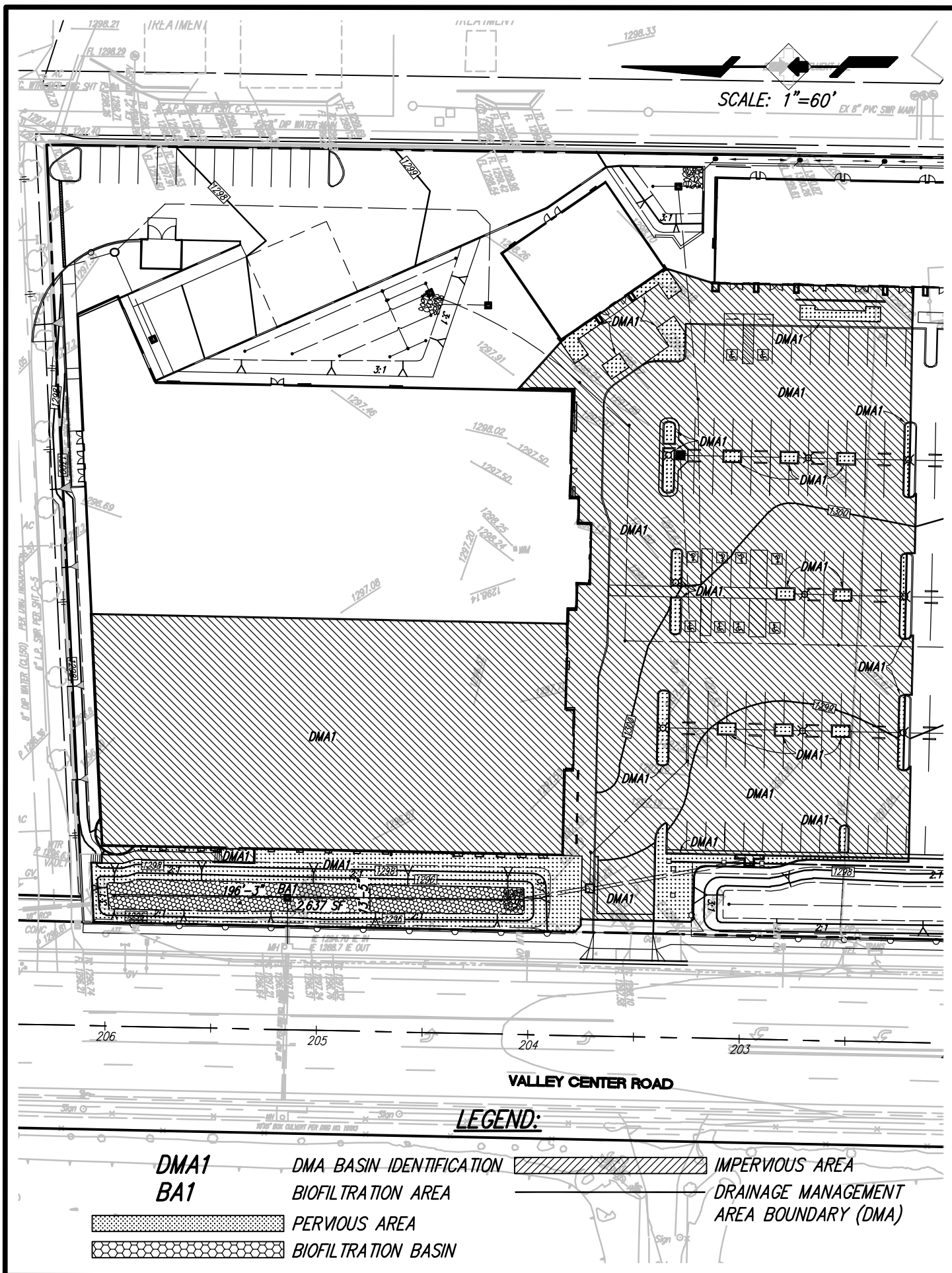
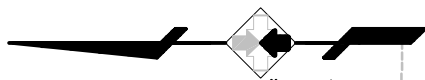


2.2 Individual Structural BMP DMA Mapbook

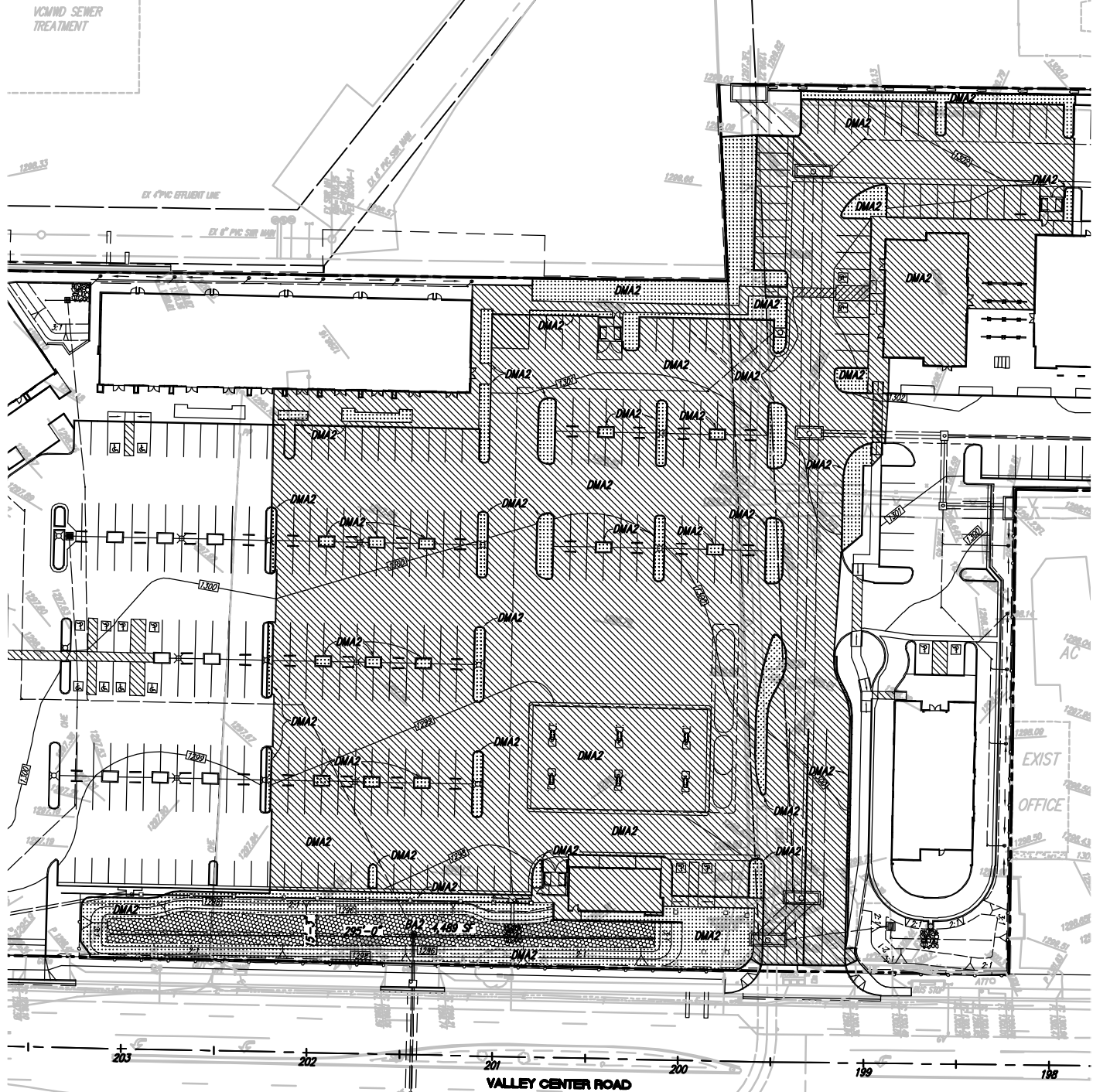
- Use this page as a cover sheet for the Structural DMA Mapbook.
- An individual Structural DMA Mapbook must be submitted for any project site with one or more structural BMPs. One Mapbook is required for each unique subsequent owner with responsibility for maintenance of a Structural BMP. Mapbook exhibits will be incorporated as exhibits in Stormwater Maintenance Agreements (SWMAs) and Maintenance Notifications (MNs). See Attachment 11 for additional information on maintenance agreements. If the Mapbook has been provided for each subsequent owner in Attachment 11, they are not required here.
- Place each map on 8.5"x11" paper.
- Show at a minimum the DMA, Structural BMP, Assessor's parcel boundaries with parcel numbers, and any existing hydrologic features within the DMA.

<input type="checkbox"/>	<u>All Mapbooks are attached</u>
<input checked="" type="checkbox"/>	<u>All Mapbooks are in Attachment 11</u>




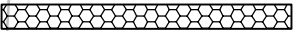


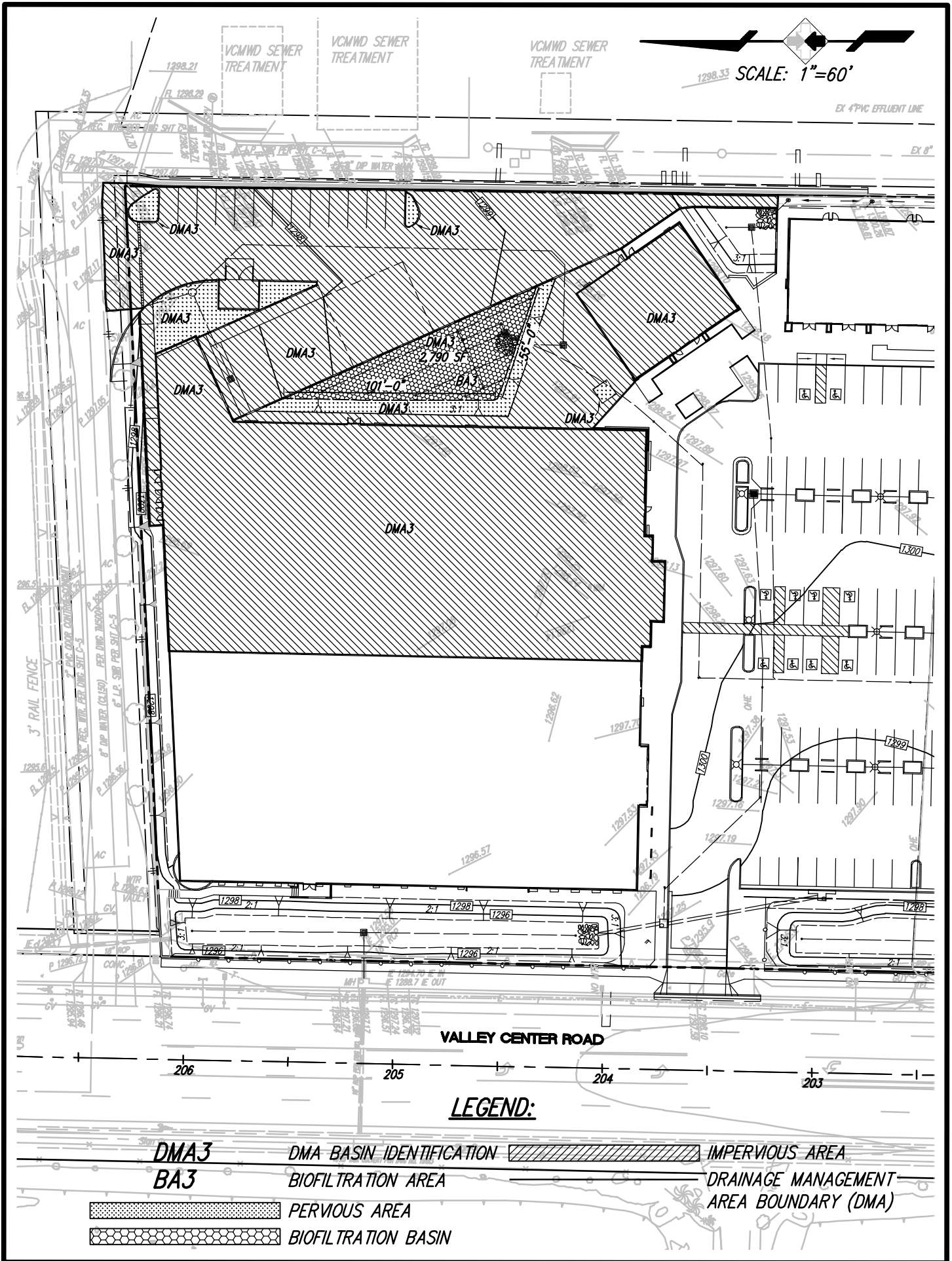


SCALE: 1"=80'



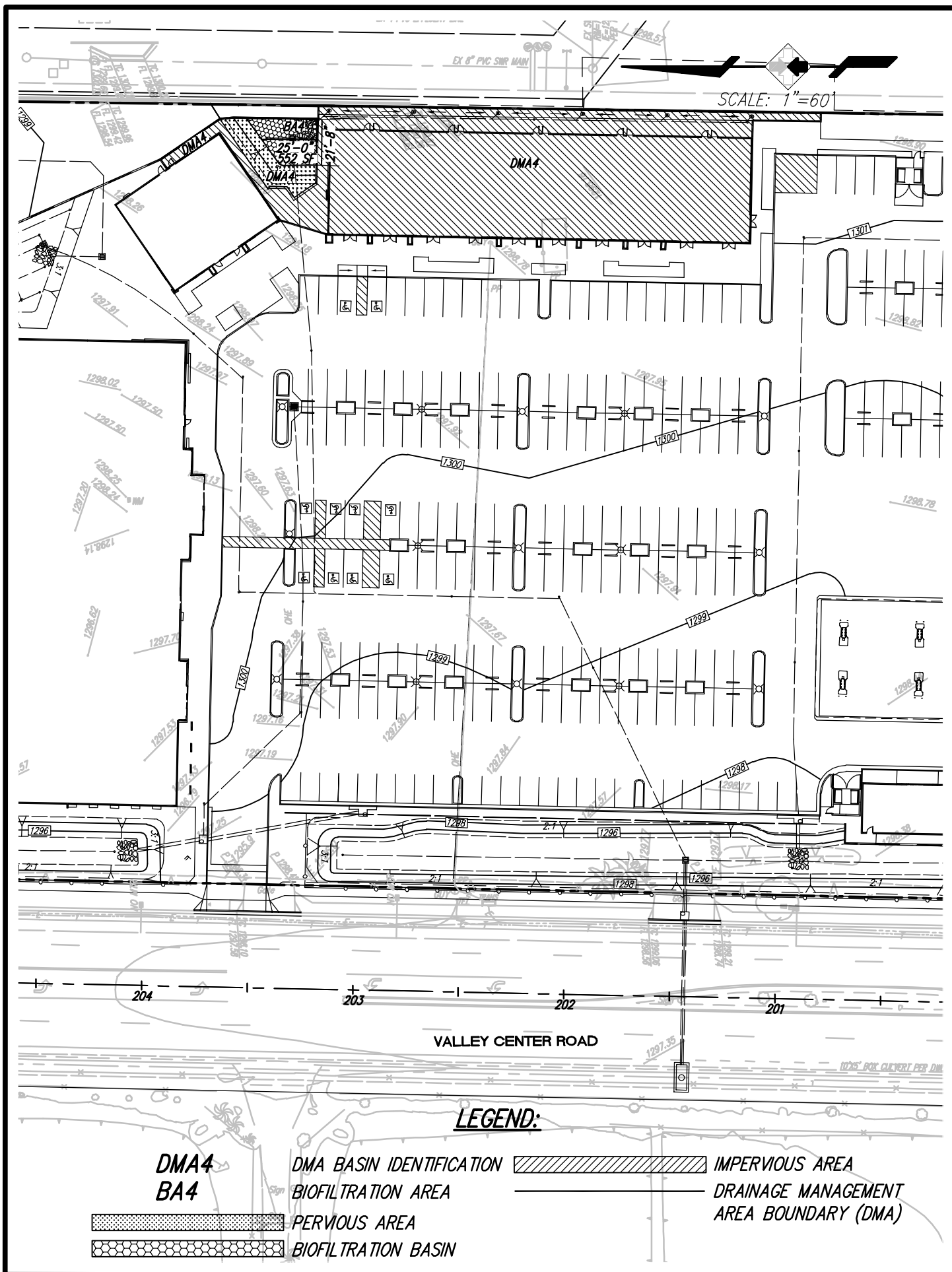
LEGEND:

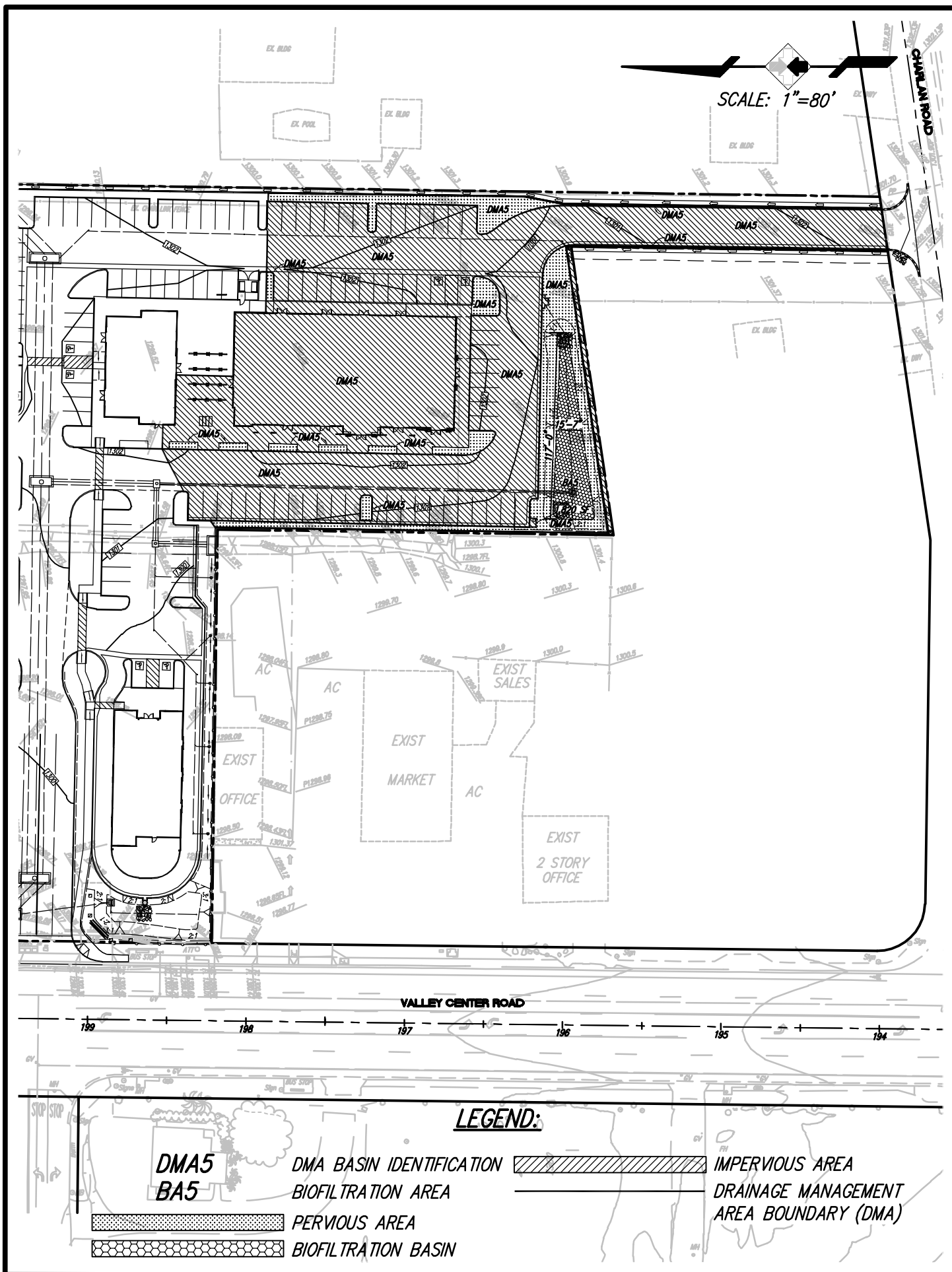
DMA2	DMA BASIN IDENTIFICATION		IMPERVIOUS AREA
BA2	BIOFILTRATION AREA		DRAINAGE MANAGEMENT AREA BOUNDARY (DMA)
	PERVIOUS AREA		
	BIOFILTRATION BASIN		

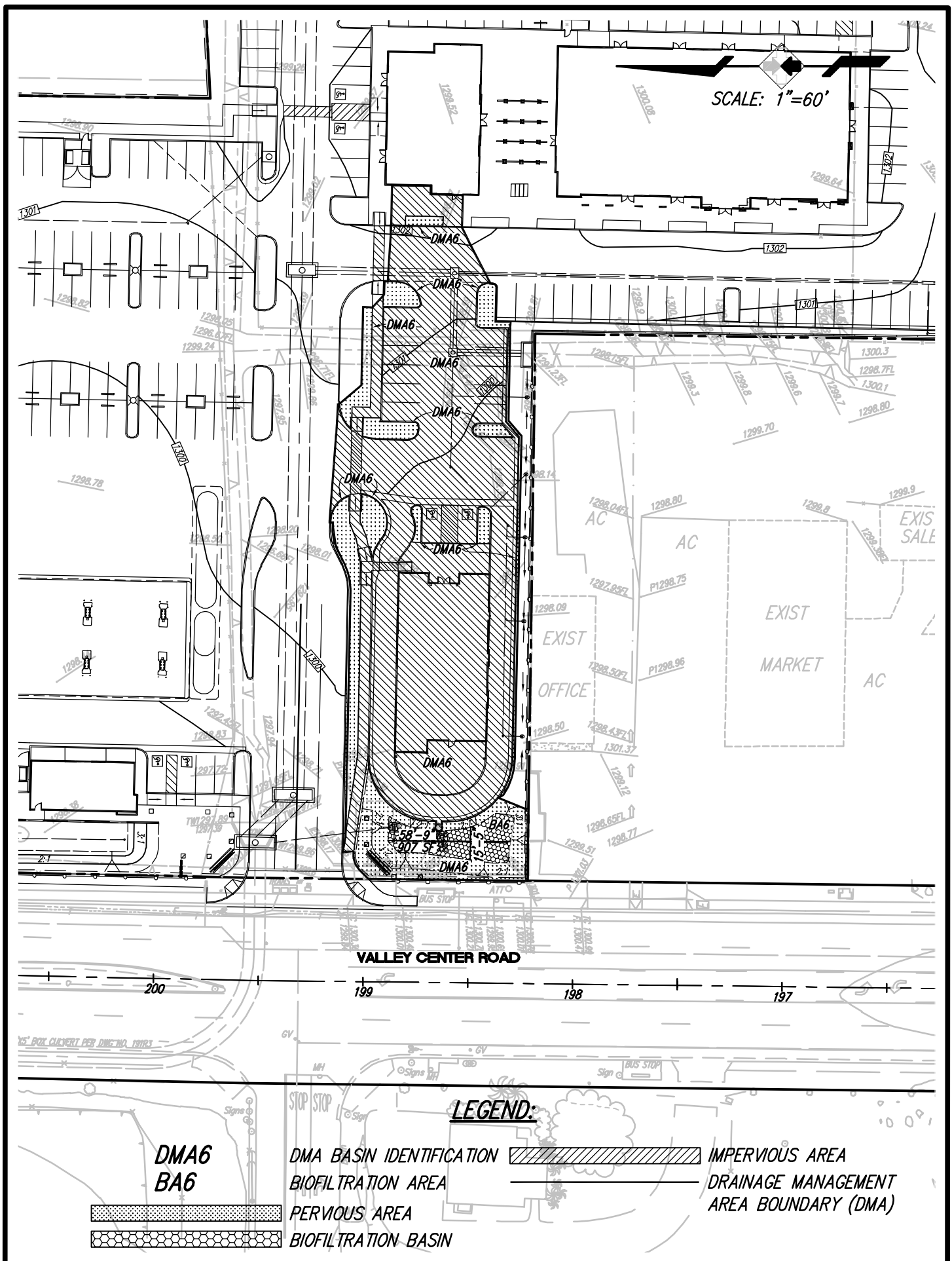


LEGEND:

DMA3	DMA BASIN IDENTIFICATION		IMPERVIOUS AREA
BA3	BIOFILTRATION AREA		DRAINAGE MANAGEMENT AREA BOUNDARY (DMA)
	PERVIOUS AREA		
	BIOFILTRATION BASIN		







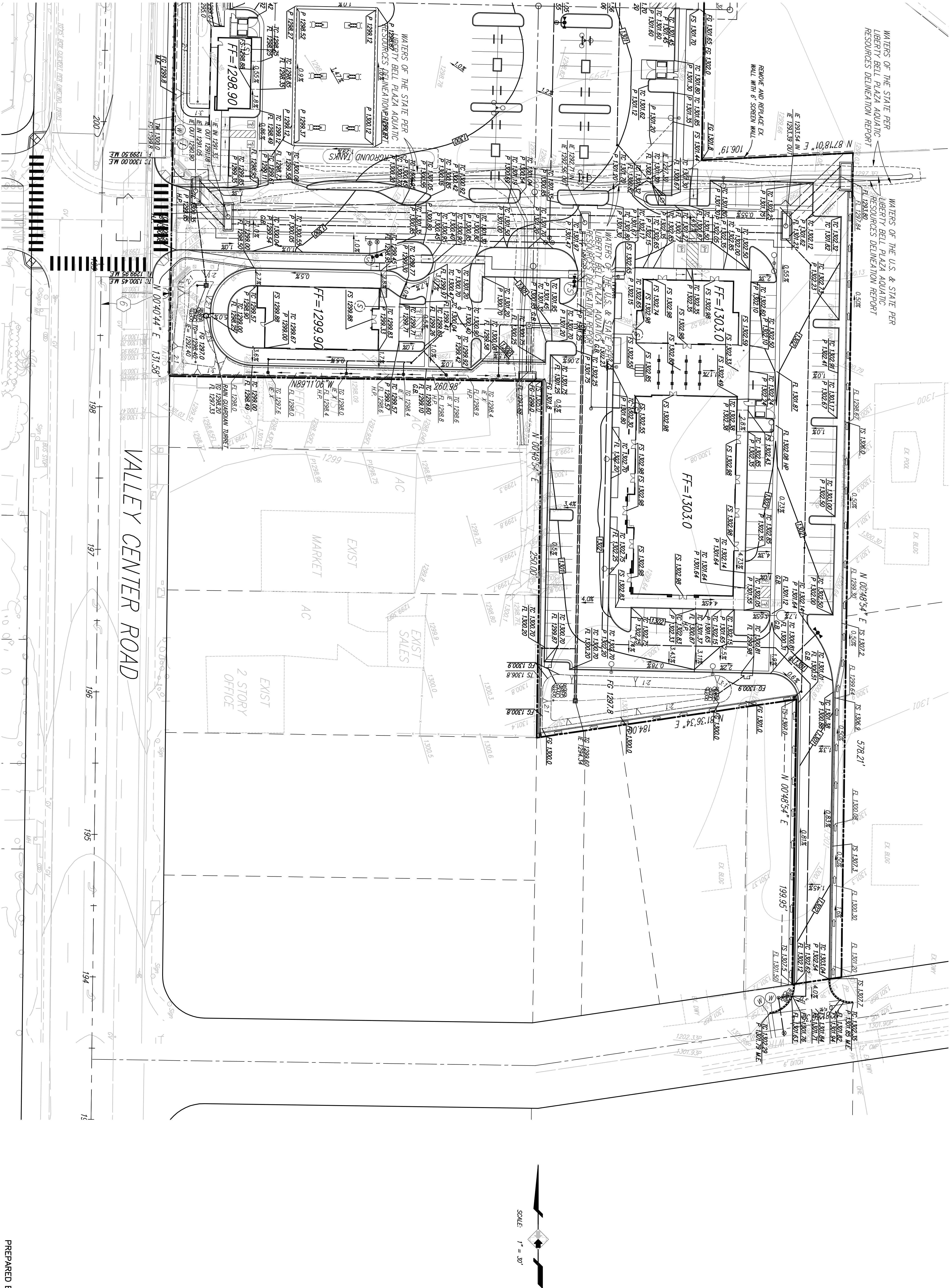
2.3 Construction Plan Sets

- DMAs, features, and BMPs identified and described in this attachment must also be shown on all applicable construction and landscape plans.
- As applicable, plan sheets must identify:
 - All features and BMPs identified in Sub-attachment 2.1 (DMA Exhibits).
 - The additional information listed below.
- Use this checklist to ensure required information is included on each plan (copy as needed).

Plan Type
Required Information⁴
<ul style="list-style-type: none"><input type="checkbox"/> Structural BMP(s) and Significant Site Design BMPs (if applicable) with ID numbers.<input type="checkbox"/> The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit.<input type="checkbox"/> Details and specifications for construction of Structural BMP(s) and Significant Site Design BMPs (if applicable).<input type="checkbox"/> Signage indicating the location and boundary of structural BMP(s) as required by County staff.<input type="checkbox"/> How to access the structural BMP(s) to inspect and perform maintenance.<input type="checkbox"/> 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).<input type="checkbox"/> 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).<input type="checkbox"/> Recommended equipment to perform maintenance.<input type="checkbox"/> When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management.<input type="checkbox"/> Include landscaping plan sheets (if available) showing vegetation requirements for vegetated structural BMP(s).<input type="checkbox"/> All BMPs must be fully dimensioned on the plans.<input type="checkbox"/> When proprietary BMPs are used, site-specific cross-section with outflow, inflow, and manufacturer model number must be provided. Photocopies of general brochures are not acceptable.<input type="checkbox"/> Include all source control and site design measures described in the SWQMP.<input type="checkbox"/> Include all construction BMPs described in the SWQMP.

⁴ For Building Permit Applications, refer to Form PDS 272,
<https://www.sandiegocounty.gov/content/dam/sdc/pds/docs/pds272.pdf>

SEE SHEET 1



SITE PLAN 1
CONCEPTUAL GRADING PLAN 2-3
LANDSCAPE CONCEPT PLAN 4-7

ALIDADE ENGINEERING
41743 ENTERPRISE CIRCLE NORTH
SUITE 209
TEMUCULA, CA 92590
Ph. (951) 587-2020
Fax: (951) 587-2626

PREPARED BY:
NAME: ALIDADE ENGINEERING
ADDRESS: 41743 ENTERPRISE CIRCLE N, SUITE 209
TEMUCULA, CA 92590
PHONE #: (951) 587-2020 FAX: (951) 587-2626

PROJECT ADDRESS:
27444 VALLEY CENTER ROAD
VALLEY CENTER, CA 92082

PROJECT NAME:
LIBERTY BELL PLAZA

SHEET TITLE:
CONCEPTUAL GRADING PLAN SHEET 2 OF 2 SHEETS



County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 3: Source Control BMP Worksheet

3.0 Cover Sheet and General Requirements

- Standard SWQMP Form Table 2 and PDP SWQMP Form Table 3 require the identification of pollutant-generating sources and associated BMPs for development projects.
- In some cases, County staff may request additional, more detailed documentation of source control BMP design details. If requested, applicants must submit a completed copy of this Source Control BMP Worksheet. This requirement can be satisfied either by submitting a copy of BMPDM Attachment E.1 (Source Control BMP Requirements) or equivalent documentation at the County's discretion.
- Submit this documentation using this cover sheet.
- Sources and BMPs must also be shown as applicable on DMA exhibits and construction plans (see Attachment 2).

Appendix E: BMP Design Fact Sheets

... Then Your SWQMP Must Consider These Source Control BMPs			
1 If These Sources Will Be on the Project Site ...	2 Permanent Controls—Show on Drawings	3 Permanent Controls—List in Table and Narrative	4 Operational BMPs—Include in Table and Narrative
<input checked="" type="checkbox"/> A. Onsite storm drain inlets <input type="checkbox"/> Not Applicable	<input checked="" type="checkbox"/> Locations of inlets.	<input checked="" type="checkbox"/> Mark all inlets with the words “No Dumping! Flows to Bay” or similar. See stencil template provided in Appendix I-4	<input checked="" type="checkbox"/> Maintain and periodically repaint or replace inlet markings. <input checked="" type="checkbox"/> Provide storm water pollution prevention information to new site owners, lessees, or operators. <input checked="" type="checkbox"/> See applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Storm Water Quality Handbooks at https://www.casqa.org/resources/bmp-handbooks <input checked="" type="checkbox"/> 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	2	3	4
Potential Sources of Runoff Pollutants	Permanent Controls—Show on Drawings	Permanent Controls—List in Table and Narrative	Operational BMPs—Include in Table and Narrative
<input checked="" type="checkbox"/> B. Interior floor drains and elevator shaft sump pumps <input type="checkbox"/> Not Applicable <input type="checkbox"/> C. Interior parking garages <input type="checkbox"/> Not Applicable		<input checked="" type="checkbox"/> State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer. <input type="checkbox"/> State that parking garage floor drains will be plumbed to the sanitary sewer.	<input checked="" type="checkbox"/> Inspect and maintain drains to prevent blockages and overflow. <input type="checkbox"/> Inspect and maintain drains to prevent blockages and overflow.
<input checked="" type="checkbox"/> D1. Need for future indoor & structural pest control <input type="checkbox"/> Not Applicable		<input checked="" type="checkbox"/> Note building design features that discourage entry of pests.	<input checked="" type="checkbox"/> Provide Integrated Pest Management information to owners, lessees, and operators.

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

<p>If These Sources Will Be on the Project Site ... Then Your SWQMP must consider These Source Control BMPs</p>				
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	
<input type="checkbox"/> E. Pools, spas, ponds, decorative fountains, and other water features. <input type="checkbox"/> Not Applicable	<input type="checkbox"/> Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	<input type="checkbox"/> 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.	<input type="checkbox"/> See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Storm Water Quality Handbooks at https://www.casqa.org/resources/bmp-handbooks	
<input checked="" type="checkbox"/> F. Food service <input type="checkbox"/> Not Applicable	<input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	<input type="checkbox"/> Describe the location and features of the designated cleaning area. <input type="checkbox"/> 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
<input checked="" type="checkbox"/> G. Refuse areas <input type="checkbox"/> Not Applicable	<input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent runoff and show locations of berms to prevent runoff from the area. Also show how the designated area will be protected from wind dispersal. <input type="checkbox"/> Any drains from dumpsters, compactors, and tallow bin areas must be connected to a grease removal device before discharge to sanitary sewer.	<input checked="" type="checkbox"/> State how site refuse will be handled and provide supporting detail to what is shown on plans. <input checked="" type="checkbox"/> State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	<input checked="" type="checkbox"/> 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 https://www.casqa.org/resources/bmp-handbooks

... Then Your SWQMP must consider These Source Control BMPs				
1 If These Sources Will Be on the Project Site ...	2 Permanent Controls—Show on Drawings	3 Permanent Controls—List in Table and Narrative	4 Operational BMPs—Include in Table and Narrative	
Potential Sources of Runoff Pollutants <input type="checkbox"/> H. Industrial processes. <input type="checkbox"/> Not Applicable	<input type="checkbox"/> Show process area.	<input type="checkbox"/> 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."	<input type="checkbox"/> See Fact Sheet SC-10, "Non-Storm Water Discharges" in the CASQA Storm Water Quality Handbooks at https://www.casqa.org/resoures/bmp-handbooks	
<input type="checkbox"/> I. Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.) <input type="checkbox"/> Not Applicable	<input type="checkbox"/> 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. <input type="checkbox"/> 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. <input type="checkbox"/> 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.	<input type="checkbox"/> 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: <ul style="list-style-type: none"> ▪ 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 	<input type="checkbox"/> 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 https://www.casqa.org/resoures/bmp-handbooks	

... Then Your SWQMP must consider These Source Control BMPs			
1 If These Sources Will Be on the Project Site ...	2 Permanent Controls—Show on Drawings	3 Permanent Controls—List in Table and Narrative	4 Operational BMPs—Include in Table and Narrative
<input type="checkbox"/> J. Vehicle and Equipment Cleaning <input type="checkbox"/> Not Applicable	<input type="checkbox"/> 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.	<input type="checkbox"/> 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): <input type="checkbox"/> Wastewater from vehicle and equipment washing operations must not be discharged to the storm drain system. <input type="checkbox"/> Car dealerships and similar may rinse cars with water only. <input type="checkbox"/> See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Storm Water Quality Handbooks at https://www.casqa.org/resources/bmp-handbooks

... Then Your SWQMP must consider These Source Control BMPs				
1	2	3	4	
Potential Sources of Runoff Pollutants	Permanent Controls—Show on Drawings	Permanent Controls—List in Table and Narrative	Operational BMPs—Include in Table and Narrative	
<div><div><input type="checkbox"/> K. Vehicle/Equipment Repair and Maintenance</div><div><input type="checkbox"/> Not Applicable</div></div>	<div><div><input type="checkbox"/> Accommodate all vehicle repair and maintenance indoors. Or designate an outdoor work area and design the area to protect from rainfall, run-on runoff, and wind dispersal.</div><div><input type="checkbox"/> 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.</div><div><input type="checkbox"/> 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.</div></div>	<div><div><input type="checkbox"/> State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.</div><div><input type="checkbox"/> 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.</div><div><input type="checkbox"/> 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.</div></div>	<div>In the report, note that all of the following restrictions apply to use the site:</div> <div><div><input type="checkbox"/> 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.</div><div><input type="checkbox"/> 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.</div><div><input type="checkbox"/> 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.</div></div>	

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
<input checked="" type="checkbox"/> L. Fuel Dispensing Areas <input type="checkbox"/> Not Applicable	<input checked="" type="checkbox"/> Fueling areas ² 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. <input checked="" type="checkbox"/> 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 area ¹ .] The canopy [or cover] must not drain onto the fueling area.		<input checked="" type="checkbox"/> The property owner must dry sweep the fueling area routinely. <input checked="" type="checkbox"/> See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Storm Water Quality Handbooks at https://www.casqa.org/resources/bmp-handbooks

² 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.

1 If These Sources Will Be on the Project Site ...	2 Permanent Controls—Show on Drawings	3 Permanent Controls—List in Table and Narrative	4 Operational BMPs—Include in Table and Narrative
Potential Sources of Runoff Pollutants M. Loading Docks ✕ <input type="checkbox"/> Not Applicable	<input checked="" type="checkbox"/> 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. <input type="checkbox"/> 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. <input type="checkbox"/> Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		<input checked="" type="checkbox"/> Move loaded and unloaded items indoors as soon as possible. <input checked="" type="checkbox"/> See Fact Sheet SC-30, “Outdoor Loading and Unloading,” in the CASQA Storm Water Quality Handbooks at https://www.casqa.org/resources/bmp-handbooks

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
<input checked="" type="checkbox"/> N. Fire Sprinkler Test Water <input type="checkbox"/> Not Applicable		<input checked="" type="checkbox"/> Provide a means to drain fire sprinkler test water to the sanitary sewer.	<input checked="" type="checkbox"/> See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Storm Water Quality Handbooks at https://www.casqa.org/resources/bmp-handbooks
O. Miscellaneous Drain or Wash Water <input type="checkbox"/> Boiler drain lines <input checked="" type="checkbox"/> Condensate drain lines <input checked="" type="checkbox"/> Rooftop equipment <input type="checkbox"/> Drainage sumps <input type="checkbox"/> Roofing, gutters, and trim <input type="checkbox"/> Not Applicable		<input type="checkbox"/> Boiler drain lines must be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> Rooftop mounted equipment with potential to produce pollutants must be roofed and/or have secondary containment. <input type="checkbox"/> Any drainage sumps onsite must feature a sediment sump to reduce the quantity of sediment in pumped water. <input type="checkbox"/> Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	

1 If These Sources Will Be on the Project Site ...	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. <input type="checkbox"/> Not Applicable			<input checked="" type="checkbox"/> 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.



County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 5: Site and Drainage Description

5.0 General Requirements

- Each Priority Development Project (PDP) must provide a description of existing site conditions and proposed changes to them, including changes to topography and drainage.
- Has a **Drainage Report** has been prepared for the PDP?

☒ **Yes**

- Review of the Drainage Report must be concurrent with the PDP SWQMP.
- Include the summary page of the Drainage Report with this cover page, and provide the following information:

Title: Preliminary Drainage Study for Liberty Bell Plaza

Prepared By: Alidade Engineering

Date: October 15, 2019

- Do not complete the rest of this attachment (also exclude these additional pages from your submittal). Additional documentation of site and drainage conditions is not required unless requested by County staff.

☐ **No** -- Complete and submit the remainder of this attachment below.



County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 5: Site and Drainage Description

5.1 Description of Existing Site Condition

Provide the requested information below for the project site in its existing condition.

a. Current Site Status

Select all that apply to any portion of the site.

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

b. Existing Land Cover

Provide the area (in acres or square feet) within all applicable categories of land cover below. The total area should equal that of the entire project site.

Area (acres or ft²)

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

Click here to enter text.

Click here to enter text.

Click here to enter text.

c. Underlying Soil

Select all soil groups that are present on the site.

NRCS Hydrologic Soil Group(s)

Type A

Type B

Type C

Type D

☐

☐

☐

☐



County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 5: Site and Drainage Description

5.2 Description of Existing Site Drainage

Describe how storm water runoff is conveyed from the site. At a minimum, address the following:

- Is the existing drainage conveyance ☐ **natural** or ☐ **urban**?
- Is runoff from offsite conveyed through the site? ☐ **Yes** ☐ **No**
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.
- Describe the existing project site drainage conveyance network (including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels).
- 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. Summarize the pre-project drainage areas and design flows to each of the existing runoff discharge locations.
- Provide additional information as necessary or requested to describe the site drainage.

Description (add pages as necessary to provide all requested information).

Click here to enter text.



County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 5: Site and Drainage Description

5.3 Description of Proposed Site Development

Provide a general description of the proposed site development, including at a minimum the information requested below. Add pages as necessary.

a. Project description/ Proposed land use and/or activities (project location, development type, size, numbers of units, etc.)

[Click here to enter text.](#)

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

[Click here to enter text.](#)

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

[Click here to enter text.](#)

d. Does the project include grading and changes to site topography? ☐ **Yes** ☐ **No**

*If **yes**, describe below.*

[Click here to enter text.](#)



County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 5: Site and Drainage Description

5.4 Description of Proposed Site Drainage

A. Changes to Site Drainage -- Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)? ☐ **Yes** ☐ **No**

If **yes**:

- Describe (1) the proposed project site drainage conveyance network (including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels), and (2) 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.

Description (add pages as necessary to provide all requested information).

[Click here to enter text.](#)



County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 6: Documentation of DMAs without Structural BMPs

6.0 General Requirements

- Use this attachment to document all proposed (1) self-mitigating, (2) de minimis, and (3) self-retaining DMAs. Indicate under “DMA Compliance Option” below which design options will be used to satisfy structural performance requirements for one or more DMA.

DMA Compliance Option	Required Sub-attachments	BMPDM Design Resources
<input checked="" type="checkbox"/> Self-mitigating	<ul style="list-style-type: none">Sub-attachment 6.1	<ul style="list-style-type: none">BMPDM Section 5.2.1
<input checked="" type="checkbox"/> De minimis	<ul style="list-style-type: none">Sub-attachment 6.2	<ul style="list-style-type: none">BMPDM Section 5.2.2
<input type="checkbox"/> Self-retaining¹ <u>SSD-BMP Type(s)</u> <input type="checkbox"/> Impervious Area Dispersion <input type="checkbox"/> Tree Wells	<ul style="list-style-type: none">Sub-attachment 6.3 Sub-attachment 6.3.1 Sub-attachment 6.3.2	<ul style="list-style-type: none">BMPDM Section 5.2.3 (all options) Fact Sheet SD-B (Appendix E.8) Fact Sheet SD-A (Appendix E.7)

- Submit this cover page and all “Required Sub-attachments” listed for each selected DMA compliance option.
- See the BMPDM sections and appendices listed under “BMPDM Design Resources” for additional explanation of design requirements. Each constructed feature must fully satisfy the requirements described in these resources, and any other guidance identified by the County.
- DMA Exhibits and Construction Plans:** DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.

¹ If “Self-retaining” is selected, also choose the types of Significant Site Design BMPs (SSD-BMPs) to be used. SSD-BMPs are Site Design BMPs that are sized and constructed to fully satisfy all applicable Structural Performance Standards for a DMA.

6.1 Self-mitigating DMAs (complete this page once for ALL self-mitigating DMAs)

Self-mitigating DMAs consist of natural or landscaped areas that drain directly offsite or to the public storm drain system. These DMAs are excluded from DCV calculations.

- Provide the information requested below for each proposed self-mitigating DMA. Add rows or copy the table if additional entries are needed.

DMA #	a. DMA Area (ft²)	Incidental Impervious Area		Permit # and Sheet #
		b. Size(ft²)	c. % (b/a*100)	
DMA10	3,266			
DMA18	1,948			
DMA19	136			

- “DMA #”, “DMA Area”, and “Permit # and Sheet #” are required for all DMAs listed.
- “Incidental Impervious Area” calculations are required only where applicable (see below).
- Each self-mitigating DMA must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.1 and any other guidance or instruction identified by the County. Check the boxes below to confirm that all required conditions are satisfied for every DMA listed.

☒ Each DMA is hydraulically separate from other DMAs that contain permanent storm water pollutant control BMPs.

Natural and Landscaped Areas

☒ Each DMA consists solely of natural or landscaped areas, except for incidental impervious areas (see below).

☒ Each area drains directly offsite or to the public storm drain system.

☒ Soils are undisturbed native topsoil, or disturbed soils that have been amended and aerated to promote water retention characteristics equivalent to undisturbed native topsoil.

☒ Vegetation is native and/or non-native/non-invasive drought tolerant species that do not require regular application of fertilizers and pesticides.

Incidental Impervious Areas (if applicable; see above)

Minor impervious areas may be permitted within the DMA if they satisfy the following criteria:

☐ They are not hydraulically connected to other impervious areas (unless it is a storm water conveyance system such as a brow ditch).

☐ They comprise less than 5% of the total DMA. Calculate the % incidental impervious area in the table above ($c = b/a$). DMAs are not self-mitigating if this area is 5% or greater.

6.2 De Minimis DMAs (complete this page once for ALL de minimis DMAs)

De minimis DMAs consist of areas too small to be considered significant contributors of pollutants and not practicable to drain to a BMP. They are excluded from DCV calculations. Examples include driveway aprons connecting to existing streets, portions of sidewalks, retaining walls, and similar features at the external boundaries of a project.

- Provide the information requested below for each proposed de minimis DMA. Add rows or copy the table if additional entries are needed.

<i>DMA #</i>	<i>DMA Area (ft²)</i>	<i>Permit # and Sheet #</i>
DMA7	250	
DMA8	212	
DMA9	153	
DMA12	198	
DMA14	135	
DMA20	195	

- “DMA #”, “DMA Area”, and “Permit # and Sheet #” are required.
- Check the boxes below to confirm that each required condition is satisfied for ALL de minimis DMAs on the site.
 - ☒ Each DMA listed is less than 250 square feet and not adjacent or hydraulically connected to each other.
 - ☒ Each DMA listed fully satisfies all design requirements and restrictions described in BMPDM Section 5.2.2 De Minimis DMAs.

6.3 Self-retaining DMAs using Significant Site Design BMPs

Self-retaining DMAs use Site Design BMPs to fully-retain the entire DCV, at a minimum. Site Design BMPs that fully retain the DCV, at a minimum, therefore replacing the need for a Structural BMP (S-BMP), are classified as Significant Site Design BMPs (SSD-BMPs). To satisfy pollutant control requirements only, self-retaining means retention of the entire DCV. However, under some circumstances, a self-retaining DMA can also satisfy hydromodification management requirements by implementing BMPs that retain a greater volume of runoff.

- Provide the information requested below for each proposed self-retaining DMA. Add rows or copy the table if additional entries are needed.

DMA #	DMA Area (ft ²)	BMP Type (choose one per DMA)		Permit # and Sheet #
		Dispersion Area (Att. 6.3.1)	Tree Wells (Att. 6.3.2)	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	

Copy and Paste table here for additional DMAs

- “DMA #”, “DMA Area”, and “Permit # and Sheet #” are required.
- Select one BMP Type per DMA. Provide detailed documentation for each DMA in Attachments 6.3.1 (Impervious Dispersion Areas) and/or 6.3.2 (Tree Wells) below.
- Each self-retaining DMA must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, applicable BMPDM Appendix E Fact Sheets, and any other guidance or instruction identified by the County.

²Applicants wishing to utilize parameters less conservative than listed here must submit modeling to support their proposal. Consult your project manager for more information.

³Including the permeable pavement.

6.3.1 Self-retaining DMAs with Impervious Dispersion Areas

Impervious area dispersion (dispersion) refers to the practice of effectively disconnecting impervious areas from directly draining to the storm drain system by routing runoff from impervious areas such as rooftops (through downspout disconnection), walkways, and driveways onto the surface of adjacent pervious areas. The intent is to slow runoff discharges and reduce volumes. Dispersion with partial or full infiltration results in significant volume reduction by means of infiltration and evapotranspiration. When adequately sized, dispersion can also be used to satisfy both the pollutant control and hydromodification management structural performance standards for a DMA.

- Each self-retaining DMA with impervious area dispersion must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, Fact Sheet SD-B: Impervious Area Dispersion, and any other guidance or instruction identified by the County.
- Documentation of compliance with all applicable conditions must be submitted with this sub-attachment using the **Summary Sheet for DMAs with Impervious Area Dispersion** on the next page. One version of this Summary Sheet must be completed for each applicable DMA.
- Applicants are responsible to comply with all other applicable requirements, regardless of whether they are included in the summary sheet.
- The following applies if the dispersion area is **native soil** (SD-B in Appendix E):
 - For pollutant control only, the DMA is considered self-retaining if the impervious to pervious ratio is:
 - 2:1 when the pervious area is composed of Hydrologic Soil Group A
 - 1:1 when the pervious area is composed of Hydrologic Soil Group B
- The following applies if the dispersion area includes **amended soil** (SD-B in Appendix E):
 - DMAs using impervious area dispersion can be considered to meet both pollutant control and hydromodification flow control requirements if the impervious to pervious area ratio is 1:1 or less and all other design requirements of SD-B are satisfied, including 11 inches of amended soil.
- The following apply if the dispersion area is **permeable pavement** (SD-D in Appendix E):
 - For pollutant control only, a DMA is considered self-retaining if the ratio of total drainage area (including permeable pavement) to area of permeable pavement is 1.5:1 or less, and all other design requirements of SD-D are satisfied.
 - Hydromodification management performance standards can be satisfied using permeable pavement only if constructed to Structural BMP specifications. In this case, the permeable pavement must be sized and constructed in accordance with the requirements of INF-3.

²Applicants wishing to utilize parameters less conservative than listed here must submit modeling to support their proposal. Consult your project manager for more information.

³Including the permeable pavement.

Summary Sheet for DMAs with Impervious Area Dispersion (Complete 1 sheet per DMA)

DMA #		
A. Minimum Sizing Requirements		
Verify that minimum standards are satisfied for the applicable dispersion area type below ² .		
Native Soil (Pollutant Control Only) Select one and provide calculations below.		
<input type="checkbox"/> <u>Soil Group A</u> : Ratio I:P is 2:1 or less <input type="checkbox"/> <u>Soil Group B</u> : Ratio I:P is 1:1 or less		
<i>Impervious Area (ft²)</i>	<i>Permeable Dispersion Area (ft²)</i>	<i>Ratio I:P</i>
Amended Soil (Pollutant Control plus Hydromodification Management)		
Must satisfy both conditions and provide calculations below.		
<input type="checkbox"/> Ratio I:P is 1:1 or less, AND <input type="checkbox"/> 11 inches or more of the top of the pervious area consists of amended soils (Fact Sheet SD-F)		
<i>Impervious Area (ft²)</i>	<i>Permeable Dispersion Area (ft²)</i>	<i>Ratio I:P</i>
Permeable Pavement (Pollutant Control Only) Provide calculations below.		
<input type="checkbox"/> Ratio DMA area to area of permeable pavement is 1.5:1 or less		
<i>DMA Area³ (ft²)</i>	<i>Permeable Pavement Area (ft²)</i>	<i>Ratio DMA:Pavement</i>
B. Minimum Design Criteria		
Check the boxes below to confirm that each design criterion has been satisfied for the DMA.		
Impervious Areas:		
<input type="checkbox"/> Are graded to ensure area that the full DCV drains to the dispersion area before the runoff discharges from the DMA.		
Pervious Dispersion Areas:		
<input type="checkbox"/> Are less than 5% slope and sheet flow over a distance of at least 10 feet from inflow to overflow route.		
<input type="checkbox"/> Have inflow velocities of 3 ft/s or less OR use energy dissipation methods (e.g., riprap, level spreader) for concentrated inflows.		
<input type="checkbox"/> Are densely and robustly vegetated with drought tolerant species.		
<input type="checkbox"/> Consist of soil types capable of supporting or being amended to support vegetation (e.g., with sand or compost). If applicable, media amendments have been tested to verify that they are not a source of pollutants.		
<input type="checkbox"/> Are owned by the project owner and will be dedicated to exclude future uses that might reduce their effectiveness.		

Copy and Paste table here for additional DMAs

²Applicants wishing to utilize parameters less conservative than listed here must submit modeling to support their proposal. Consult your project manager for more information.

³Including the permeable pavement.

6.3.2 Self-retaining DMAs with Tree Wells

Trees wells can provide a variety of benefits such as interception and increased infiltration of rainfall, reduced erosion, energy conservation, air quality improvement, and aesthetic enhancement. They can also be used to satisfy both pollutant control and hydromodification management performance standards for a DMA.

- Each self-retaining DMA with tree wells must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, Fact Sheet SD-A: Tree Wells, and any other guidance or instruction identified by the County.
- For pollutant control only, the DMA must retain the entire DCV. For hydromodification management, an additional volume must be retained in accordance with the sizing requirements presented in the DCV multiplier table in Fact Sheet SD-A.
- Documentation of compliance with applicable conditions must be submitted using the **Summary Sheet for Self-retaining DMAs with Tree Wells** on the next page. One version of this Summary Sheet must be completed for each applicable DMA.
- If both pollutant control and hydromodification standards apply, the soil depth of all tree wells in the DMA must be selected before determining the Required Retention Volume (RRV). Each tree well must be constructed to the selected depth. For pollutant control only, tree wells within a DMA may be constructed to different soil depths.
- In most cases tree wells must use Amended Soil per Fact Sheet SD-F. However, Structural Soil is required in some cases (e.g., placing the tree well next to a curb). See **Structural Requirements for Confined Tree Well Soil Volume** in Fact Sheet SD-A for additional explanation. If applicable, list the DMAs and Tree Well #s below for all tree wells requiring Structural Soil.

DMA #	Tree Wells Requiring Structural Soil (list Tree Well #s)

- The Design Capture Volume (DCV) must be known for each DMA in order to determine the volume to be mitigated by the tree wells. Instructions for DCV calculation are provided in BMPDM Appendix B.1. An automated version of Worksheet B.1 (Calculation of Design Capture Volume) is available at www.sandiegocounty.gov/stormwater under the Development Resources tab.

Summary Sheet for Self-retaining DMAs with Tree Wells (complete one sheet per DMA)

DMA #:		DMA Area (ft²):	
Required Retention Volume (RRV)			
a. Design Capture Volume (DCV; ft³):			
b. DCV Multiplier (Fact Sheet SD-A)			
Applicable Structural Performance Standards (select one)	Tree well soil depth (inches)	Underlying soil type (A, B, C, or D)	DCV Multiplier
<input type="checkbox"/> Pollutant control only	Any	All	1.0
<input type="checkbox"/> Pollutant control plus hydromodification			
c. Required Retention Volume (ft³) [DCV * DCV Multiplier]			
Tree Well Credit Volume (add records or copy this sheet as needed for additional tree wells)			
Provide the information below for each tree well or group of tree wells within the DMA. A single entry can be used for any group of tree wells of the same species and soil depth.			
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)	Credit Volume per tree well (ft³)		
Tree well ID #(s)	Combined Volume (ft³)		
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)	Credit Volume per tree well (ft³)		
Tree well ID #(s)	Combined Volume (ft³)		
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)	Credit Volume per tree well (ft³)		
Tree well ID #(s)	Combined Volume (ft³)		
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)	Credit Volume per tree well (ft³)		
Tree well ID #(s)	Combined Volume (ft³)		
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)	Credit Volume per tree well (ft³)		
Tree well ID #(s)	Combined Volume (ft³)		
Total Credit Volume (ft³)			
Add the combined volumes above. Total credit volume must equal or exceed the RRV.			

Copy and Paste table here for additional DMAs



County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 7: Documentation of DMAs with Structural Pollutant Control BMPs

7.0 General Requirements

- Submit this cover page and all required Sub-attachments for all structural BMPs proposed for the project.
- See the BMPDM sections and appendices listed under “BMPDM Design Resources” in the table below for additional explanation of design requirements. Constructed features must fully satisfy the requirements described in these resources, and any other guidance identified by the County.
- PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management. Completion of SWQMP Attachment 8 is also required for these BMPs.
- DMA Exhibits and Construction Plans: DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.
- Structural BMP Certification. All structural BMPs documented this attachment and in Attachment 8 must be certified by a registered engineer in Sub-attachment 7.1.
- Structural BMP Verification. Structural BMP installation must be verified by the County at the completion of construction. Applicants must complete an Installation Verification Form (Attachment 10).

Sub-attachments (check all that are completed)	Requirement	BMPDM Design Resources
<input checked="" type="checkbox"/> 7.1: Preparer’s Certification	Required	• N/A
<input checked="" type="checkbox"/> 7.2: Structural BMP Strategy	Required	• BMPDM Sections 5.1., 5.3, 5.4, and Chapter 6 • BMPDM Appendix E (pages E-78 through E-210)
<input checked="" type="checkbox"/> 7.3: Structural BMP Checklist(s)	Required	
<input checked="" type="checkbox"/> 7.4: Stormwater Pollutant Control Worksheet Calculations	Required	• BMPDM Appendix B
<input type="checkbox"/> 7.5: Identification and Narrative of Receiving Water and Pollutants of Concern	Required if flow-thru BMPs are proposed	• N/A

7.1 Engineer of Work Certification for Structural BMPs

Project Name Liberty Bell Plaza
Permit Application Number PDS2017-STP-17-037

CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of structural storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the County of San Diego BMP Design Manual, which is a design manual for compliance with local County of San Diego Watershed Protection Ordinance (Sections 67.801 et seq.) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100) requirements for storm water management. I have read and understand that the County of San Diego has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual.

I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by County staff is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of structural storm water BMPs for this project, of my responsibilities for their design.

- ☒ In addition to the structural pollutant control BMPs described in this attachment, this certification applies to the Structural Hydromodification Management BMPs described in Attachment 8 (check if applicable).

Brent C. Moore PCE C59121 EXP 6/30/2021
Engineer of Work's Signature, PE Number & Expiration Date

Brent C. Moore
Print Name

Alidade Engineering
Company

1/29/2020
Date

Engineer's Seal:



7.2 Structural BMP Strategy

7.2.1 Narrative Strategy (Continue description on subsequent pages as necessary)

Describe the general strategy for structural BMP implementation at the project site. For pollutant control BMPs, your description must address the key points outlined in Section 5.1 of the BMP Design Manual, and the type of BMPs selected. For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

We coordinated with the project design team and the local Valley Center Design Review Board to layout the proposed development and at the same time allow sufficient area to construct the proposed biofiltration basins in the best areas available to collect, clean and store the runoff from the project site. As soon as we nailed down the approved site plan, we prepared a preliminary grading plan and determined the areas tributary to each of the proposed biofiltration basins to preliminarily determine whether or not the proposed basin sizes would be sufficient or if we needed to regrade the site to adjust any of the tributary areas accordingly. At the same time, we determined the runoff factors for each of the proposed tributary areas to determine if we needed to reduce the amount of impervious area tributary to each basin. We then met with our subconsultant REC Consultants to discuss whether or not we could utilize street trees or rain barrels to effectively reduce the DCV for each basin. REC's concern with street trees was that although they may be good for reducing the DCV and could be effective in meeting the flow control requirement for each of the proposed biofiltration basins, they would be not be effective at reducing the peak flow from the 100-year storm event. In addition, the project does not propose habitable structures greater than 9 stories tall. Therefore, in accordance with Section B.2.1 of the BMP Design Manual, capture and use is considered infeasible for the project.

The next step was to have the Geotechnical Engineer for the project perform infiltration/percolation tests as outlined in Appendix D of the BMP Design Manual in the locations we have chosen for the treatment control BMPs. The Geotechnical Engineer then filled out Tables D.1-1 and D.2-3 for each of the proposed basin location in order to determine if any of the proposed basin locations would be restricted from allowing infiltration into the underlying soils and to calculate the required safety factor to be applied to the observed infiltration rates from the field tests for each basin location. Although the Geotechnical Engineer determined that each of the proposed biofiltration basins would be restricted from infiltrating into the underlying soils in accordance with Table D.1-1, they utilized their professional judgement and their knowledge of the area soils to determine that partial infiltration into the underlying soils would not negatively impact the proposed project.

With this information in hand, we then determined the rainfall depth for the project site and tabulated the amount of impervious and pervious areas tributary to each of the proposed biofiltration basins. We then filled out worksheet B.1 to calculate the DCV for each basin, worksheet B.2 to determine the retention requirements for each basin and worksheet B.3 to verify the BMP performance for each of the proposed basins.

The proposed basins were preliminarily designed to be integrated to meet both the pollutant control and flow control requirements. Our subconsultant REC Consultants performed a SWMM modeling analysis for each of the basins to verify that the basins as designed would meet the flow control requirement or if additional facilities would be required. REC's analysis verified that each of the basins met the flow control requirement.

- List and provide the information requested below for all pollutant control and hydromodification management BMPs proposed for the project.
- For each BMP listed, complete the Structural BMP Checklist on the next page. Copy the Checklist as many times as needed.

Copy and Paste table here for additional BMPs

County of San Diego SWQMP Sub-attachment 7.2 (Structural BMP Strategy) Page 7.2-2
Template Date: January 03, 2019 Preparation Date: 1/29/2020

7.3 Structural BMP Checklist (Complete once for each proposed structural BMP)

Structural BMP ID #	BA1	Permit # and Sheet #			
BMP Type					
Infiltration <input type="checkbox"/> Infiltration basin (INF-1) <input type="checkbox"/> Bioretention (INF-2) <input type="checkbox"/> Permeable pavement (INF-3)		Harvest and Use <input type="checkbox"/> Cistern (HU-1) Flow-thru Treatment (describe below) <input type="checkbox"/> With prior lawful approval to meet earlier PDP requirements <input type="checkbox"/> Pre-treatment/forebay for an onsite retention or biofiltration BMP ² <input type="checkbox"/> With alternative compliance			
Unlined Biofiltration <input checked="" type="checkbox"/> Biofiltration with partial retention (PR-1)		Hydromodification Management ³ <input type="checkbox"/> Detention pond or vault <input type="checkbox"/> Other (describe below)			
Lined Biofiltration <input type="checkbox"/> Biofiltration (BF-1) <input type="checkbox"/> Nutrient Sensitive Media Design (BF-2) <input type="checkbox"/> Proprietary Biofiltration (BF-3)					
BMP Purpose					
<input type="checkbox"/> Pollutant control only <input type="checkbox"/> Hydromodification control only <input checked="" type="checkbox"/> Combined pollutant control and hydromodification		<input type="checkbox"/> Pre-treatment/forebay for another BMP <input type="checkbox"/> Other (describe below)			
BMP Verification (See BMPDM Section 8.3)					
Provide name and contact information for the party responsible to sign BMP verification forms		Brent C. Moore – Alidade Engineering 41743 Enterprise Circle North, Suite 209 Temecula, CA 92590 (951) 587-2020			
BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)					
BMP Maintenance Category	Cat. 1	Cat. 2	Cat. 3	Cat. 4	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Final owner of BMP	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):		<input checked="" type="checkbox"/> Property Owner <input type="checkbox"/> County		
Maintenance of BMP into perpetuity	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):		<input checked="" type="checkbox"/> Property Owner <input type="checkbox"/> County		
Discussion (As needed; Continue on subsequent pages as necessary)					

² Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.

³ Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID #	BA2			Permit # and Sheet #
BMP Type				
Infiltration <input type="checkbox"/> Infiltration basin (INF-1) <input type="checkbox"/> Bioretention (INF-2) <input type="checkbox"/> Permeable pavement (INF-3)		Harvest and Use <input type="checkbox"/> Cistern (HU-1) Flow-thru Treatment (describe below) <input type="checkbox"/> With prior lawful approval to meet earlier PDP requirements <input type="checkbox"/> Pre-treatment/forebay for an onsite retention or biofiltration BMP ² <input type="checkbox"/> With alternative compliance		
Unlined Biofiltration <input checked="" type="checkbox"/> Biofiltration with partial retention (PR-1)		Hydromodification Management ³ <input type="checkbox"/> Detention pond or vault <input type="checkbox"/> Other (describe below)		
Lined Biofiltration <input type="checkbox"/> Biofiltration (BF-1) <input type="checkbox"/> Nutrient Sensitive Media Design (BF-2) <input type="checkbox"/> Proprietary Biofiltration (BF-3)				
BMP Purpose				
<input type="checkbox"/> Pollutant control only <input type="checkbox"/> Hydromodification control only <input checked="" type="checkbox"/> Combined pollutant control and hydromodification		<input type="checkbox"/> Pre-treatment/forebay for another BMP <input type="checkbox"/> Other (describe below)		
BMP Verification (See BMPDM Section 8.3)				
Provide name and contact information for the party responsible to sign BMP verification forms		Brent C. Moore – Alidade Engineering 41743 Enterprise Circle North, Suite 209 Temecula, CA 92590 (951) 587-2020		
BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)				
BMP Maintenance Category	Cat. 1	Cat. 2	Cat. 3	Cat. 4
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Final owner of BMP	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):	<input checked="" type="checkbox"/> Property Owner		<input type="checkbox"/> County
Maintenance of BMP into perpetuity	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):	<input checked="" type="checkbox"/> Property Owner		<input type="checkbox"/> County
Discussion (As needed; Continue on subsequent pages as necessary)				

² Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.

³ Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID #	BA3	Permit # and Sheet #			
BMP Type					
Infiltration <input type="checkbox"/> Infiltration basin (INF-1) <input type="checkbox"/> Bioretention (INF-2) <input type="checkbox"/> Permeable pavement (INF-3)		Harvest and Use <input type="checkbox"/> Cistern (HU-1) Flow-thru Treatment (describe below) <input type="checkbox"/> With prior lawful approval to meet earlier PDP requirements <input type="checkbox"/> Pre-treatment/forebay for an onsite retention or biofiltration BMP ² <input type="checkbox"/> With alternative compliance			
Unlined Biofiltration <input checked="" type="checkbox"/> Biofiltration with partial retention (PR-1)		Hydromodification Management ³ <input type="checkbox"/> Detention pond or vault <input type="checkbox"/> Other (describe below)			
Lined Biofiltration <input type="checkbox"/> Biofiltration (BF-1) <input type="checkbox"/> Nutrient Sensitive Media Design (BF-2) <input type="checkbox"/> Proprietary Biofiltration (BF-3)					
BMP Purpose					
<input type="checkbox"/> Pollutant control only <input type="checkbox"/> Hydromodification control only <input checked="" type="checkbox"/> Combined pollutant control and hydromodification		<input type="checkbox"/> Pre-treatment/forebay for another BMP <input type="checkbox"/> Other (describe below)			
BMP Verification (See BMPDM Section 8.3)					
Provide name and contact information for the party responsible to sign BMP verification forms		Brent C. Moore – Alidade Engineering 41743 Enterprise Circle North, Suite 209 Temecula, CA 92590 (951) 587-2020			
BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)					
BMP Maintenance Category	Cat. 1	Cat. 2	Cat. 3	Cat. 4	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Final owner of BMP	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):	<input checked="" type="checkbox"/> Property Owner		<input type="checkbox"/> County	
Maintenance of BMP into perpetuity	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):	<input checked="" type="checkbox"/> Property Owner		<input type="checkbox"/> County	
Discussion (As needed; Continue on subsequent pages as necessary)					

² Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.

³ Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID # BA4		Permit # and Sheet #	
BMP Type			
Infiltration <input type="checkbox"/> Infiltration basin (INF-1) <input type="checkbox"/> Bioretention (INF-2) <input type="checkbox"/> Permeable pavement (INF-3)		Harvest and Use <input type="checkbox"/> Cistern (HU-1)	
Unlined Biofiltration <input checked="" type="checkbox"/> Biofiltration with partial retention (PR-1)		Flow-thru Treatment (describe below) <input type="checkbox"/> With prior lawful approval to meet earlier PDP requirements <input type="checkbox"/> Pre-treatment/forebay for an onsite retention or biofiltration BMP ² <input type="checkbox"/> With alternative compliance	
Lined Biofiltration <input type="checkbox"/> Biofiltration (BF-1) <input type="checkbox"/> Nutrient Sensitive Media Design (BF-2) <input type="checkbox"/> Proprietary Biofiltration (BF-3)		Hydromodification Management ³ <input type="checkbox"/> Detention pond or vault <input type="checkbox"/> Other (describe below)	
BMP Purpose			
<input type="checkbox"/> Pollutant control only <input type="checkbox"/> Hydromodification control only <input checked="" type="checkbox"/> Combined pollutant control and hydromodification		<input type="checkbox"/> Pre-treatment/forebay for another BMP <input type="checkbox"/> Other (describe below)	
BMP Verification (See BMPDM Section 8.3)			
Provide name and contact information for the party responsible to sign BMP verification forms		Brent C. Moore – Alidade Engineering 41743 Enterprise Circle North, Suite 209 Temecula, CA 92590 (951) 587-2020	
BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)			
BMP Maintenance Category	Cat. 1	Cat. 2	Cat. 3
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Final owner of BMP	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):	<input checked="" type="checkbox"/> Property Owner	<input type="checkbox"/> County
Maintenance of BMP into perpetuity	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):	<input checked="" type="checkbox"/> Property Owner	<input type="checkbox"/> County
Discussion (As needed; Continue on subsequent pages as necessary)			

² Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.

³ Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID # BA5		Permit # and Sheet #	
BMP Type			
Infiltration <input type="checkbox"/> Infiltration basin (INF-1) <input type="checkbox"/> Bioretention (INF-2) <input type="checkbox"/> Permeable pavement (INF-3)		Harvest and Use <input type="checkbox"/> Cistern (HU-1) Flow-thru Treatment (describe below) <input type="checkbox"/> With prior lawful approval to meet earlier PDP requirements <input type="checkbox"/> Pre-treatment/forebay for an onsite retention or biofiltration BMP ² <input type="checkbox"/> With alternative compliance	
Unlined Biofiltration <input checked="" type="checkbox"/> Biofiltration with partial retention (PR-1)		Hydromodification Management ³ <input type="checkbox"/> Detention pond or vault <input type="checkbox"/> Other (describe below)	
Lined Biofiltration <input type="checkbox"/> Biofiltration (BF-1) <input type="checkbox"/> Nutrient Sensitive Media Design (BF-2) <input type="checkbox"/> Proprietary Biofiltration (BF-3)			
BMP Purpose			
<input type="checkbox"/> Pollutant control only <input type="checkbox"/> Hydromodification control only <input checked="" type="checkbox"/> Combined pollutant control and hydromodification		<input type="checkbox"/> Pre-treatment/forebay for another BMP <input type="checkbox"/> Other (describe below)	
BMP Verification (See BMPDM Section 8.3)			
Provide name and contact information for the party responsible to sign BMP verification forms		Brent C. Moore – Alidade Engineering 41743 Enterprise Circle North, Suite 209 Temecula, CA 92590 (951) 587-2020	
BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)			
BMP Maintenance Category	Cat. 1	Cat. 2	Cat. 3
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Final owner of BMP	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):	<input checked="" type="checkbox"/> Property Owner <input type="checkbox"/> Other (describe):	<input type="checkbox"/> County
Maintenance of BMP into perpetuity	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):	<input checked="" type="checkbox"/> Property Owner <input type="checkbox"/> Other (describe):	<input type="checkbox"/> County
Discussion (As needed; Continue on subsequent pages as necessary)			

² Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.

³ Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID #	BA6			Permit # and Sheet #
BMP Type				
Infiltration <input type="checkbox"/> Infiltration basin (INF-1) <input type="checkbox"/> Bioretention (INF-2) <input type="checkbox"/> Permeable pavement (INF-3)		Harvest and Use <input type="checkbox"/> Cistern (HU-1) Flow-thru Treatment (describe below) <input type="checkbox"/> With prior lawful approval to meet earlier PDP requirements <input type="checkbox"/> Pre-treatment/forebay for an onsite retention or biofiltration BMP ² <input type="checkbox"/> With alternative compliance		
Unlined Biofiltration <input checked="" type="checkbox"/> Biofiltration with partial retention (PR-1)		Hydromodification Management ³ <input type="checkbox"/> Detention pond or vault <input type="checkbox"/> Other (describe below)		
Lined Biofiltration <input type="checkbox"/> Biofiltration (BF-1) <input type="checkbox"/> Nutrient Sensitive Media Design (BF-2) <input type="checkbox"/> Proprietary Biofiltration (BF-3)				
BMP Purpose				
<input type="checkbox"/> Pollutant control only <input type="checkbox"/> Hydromodification control only <input checked="" type="checkbox"/> Combined pollutant control and hydromodification		<input type="checkbox"/> Pre-treatment/forebay for another BMP <input type="checkbox"/> Other (describe below)		
BMP Verification (See BMPDM Section 8.3)				
Provide name and contact information for the party responsible to sign BMP verification forms		Brent C. Moore – Alidade Engineering 41743 Enterprise Circle North, Suite 209 Temecula, CA 92590 (951) 587-2020		
BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)				
BMP Maintenance Category	Cat. 1	Cat. 2	Cat. 3	Cat. 4
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Final owner of BMP	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):		<input checked="" type="checkbox"/> Property Owner <input type="checkbox"/> County	
Maintenance of BMP into perpetuity	<input type="checkbox"/> HOA <input type="checkbox"/> Other (describe):		<input checked="" type="checkbox"/> Property Owner <input type="checkbox"/> County	
Discussion (As needed; Continue on subsequent pages as necessary)				

² Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.

³ Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

7.4 Storm Water Pollutant Control Worksheet Calculations

- Use this page as a cover sheet for the submittal of any required worksheets below.
- Complete the checklist to identify which BMPDM Appendix B (Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods) worksheets are included with this attachment.
- See BMPDM Appendix B for an explanation of the applicability of individual worksheets and detailed guidance on their completion.

Worksheet	Requirement
<input checked="" type="checkbox"/> Worksheet B.1 Calculation of Design Capture Volume (DCV)	Required
<input checked="" type="checkbox"/> Worksheet B.2 Retention Requirements	Required
<input checked="" type="checkbox"/> Worksheet B.3 BMP Performance	Required
<input type="checkbox"/> Worksheet B.4 Major Maintenance Intervals for Reduced-sized BMPs	If applicable
<input type="checkbox"/> Other worksheets	As required

7.5 Identification and Narrative of Receiving Water and Pollutants of Concern

- Complete this sub-attachment *only if flow-thru treatment BMPs are implemented onsite* in lieu of retention or biofiltration BMPs. Unless excepted because of a Prior Lawful Approval⁴, PDPs must also participate in an alternative compliance program⁵.

A. General Description 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 runoff from the project site is conveyed to the public storm drain system in Valley Center Road which outlets to Moosa Creek. Moosa Creek drains to Turner Lake. Downstream of Turner Lake, Moosa Creek drains to the Lower San Luis Rey River which outlet to the Pacific Ocean in Oceanside.			
B. Water Body Impairments and Priorities List any 303(d) impaired water bodies ⁶ 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	
Moosa Canyon Creek (903.13)	Indicator Bacteria, Nitrogen, Phosphorus		
San Luis Rey River Lower (903.11)	Benthic Community Effects, Bifenthrin, Chloride, Indicator Bacteria, Nitrogen, Phosphorus, Toxicity, TDS	Bacteria	
Pacific Ocean (903.11)	Indicator Bacteria, Trash		
C. Identification of Project Site Pollutants Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6.			
Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Nutrients	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Heavy Metals	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Organic Compounds	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Trash & Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Oxygen Demanding Substances	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Oil & Grease	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bacteria & Viruses	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

⁴ See BMPDM Appendix L: Prior Lawful Approval Requirements and Guidance.

⁵ See SWQMP Attachment 12 (Alternative Compliance Projects) and BMPDM Appendix J (Offsite Alternative Compliance Requirements and Guidance).

⁶ The current list of Section 303(d) impaired water bodies can be found at:

https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml

Pesticides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	BA1	BA2	BA3	BA4	BA5	BA6					unitless
	2	85th Percentile 24-hr Storm Depth	0.76	0.76	0.76	0.76	0.76	0.76					inches
	3	Impervious Surfaces <u>Not Directed to Dispersion Area</u> (C=0.90)	67,304	111,448	50,609	13,515	45,288	19,233					sq-ft
	4	Semi-Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.10)	10,660	22,446	5,391	1,141	8,683	5,257					sq-ft
	6	Natural Type A Soil <u>Not Serving as Dispersion Area</u> (C=0.10)											sq-ft
	7	Natural Type B Soil <u>Not Serving as Dispersion Area</u> (C=0.14)											sq-ft
	8	Natural Type C Soil <u>Not Serving as Dispersion Area</u> (C=0.23)											sq-ft
	9	Natural Type D Soil <u>Not Serving as Dispersion Area</u> (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	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	6										#
21	Average Rain Barrel Size	50										gal	
Initial Runoff Factor Calculation	22	Total Tributary Area	77,964	133,894	56,000	14,656	53,971	24,490	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.79	0.77	0.82	0.84	0.77	0.73	0.00	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.79	0.77	0.82	0.84	0.77	0.73	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	3,901	6,530	2,908	780	2,632	1,132	0	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.79	0.77	0.82	0.84	0.77	0.73	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	3,901	6,530	2,908	780	2,632	1,132	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.79	0.77	0.82	0.84	0.77	0.73	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	61,592	103,098	45,920	12,311	41,558	17,878	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	3,901	6,530	2,908	780	2,632	1,132	0	0	0	0	cubic-feet
No Warning Messages													

Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
Basic Analysis	1	Drainage Basin ID or Name	BA1	BA2	BA3	BA4	BA5	BA6	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.76	0.76	0.76	0.76	0.76	0.76	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	C	C	A	A	C	C					unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted					unitless
	5	Nature of Restriction	n/a	n/a	n/a	n/a	n/a	n/a					unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No					yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes					yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.350	0.400	0.150	0.150	0.500	0.150					in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.350	0.400	0.150	0.150	0.500	0.150	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	40.0%	40.0%	21.2%	21.2%	40.0%	21.2%	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.32	0.32	0.14	0.14	0.32	0.14	-	-	-	-	ratio
	13	Required Retention Volume	1248	2090	407	109	842	158	-	-	-	-	cubic-feet

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

Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
BMP Inputs	1	Drainage Basin ID or Name	BA1	BA2	BA3	BA4	BA5	BA6	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.350	0.400	0.150	0.150	0.500	0.150	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	3,901	6,530	2,908	780	2,632	1,132	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated					unitless
	5	Is BMP Impermeably Lined or Unlined?	Unlined	Unlined	Unlined	Unlined	Unlined	Unlined					unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain					unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard					unitless
	8	Provided Surface Area	2,637	4,489	2,790	552	1,820	907					sq-ft
	9	Provided Surface Ponding Depth	21.6	27	18	15	21.6	16.8					inches
	10	Provided Soil Media Thickness	18	18	18	18	18	18					inches
	11	Provided Gravel Thickness (Total Thickness)	36	36	30	30	36	30					inches
	12	Underdrain Offset	18	18	9	9	24	9					inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.25	1.88	1.19	0.56	1.00	0.69					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	461	898	209	41	455	68	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	8.10	8.10	4.50	4.50	10.50	4.50	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.57	0.60	0.43	0.32	0.78	0.36	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	23	20	30	30	21	30	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.86	0.93	0.66	0.53	1.00	0.58	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	3,346	6,054	1,927	414	2,632	659	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	555	476	981	366	0	473	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.0894	0.2100	0.0803	0.0176	0.0542	0.0267	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	1.46	2.02	1.24	1.38	1.29	1.27	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	1.46	2.02	1.24	1.38	1.29	1.27	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	8.79	12.12	7.46	8.26	7.72	7.63	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	32.40	37.80	30.00	27.00	30.00	28.80	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	12	11	13	10	12	12	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	18	16	22	18	17	20	0	0	0	0	hours
	40	Total Depth Biofiltered	41.19	49.92	37.46	35.26	37.72	36.43	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	833	715	1,472	549	0	709	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	833	715	1,472	549	0	709	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	417	357	736	275	0	354	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	417	357	736	275	0	354	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
	48	Deficit of Effectively Treated Stormwater	0	0	0	0	0	0	n/a	n/a	n/a	n/a	cubic-feet

No Warning Messages

7.5 Identification and Narrative of Receiving Water and Pollutants of Concern

- Complete this sub-attachment *only if flow-thru treatment BMPs are implemented onsite* in lieu of retention or biofiltration BMPs. Unless excepted because of a Prior Lawful Approval⁴, PDPs must also participate in an alternative compliance program⁵.

A. General Description

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 runoff from the project site is conveyed to the public storm drain system in Valley Center Road which outlets to Moosa Creek. Moosa Creek drains to Turner Lake. Downstream of Turner Lake, Moosa Creek drains to the Lower San Luis Rey River which outlet to the Pacific Ocean in Oceanside.

B. Water Body Impairments and Priorities

List any 303(d) impaired water bodies⁶ 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
Moosa Canyon Creek (903.13)	Indicator Bacteria, Nitrogen, Phosphorus	
San Luis Rey River Lower (903.11)	Benthic Community Effects, Bifenthrin, Chloride, Indicator Bacteria, Nitrogen, Phosphorus, Toxicity, TDS	Bacteria
Pacific Ocean (903.11)	Indicator Bacteria, Trash	

C. Identification of Project Site Pollutants

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

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Nutrients	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Heavy Metals	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Organic Compounds	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Trash & Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Oxygen Demanding Substances	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Oil & Grease	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

⁴ See BMPDM Appendix L: Prior Lawful Approval Requirements and Guidance.

⁵ See SWQMP Attachment 12 (Alternative Compliance Projects) and BMPDM Appendix J (Offsite Alternative Compliance Requirements and Guidance).

⁶ The current list of Section 303(d) impaired water bodies can be found at:

https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml

Bacteria & Viruses	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pesticides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



8.0 General Requirements

- Completion of this attachment is required for all PDPs subject to hydromodification management requirements (see PDP SWQMP Form Table 5). Do not submit this attachment if exempt from Hydromodification Management requirements. Document the PDP exemption in Attachment 9.
- Submit this cover page and all required Sub-attachments for all structural hydromodification management BMPs proposed for the project.
- Constructed features must fully satisfy the requirements described in applicable BMPDM sections and appendices, and any other guidance identified by the County.
- DMA Exhibits and Construction Plans: DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.
- Structural BMP Certification. All structural hydromodification management BMPs documented this attachment must be certified by a registered engineer in Attachment 7, Sub-attachment 7.1.
- Structural BMP Verification. BMP installation must be verified by the County at the completion of construction. Applicants must complete an Installation Verification Form (Attachment 10).

Sub-attachments (check all that are completed)
<input checked="" type="checkbox"/> 8.1: Flow Control Facility Design (required) ¹ Submit using <input checked="" type="checkbox"/> the Sub-attachment 8.1 cover sheet provided, or <input type="checkbox"/> as a separate stand-alone document labeled Sub-attachment 8.1.
<input checked="" type="checkbox"/> 8.2: Hydromodification Management Points of Compliance (required) Complete the table provided in Sub-attachment 8.2.
8.3: Geomorphic Assessment of Receiving Channels 1. Has a geomorphic assessment been performed for the receiving channel(s)? <input checked="" type="checkbox"/> No, the low flow threshold is 0.1Q ₂ (default low flow threshold) <input type="checkbox"/> Yes (provide the information below): Low flow threshold: <input type="checkbox"/> 0.1Q ₂ <input type="checkbox"/> 0.3Q ₂ <input type="checkbox"/> 0.5Q ₂ Title: Date: Preparer:
Submit using <input type="checkbox"/> the Sub-attachment 8.3 cover sheet provided, or <input type="checkbox"/> as a separate stand-alone document labeled Sub-attachment 8.3.
8.4: Vector Control Plan (required if BMPs will not drain in less than 96 hours) <input type="checkbox"/> Included with this attachment <input checked="" type="checkbox"/> Not required

¹ Including Structural BMP Drawdown Calculations and Overflow Design Summary. See BMPDM Chapter 6 and Appendix G for additional design guidance.

8.1 Flow Control Facility Design

Insert Flow Control Facility Design behind this cover page or submit as a separate stand-alone document labeled Sub-attachment 8.1.

8.2 Hydromodification Management Points of Compliance

- List and describe all points of compliance (POCs) for flow control for hydromodification management.
- For each POC, provide a POC identification name or number, and a receiving channel identification name or number correlating to the project's HMP Exhibit (see Attachment 2).

POC name or #	Channel name or #	POC Description
P.O.C. 1		Connection to the existing 10' x 5' box culvert from our project site

TECHNICAL MEMORANDUM:

SWMM Modeling for
Hydromodification Compliance of:


Liberty Bell Plaza

Prepared For:

Alidade Engineering

March 28, 2019

Prepared by:


Luis Parra, PhD, CPSWQ, ToR, D.WRE.
R.C.E. 66377



REC Consultants
2442 Second Avenue
San Diego, CA 92101
Telephone: (619) 232-9200



TECHNICAL MEMORANDUM

TO: Alidade Engineering

FROM: Luis Parra, PhD, PE, CPSWQ, ToR, D.WRE.
David Edwards, PE.

DATE: March 28, 2019

RE: Summary of SWMM Modeling for Hydromodification Compliance for Liberty Bell Plaza, Valley Center, CA.

INTRODUCTION

This memorandum summarizes the approach used to model the proposed commercial development project site in the City of Valley Center using the Environmental Protection Agency (EPA) Storm Water Management Model 5.0 (SWMM). SWMM models were prepared for the pre and post-developed conditions at the site in order to determine if the proposed LID biofiltration facilities have sufficient volume to meet Order R9-2013-001 requirements of the California Regional Water Quality Control Board San Diego Region (SDRWQCB), as explained in the Final Hydromodification Management Plan (HMP), dated March 2011, prepared for the County of San Diego by Brown and Caldwell.

SWMM MODEL DEVELOPMENT

The Liberty Bell Plaza project comprises of a commercial development inclusive of associated parking lots. Two (2) SWMM models were prepared for this study: the first for the pre-development and the second for the post-developed conditions. The project site drains to one (1) Point of Compliance (POC-1), located at the existing 5' x 10' RCB within the adjacent Valley Center Road to the west of the project site.

Per Section G.1.2 in Appendix G of the 2019 County of San Diego's BMP Design Manual, the EPA SWMM model was used to perform the continuous hydrologic simulation. For both SWMM models, flow duration curves were prepared to determine if the proposed HMP facilities are sufficient to meet the current HMP requirements.

The inputs required to develop SWMM models include rainfall, watershed characteristics, and BMP configurations. The Lake Wohlford gauge from the Project Clean Water website was used for this study, since it is the most representative of the project site precipitation due to elevation and proximity to the project site. Please see gauge location and project location map on Attachment 5.

Per the California Irrigation Management Information System "Reference Evaporation Zones" (CIMIS ETo Zone Map), the project site is located within the Zone 9 Evapotranspiration Area. Thus evapotranspiration values for the site were modeled using Zone 9 average monthly values from Table G.1-1 from the County of San Diego 2019 BMP Design Manual. The site was modeled with Type C hydrologic soil as this is the closest existing soil determined from the NRCS Soil Survey. However, it should be noted that for this particular project a soil type has not been identified in the NRCS soil survey, as such soil class C has been as it is the most conservative approach in this case.

Infiltration tests undertaken on the project site (and located in Attachment 8 of this report) indicate that the infiltration rate of the soil located on the project site corresponds to the typical type C soil range according to the NRCS definition (Part 630 Hydrology National Engineering Handbook, Chapter 7, NRCS).

Soils have been assumed to be compacted in the existing condition to represent the current mass-grade condition of the site. In the post developed conditions the soils have been modeled as fully compacted. Other SWMM inputs for the subareas are discussed in the appendices to this document, where the selection of the parameters is explained in detail.

HMP MODELING

PRE DEVELOPED CONDITIONS

The current property consists on an undeveloped but mass graded site that drains via overland flow to the receiving storm drain system located to the west of the project site within the adjacent Valley Center Road. Table 1 below illustrates the pre-developed area to be developed and impervious percentage accordingly.

TABLE 1 – SUMMARY OF PRE-DEVELOPED CONDITIONS

POC	DMA	Tributary Area, A (Ac)	Impervious Percentage, Ip⁽¹⁾
POC-1	DMA-1	7.58	0%
TOTAL	--	7.58	0%

Notes: (1) – Per the 2013 RWQCB permit, existing condition impervious surfaces are not to be accounted for in existing conditions analysis.

DEVELOPED CONDITIONS

Storm water runoff from the proposed project site is routed to one (1) POC located at the existing storm drain location to the west of the project site. Runoff from the developed project site is drained to six (6) onsite receiving biofiltration LID BMPs. Once flows are routed via the proposed LID BMPs, developed onsite flows are then conveyed to the aforementioned POC. A small self-mitigating area bypasses the treatment basins and confluence with flows at the POC.

TABLE 2 – SUMMARY OF DEVELOPED CONDITIONS

POC	DMA	Tributary Area, A (Ac)	Impervious Percentage, Ip
POC-1	DMA-1	1.790	89.35%
	DMA-2	3.074	86.12%
	DMA-3	1.286	95.11%
	DMA-4	0.336	95.82%
	DMA-5	1.239	86.84%
	DMA-6	0.562	81.55%
	DMA-SM	0.398	32.51%
TOTAL	--	8.69	--

Six (6) LID biofiltration basins are located within the project site and are responsible for handling hydromodification requirements for the project site. In developed conditions, the basins will have a surface depth and a riser spillway structure (see dimensions in Table 4). Flows will then discharge from the basin via a surface outlet structure and a low flow orifice outlet within the gravel layer. The riser structure will act as a spillway such that peak flows can be safely discharged to the receiving storm drain.

Beneath the basins' invert lies the proposed LID biofiltration portion of the drainage facility. This portion of the basin is comprised of a 3-inch layer of mulch, an 18-inch layer of amended soil (a highly sandy, organic rich composite with an infiltration capacity of at least 5 inches/hr) and a layer of gravel for additional detention and to accommodate the French drain system. These systems are to be located beneath the biofiltration layers to intercept treated storm water and convey these flows to a single small diameter lower outlet orifice. Once flows have been routed by the outlet structure, flows are then drained to the receiving storm drain.

The biofiltration basins were modeled using the biofiltration LID module within SWMM. The biofiltration module can model the underground gravel storage layer, underdrain with an orifice plate, amended soil layer, and a surface storage pond up to the elevation of the invert of the spillway. It should be noted that detailed outlet structure location and elevations will be shown on the construction plans based on the recommendations of this study.

Water Quality BMP Sizing

It is assumed all storm water quality requirements for the project will be met by the bio-filtration LID BMPs detailed in the SWQMP and other BMPs included within the site design. However, detailed water quality requirements are not discussed within this technical memo. For further information in regards to storm water quality requirements for the project (including sizing) please refer to the site specific Storm Water Quality Management Plan (SWQMP).

BMP Effective Depth

In order to accurately model the available surface volume provided above the surface of the biofiltration LID area, an "effective depth" is calculated.

Let A_{BMP} be the area of the BMP (area of amended soil and area of gravel). The proper value of the effective depth S_D to be included in the LID module can be calculated by using geometric properties of the surface volume. Let A_0 be the surface area at the bottom of the surface pond, and let A_i be the surface area at the elevation of the invert of the first row of orifices (or at the invert of the riser if no surface orifices are included). Finally, let h_i be the difference in elevation between A_0 and A_i . By volumetric definition:

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

TABLE 3 – EFFECTIVE VS ACTUAL SURFACE BASIN DEPTH

BMP	ACTUAL SLOT DEPTH (in)	EFFECTIVE SURFACE DEPTH (in)	TOTAL EFFECTIVE DEPTH ⁽¹⁾ (in)
BMP-1	21.6	28.23	26.43
BMP-2	27.0	35.10	33.3
BMP-3	18.0	20.50	18.7
BMP-4	15.0	20.96	19.16
BMP-5	21.8	27.15	25.35
BMP-6	16.8	21.68	19.88

(1): Includes additional voids located within 3-inch mulch layer.

It should be noted that the effective depth is to exclude the volume of solids present in the 3-inch surface mulch layer ($3'' \times 0.6 = 1.8''$ reduction). Please refer to Attachment 4 for additional information.

BMP MODELING FOR HMP PURPOSES

Modeling of HMP BMPs

Six (6) BMP biofiltration with partial infiltration basins are proposed for hydromodification conformance for the project site. Table 4 illustrates the dimensions required for HMP compliance according to the SWMM model that was undertaken for the project.

TABLE 4 – SUMMARY OF BIOFILTRATION / PARTIAL INFILTRATION BMP

BMP	DIMENSIONS					
	BMP Area ⁽¹⁾ , (ft ²)	Low Flow Orif. on gravel layer (in)	Gravel Depth (in) ⁽²⁾	Depth to Riser Invert (ft) ⁽³⁾	Weir Perimeter Length ⁽³⁾ (ft)	Total Surface Depth ⁽⁴⁾ (ft)
BMP-1	2,637	1.25"	36"	1.8'	16	2.3'
BMP-2	4,489	1.875"	36"	2.25'	24	3.0'
BMP-3	2,790	1.1875"	30"	1.5'	12	2.1'
BMP-4	552	0.5625"	30"	1.25'	8	1.75'
BMP-5	1,820	1.00"	36"	1.8'	8	1.8'
BMP-6	907	0.6875"	30"	1.4'	8	1.4'

- Notes:
- (1): Area of amended soil equal to area of gravel
 - (2): Includes filter gravel layer, French Drain is set at an elevation of 3-inches above the base of the facility.
 - (3): Diameter of orifice in gravel layer with invert at bottom of layer; tied with hydromod min threshold ($0.1 \cdot Q_2$).
 - (4): Depth of ponding beneath riser structure's surface spillway.
 - (5): Overflow length, the internal perimeter of the riser.
 - (6): Total surface depth of BMP from top crest elevation to surface invert.

FLOW DURATION CURVE COMPARISON

The Flow Duration Curve (FDC) for the site was compared at the POC by exporting the hourly runoff time series results from SWMM to a spreadsheet.

Q_2 and Q_{10} were determined with a partial duration statistical analysis of the runoff time series in an Excel spreadsheet using the Cunnane plotting position method (which is the preferred plotting methodology in the HMP Permit). As the SWMM Model includes a statistical analysis based on the Weibull Plotting Position Method, the Weibull Method was also used within the spreadsheet to ensure that the results were similar to those obtained by the SWMM Model.

The range between 10% of Q_2 and Q_{10} was divided into 100 equal time intervals; the number of hours that each flow rate was exceeded was counted from the hourly series. Additionally, the intermediate peaks with a return period “i” were obtained (Q_i with $i=3$ to 9). For the purpose of the plot, the values were presented as percentage of time exceeded for each flow rate. FDC comparison at the POC is illustrated in Figure 1 in both normal and logarithmic scale.

As can be seen in Figure 1, the FDC for the proposed condition with the HMP BMPs is within 110% of the curve for the existing condition in both peak flows and durations. The additional runoff volume generated from developing the site will be released to the existing point of discharge at a flow rate below the 10% Q_2 lower threshold for POC-1. Additionally, the project will also not increase peak flow rates between the Q_2 and the Q_{10} , as shown in the peak flow table in Attachment 1.

Discussion of the Manning’s coefficient (Pervious Areas) for Pre and Post-Development Conditions

Typically the Manning’s coefficient is selected as $n = 0.10$ for pervious areas and $n = 0.012$ for impervious areas. However, due to the impact that n has in the continuous simulation a more accurate value of the Manning’s coefficient has been chosen for pervious areas. Taken into consideration the study prepared by TRWE (Reference [6]) a value of $n = 0.05$ has been selected (see Table 1 of Reference [6] included in Attachment 7). An average n value between average grass plus pasture (0.04) and dense grass (0.06) has been selected per the reference cited, for light rain (<0.8 in/hr) as more than 99% of the rainfall has been measured with this intensity.

DRYING TIMES

To ensure compliance with the 96 hour drawdown requirements per Section 6.4.6 of the Final HMP dated March 2011, drawdown calculations are provided in Attachment 4 of this report. Per the drawdown calculations, the drying times are detailed in Table 5.

TABLE 5 – SUMMARY OF BASIN DRAW DOWN TIME:

BASIN	DRAWDOWN TIME (hrs)
BMP-1	23.6
BMP-2	23.2
BMP-3	22.1
BMP-4	20.3
BMP-5	23.8
BMP-6	22.9

SUMMARY

This study has demonstrated that the proposed HMP BMPs provided for the Liberty Bell Plaza site are sufficient to meet the current HMP criteria if the cross-section areas and volumes recommended within this technical memorandum, and the respective orifice and outlet structure are incorporated as specified within the proposed project site.

KEY ASSUMPTIONS

1. Type C Soil is representative of the existing condition site. This is based on the site specific infiltration tests which are representative of type C soils.

ATTACHMENTS

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

REFERENCES

- [1] – *"Review and Analysis of San Diego County Hydromodification Management Plan (HMP): Assumptions, Criteria, Methods, & Modeling Tools – Prepared for the Cities of San Marcos, Oceanside & Vista"*, May 2012, TRW Engineering.
- [2] – *"Final Hydromodification Management Plan (HMP) prepared for the County of San Diego"*, March 2011, Brown and Caldwell.
- [3] - Order R9-2013-001, California Regional Water Quality Control Board San Diego Region (SDRWQCB).
- [4] – *"Handbook of Hydrology"*, David R. Maidment, Editor in Chief. 1992, McGraw Hill.
- [5] – *"County of San Diego BMP Design Manual"*, January 2019.
- [6] – *"Improving Accuracy in Continuous Hydrologic Modeling: Guidance for Selecting Pervious Overland Flow Manning's n Values in the San Diego Region"*, TRWE, 2016.

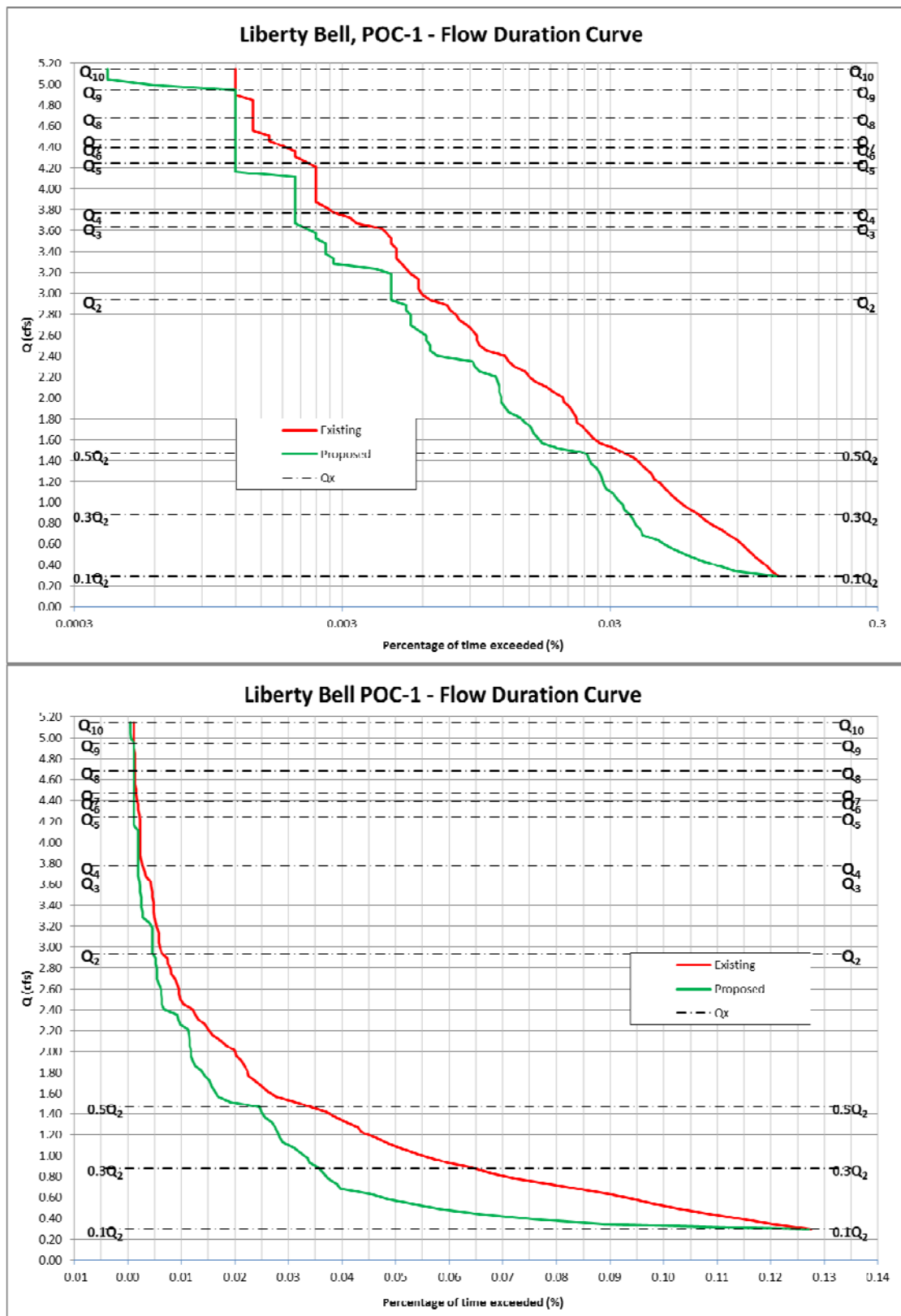


Figure 1a and 1b. Flow Duration Curve Comparison (logarithmic and normal “x” scale)

ATTACHMENT 1.

Q₂ to Q₁₀ Comparison Table – POC 1

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
2-year	2.936	1.536	1.400
3-year	3.632	2.222	1.411
4-year	3.770	3.218	0.552
5-year	4.245	3.244	1.001
6-year	4.391	3.281	1.110
7-year	4.470	3.428	1.042
8-year	4.679	3.559	1.121
9-year	4.944	3.621	1.323
10-year	5.142	3.644	1.498

ATTACHMENT 2

FLOW DURATION CURVE ANALYSIS

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

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

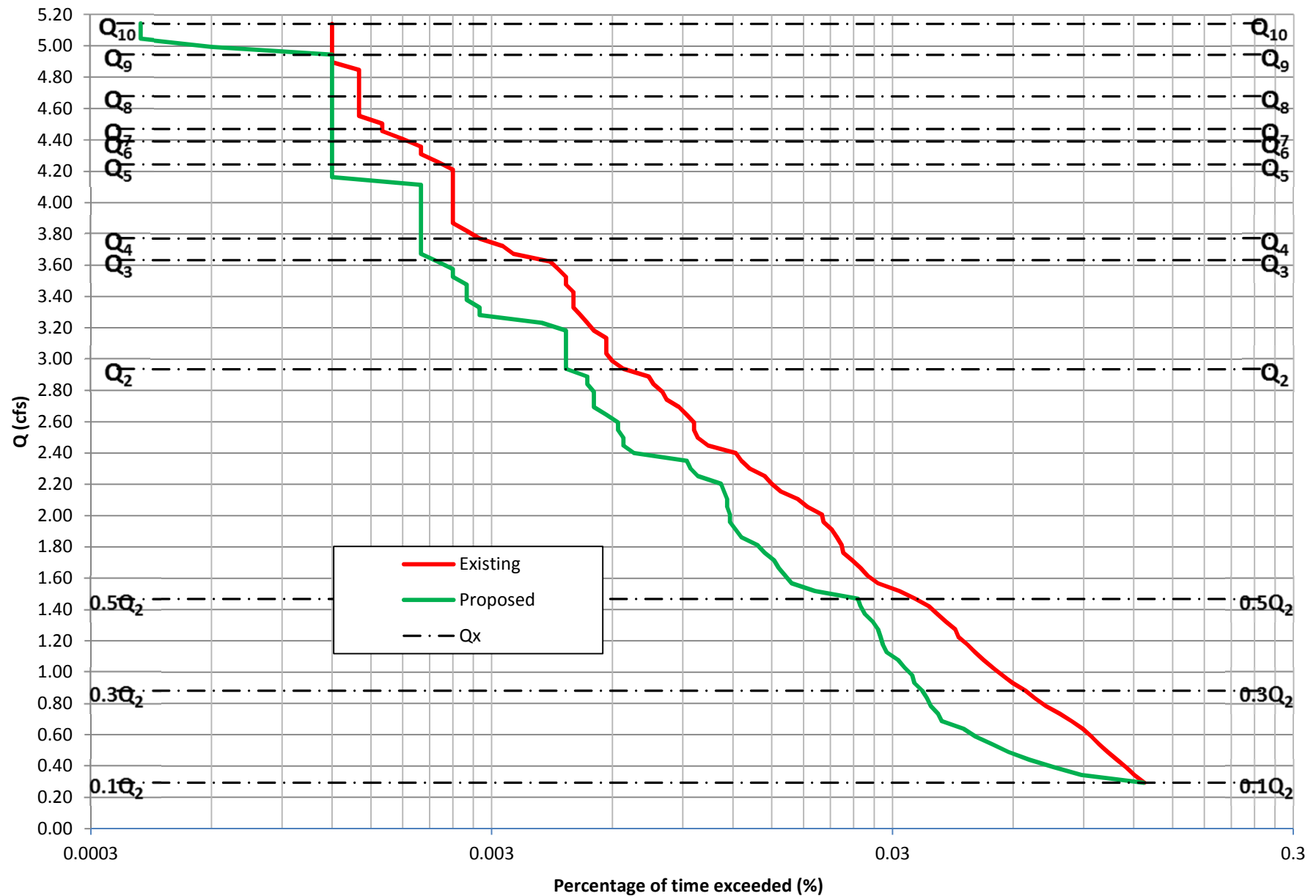
Consequently, the design passes the hydromodification test.

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

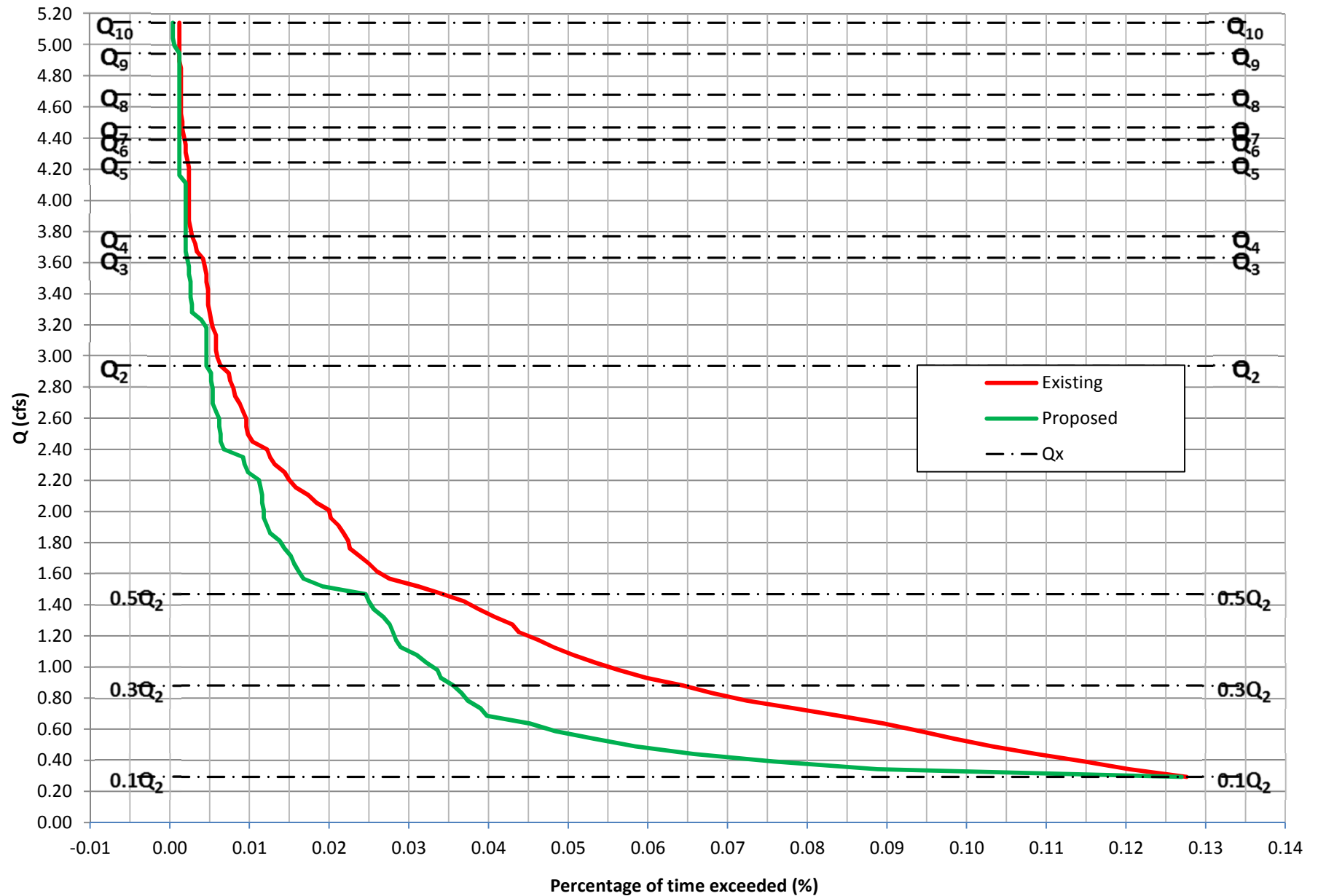
In terms of the “y” axis, the peak flow value is the variable of choice. As an additional analysis performed by REC, not only the range of analysis is clearly depicted (10% of Q_2 to Q_{10}) but also all intermediate flows are shown (Q_2 , Q_3 , Q_4 , Q_5 , Q_6 , Q_7 , Q_8 and Q_9) in order to demonstrate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

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

Liberty Bell POC-1 - Flow Duration Curve



Liberty Bell POC-1 - Flow Duration Curve



Flow Duration Curve Data for Liberty Bell, POC-1, City of Valley Center

Q2 = 2.94 cfs Fraction 10 %
 Q10 = 5.14 cfs
 Step = 0.0490 cfs
 Count = 499995 hours
 57.04 years

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
1	0.294	638	1.28E-01	635	1.27E-01	100%	Pass
2	0.343	602	1.20E-01	444	8.88E-02	74%	Pass
3	0.392	574	1.15E-01	379	7.58E-02	66%	Pass
4	0.441	544	1.09E-01	329	6.58E-02	60%	Pass
5	0.490	516	1.03E-01	292	5.84E-02	57%	Pass
6	0.538	492	9.84E-02	266	5.32E-02	54%	Pass
7	0.587	471	9.42E-02	242	4.84E-02	51%	Pass
8	0.636	448	8.96E-02	226	4.52E-02	50%	Pass
9	0.685	420	8.40E-02	199	3.98E-02	47%	Pass
10	0.734	392	7.84E-02	195	3.90E-02	50%	Pass
11	0.783	362	7.24E-02	187	3.74E-02	52%	Pass
12	0.832	340	6.80E-02	183	3.66E-02	54%	Pass
13	0.881	322	6.44E-02	178	3.56E-02	55%	Pass
14	0.930	299	5.98E-02	170	3.40E-02	57%	Pass
15	0.979	282	5.64E-02	168	3.36E-02	60%	Pass
16	1.028	267	5.34E-02	161	3.22E-02	60%	Pass
17	1.077	253	5.06E-02	155	3.10E-02	61%	Pass
18	1.126	241	4.82E-02	145	2.90E-02	60%	Pass
19	1.175	231	4.62E-02	142	2.84E-02	61%	Pass
20	1.224	219	4.38E-02	140	2.80E-02	64%	Pass
21	1.273	215	4.30E-02	138	2.76E-02	64%	Pass
22	1.322	204	4.08E-02	134	2.68E-02	66%	Pass
23	1.371	194	3.88E-02	128	2.56E-02	66%	Pass
24	1.420	185	3.70E-02	125	2.50E-02	68%	Pass
25	1.469	171	3.42E-02	123	2.46E-02	72%	Pass
26	1.518	156	3.12E-02	96	1.92E-02	62%	Pass
27	1.567	138	2.76E-02	84	1.68E-02	61%	Pass
28	1.616	130	2.60E-02	81	1.62E-02	62%	Pass
29	1.665	125	2.50E-02	78	1.56E-02	62%	Pass
30	1.714	119	2.38E-02	76	1.52E-02	64%	Pass
31	1.763	113	2.26E-02	72	1.44E-02	64%	Pass
32	1.812	112	2.24E-02	69	1.38E-02	62%	Pass
33	1.861	109	2.18E-02	63	1.26E-02	58%	Pass
34	1.910	106	2.12E-02	61	1.22E-02	58%	Pass
35	1.959	101	2.02E-02	59	1.18E-02	58%	Pass
36	2.008	100	2.00E-02	59	1.18E-02	59%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
37	2.057	92	1.84E-02	58	1.16E-02	63%	Pass
38	2.106	87	1.74E-02	58	1.16E-02	67%	Pass
39	2.155	79	1.58E-02	57	1.14E-02	72%	Pass
40	2.204	75	1.50E-02	56	1.12E-02	75%	Pass
41	2.253	72	1.44E-02	49	9.80E-03	68%	Pass
42	2.302	66	1.32E-02	47	9.40E-03	71%	Pass
43	2.351	63	1.26E-02	46	9.20E-03	73%	Pass
44	2.400	61	1.22E-02	34	6.80E-03	56%	Pass
45	2.449	52	1.04E-02	32	6.40E-03	62%	Pass
46	2.498	49	9.80E-03	32	6.40E-03	65%	Pass
47	2.547	48	9.60E-03	31	6.20E-03	65%	Pass
48	2.596	48	9.60E-03	31	6.20E-03	65%	Pass
49	2.645	46	9.20E-03	29	5.80E-03	63%	Pass
50	2.694	44	8.80E-03	27	5.40E-03	61%	Pass
51	2.743	41	8.20E-03	27	5.40E-03	66%	Pass
52	2.792	40	8.00E-03	27	5.40E-03	68%	Pass
53	2.840	38	7.60E-03	26	5.20E-03	68%	Pass
54	2.889	37	7.40E-03	26	5.20E-03	70%	Pass
55	2.938	32	6.40E-03	23	4.60E-03	72%	Pass
56	2.987	30	6.00E-03	23	4.60E-03	77%	Pass
57	3.036	29	5.80E-03	23	4.60E-03	79%	Pass
58	3.085	29	5.80E-03	23	4.60E-03	79%	Pass
59	3.134	29	5.80E-03	23	4.60E-03	79%	Pass
60	3.183	27	5.40E-03	23	4.60E-03	85%	Pass
61	3.232	26	5.20E-03	20	4.00E-03	77%	Pass
62	3.281	25	5.00E-03	14	2.80E-03	56%	Pass
63	3.330	24	4.80E-03	14	2.80E-03	58%	Pass
64	3.379	24	4.80E-03	13	2.60E-03	54%	Pass
65	3.428	24	4.80E-03	13	2.60E-03	54%	Pass
66	3.477	23	4.60E-03	13	2.60E-03	57%	Pass
67	3.526	23	4.60E-03	12	2.40E-03	52%	Pass
68	3.575	22	4.40E-03	12	2.40E-03	55%	Pass
69	3.624	21	4.20E-03	11	2.20E-03	52%	Pass
70	3.673	17	3.40E-03	10	2.00E-03	59%	Pass
71	3.722	16	3.20E-03	10	2.00E-03	63%	Pass
72	3.771	14	2.80E-03	10	2.00E-03	71%	Pass
73	3.820	13	2.60E-03	10	2.00E-03	77%	Pass
74	3.869	12	2.40E-03	10	2.00E-03	83%	Pass
75	3.918	12	2.40E-03	10	2.00E-03	83%	Pass
76	3.967	12	2.40E-03	10	2.00E-03	83%	Pass
77	4.016	12	2.40E-03	10	2.00E-03	83%	Pass
78	4.065	12	2.40E-03	10	2.00E-03	83%	Pass
79	4.114	12	2.40E-03	10	2.00E-03	83%	Pass
80	4.163	12	2.40E-03	6	1.20E-03	50%	Pass
81	4.212	12	2.40E-03	6	1.20E-03	50%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
82	4.261	11	2.20E-03	6	1.20E-03	55%	Pass
83	4.310	10	2.00E-03	6	1.20E-03	60%	Pass
84	4.359	10	2.00E-03	6	1.20E-03	60%	Pass
85	4.408	9	1.80E-03	6	1.20E-03	67%	Pass
86	4.457	8	1.60E-03	6	1.20E-03	75%	Pass
87	4.506	8	1.60E-03	6	1.20E-03	75%	Pass
88	4.555	7	1.40E-03	6	1.20E-03	86%	Pass
89	4.604	7	1.40E-03	6	1.20E-03	86%	Pass
90	4.653	7	1.40E-03	6	1.20E-03	86%	Pass
91	4.702	7	1.40E-03	6	1.20E-03	86%	Pass
92	4.751	7	1.40E-03	6	1.20E-03	86%	Pass
93	4.800	7	1.40E-03	6	1.20E-03	86%	Pass
94	4.849	7	1.40E-03	6	1.20E-03	86%	Pass
95	4.898	6	1.20E-03	6	1.20E-03	100%	Pass
96	4.947	6	1.20E-03	6	1.20E-03	100%	Pass
97	4.996	6	1.20E-03	3	6.00E-04	50%	Pass
98	5.045	6	1.20E-03	2	4.00E-04	33%	Pass
99	5.094	6	1.20E-03	2	4.00E-04	33%	Pass
100	5.142	6	1.20E-03	2	4.00E-04	33%	Pass

Peak Flows calculated with Cunnane Plotting Position

Return Period (years)	Pre-dev. Q (cfs)	Post-Dev. Q (cfs)	Reduction (cfs)
10	5.142	3.644	1.498
9	4.944	3.621	1.323
8	4.679	3.559	1.121
7	4.470	3.428	1.042
6	4.391	3.281	1.110
5	4.245	3.244	1.001
4	3.770	3.218	0.552
3	3.632	2.222	1.411
2	2.936	1.536	1.400



County of San Diego
Stormwater Quality Management Plan (SWQMP)
For Priority Development Projects (PDPs)

Use for all PDPs (see Storm Water Intake Form, Part 5)



**Priority Development
Project**

Project Information	
Project Name	Liberty Bell Plaza
Project Address	27555 Valley Center Road, Valley Center, CA 92082
Assessor's Parcel # (APN)	189-012-17, 20, 21 & 49; 189-091-08, 22, 30 & 35
Permit # / Record ID	PDS2017-STP-17-037

Project Applicant / Project Proponent	
Name	Steve Flynn - Liberty Bell Plaza, LLC
Address	P.O. Box 642, Rancho Santa Fe, CA 92067
Phone	(858) 756-3589
Email:	steveflynn@aol.com

SWQMP Preparer	
Name	Brent C. Moore
Company (if applicable)	Alidade Engineering
Address	41743 Enterprise Circle North, Suite 209, Temecula, CA 92590
Phone	(951) 587-2020
Email:	brent-alidade@att.net
PE Number (if applicable)	C59121

Preparer's Certification

I understand that the County of San Diego has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the County of San Diego BMP Design Manual. The BMP Design Manual is a design manual for compliance with local County of San Diego Watershed Protection Ordinance (Sections 67.801 et seq.) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001, as amended by Order No. R9-2015-0001 and Order No. R9-2015-0100) requirements for storm water management.

This SWQMP is intended to comply with applicable requirements of the BMP Design Manual. I certify that it 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 SWQMP by County staff is confined to a review and does not relieve me as the person in charge of overseeing the selection and design of storm water BMPs for this project, of my responsibilities for project design.

Signature

Date January 29, 2020

COUNTY ACCEPTED

SWQMP Approved By:

Approval Date:

*** Note* Approval does not constitute compliance with regulatory requirements.**