANCE IS NEEDED	MAINTENANCE NOTES
CATCHMENT INSPECTION	Weekly or Biweekly with routine property maintenance.	Excessive sediment, trash, and/or debris accumulation on the surface of biofiltration	Permanently stabilize any exposed soil and remove any accumulated sediment. Adjacent pervious areas may need to be regraded.
INLET INSPECTION		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the biofiltration is as designed. Remove any accumulated sediment.
LITTER/LEAF REMOVAL AND MISC. UPKEEP		Accumulation of litter and debris within biofiltration area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the biofiltration area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
PRUNING	1-2 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Nutrients in runoff often cause biofiltration vegetation to flourish.
MOWING	2-12 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Frequency depends on location and desired aesthetic appeal and type of vegetation.
OUTLET INSPECTION	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.

TASK	FREQUENCY	INDICATOR MAINTENANCE IS NEEDED	MAINTENANCE NOTES
MULCH REMOVAL AND REPLACEMENT	1 time/2-3 years	2/3 of mulch has decomposed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches
REMOVE AND REPLACE DEAD PLANTS	1 time/year	Dead plants	Within the first year, 10 percent of plants can die. Survival rates increase with time.
TEMPORARY WATERING	1 time/2-3 days for first 2-3 months	Until establishment and during severely-droughty weather	Watering after the initial year might be required.
FERTILIZATION	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

6.0 SUMMARY AND CONCLUSIONS

The hydromodification mitigation measures proposed for the Sweetwater Vistas project will satisfy the requirements of the Final Hydromodification Management Plan. Mitigation of hydromodification impacts will be achieved through the use of a bio-filtration plus cistern BMP which will reduce runoff flows and durations from the developed areas of the project to below pre-project levels for the flow range of $0.1Q_2$ to Q_{10} . The bio-filtration areas will be located at the low point of each DMA area. Bio-filtration plus Cisterns will be utilized on the project to provide the appropriate storage volume required. The BMP has been designed using the BMP Sizing Spreadsheet. Maintenance of the BMP will be performed by the Sweetwater Vistas Homeowner's Association. Please refer to the Storm Water Management Plan and Drainage Study prepared for this project for further information regarding the water quality and drainage aspects of the proposed BMP.

7.0 APPENDICES

<i>Appendix 1</i>	<i>Soils Map</i>
<i>Appendix 2</i>	<i>Existing Hydrology Exhibit</i>
<i>Appendix 3</i>	<i>BMP Sizing Spreadsheet Output</i>
<i>Appendix 4</i>	<i>Hydromodification Management Exhibit</i>
<i>Appendix 5</i>	<i>BMP Details</i>

APPENDIX 1

SOILS MAP



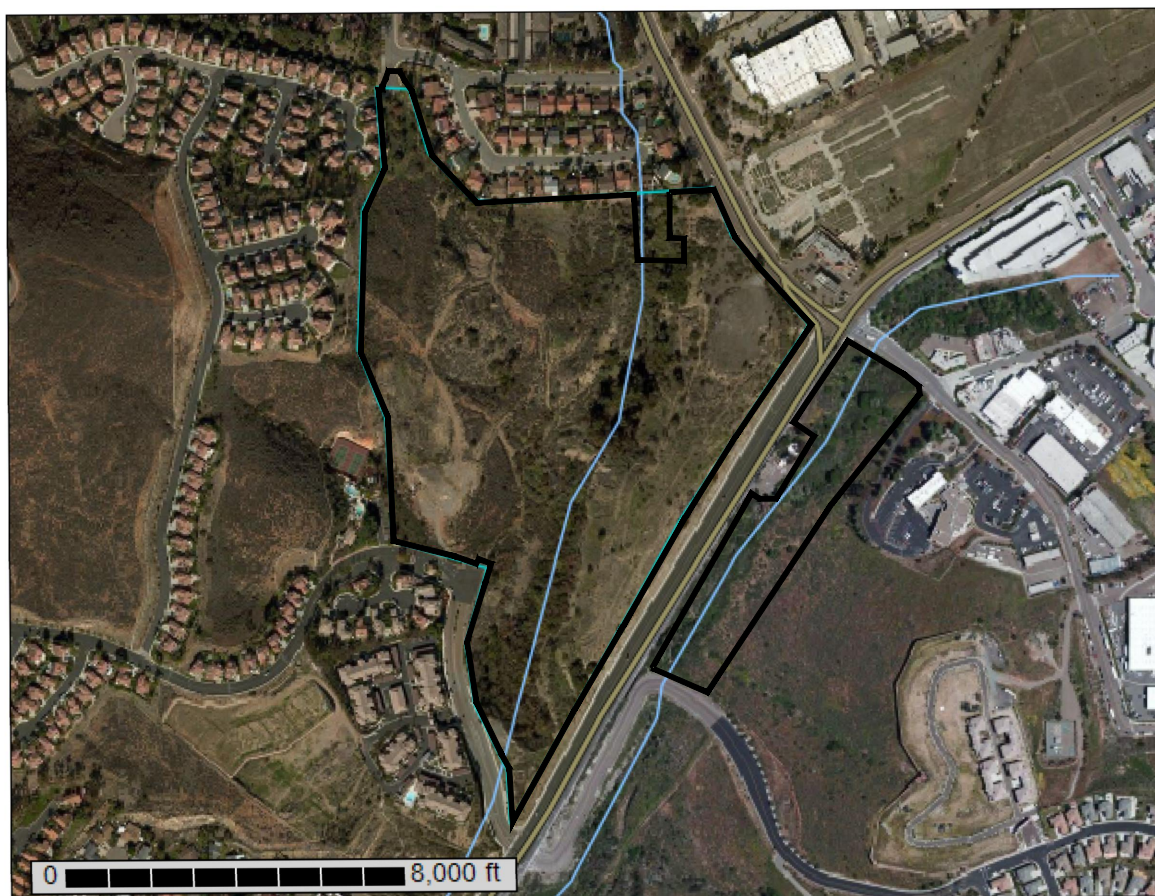
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

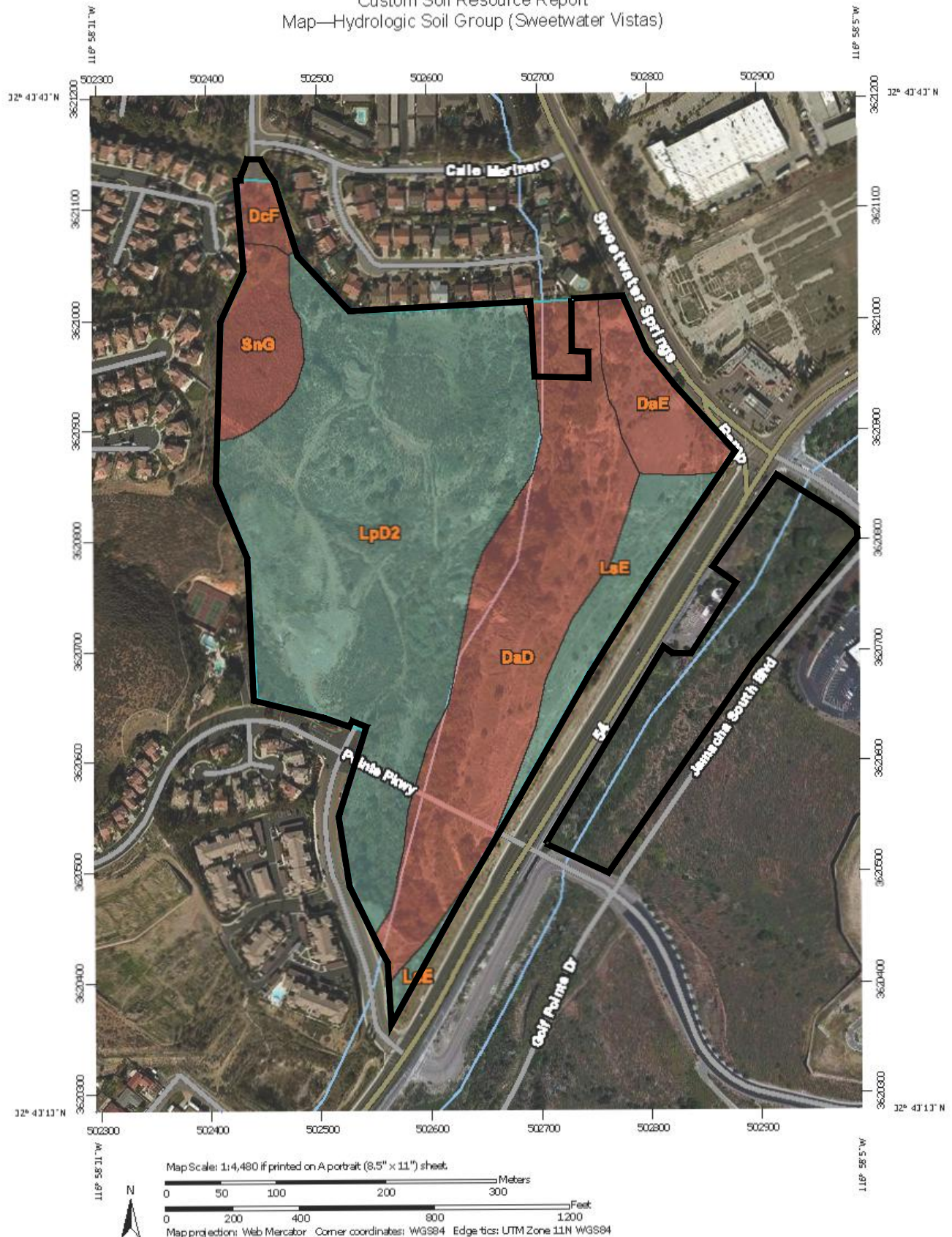
Custom Soil Resource Report for **San Diego County Area, California**



July 6, 2015

Custom Soil Resource Report

Map—Hydrologic Soil Group (Sweetwater Vistas)



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: San Diego County Area, California
 Survey Area Data: Version 8, Sep 17, 2014

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

Date(s) aerial images were photographed: May 3, 2010—Jan 4, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (Sweetwater Vistas)

Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaD	Diablo clay, 9 to 15 percent slopes	D	12.2	27.7%
DaE	Diablo clay, 15 to 30 percent slopes	D	2.4	5.5%
DcF	Diablo-Urban land complex, 15 to 50 percent slopes	D	0.6	1.4%
LpD2	Las Posas fine sandy loam, 9 to 15 percent slopes, eroded	C	23.2	52.5%
LsE	Linne clay loam, 9 to 30 percent slopes	C	3.2	7.3%
SnG	San Miguel-Exchequer rocky silt loams, 9 to 70 percent slopes	D	2.5	5.6%
Totals for Area of Interest			44.1	100.0%

Rating Options—Hydrologic Soil Group (Sweetwater Vistas)

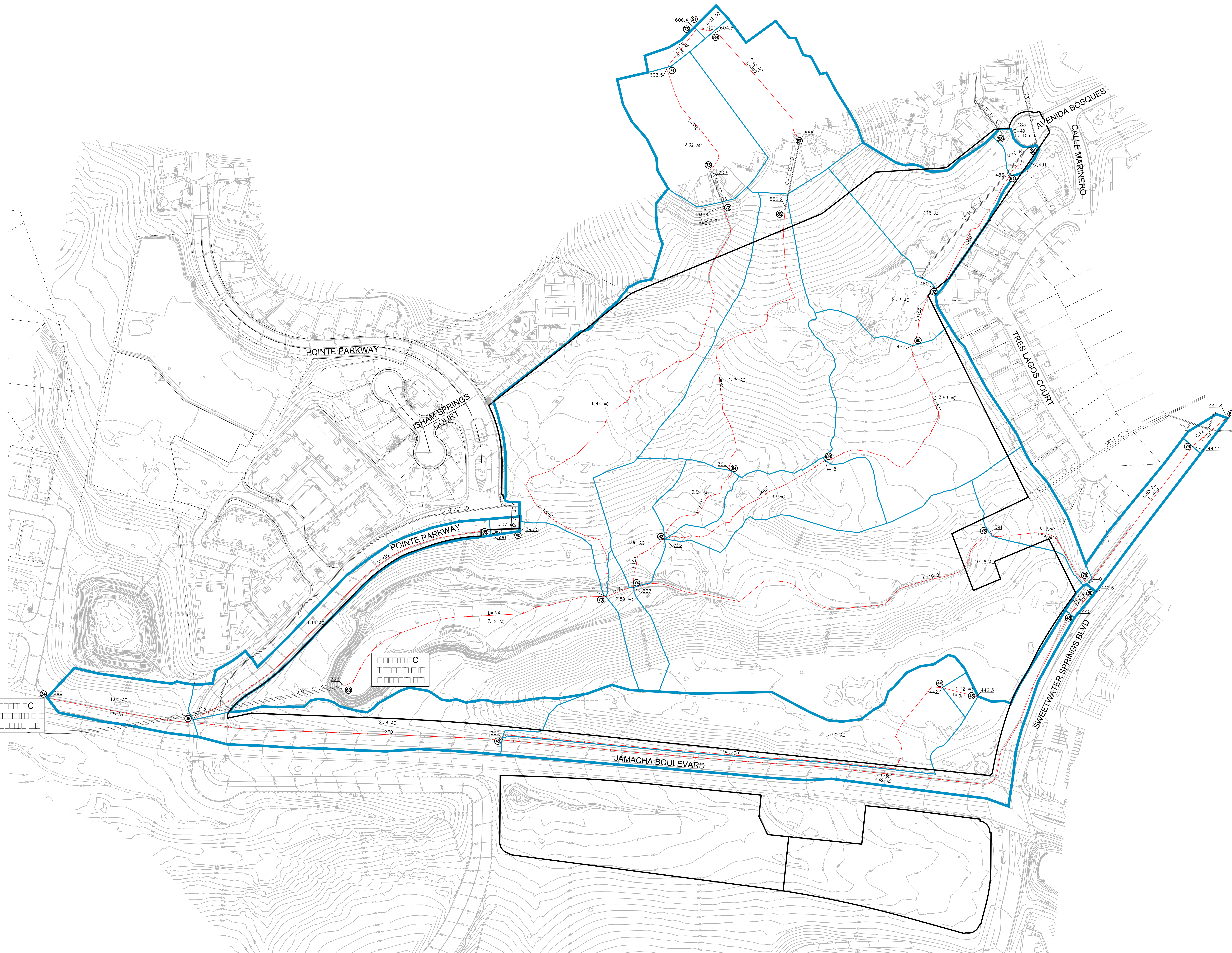
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX 2

EXISTING HYDROLOGY EXHIBIT



LEGEND

- PROJECT BOUNDARY
- BASIN BOUNDARY
- FLOW PATH
- HYDROLOGY NODE

**SWEETWATER VISTAS
EXISTING 100-YEAR HYDROLOGY
COUNTY OF SAN DIEGO, CA**

PROJECT NUMBER: 2780-002
DATE: July 27, 2015

APPENDIX 3

BMP SIZING SPREADSHEET OUTPUT

DMA 1.1

BMP Sizing Spreadsheet V2.0

Project Name:	Sweetwater Vistas
Project Applicant:	Sweewater Vistas, LLC
Jurisdiction:	County of San diego
Parcel (APN):	505-672-23 & 505-672-37
Hydrologic Unit:	Sweetwater
Rain Gauge:	Oceanside
Total Project Area (sf):	1.17
Channel Susceptibility:	High

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San Diego	Total Project Area:	1
Parcel (APN):	505-672-23 & 505-672-37	Low Flow Threshold:	0.1Q2
BMP Name:	Bio-Retention 1.1	BMP Type:	Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Pre-project Slope	Post Project Surface Type	Runoff Factor (Table G.2-1) ¹	N/A	Cistern Volume	N/A	N/A	Cistern Volume (cf)	N/A
Flat-Perv->Perv	1630	C	Flat	Landscaping	0.1	N/A	0.26	N/A	N/A	42	N/A
Flat-Perv->Imp	5283	C	Flat	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	1374	N/A
Mod-Perv->Perv	3575	C	Moderate	Landscaping	0.1	N/A	0.26	N/A	N/A	93	N/A
Mod-Perv->Imp	11749	C	Moderate	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	3055	N/A
Steep-Perv->Perv	6691	C	Steep	Landscaping	0.1	N/A	0.2	N/A	N/A	134	N/A
Steep-Perv->Imp	21987	C	Steep	Pavement/Bldgs	1.0	N/A	0.2	N/A	N/A	4397	N/A
Total BMP Area	50,915										
									Minimum BMP Size	9095	
									Proposed BMP Size*	1085	N/A
									Minimum Cistern Depth	N/A	in
									Maximum Cistern Depth	N/A	in
									Selected Cistern Depth	72.00	in
									Selected Cistern Volume	11160	cubic feet

Notes:

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

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

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

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, February 2016. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweewater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	1
Parcel (APN):	05-672-23 & 505-672-3	Low Flow Threshold:	0.1Q2
BMP Name	Bio-Retention 1.1	BMP Type:	Cistern

DMA Name	Rain Gauge	Pre-developed Condition			Q ₂ Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Cover	Slope				
Flat-Perv->Perv	Oceanside	C	Scrub	Flat	0.146	0.037	0.001	0.01
Flat-Perv->Imp	Oceanside	C	Scrub	Flat	0.146	0.121	0.002	0.02
Mod-Perv->Perv	Oceanside	C	Scrub	Moderate	0.185	0.082	0.002	0.02
Mod-Perv->Imp	Oceanside	C	Scrub	Moderate	0.185	0.270	0.005	0.07
Steep-Perv->Perv	Oceanside	C	Scrub	Steep	0.217	0.154	0.003	0.04
Steep-Perv->Imp	Oceanside	C	Scrub	Steep	0.217	0.505	0.011	0.14
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					

0.023	0.30	0.62
Tot. Allowable Orifice Flow (cfs)	Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.023	0.28	0.60
Actual Orifice Flow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	provide hand calculation
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DMA 1.2

BMP Sizing Spreadsheet V2.0

Project Name:	Sweetwater Vistas
Project Applicant:	Sweetwater Vistas, LLC
Jurisdiction:	County of San diego
Parcel (APN):	505-672-23 & 505-672-37
Hydrologic Unit:	Sweetwater
Rain Gauge:	Oceanside
Total Project Area (sf):	2.11
Channel Susceptibility:	High

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	2
Parcel (APN):	505-672-23 & 505-672-37	Low Flow Threshold:	0.1Q2
BMP Name:	Bio-Retention 1.2	BMP Type:	Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Pre-project Slope	Post Project Surface Type	Runoff Factor (Table G.2-1) ¹	N/A	Cistern Volume	N/A	N/A	Cistern Volume (cf)	N/A
Flat-Perv->Perv	3284	C	Flat	Landscaping	0.1	N/A	0.26	N/A	N/A	85	N/A
Flat-Perv->Imp	9232	C	Flat	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	2400	N/A
Mod-Perv->Perv	7203	C	Moderate	Landscaping	0.1	N/A	0.26	N/A	N/A	187	N/A
Mod-Perv->Imp	20515	C	Moderate	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	5334	N/A
Steep-Perv->Perv	13483	C	Steep	Landscaping	0.1	N/A	0.2	N/A	N/A	270	N/A
Steep-Perv->Imp	38388	C	Steep	Pavement/Bldgs	1.0	N/A	0.2	N/A	N/A	7678	N/A
Total BMP Area	92,105										
									Minimum BMP Size	15954	
									Proposed BMP Size*	1907	N/A
									Minimum Cistern Depth	N/A	in
									Maximum Cistern Depth	N/A	in
									Selected Cistern Depth	108.00	in
									Selected Cistern Volume	16065	cubic feet

Notes:

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

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

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

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, February 2016. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	2
Parcel (APN):	05-672-23 & 505-672-3	Low Flow Threshold:	0.1Q2
BMP Name	Bio-Retention 1.2	BMP Type:	Cistern

DMA Name	Rain Gauge	Pre-developed Condition			Q ₂ Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Cover	Slope				
Flat-Perv->Perv	Oceanside	C	Scrub	Flat	0.146	0.075	0.001	0.01
Flat-Perv->Imp	Oceanside	C	Scrub	Flat	0.146	0.212	0.003	0.03
Mod-Perv->Perv	Oceanside	C	Scrub	Moderate	0.185	0.165	0.003	0.03
Mod-Perv->Imp	Oceanside	C	Scrub	Moderate	0.185	0.471	0.009	0.09
Steep-Perv->Perv	Oceanside	C	Scrub	Steep	0.217	0.310	0.007	0.07
Steep-Perv->Imp	Oceanside	C	Scrub	Steep	0.217	0.881	0.019	0.20
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					

0.042	0.45	0.75
Tot. Allowable Orifice Flow (cfs)	Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.039	0.38	0.70
Actual Orifice Flow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	provide hand calculation
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DMA 1.3

BMP Sizing Spreadsheet V2.0

Project Name:	Sweetwater Vistas
Project Applicant:	Sweetwater Vistas, LLC
Jurisdiction:	County of San diego
Parcel (APN):	505-672-23 & 505-672-37
Hydrologic Unit:	Sweetwater
Rain Gauge:	Oceanside
Total Project Area (sf):	1.96
Channel Susceptibility:	High

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	2
Parcel (APN):	505-672-23 & 505-672-37	Low Flow Threshold:	0.1Q2
BMP Name:	Bio-Retention 1.3	BMP Type:	Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Pre-project Slope	Post Project Surface Type	Runoff Factor (Table G.2-1) ¹	N/A	Cistern Volume	N/A	N/A	Cistern Volume (cf)	N/A
Flat-Perv->Perv	3407	C	Flat	Landscaping	0.1	N/A	0.26	N/A	N/A	89	N/A
Flat-Perv->Imp	8225	C	Flat	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	2139	N/A
Mod-Perv->Perv	7542	C	Moderate	Landscaping	0.1	N/A	0.26	N/A	N/A	196	N/A
Mod-Perv->Imp	18204	C	Moderate	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	4733	N/A
Steep-Perv->Perv	14106	C	Steep	Landscaping	0.1	N/A	0.2	N/A	N/A	282	N/A
Steep-Perv->Imp	34050	C	Steep	Pavement/Bldgs	1.0	N/A	0.2	N/A	N/A	6810	N/A
Total BMP Area	85,534										
									Minimum BMP Size	14248	
									Proposed BMP Size*	1720	N/A
									Minimum Cistern Depth	N/A	in
									Maximum Cistern Depth	N/A	in
									Selected Cistern Depth	60.00	in
									Selected Cistern Volume	14250	cubic feet

Notes:

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

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

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

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, February 2016. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	2
Parcel (APN):	05-672-23 & 505-672-3	Low Flow Threshold:	0.1Q2
BMP Name	Bio-Retention 1.3	BMP Type:	Cistern

DMA Name	Rain Gauge	Pre-developed Condition			Q ₂ Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Cover	Slope				
Flat-Perv->Perv	Oceanside	C	Scrub	Flat	0.146	0.078	0.001	0.02
Flat-Perv->Imp	Oceanside	C	Scrub	Flat	0.146	0.189	0.003	0.04
Mod-Perv->Perv	Oceanside	C	Scrub	Moderate	0.185	0.173	0.003	0.05
Mod-Perv->Imp	Oceanside	C	Scrub	Moderate	0.185	0.418	0.008	0.11
Steep-Perv->Perv	Oceanside	C	Scrub	Steep	0.217	0.324	0.007	0.10
Steep-Perv->Imp	Oceanside	C	Scrub	Steep	0.217	0.782	0.017	0.24
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					

0.039	0.56	0.84
Tot. Allowable Orifice Flow (cfs)	Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.038	0.50	0.80
Actual Orifice Flow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	provide hand calculation
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DMA 2

BMP Sizing Spreadsheet V2.0

Project Name:	Sweetwater Vistas
Project Applicant:	Sweetwater Vistas, LLC
Jurisdiction:	County of San diego
Parcel (APN):	505-672-03 & 505-672-23
Hydrologic Unit:	Sweetwater
Rain Gauge:	Oceanside
Total Project Area (sf):	3.26
Channel Susceptibility:	High

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	3
Parcel (APN):	505-672-03 & 505-672-23	Low Flow Threshold:	0.1Q2
BMP Name:	Bio-Retention 2	BMP Type:	Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Pre-project Slope	Post Project Surface Type	Runoff Factor (Table G.2-1) ¹	N/A	Cistern Volume	N/A	N/A	Cistern Volume (cf)	N/A
Flat-Perv->Perv	17038	C	Flat	Landscaping	0.1	N/A	0.26	N/A	N/A	443	N/A
Flat-Perv->Imp	23671	C	Flat	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	6154	N/A
Mod-Perv->Perv	20441	C	Moderate	Landscaping	0.1	N/A	0.26	N/A	N/A	531	N/A
Mod-Perv->Imp	28398	C	Moderate	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	7383	N/A
Steep-Perv->Perv	22012	C	Steep	Landscaping	0.1	N/A	0.2	N/A	N/A	440	N/A
Steep-Perv->Imp	30580	C	Steep	Pavement/Bldgs	1.0	N/A	0.2	N/A	N/A	6116	N/A
Total BMP Area	142,140										
									Minimum BMP Size	21069	
									Proposed BMP Size*	2670	N/A
									Minimum Cistern Depth	N/A	in
									Maximum Cistern Depth	N/A	in
									Selected Cistern Depth	60.00	in
									Selected Cistern Volume	22100	cubic feet

Notes:

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

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

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

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BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	3
Parcel (APN):	05-672-03 & 505-672-21	Low Flow Threshold:	0.1Q2
BMP Name	Bio-Retention 2	BMP Type:	Cistern

DMA Name	Rain Gauge	Pre-developed Condition			Q ₂ Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Cover	Slope				
Flat-Perv->Perv	Oceanside	C	Scrub	Flat	0.146	0.391	0.006	0.08
Flat-Perv->Imp	Oceanside	C	Scrub	Flat	0.146	0.543	0.008	0.11
Mod-Perv->Perv	Oceanside	C	Scrub	Moderate	0.185	0.469	0.009	0.12
Mod-Perv->Imp	Oceanside	C	Scrub	Moderate	0.185	0.652	0.012	0.17
Steep-Perv->Perv	Oceanside	C	Scrub	Steep	0.217	0.505	0.011	0.16
Steep-Perv->Imp	Oceanside	C	Scrub	Steep	0.217	0.702	0.015	0.22
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					
			Scrub					

0.061	0.87	1.05
Tot. Allowable Orifice Flow (cfs)	Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.059	0.79	1.00
Actual Orifice Flow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	provide hand calculation
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DMA 3

BMP Sizing Spreadsheet V2.0

Project Name:	Sweetwater Vistas
Project Applicant:	Sweetwater Vistas, LLC
Jurisdiction:	County of San diego
Parcel (APN):	505-672-03
Hydrologic Unit:	Sweetwater
Rain Gauge:	Oceanside
Total Project Area (sf):	5.06
Channel Susceptibility:	High

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	5
Parcel (APN):	505-672-03	Low Flow Threshold:	0.1Q2
BMP Name:	Bio-Retention 3	BMP Type:	Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Pre-project Slope	Post Project Surface Type	Runoff Factor (Table G.2-1) ¹	N/A	Cistern Volume	N/A	N/A	Cistern Volume (cf)	N/A
C-Flat-Perv->Perv	16195	C	Flat	Landscaping	0.1	N/A	0.26	N/A	N/A	421	N/A
C-Flat-Perv->Imp	36421	C	Flat	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	9469	N/A
C-Mod-Perv->Perv	6045	C	Moderate	Landscaping	0.1	N/A	0.26	N/A	N/A	157	N/A
C-Mod-Perv->Imp	13595	C	Moderate	Pavement/Bldgs	1.0	N/A	0.26	N/A	N/A	3535	N/A
C-Steep-Perv->Perv	5837	C	Steep	Landscaping	0.1	N/A	0.2	N/A	N/A	117	N/A
C-Steep-Perv->Imp	13127	C	Steep	Pavement/Bldgs	1.0	N/A	0.2	N/A	N/A	2625	N/A
D-Flat-Perv->Perv	20248	D	Flat	Landscaping	0.1	N/A	0.2	N/A	N/A	405	N/A
D-Flat-Perv->Imp	52956	D	Flat	Pavement/Bldgs	1.0	N/A	0.2	N/A	N/A	10591	N/A
D-Mod-Perv->Perv	8790	D	Moderate	Landscaping	0.1	N/A	0.2	N/A	N/A	176	N/A
D-Mod-Perv->Imp	19767	D	Moderate	Pavement/Bldgs	1.0	N/A	0.2	N/A	N/A	3953	N/A
D-Steep-Perv->Perv	8487	D	Steep	Landscaping	0.1	N/A	0.18	N/A	N/A	153	N/A
D-Steep-Perv->Imp	19087	D	Steep	Pavement/Bldgs	1.0	N/A	0.18	N/A	N/A	3436	N/A
Total BMP Area	220,555										
									Minimum BMP Size	35038	
									Proposed BMP Size*	6000	N/A
									Minimum Cistern Depth	N/A	in
									Maximum Cistern Depth	N/A	in
									Selected Cistern Depth	186.00	in
									Selected Cistern Volume	37200	cubic feet

Notes:

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

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

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Designated Staff have final review and approval authority over the project design.

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BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	5
Parcel (APN):	505-672-03	Low Flow Threshold:	0.1Q2
BMP Name	Bio-Rentention 3	BMP Type:	Cistern

DMA Name	Rain Gauge	Pre-developed Condition			Q ₂ Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Cover	Slope				
C-Flat-Perv->Perv	Oceanside	C	Scrub	Flat	0.146	0.372	0.005	0.04
C-Flat-Perv->Imp	Oceanside	C	Scrub	Flat	0.146	0.836	0.012	0.10
C-Mod-Perv->Perv	Oceanside	C	Scrub	Moderate	0.185	0.139	0.003	0.02
C-Mod-Perv->Imp	Oceanside	C	Scrub	Moderate	0.185	0.312	0.006	0.05
C-Steep-Perv->Perv	Oceanside	C	Scrub	Steep	0.217	0.134	0.003	0.02
C-Steep-Perv->Imp	Oceanside	C	Scrub	Steep	0.217	0.301	0.007	0.05
D-Flat-Perv->Perv	Oceanside	D	Scrub	Flat	0.175	0.465	0.008	0.07
D-Flat-Perv->Imp	Oceanside	D	Scrub	Flat	0.175	1.216	0.021	0.17
D-Mod-Perv->Perv	Oceanside	D	Scrub	Moderate	0.212	0.202	0.004	0.03
D-Mod-Perv->Imp	Oceanside	D	Scrub	Moderate	0.212	0.454	0.010	0.08
D-Steep-Perv->Perv	Oceanside	D	Scrub	Steep	0.244	0.195	0.005	0.04
D-Steep-Perv->Imp	Oceanside	D	Scrub	Steep	0.244	0.438	0.011	0.09
			Scrub					
			Scrub					
			Scrub					

0.094	0.76	0.99
Tot. Allowable Orifice Flow (cfs)	Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.084	0.64	0.90
Actual Orifice Flow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	provide hand calculation
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DMA 4

BMP Sizing Spreadsheet V2.0

Project Name:	Sweetwater Vistas
Project Applicant:	Sweetwater Vistas, LLC
Jurisdiction:	County of San diego
Parcel (APN):	505-672-03, 505-672-23 & 505-672-37
Hydrologic Unit:	Sweetwater
Rain Gauge:	Oceanside
Total Project Area (sf):	3.61
Channel Susceptibility:	High

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	4
Parcel (APN):	05-672-03, 505-672-23 & 505-672-	Low Flow Threshold:	0.1Q2
BMP Name:	Bio-Retention 4	BMP Type:	Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Pre-project Slope	Post Project Surface Type	Runoff Factor (Table G.2-1) ¹	N/A	Cistern Volume	N/A	N/A	Cistern Volume (cf)	N/A
C- Flat-Perv->Perv	3103	C	Flat	Landscaping	0.1	N/A	0.26	N/A	N/A	81	N/A
C- Flat-Perv->Imp	3618	C	Flat	AC/Sidewalk	1.0	N/A	0.26	N/A	N/A	941	N/A
C- Mod-Perv->Perv	12445	C	Moderate	Landscaping	0.1	N/A	0.26	N/A	N/A	324	N/A
C- Mod-Perv->Imp	14512	C	Moderate	AC/Sidewalk	1.0	N/A	0.26	N/A	N/A	3773	N/A
C- Steep-Perv->Perv	42411	C	Steep	Landscaping	0.1	N/A	0.2	N/A	N/A	848	N/A
C- Steep-Perv->Imp	49444	C	Steep	AC/Sidewalk	1.0	N/A	0.2	N/A	N/A	9889	N/A
D- Flat-Perv->Perv	2412	D	Flat	Landscaping	0.1	N/A	0.2	N/A	N/A	48	N/A
D-Flat-Perv->Imp	1640	D	Flat	AC/Sidewalk	1.0	N/A	0.2	N/A	N/A	328	N/A
D-Mod-Perv->Perv	3810	D	Moderate	Landscaping	0.1	N/A	0.2	N/A	N/A	76	N/A
D-Mod-Perv->Imp	2589	D	Moderate	AC/Sidewalk	1.0	N/A	0.2	N/A	N/A	518	N/A
D-Steep-Perv->Perv	12637	D	Steep	Landscaping	0.1	N/A	0.18	N/A	N/A	227	N/A
D-Steep-Perv->Imp	8594	D	Steep	AC/Sidewalk	1.0	N/A	0.18	N/A	N/A	1547	N/A
Total BMP Area	157,215										
									Minimum BMP Size	18600	
									Proposed BMP Size*	4000	N/A
									Minimum Cistern Depth	N/A	in
									Maximum Cistern Depth	N/A	in
									Selected Cistern Depth	198.00	in
									Selected Cistern Volume	26400	cubic feet

Notes:

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

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

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.

Designated Staff have final review and approval authority over the project design.

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, February 2016. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V2.0			
Project Name:	Sweetwater Vistas	Hydrologic Unit:	Sweetwater
Project Applicant:	Sweetwater Vistas, LLC	Rain Gauge:	Oceanside
Jurisdiction:	County of San diego	Total Project Area:	4
Parcel (APN):	2-03, 505-672-23 & 505	Low Flow Threshold:	0.1Q2
BMP Name	Bio-Retention 4	BMP Type:	Cistern

DMA Name	Rain Gauge	Pre-developed Condition			Q ₂ Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Cover	Slope				
C- Flat-Perv->Perv	Oceanside	C	Scrub	Flat	0.146	0.071	0.001	0.01
C- Flat-Perv->Imp	Oceanside	C	Scrub	Flat	0.146	0.083	0.001	0.01
C- Mod-Perv->Perv	Oceanside	C	Scrub	Moderate	0.185	0.286	0.005	0.04
C- Mod-Perv->Imp	Oceanside	C	Scrub	Moderate	0.185	0.333	0.006	0.05
C- Steep-Perv->Perv	Oceanside	C	Scrub	Steep	0.217	0.974	0.021	0.17
C- Steep-Perv->Imp	Oceanside	C	Scrub	Steep	0.217	1.135	0.025	0.19
D- Flat-Perv->Perv	Oceanside	D	Scrub	Flat	0.175	0.055	0.001	0.01
D-Flat-Perv->Imp	Oceanside	D	Scrub	Flat	0.175	0.038	0.001	0.01
D-Mod-Perv->Perv	Oceanside	D	Scrub	Moderate	0.212	0.087	0.002	0.01
D-Mod-Perv->Imp	Oceanside	D	Scrub	Moderate	0.212	0.059	0.001	0.01
D-Steep-Perv->Perv	Oceanside	D	Scrub	Steep	0.244	0.290	0.007	0.06
D-Steep-Perv->Imp	Oceanside	D	Scrub	Steep	0.244	0.197	0.005	0.04
			Scrub					
			Scrub					
			Scrub					

0.076	0.60	0.87
Tot. Allowable Orifice Flow (cfs)	Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.086	0.64	0.90
Actual Orifice Flow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	provide hand calculation
----------------	-----------------------------

BMP 1.1 Drawdown Calculation						
Cd	A	H	$\sqrt{(2gh)}$	Q	Volume	Time (hours)
0.60	0.0019	6.00	19.66	0.0229	930	11.26
0.60	0.0019	5.50	18.82	0.0220	930	11.77
0.60	0.0019	5.00	17.94	0.0209	930	12.34
0.60	0.0019	4.50	17.02	0.0199	930	13.01
0.60	0.0019	4.00	16.05	0.0187	930	13.80
0.60	0.0019	3.50	15.01	0.0175	930	14.75
0.60	0.0019	3.00	13.90	0.0162	930	15.93
0.60	0.0019	2.50	12.69	0.0148	930	17.45
0.60	0.0019	2.00	11.35	0.0132	930	19.51
0.60	0.0019	1.50	9.83	0.0115	930	22.53
0.60	0.0019	1.00	8.02	0.0094	930	27.59
0.60	0.0019	0.50	5.67	0.0066	930	39.02
					11,160	218.96

BMP 1.2 Drawdown Calculation						
Cd	A	H	$\sqrt{(2gh)}$	Q	Volume	Time (hours)
0.60	0.0026	9.00	24.07	0.0381	893	6.50
0.60	0.0026	8.50	23.40	0.0370	893	6.69
0.60	0.0026	8.00	22.70	0.0359	893	6.90
0.60	0.0026	7.50	21.98	0.0348	893	7.12
0.60	0.0026	7.00	21.23	0.0336	893	7.37
0.60	0.0026	6.50	20.46	0.0324	893	7.65
0.60	0.0026	6.00	19.66	0.0311	893	7.97
0.60	0.0026	5.50	18.82	0.0298	893	8.32
0.60	0.0026	5.00	17.94	0.0284	893	8.73
0.60	0.0026	4.50	17.02	0.0270	893	9.20
0.60	0.0026	4.00	16.05	0.0254	893	9.76
0.60	0.0026	3.50	15.01	0.0238	893	10.43
0.60	0.0026	3.00	13.90	0.0220	893	11.26
0.60	0.0026	2.50	12.69	0.0201	893	12.34
0.60	0.0026	2.00	11.35	0.0180	893	13.80
0.60	0.0026	1.50	9.83	0.0156	893	15.93
0.60	0.0026	1.00	8.02	0.0127	893	19.51
0.60	0.0026	0.50	5.67	0.0090	893	27.59
					16,065	197.08

BMP 1.3 Drawdown Calculation						
Cd	A	H	$\sqrt{(2gh)}$	Q	Volume	Time (hours)
0.60	0.0035	5.00	17.94	0.0374	1,425	10.59
0.60	0.0035	4.50	17.02	0.0355	1,425	11.16
0.60	0.0035	4.00	16.05	0.0334	1,425	11.84
0.60	0.0035	3.50	15.01	0.0313	1,425	12.66
0.60	0.0035	3.00	13.90	0.0290	1,425	13.67
0.60	0.0035	2.50	12.69	0.0264	1,425	14.97
0.60	0.0035	2.00	11.35	0.0236	1,425	16.74
0.60	0.0035	1.50	9.83	0.0205	1,425	19.33
0.60	0.0035	1.00	8.02	0.0167	1,425	23.68
0.60	0.0035	0.50	5.67	0.0118	1,425	33.48
					14,250	168.12

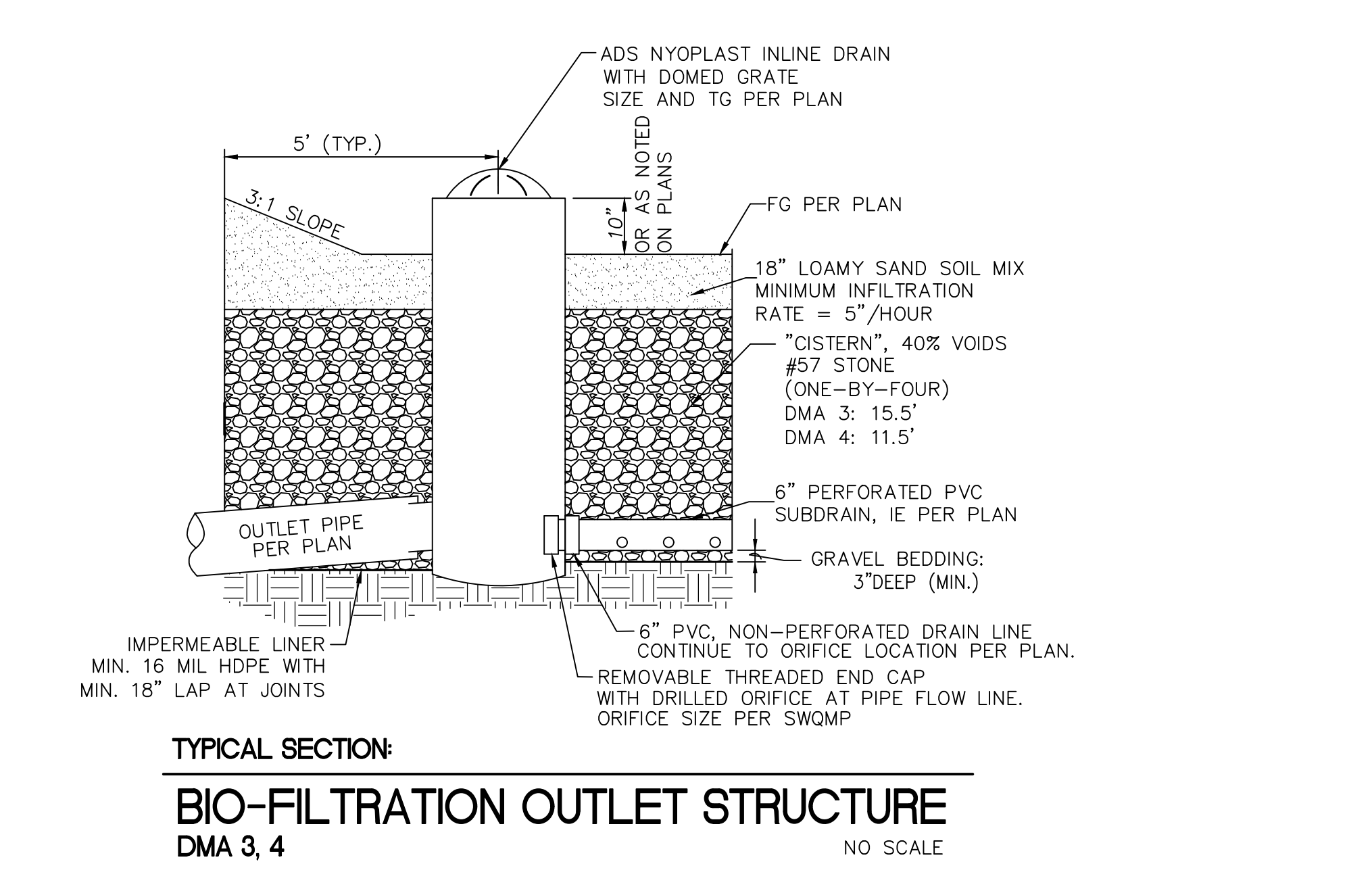
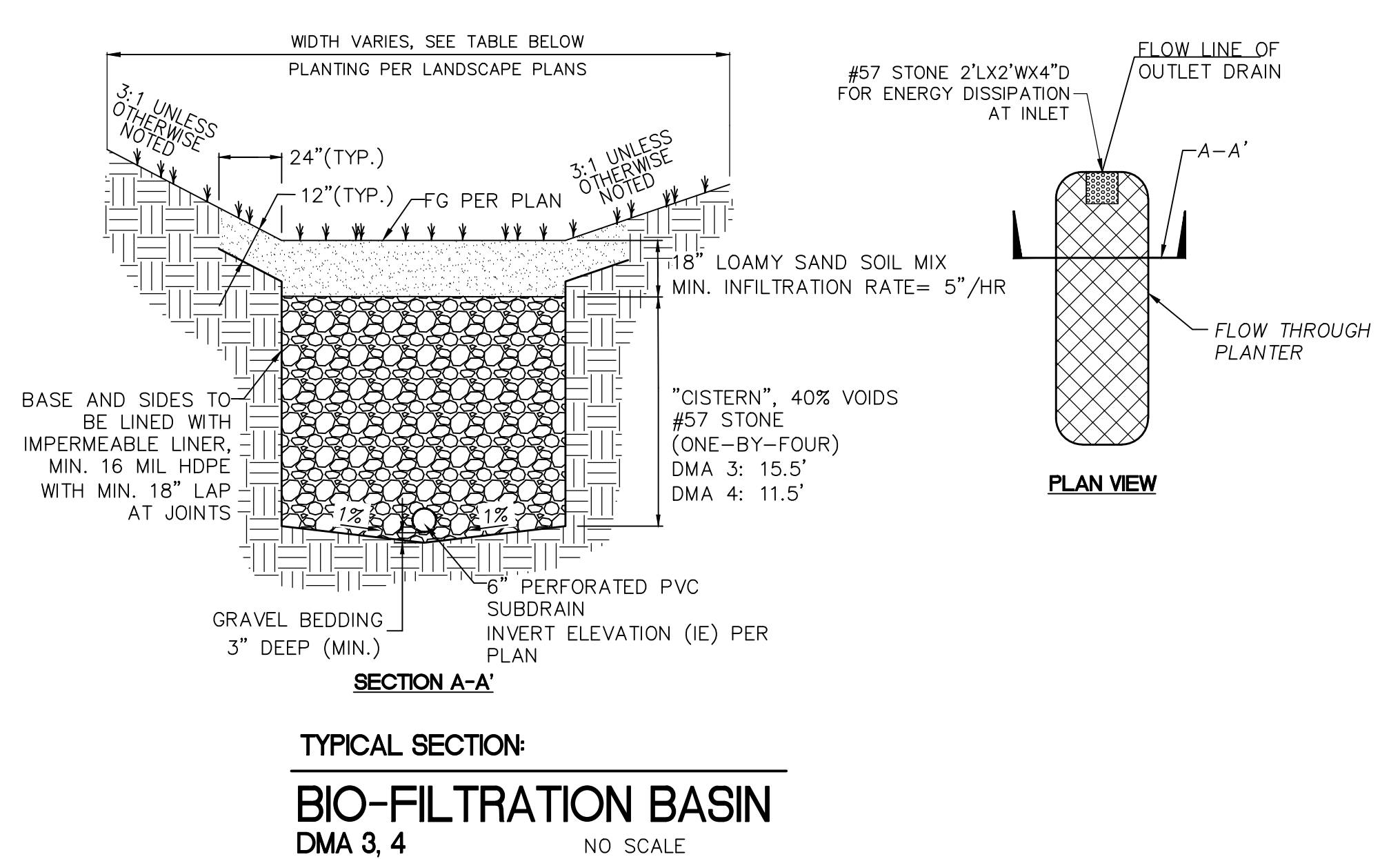
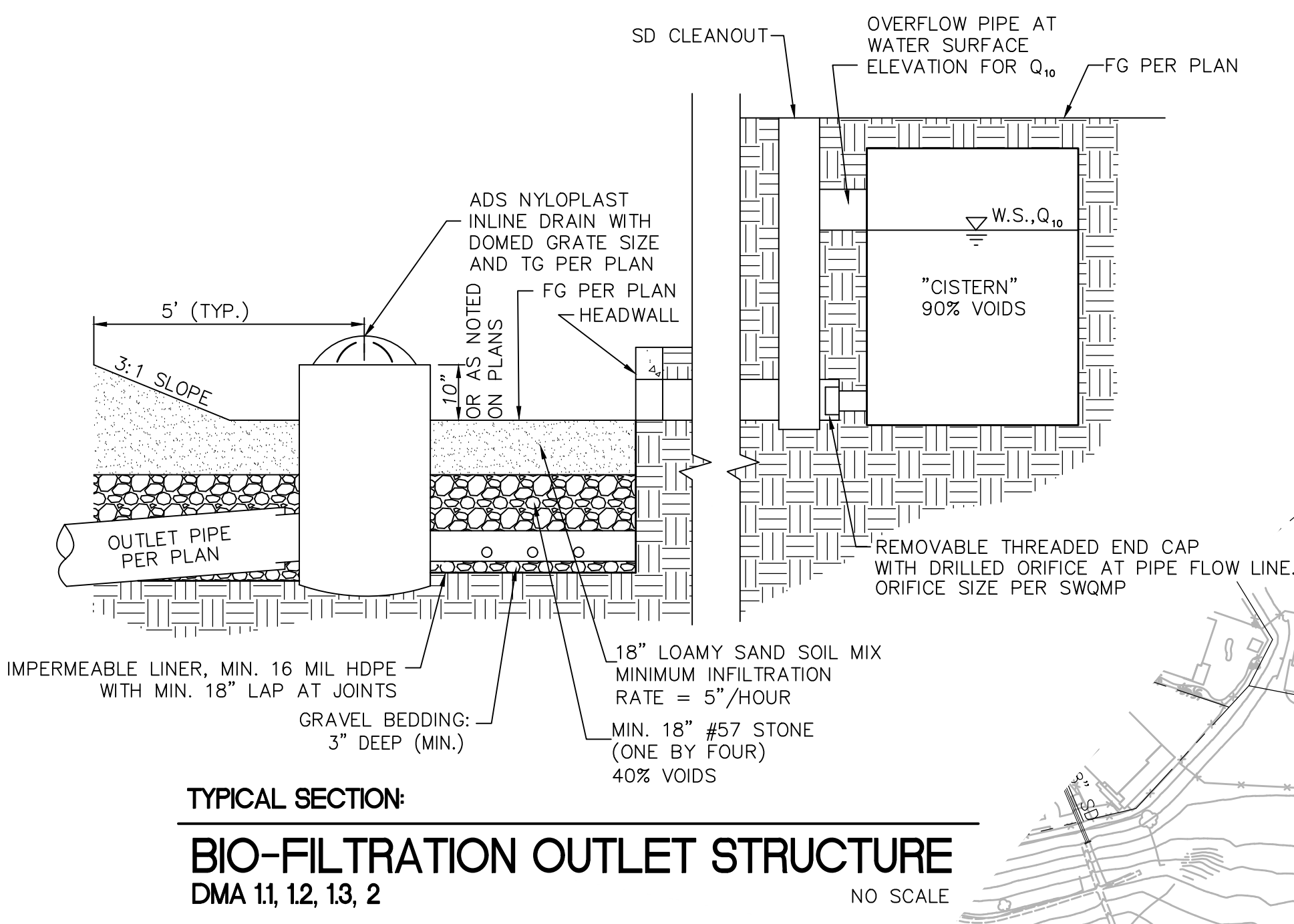
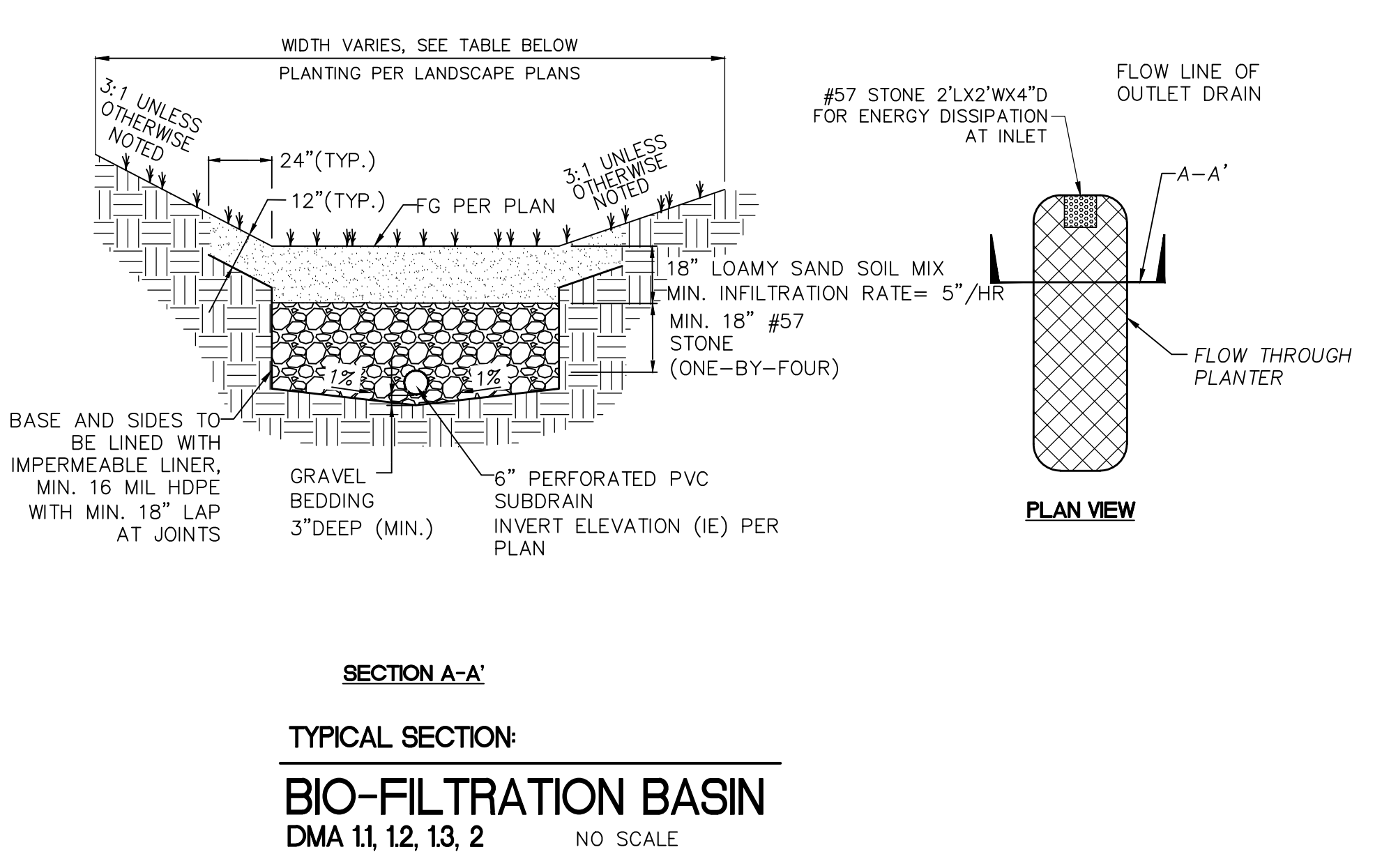
BMP 2.0 Drawdown Calculation						
Cd	A	H	$\sqrt{(2gh)}$	Q	Volume	Time (hours)
0.60	0.0055	5.00	17.94	0.0591	2,210	10.39
0.60	0.0055	4.50	17.02	0.0560	2,210	10.96
0.60	0.0055	4.00	16.05	0.0528	2,210	11.62
0.60	0.0055	3.50	15.01	0.0494	2,210	12.42
0.60	0.0055	3.00	13.90	0.0458	2,210	13.42
0.60	0.0055	2.50	12.69	0.0418	2,210	14.70
0.60	0.0055	2.00	11.35	0.0374	2,210	16.43
0.60	0.0055	1.50	9.83	0.0324	2,210	18.98
0.60	0.0055	1.00	8.02	0.0264	2,210	23.24
0.60	0.0055	0.50	5.67	0.0187	2,210	32.87
					22,100	165.02

BMP 3.0 Drawdown Calculation						
Cd	A	H	$\sqrt{(2gh)}$	Q	Volume	Time (hours)
0.60	0.0044	15.50	31.59	0.0843	1,200	3.96
0.60	0.0044	15.00	31.08	0.0829	1,200	4.02
0.60	0.0044	14.50	30.56	0.0815	1,200	4.09
0.60	0.0044	14.00	30.03	0.0801	1,200	4.16
0.60	0.0044	13.50	29.49	0.0786	1,200	4.24
0.60	0.0044	13.00	28.93	0.0772	1,200	4.32
0.60	0.0044	12.50	28.37	0.0757	1,200	4.41
0.60	0.0044	12.00	27.80	0.0741	1,200	4.50
0.60	0.0044	11.50	27.21	0.0726	1,200	4.59
0.60	0.0044	11.00	26.62	0.0710	1,200	4.70
0.60	0.0044	10.50	26.00	0.0693	1,200	4.81
0.60	0.0044	10.00	25.38	0.0677	1,200	4.93
0.60	0.0044	9.50	24.73	0.0660	1,200	5.05
0.60	0.0044	9.00	24.07	0.0642	1,200	5.19
0.60	0.0044	8.50	23.40	0.0624	1,200	5.34
0.60	0.0044	8.00	22.70	0.0605	1,200	5.51
0.60	0.0044	7.50	21.98	0.0586	1,200	5.69
0.60	0.0044	7.00	21.23	0.0566	1,200	5.89
0.60	0.0044	6.50	20.46	0.0546	1,200	6.11
0.60	0.0044	6.00	19.66	0.0524	1,200	6.36
0.60	0.0044	5.50	18.82	0.0502	1,200	6.64
0.60	0.0044	5.00	17.94	0.0479	1,200	6.97
0.60	0.0044	4.50	17.02	0.0454	1,200	7.34
0.60	0.0044	4.00	16.05	0.0428	1,200	7.79
0.60	0.0044	3.50	15.01	0.0400	1,200	8.33
0.60	0.0044	3.00	13.90	0.0371	1,200	8.99
0.60	0.0044	2.50	12.69	0.0338	1,200	9.85
0.60	0.0044	2.00	11.35	0.0303	1,200	11.01
0.60	0.0044	1.50	9.83	0.0262	1,200	12.72
0.60	0.0044	1.00	8.02	0.0214	1,200	15.58
0.60	0.0044	0.50	5.67	0.0151	1,200	22.03
					37,200	215.10

BMP 4.0 Drawdown Calculation						
Cd	A	H	$\sqrt{(2gh)}$	Q	Volume	Time (hours)
0.60	0.0044	16.50	32.60	0.0869	800	2.56
0.60	0.0044	16.00	32.10	0.0856	800	2.60
0.60	0.0044	15.50	31.59	0.0843	800	2.64
0.60	0.0044	15.00	31.08	0.0829	800	2.68
0.60	0.0044	14.50	30.56	0.0815	800	2.73
0.60	0.0044	14.00	30.03	0.0801	800	2.78
0.60	0.0044	13.50	29.49	0.0786	800	2.83
0.60	0.0044	13.00	28.93	0.0772	800	2.88
0.60	0.0044	12.50	28.37	0.0757	800	2.94
0.60	0.0044	12.00	27.80	0.0741	800	3.00
0.60	0.0044	11.50	27.21	0.0726	800	3.06
0.60	0.0044	11.00	26.62	0.0710	800	3.13
0.60	0.0044	10.50	26.00	0.0693	800	3.20
0.60	0.0044	10.00	25.38	0.0677	800	3.28
0.60	0.0044	9.50	24.73	0.0660	800	3.37
0.60	0.0044	9.00	24.07	0.0642	800	3.46
0.60	0.0044	8.50	23.40	0.0624	800	3.56
0.60	0.0044	8.00	22.70	0.0605	800	3.67
0.60	0.0044	7.50	21.98	0.0586	800	3.79
0.60	0.0044	7.00	21.23	0.0566	800	3.92
0.60	0.0044	6.50	20.46	0.0546	800	4.07
0.60	0.0044	6.00	19.66	0.0524	800	4.24
0.60	0.0044	5.50	18.82	0.0502	800	4.43
0.60	0.0044	5.00	17.94	0.0479	800	4.64
0.60	0.0044	4.50	17.02	0.0454	800	4.90
0.60	0.0044	4.00	16.05	0.0428	800	5.19
0.60	0.0044	3.50	15.01	0.0400	800	5.55
0.60	0.0044	3.00	13.90	0.0371	800	6.00
0.60	0.0044	2.50	12.69	0.0338	800	6.57
0.60	0.0044	2.00	11.35	0.0303	800	7.34
0.60	0.0044	1.50	9.83	0.0262	800	8.48
0.60	0.0044	1.00	8.02	0.0214	800	10.38
0.60	0.0044	0.50	5.67	0.0151	800	14.69
					26,400	148.55

APPENDIX 4

HYDROMODIFICATION MANAGEMENT EXHIBIT



NOTE: THE SITE HAS NO CRITICAL COURSE YIELD AREAS TO BE PROTECTED GROUNDWATER: IN SOME PLACES, GROUNDWATER CAN BE FOUND AS SHALLOW AS 5-10' BELOW GROUND

LEGEND

RIGHT OF WAY

STREET CENTERLINE

PROPOSED ASPHALT PAVEMENT

PROPOSED BUILDINGS

PROPOSED TREATMENT AREA

PROPOSED CONCRETE

LANDSCAPING AREA

BASIN LIMITS

FLOW DIRECTION

DISCHARGE POINT/POINT OF COMPLIANCE

STORM DRAIN INLET STENCILING

TREATMENT BASIN

SOIL TYPE BOUNDARY

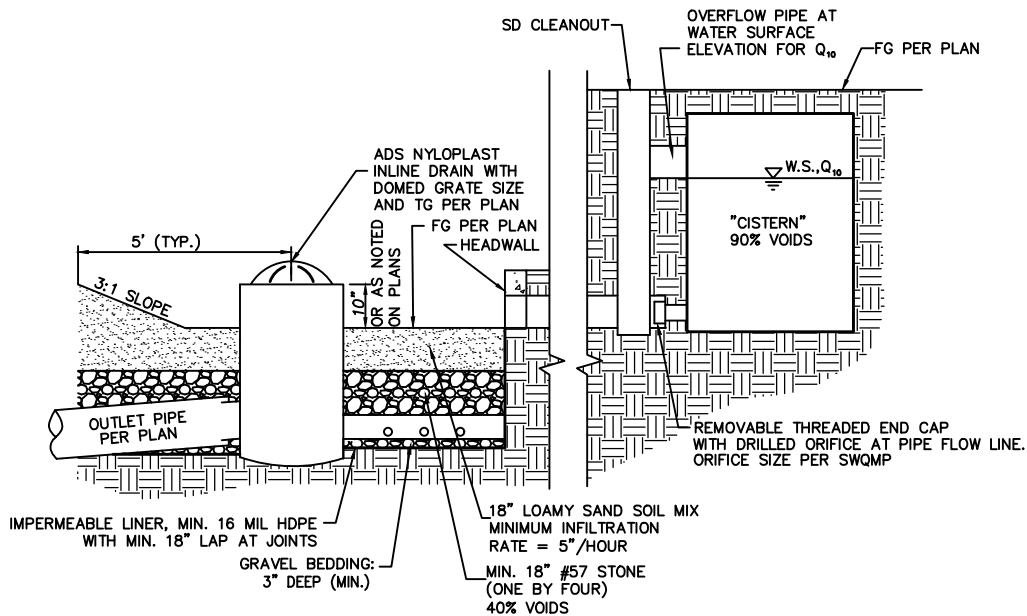
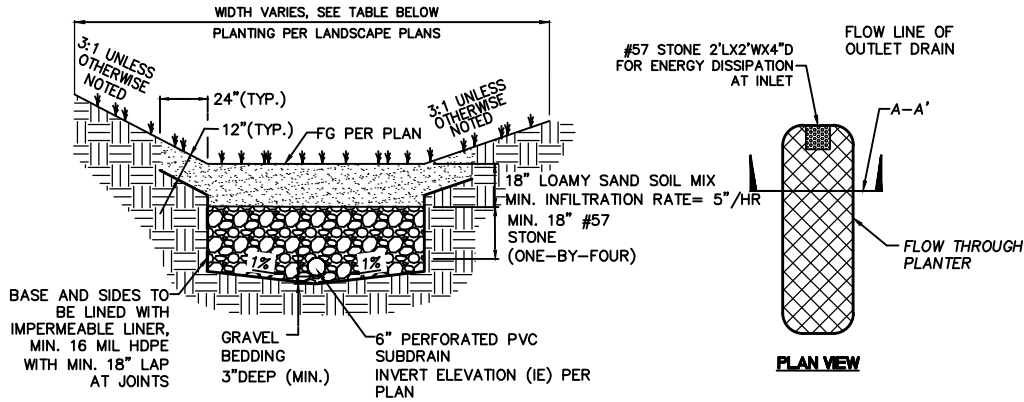
- * SELF MITIGATING AREA NOTES:
- VEGETATION IN THE NATURAL OR LANDSCAPED AREA IS NATIVE AND/OR NON-NATIVE/NON-INVASIVE DROUGHT TOLERANT SPECIES THAT DO NOT REQUIRE REGULAR APPLICATION OF FERTILIZERS AND PESTICIDES.
 - SOILS ARE UNDISTURBED NATIVE TOPSOIL, OR DISTURBED SOILS THAT HAVE BEEN AMENDED AND AERATED TO PROMOTE WATER RETENTION CHARACTERISTICS EQUIVALENT TO UNDISTURBED NATIVE TOPSOIL.
 - THE INCIDENTAL IMPERVIOUS AREAS ARE LESS THAN 5 PERCENT OF THE SELF-MITIGATING AREA.
 - IMPERVIOUS AREA WITHIN THE SELF-MITIGATING AREA SHOULD NOT BE HYDRAULICALLY CONNECTED TO OTHER IMPERVIOUS AREAS UNLESS IT IS A STORM WATER CONVEYANCE SYSTEM (SUCH AS A BROW DITCH).
 - THE SELF-MITIGATING AREA IS HYDRAULICALLY SEPARATE FROM DMAS THAT CONTAIN PERMANENT STORM WATER POLLUTANT CONTROL BMPS.

DMA ID	DMA AREAS (AC)	BMP ID	TYPE	BIOFILTRATION BASIN AREA (SF) REQUIRED	BIOFILTRATION BASIN AREA (SF) PROVIDED	CISTERN VOLUME (CF) REQUIRED	CISTERN VOLUME (CF) PROVIDED
1.1	1.17	1.1-2	BIOF + CISTERN	804	1,085	9,095	11,160
1.2	2.11	1.1-2	BIOF + CISTERN	1,410	1,907	15,954	16,065
1.3	1.96	1.3	BIOF + CISTERN	1,260	1,720	12,980	14,250
2	3.26	2	BIOF + CISTERN	1,772	2,670	21,069	22,100
3	5.06	3	BIOF + CISTERN	3,230	6,000	35,104	37,200
4	3.61	4	BIOF + CISTERN	1,761	4,000	18,600	26,400
5	2.65	N/A	SELF MITIGATING *	N/A	N/A	N/A	N/A
6	0.59	N/A	SELF MITIGATING *	N/A	N/A	N/A	N/A
7	0.40	7	BIOF (TREE WELLS)	2,229	2,233	N/A	N/A
8	0.60	N/A	SELF MITIGATING *	N/A	N/A	N/A	N/A

* SEE SELF MITIGATING AREA NOTES ON LEFT

APPENDIX 5

BMP DETAILS



BMP DETAILS

BIOFILTRATION BASIN WITH CISTERN (90% VOIDS)

SWEETWATER VISTAS

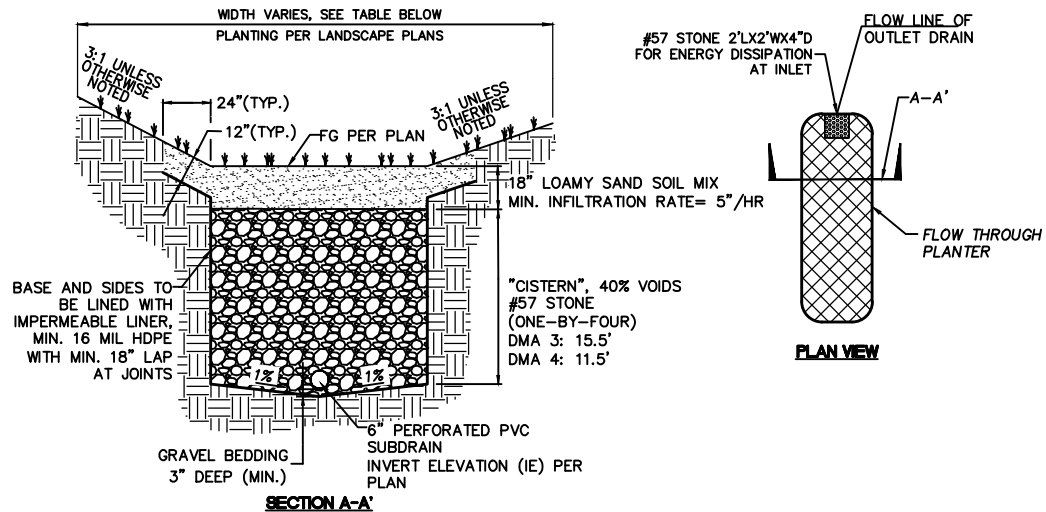
COUNTY OF SAN DIEGO, CA

PROJECT NUMBER: 2780-002

SHEET 1 OF 2

FUSCOE
ENGINEERING

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San Diego, California 92122
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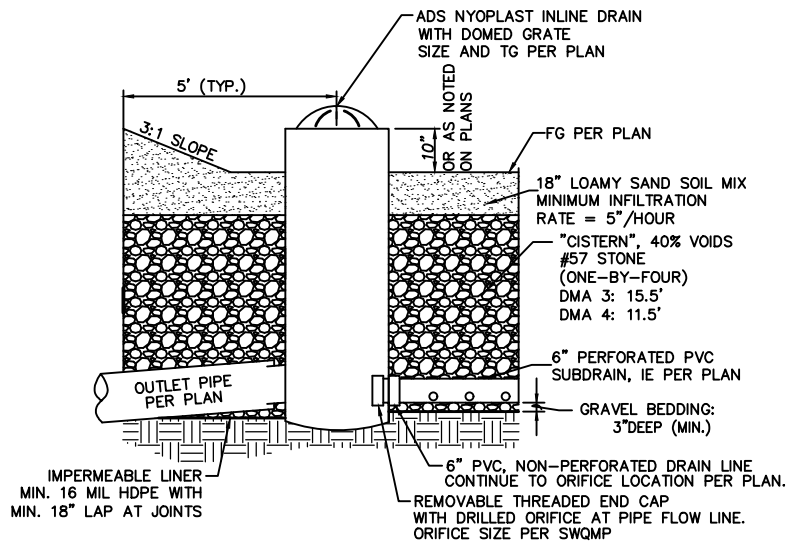


TYPICAL SECTION:

BIO-FILTRATION BASIN

DMA 3, 4

NO SCALE



TYPICAL SECTION:

BIO-FILTRATION OUTLET STRUCTURE

DMA 3, 4

NO SCALE

BMP DETAILS
BIOFILTRATION BASIN WITH CISTERN (40% VOIDS)
SWEETWATER VISTAS
COUNTY OF SAN DIEGO, CA
PROJECT NUMBER: 2780-002
SHEET 2 OF 2

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