The City of San Diego

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

PASEO MEWS MIXED USE PROJECT

PTS NO. 475565

ENGINEER OF WORK:

Antony K. Christensen, RCE 54021
Provide Wet Signature and Stamp Above Line

PREPARED FOR:

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858

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FEBRUARY 10, 2017
Revised APRIL 29, 2017
Revised June 14, 2017

Approved by: City of San Diego Date

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ACRONYMS

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

CERTIFICATION PAGE

Project Name:
Permit Application Number:

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

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

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

Antony K. Christensen, RCE 54021

Christensen Engineering & Surveying

06-14-17

Date

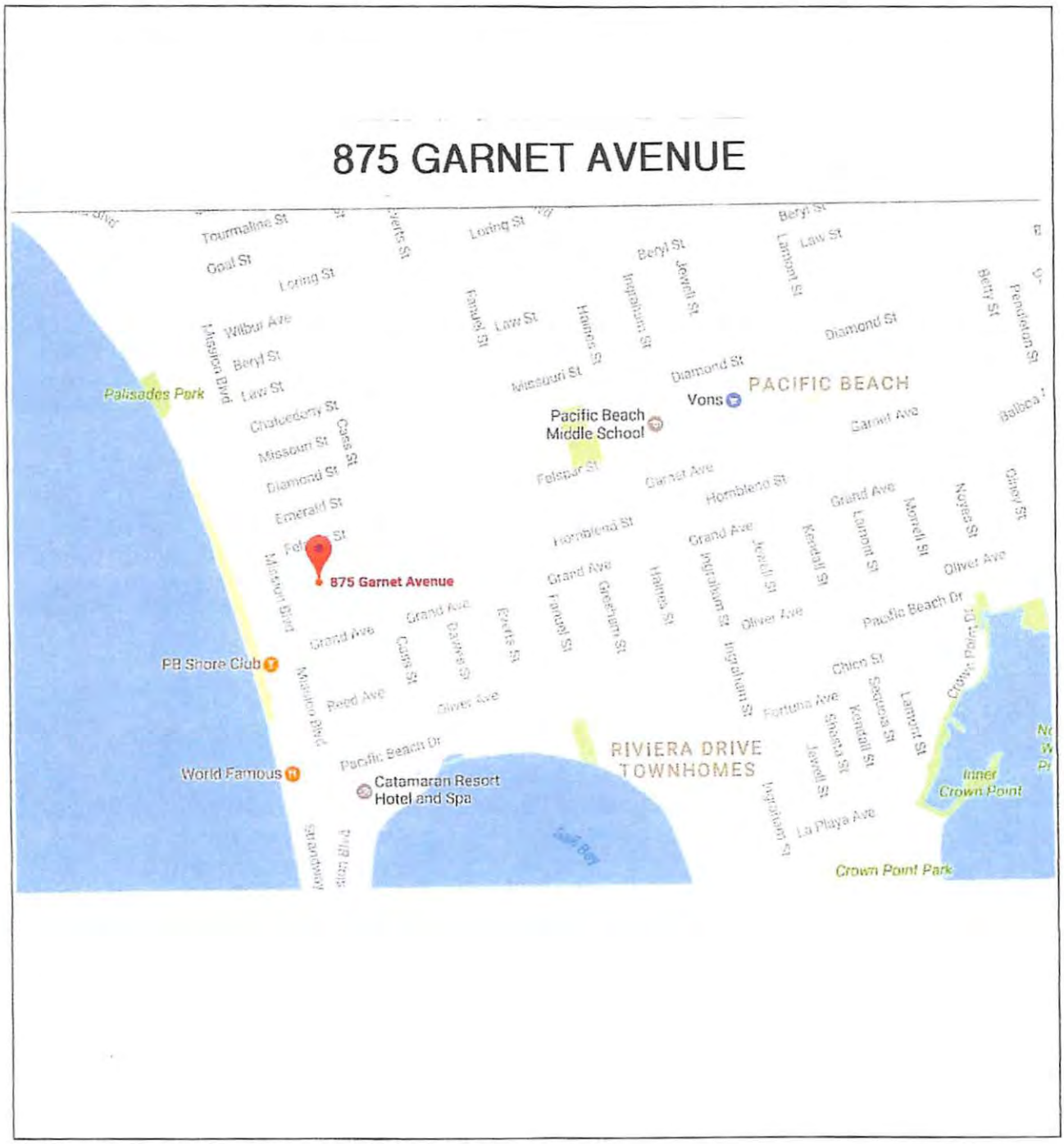
SUBMITTAL RECORD

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

Submittal Number	Date	Project Status	Changes
1	02-10-2017	☒ Preliminary Design/Planning/CEQA ☐ Final Design	Initial Submittal
2	04-29-2017	☒ Preliminary Design/Planning/CEQA ☐ Final Design	Address City Comments
3	06-14-2017	☒ Preliminary Design/Planning/CEQA ☐ Final Design	Address City Comments
4		☐ Preliminary Design/Planning/CEQA ☐ Final Design	

PROJECT VICINITY MAP

Project Name: PASEO MEWS MIXED USE DEVELOPMENT
Permit Application Number:



STORM WATER REQUIREMENTS APPLICABILITY CHECKLIST

Complete and attach DS-560 Form included in Appendix A.1

City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Storm Water Requirements Applicability Checklist

FORM DS-560
October 2016

Project Address: 875 Garnet Avenue

Project Number *(for City Use Only)*:

SECTION 1. Construction Storm Water BMP Requirements:

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

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

PART A: Determine Construction Phase Storm Water Requirements.

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

☐ Yes; SWPPP required, skip questions 2-4 ☒ No; next question

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

☒ Yes; WPCP required, skip 3-4 ☐ No; next question

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

☐ Yes; WPCP required, skip 4 ☐ No; next question

4. Does the project only include the following Permit types listed below?

- Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
- Individual Right of Way Permits that exclusively include only ONE of the following activities: water service, sewer lateral, or utility service.
- Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, pot holing, curb and gutter replacement, and retaining wall encroachments.

☐ Yes; no document required

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

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

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

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

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

PART B: Determine Construction Site Priority

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

Complete PART B and continued to Section 2

1. ☐ **ASBS**
   a. Projects located in the ASBS watershed.

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

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

4. ☒ **Low Priority**
   a. Projects requiring a Water Pollution Control Plan but not subject to ASBS, high, or medium priority designation.

SECTION 2. Permanent Storm Water BMP Requirements.

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

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

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

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

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

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

PART D: PDP Exempt Requirements.

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

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."

If "no" was checked for all questions in Part D, continue to Part E.

1. **Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:**
   - **Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;**
   - **Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or;**
   - **Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?**

   ☐ Yes; PDP exempt requirements apply ☒ No; next question

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

   ☐ Yes; PDP exempt requirements apply ☒ No; project not exempt.

PART E: Determine if Project is a Priority Development Project (PDP).

Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

If "yes" is checked for any number in PART E, continue to PART F and check the box labeled "Priority Development Project".

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

1. **New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. ☐ Yes ☒ No

2. **Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. ☒ Yes ☐ No

3. **New development or redevelopment of a restaurant.** Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface. ☐ Yes ☒ No

4. **New development or redevelopment on a hillside.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater. ☐ Yes ☒ No

5. **New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).** ☐ Yes ☒ No

6. **New development or redevelopment of streets, roads, highways, freeways, and driveways.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site). ☐ Yes ☒ No

7. **New development or redevelopment discharging directly to an Environmentally Sensitive Area.** The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). ☐ Yes ☒ No

8. **New development or redevelopment projects of a retail gasoline outlet (RGO) that create and/or replaces 5,000 square feet of impervious surface.** The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day. ☐ Yes ☒ No

9. **New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces.** Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539. ☐ Yes ☒ No

10. **Other Pollutant Generating Project.** The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces. ☐ Yes ☒ No

PART F: Select the appropriate category based on the outcomes of PART C through PART E.

1. The project is **NOT SUBJECT TO PERMANENT STORM WATER REQUIREMENTS.** ☐
2. The project is a **STANDARD DEVELOPMENT PROJECT.** Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance. ☐
3. The project is **PDP EXEMPT.** Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance. ☐
4. The project is a **PRIORITY DEVELOPMENT PROJECT.** Site design, source control, and structural pollutant control BMP requirements apply. See the Storm Water Standards Manual for guidance on determining if project requires a hydromodification plan management ☒

Joy D. Christensen	Assistant Engineer
Name of Owner or Agent *(Please Print)*	Title
Joy D. Christensen	02/13/2017
Signature	Date

Applicability of Permanent, Post-Construction Storm Water BMP Requirements	Form I-1

Project Identification

Project Name: PASEO MEW MIXED USE DEVELOPMENT

Permit Application Number:	Date: February 10, 2017

Determination of Requirements

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

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

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

Form I-1 Page 2		
Step	Answer	Progression
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	☐Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	☒ No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (not required if prior lawful approval does not apply):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	☒ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do not apply: This project discharges to the Pacific Ocean (exempt water body) via impervious/concrete lined conveyances from the project site. Runoff flows onto Hornblend and flows onto Mission Boulevard and then flows southerly to the NW corner at the intersection of Mission and Grand Avenue and the curb inlet located there. From there runoff flows into the Pacific Ocean.		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	☒ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does not apply: Verified using Google Earth KMZ file from Project Clean Water.		

CONVEYANCE TO EXEMPT WATERBODY

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	PASEO MEW MIXED USE DEVELOPMENT
Project Address	875 Garnet Avenue San Diego, CA 92109
Assessor's Parcel Number(s) (APN(s))	423-044-04-00,-05-00,-07-00,-08-00,-12-00 & -13-00
Permit Application Number	
Project Watershed	Select One: ☐ San Dieguito River ☐ Penasquitos ☒ Mission Bay ☐ San Diego River ☐ San Diego Bay ☐ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal places (9XX.XX)	Scripps Hydrologic Area 906.3
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	0.854 Acres (_____ Square Feet)
Area to be disturbed by the project (Project Footprint)	0.779 Acres (_____ Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	0.710 Acres (_____ Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	0.069 Acres (_____ Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Project Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition.	(0.712 to 0.710) -2.8 %

Description of Existing Site Condition and Drainage Patterns

Current Status of the Site (select all that apply):
☒ Existing development
☐ Previously graded but not built out
☐ Agricultural or other non-impervious use
☐ Vacant, undeveloped/natural
Description / Additional Information: Portions of the property is improved with parking lots and a retail building.

Existing Land Cover Includes (select all that apply):
☒ Vegetative Cover
☐ Non-Vegetated Pervious Areas
☒ Impervious Areas
Description / Additional Information: The project site currently includes some landscaping.

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

Approximate Depth to Groundwater (GW):
☐ GW Depth < 5 feet
☐ 5 feet < GW Depth < 10 feet
☐ 10 feet < GW Depth < 20 feet
☒ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):
☐ Watercourses
☐ Seeps
☐ Springs
☐ Wetlands
☒None
Description / Additional Information: A canyon exists onsite.

Description of Existing Site Topography and Drainage:

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

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

Description / Additional Information:

Currently the drainage from the site is by surface flow and is urban in character. Prior to construction the northerly portion flows to the common alley and then westerly with a small portion flowing northerly to Garnet Avenue. The southerly portion of the project flows to Hornblend Street. The project prior to development is considered a commercial site. Following construction, the same general pattern of flow persists with the same portion of the northerly site flowing to Garnet Avenue but the remainder of the northerly site runoff being conveyed to Hornblend Street. The southerly portion of the site project continues to flow to Hornblend Street. The alley flows westerly both before and after construction. Since the project will be a residential multi-unit development the runoff coefficient is reduced resulting in less total runoff from the site. The runoff flowing to the north, onto Garnet Avenue is expected to reduce from 0.07 cfs to 0.05 cfs following development. The flow westerly along the alley will reduce from 1.49 cfs to 0.22 cfs. The flow to Hornblend is expected to increase from 1.34 cfs to 2.19 cfs. Total site and alley runoff will decrease from 2.90 cfs to 2.46 cfs.

The site has 0.712 ac of imperviousness and a proposed 0.710 area of imperviousness following development. A change from of 83.3% to 83.2% area of imperviousness.

. Impervious area runoff will be treated by standard design biofiltration basins. An estimate of infiltration has been employed (0.05 in/hr) until the site can be tested.. Runoff flows from Hornblend Street to Mission Boulevard where it flows southerly to a curb inlet at Grand Avenue and Mission Boulevard and then flows to the Pacific Ocean.

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

Project site is currently a commercial development with associated parking lots. It is proposed to be a mixed use project with a majority of it being multi-unit residential with some of the existing retail space new proposed retail space (the new spaces including residential components, as well).

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

Impervious surfaces will include the new building and parking surfaces.

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

Landscaped areas will include the area surrounding the parking and there are proposed permeable pavers in some of the walkways.

Does the project include grading and changes to site topography?

☒ Yes

☐ No

Description / Additional Information:

Grading will be limited to that required to remove the existing improvements and to assure the site continues to slope southerly. There will be little change in elevation or slope of the site.

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

☒ Yes

☐ No

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

Description / Additional Information:

The project proposes the construction of onsite drainage improvements including several biofiltration basins, catch basins, some including pumps and trench drains. The biofiltration basins are sized using worksheets B.5 using open bottoms and a estimated infiltration rate of 0.05 in/hr to treat impervious surface runoff. See attached Drainage Study for additional information.

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

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

Description / Additional Information:

No pesticides are expected to be required as part of the landscape management. Refuse containers shall be covered.

Identification and Narrative of Receiving Water

Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable)

Runoff flows from the project site to Hornblend Street and then westerly to Mission Boulevard and then southerly to a curb inlet at Mission Boulevard and Grand Avenue where it is conveyed to the Pacific Ocean. This outlet is shown on the Google KMZ mapping as an exempt conveyance system.

Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations.

For Coastal Water uses include Industrial service supply, Navigation, Contact Water Recreation, Non-Contact Water Recreation, Commercial and Sport fishing, Biologic Habitats, Estuarine, Wildlife, Rare and Marine habitats, Migration, Aquaculture, Shellfish Harvesting, Spawning. Ground Water uses include Municipal, Domestic and Industrial supply.

Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations. None.

Provide distance from project outfall location to impaired or sensitive receiving waters.

Approximately 0.16 mile westerly to the Pacific Ocean.

Summarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands
There are no MHPA or ESL areas near the project site.

Identification of Receiving Water Pollutants of Concern

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

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs/ WQIP Highest Priority Pollutant
Pacific Ocean	Bacteria	Indicator Bacteria
		Fecal coliform
		Enterococcus

Identification of Project Site Pollutants*

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

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

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

Hydromodification Management Requirements

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

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

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

Runoff from the site flows onto Hornblend Street and then to Mission Boulevard where it then flows southerly to a curb inlet at Mission Boulevard and Grand Avenue where it is collected by a part of the exempt storm water conveyance system and conveyed to the Pacific Ocean.

Critical Coarse Sediment Yield Areas*

*This Section only required if hydromodification management requirements apply

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

- ☐ Yes
- ☒ No

Discussion / Additional Information:

Potential CCSYAs do not occur onsite or areas upstream and tributary to the site.

Flow Control for Post-Project Runoff*

*This Section only required if hydromodification management requirements apply

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

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

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

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

Discussion / Additional Information: (optional)

Other Site Requirements and Constraints

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

None.

Optional Additional Information or Continuation of Previous Sections As Needed

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

Source Control BMP Checklist for All Development Projects	Form I-4

Source Control BMPs

All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of the Storm Water Standards) for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

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

Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-1 not implemented: None anticipated.			
SC-2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented: None occur onsite that are applicable for stenciling.			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-3 not implemented: Will not occur onsite.			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-4 not implemented: Will not occur onsite.			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-5 not implemented: There will be a separate covered refuse area.			

Form I-4 Page 2 of 2

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

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

Landscaping will be employed but pesticide use is not anticipated. Refuse will be collected in a separate covered location.

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

Site Design BMPs

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

Answer each category below pursuant to the following.

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

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

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

Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented:			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	☒ Yes	☐ No	
5-2 Does the pervious area satisfy the design criteria in SD-5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	☒ Yes	☐ No	
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and SD-5 Fact Sheet in Appendix E?	☐ Yes	☒ No	

Form I-5 Page 3 of 4			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-6 not implemented: Runoff is collected from the impervious areas and directed to the bioretention basins			
6a-1 Are green roofs implemented in accordance with design criteria in SD-6A Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☒ No	
6a-2 Is green roof credit volume calculated using Appendix B.2.1.2 and SD-6A Fact Sheet in Appendix E?	☐ Yes	☒ No	
6b-1 Are permeable pavements implemented in accordance with design criteria in SD-6B Fact Sheet? If yes, are they shown on the site map?	☒ Yes	☐ No	
6b-2 Is permeable pavement credit volume calculated using Appendix B.2.1.3 and SD-6B Fact Sheet in Appendix E?	☐ Yes	☒ No	
SD-7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐ Yes	☒ No	☐ N/A
Discussion / justification if SD-8 not implemented: The water demand in the 36 hour limit is exceeded by the DCV.			
8-1 Are rain barrels implemented in accordance with design criteria in SD-8 Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☒ No	
8-2 Is rain barrel credit volume calculated using Appendix B.2.2.2 and SD-8 Fact Sheet in Appendix E?	☐ Yes	☒ No	

Insert Site Map with all site design BMPs identified:

COASTAL DEVELOPMENT PERMIT
DRAINAGE MANAGEMENT AREA MAP

DMA/IMP AREA SUMMARY

DMA	IMPERVIOUS AREA	PERMEABLE AREA	TOTAL AREA CONVEYED TO IMP	IMP NAME	IMP SURFACE AREA	SELF-MITIGATING AREA	SELF-RETAINING AREA	"C" VALUE
A	0 SF	888 SF	NONE	NA	NA	888 SF	0 SF	NA
NE	0 SF	166 SF	NONE	NA	NA	166 SF	0 SF	NA
SE	0 SF	184 SF	NONE	NA	NA	184 SF	0 SF	NA
WN	0 SF	1,266 SF	NONE	NA	NA	1,266 SF	0 SF	NA
WS	0 SF	978 SF	NONE	NA	NA	978 SF	0 SF	NA
DWN	936 SF	0 SF	936 SF	W	360 SF	0 SF	0 SF	0.9
DWS	468 SF	0 SF	468 SF	W	360 SF	0 SF	0 SF	0.9
P	8,868 SF	0 SF	8,868 SF	W	360 SF	0 SF	0 SF	0.9
EB	3,234 SF	0 SF	3,234 SF	EB	178 SF	0 SF	0 SF	0.9
T-1 THRU T-12	1,017 SF (EACH)	0 SF	1,017 SF (EACH)	T-1 THRU T-12	38 SF (EACH)	0 SF	0 SF	0.9
M1-M3 AND M6-M7	972 SF (EACH)	0 SF	972 SF (EACH)	M1-M3 AND M6-M7	31 SF (EACH)	0 SF	0 SF	0.9
M-4	788 SF	0 SF	788 SF	M-4	31 SF	0 SF	0 SF	0.9
M-5	972 SF	0 SF	972 SF	M-4	30 SF	0 SF	0 SF	0.9
M-8	756 SF	0 SF	756 SF	M-4	31 SF	0 SF	0 SF	0.9
W	0 SF	120 SF	NONE	NA	NA	120 SF	0 SF	NA

NOTE: ALL SELF-MITIGATING AREAS ARE LANDSCAPED IN ACCORDANCE WITH SECTION 5.2.1 OF STORM WATER MANUAL:

VEGETATION SHALL BE LANDSCAPED WITH NATIVE OR NON-NATIVE/NONINVASIVE DROUGHT TOLERANT PECIES THAT DO NOT REQUIRE REGULAR APPLICATION OF FERTILIZERS/PSESTICIDES

SOIL WILL BE AMENDED AND AERATED TO PROVIDE CHARACTERISTICS EQUIVALENT TO UNSISTURBED NATIVE TOPSOIL.

INCIDENTAL IMPERVIOUS AREA ARE LESS THAN 5% OF THE SELF-MITIGATING AREA

INCIDENTAL IMPERVIOUS AREA IS NOT HYDRAULICALLY CONNECTED TO OTHER IMPERVIOUS AREAS

THE SELF-MITIGATING AREA IS HYDRAULICALLY SEPARATE FROM DMAs THAT CONTAIN PERMANENT STORM WATER POLLUTANT CONTROL BMPs.

EXHIBIT CHECKLIST:

HYDROLOGIC SOIL GROUP: "D" (UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICES WEB SOIL SURVEY)

APPROXIMATE DEPTH TO GROUNDWATER: GREATER THAN 20'

EXISTING NATURAL HYDROLOGIC RESOURCES: NO WATERCOURSES, SEEP. SPRINGS OR WETLANDS EXIST IN THE PROJECT AREA

CRITICAL COARSE SEDIMENT YIELD AREAS: POTENTIAL CCSYAs (PCCSYAs) DO NOT OCCUR ONSITE OR UPSTREAM

EXISTING TOPOGRAPHY AND IMPERVIOUS AREAS: TOPOGRAPHY IS SHOWN SITE NEARLY ENTIRELY IMPERVIOUS

EXISTING AND PROPOSED SITE DRAINAGE NETWORK AND CONNECTIONS TO DRAINAGE OFFSITE: SITE CURRENTLY DRAINS TO ALLEY AND AND HORNBLEND STREET FOLLOWING DEVELOPMENT SITE WILL DRAIN TO HORNBLEND AND THEN FLOW WESTERLY TO MISSION BOULEVARD AND THEN SOUTHERLY TO GRAND AVENUE WHERE IT WILL ENTER A CURB INLET AND THEN FLOW TO THE PACIFIC OCEAN

PROPOSED GRADING: IS SHOWN ON DMA MAP

PROPOSED IMPERVOUS FEATURES: IMPERVIOUS ROOF AND WALKWAYS, DRIVEWAYS AND PARKING LOT

PROPOSED DESIGN FEATURES AND SURFACE TREATMENTS USED TO MINIMIZE IMPERVIOUSNESS: ARE SHOWN AND LANDSCAPING IS USED TO MINIMIZE IMPERVOUSNESS.

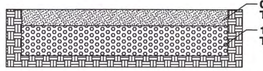
DMA MANAGEMENT AREA BOUNDARIES, NUMBERS, AREAS AND TYPES: SHOWN

POTENTIAL POLLUTANT SOURCE AREAS AND SOURCE CONTROLS:

EXISTING ONSITE STORM DRAIN INLET: DO NOT EXIST
INDOOR DRAINS, GARAGES AND PESTICIDE USE: GARAGES ARE SHOWN
LANDSCAPE/OUTSIDE PESTICIDE USE: NOT ANTICIPATED TO BE USED
POOLS, SPAS, PONDS: NOT EMPLOYED
FOOD SERVICE: NOT EMPLOYED
REFUSE AREAS: COVERED REFUSE AREA WILL BE EMPLOYED AS SHOWN
INDUSTRIAL PROCESSE: DO NOT OCCUR
OUTDOOR STORAGE OF EQUIPMENT OR MATERIALS: DOES NOT EXIST
VEHICLE CLEANING: DOES NOT EXIST
VEHICLE AND EQUIPMENT REPAIR: DOES NOT EXIST
FUEL DISPENSING AREAS: DO NOT EXIST
LOADING DOCKS: DO NOT EXIST
FIRE SPRINKLER TEST WATER: WILL BE CONVEYED TO SEWER
MISCELLANEOUS DRAIN OR WASH WATER: DOES NOT EXIST
PLAZAS, SIDEWALKS AND PARKING LOTS: ARE AS SHOWN

STRUCTURAL BMP SHOWN AS TO LOCATION, TYPE, SIZE AND DETAIL ARE SHOWN (BIOFILTRATION BASINS)

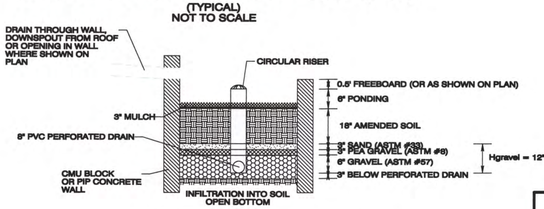
HYDROMODIFICATION REQUIREMENTS: SITE IS EXEMPT. FLOWS BY PAVED SURFACES TO A CURB INLET AT MISSION BOULDEVARD AND GRAND AVENUE (NW CORNER) AND THEN TO THE PACIFIC OCEAN.



AREAS OF PERMEABLE PAVEMENT SHALL NOT HAVE AN IMPERMEABLE LINER

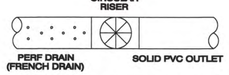
PERMEABLE PAVEMENT DETAIL (PVT)

(TYPICAL)
NOT TO SCALE



BIOFILTRATION BASIN DETAIL (PVT)

(TYPICAL)
NOT TO SCALE



BASIN OUTLET DETAIL (PVT)

(TYPICAL)
NOT TO SCALE

JUNE 17, 2017
ANTONY K. CHRISTENSEN, RCE 54021 — Date
LS 7508

REGISTERED PROFESSIONAL ENGINEER — ANTONY K. CHRISTENSEN — No. 54021 — Exp. 12-31-17 — CIVIL — STATE OF CALIFORNIA

Prepared By:
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Revision 5:
Revision 4:
Revision 3:
Revision 2: 06-17-17 ADDRESS CITY COMMENTS
Revision 1: 04-28-17 ADDRESS CITY COMMENTS

Project Name:
PASEO MEWS

Original Date: FEBRUARY 10, 2017

Sheet Title:
DMA MAP

Sheet
C-5

DEP#

JN A2016-73

Summary of PDP Structural BMPs	Form I-6

PDP Structural BMPs

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

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

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

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

The site is being modelled as a partial infiltration site (actual infiltration category to be determined with testing during the ministerial phase). The site impervious areas will be treated by standard biofiltration basins. The site is hydromodification exempt.

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

(Continued from page 1)

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. IMPs See DMA exhibit for separate IMPs	
Construction Plan Sheet No.	
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ◉ Partial retention by biofiltration with partial retention (PR-1) ○ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)	
Purpose: ◉ Pollutant control only ○ Hydromodification control only ○ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Antony K. Christensen, RCE 54021
Who will be the final owner of this BMP?	The project owners 875 Garnet Associates, LLC
Who will maintain this BMP into perpetuity?	Project Owners
What is the funding mechanism for maintenance?	Project Owners

Form I-6 Page 4 of X (Copy as many as needed)
Structural BMP ID No. All
Construction Plan Sheet No. Preliminary Grading Plan
Discussion (as needed): Open Biofiltration Basins are employed as shown on the Preliminary Grading Plan and DMA exhibit.

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

Date Prepared:	Project No.:
Project Applicant:	Phone:
Project Address:	
Project Engineer:	Phone:

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

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

CERTIFICATION:

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

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

Signature: _____

Date of Signature: _____

Printed Name: _____

Title: _____

Phone No. _____

Engineer's Stamp

ATTACHMENT 1
BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included:

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

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

The DMA Exhibit must identify:

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

COASTAL DEVELOPMENT PERMIT
PRELIMINARY GRADING PLAN

GRADING DATA

AREA OF SITE - 0.854 AC (37,172 SF) (DOES NOT INCLUDE ALLEY (2,996 SF)
AREA OF SITE TO BE GRADED 0.779 (33,938 SF) (0.848 AC (36,934 SF) INCLUDING ALLEY REMOVAL AND REPLACEMENT)
PERCENT OF SITE TO BE GRADED 92.3%
AMOUNT OF SITE WITH 25% SLOPES OR GREATER: AREA - 0 SF, PERCENT OF TOTAL SITE - 0%.
AMOUNT OF CUT - 910 C.Y.
AMOUNT OF FILL - 40 C.Y.
AMOUNT OF EXPORT - 870 C.Y.
MAXIMUM DEPTH OF FILL- 1'
MAXIMUM DEPTH OF CUT - 3 ' (4' TO PAD)
NO CUT OR FILL SLOPES
RETAINING WALL: NONE NOT PART OF BUILDING
EARTHWORK IS APPROXIMATE TO FINISH SURFACE

IMPERVIOUS AREA:

EXISTING - 0.712 AC
PROPOSED - 0.710 AC

A DEVIATION IS BEING REQUESTED FOR STREET VISIBILITY TRIANGLES LESS THAN STANDARD PER SDMC 113.0273 (C) (2)

THE PROJECT TAKES ACCESS FROM THE ALLEY. THE PROPOSED PARKING LOT IS ONE WAY AND EXITS ONTO HORNBLEND. PARKING LOT

CONSTRUCTION NOTES

1. PROPOSED CURB OUTLET PER D-25 Q100 = 2.19 CFS V100 = 4.0 FPS
2. VISIBILITY TRIANGLE. NOTHING GREATER THAN 3' IN HEIGHT ALLOWED IN THIS AREA
3. PROPOSED 14' COMMERCIAL DRIVEWAY PER SDG-163 TO REPLACE EX 24' DRIVEWAY
4. PROPOSED STREET TREE (TYPICAL) SEE LANDSCAPE PLAN
5. EX PED RAMP. PROTECT IN PLACE
6. EX ALLEY PED RAMP. PROTECT IN PLACE
7. EX WATER SERVICE TO BE KILLED
8. EX SEWER LAT TO BE ABANDONED
9. PROPOSED NORTH SITE SEWER LATERAL
10. PROPOSED SOUTH SITE SEWER LATERAL
11. PROPOSED NORTH SITE 2" WATER SERVICE
12. PROPOSED SOUTH SITE 2" WATER SERVICE
13. PROPOSED DRAIN FROM BIORETENTION BASINS TO CURB OUTLET
14. PROPOSED DRAIN FROM DRIVEWAY TRENCH DRAINS TO CATCH BASIN NORTHERLY OF WESTERLY BIORETENTION BASIN
15. PROPOSED BIORETENTION BASIN (TYPICAL)
16. PROPOSED 6" DRIVEWAY TRENCH DRAIN (TYPICAL)
17. PORTION OF EX BUILDING TO REMAIN
18. EX PARKING LOT IMPROVEMENTS TO BE REMOVED AND REPLACED
19. PROPOSED 6" PARKING LOT TRENCH DRAIN TO TO DRAIN TO 3636 CATCH BASIN
20. PROPOSED 3636 CATCH BASIN WITH SOLID LID AND PUMP TO CONVEY RUNOFF FROM PARKING LOT TRENCH DRAIN TO WEST BIORETENTION BASIN
21. PROPOSED 3636 CATCH BASIN WITH SOLID LID AND PUMP TO CONVEY RUNOFF FROM WEST BIORETENTION BASIN TO CURB OUTLET
22. PROPOSED WEST BIORETENTION BASINS
23. EXISTING ALLEY TO BE REPLACE WITH STANDARD ALLEY
24. PROPOSED 3636 CATCH BASIN AND PUMP TO CONVEY RUNOFF FROM UNIT DRIVEWAY TRENCH DRAINS TO WESTERLY BIORETENTION BASINS
25. STREET INTERSECTION VISIBILITY TRIANGLE
26. PROPOSED ONSITE PRIVATE SEWER (TYPICAL)
27. PROPOSED ONSITE PRIVATE WATER (TYPICAL)
28. PROPOSED ONSITE PRIVATE 6" CURB PER G-1
29. EX DRIVEWAY TO BE CLOSED AND REPLACED WITH STANDARD CURB GUTTER AND SIDEWALK
30. EX ALLEY APRON TO BE REPLACED WITH STANDARD APRON
31. SEWER CLEANOUT
32. DOMESTIC WATER BFP
33. 4" FIRE SERVICE TO SUPPLY NORTH AND SOUTH STRUCTURES
34. FIRE SERVICE BFP
35. PRIVATE FIRE SERVICE IN R/W TO SUPPLY NORTH STRUCTURES
36. IRRIGATION SERVICE AND BFP
37. WATER METER (TYPICAL)

NOTE:

STREET VISIBILITY TRIANGLES ARE 15' PER ZONE REGULATIONS.

THE PROJECT TAKES ACCESS FROM THE HORNBLEND. THE PROPOSED PARKING LOT IS ONE WAY AND EXITS ONTO THE ALLEY.

DOOS ALONG BAYARD (IF ANY) SHALL NOT SWING INTO THE RIGHT OF WAY

ANTONY K. CHRISTENSEN, RCE 54021
LS 7508

JULY 11, 2017
Date

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Revision 5:
Revision 4:
Revision 3:
Revision 2: 06-17-17 ADDRESS CITY COMMENTS
Revision 1: 04-28-17 ADDRESS CITY COMMENTS

Project Name:

PASEO MEWS

Original Date: FEBRUARY 10, 2017

Sheet Title:

PRELIMINARY GRADING PLAN

Sheet

DEP#

C-3

JN A2016-73

Garnet Mixed Use

IMP T1 to T12 (for each IMP)

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.55	inches
2	Area tributary to BMP (s)	A=	0.0233	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	42	cubic-feet

Garnet Mixed Use

IMP M1 to M3 & M6 to M7 (for each IMP)

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.55	inches
2	Area tributary to BMP (s)	A=	0.0223	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	40	cubic-feet

Garnet Mixed Use

IMP M4

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.55	inches
2	Area tributary to BMP (s)	A=	0.0181	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	33	cubic-feet

Garnet Mixed Use

IMP M5

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.55	inches
2	Area tributary to BMP (s)	A=	0.0223	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	40	cubic-feet

Garnet Mixed Use

IMP M8

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.55	inches
2	Area tributary to BMP (s)	A=	0.0174	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	31	cubic-feet

Garnet Mixed Use

IMP EB

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.55	inches
2	Area tributary to BMP (s)	A=	0.0742	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	133	cubic-feet

Garnet Mixed Use

IMP W (Treats DMA-DNW, DWS & P)

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.55	inches
2	Area tributary to BMP (s)	A=	0.234	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	421	cubic-feet

Harvest and Use Feasibility Checklist	Form I-7

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

☐ Toilet and urinal flushing
☐ Landscape irrigation
☐ Other:_____

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

From Table B.3-3 for Low Plant Water use 390 gal/36hr/Ac
Area of landscaping = 1,370 sf (0.0315 Ac)
Landscape water demand = 390 x 0.0315= 12.3 gallon = 1.65 cf

For toilet demand assume 2 residents per unit x 20 units x 9.3 gal/resident = 372 gal/day
For commercial assume 5 employees x 7 gal/day – 35 gal/day/
Total demand = 407 gal/day = 611 gal/36hrs= 82 cf

3. Calculate the DCV using worksheet B-2.1.
DCV = 1362 (cubic feet).

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

Is harvest and use feasible based on further evaluation?

☐ Yes, refer to Appendix E to select and size harvest and use BMPs.
☒ No, select alternate BMPs.

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-T1 TO T-12 (AREA FOR EACH IMP)	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	1017	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	42	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	63	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	17	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	31	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	24	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-3)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	27	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	27	sq. ft.
23	Provided BMP Footprint	38	sq. ft.
24	Is Line 23 > Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-T1 TO T-12 (AREA FOR EACH IMP)	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	1017	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	42	cu. ft.
BMP Parameters			
5	Footprint of the BMP	38	sq. ft.
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Media retained pore space [50% of (FC-WP)]	0.05	in/in
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Porosity of aggregate storage	0.4	in/in
Volume Retention Requirement			
10	Measured infiltration rate in the DMA	0.05	in/hr.
11	Factor of safety	2	
12	Reliable infiltration rate, for biofiltration BMP sizing [Line 10/ Line 11] Note: This worksheet is not applicable if Line 12 < 0.01 in/hr.	0.025	in/hr.
13	Average annual volume reduction target (Figure B.5-2) When Line 12 ≥ 0.01 in/hr. = Minimum (40, 166.9 x Line 12 +6.62)	10.8	%
14	Fraction of DCV to be retained (Figure B.5-3) 0.0000013 x Line 13^3 - 0.000057 x Line 13^2 + 0.0086 x Line 13 - 0.014	0.074	
15	Target volume retention [Line 14 x Line 4]	3	cu. ft.
Evapotranspiration: Average Annual Volume Retention			
16	Effective evapotranspiration depth [Line 6 x Line 7]	0.9	inches
17	Retained Pore Volume [(Line 16 x Line 5)/12]	3	cu. ft.
18	Fraction of DCV retained in pore spaces [Line 17/Line 4]	0.07	
19	Evapotranspiration average annual capture [ET nomographs in Figure B.5-5]	5.2	%
Infiltration: Average Annual Volume Retention			
20	Drawdown for infiltration storage [(Line 8 x Line 9)/Line 12]	48	hours
21	Equivalent DCV fraction from evapotranspiration (use Line 19 and Line 20 in Figure B.4-1; Refer to Appendix B.4.2.2)	0.04	
22	Infiltration volume storage [(Line 5 x Line 8 x Line 9)/12]	4	cu. ft.
23	Infiltration Storage Fraction of DCV [Line 22/Line 4]	0.09	
24	Total Equivalent Fraction of DCV [Line 21 + Line 23]	0.13	
25	Biofiltration BMP average annual capture [use Line 24 and 20 in Figure B.4-1]	16.72	%
Volume retention required from site design and other BMPs			
26	Fraction of DCV retained (Figure B.5-3) 0.0000013 x Line 25^3 - 0.000057 x Line 25^2 + 0.0086 x Line 25 - 0.014	0.120	
27	Remaining target DCV retention [(Line 14 – Line 26) x Line 4] Note: If Line 27 is equal to or smaller than 0 then the BMP meets the volume retention performance standard. If Line 27 is greater than 0, the applicant must implement site design and/or other BMPs within the DMA that will retain DCV equivalent to or greater than Line 27 to meet the volume retention performance standard	-2	cu. ft.

Volume Retention Performance Standard is Met

The City of SAN DIEGO	Project Name	GARNET MIXED USE
	BMP ID	IMP-T1 TO T-12 (AREA FOR EACH IMP)
Alternative Minimum Footprint Sizing Factor		**Worksheet B.5-3**

1	Area draining to the BMP	1017	sq. ft.
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	Load to Clog	2	lb/sq. ft.
4	Allowable Period to Accumulate Clogging Load (T_L)	10	years

Volume Weighted EMC Calculation

Land Use	Fraction of Total DCV	TSS EMC (mg/L)	Product
Single Family Residential	0	123	0
Commercial		128	0
Industrial	0	125	0
Education (Municipal)		132	0
Transportation		78	0
Multi-family Residential	1	40	40
Roof Runoff		14	0
Low Traffic Areas		50	0
Open Space		216	0
Other, specify:			0
Other, specify:			0
Other, specify:			0

5	Volume Weighted EMC (sum of all products)	40	mg/L

Sizing Factor for Clogging

6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."	0	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]	10.34	inches
8	Calculate the Average Annual Runoff (Line 7 x Line 1/12) x Line2	789	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10^6	2	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3	10	sq. ft.
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]	0.011	

Discussion:

Annual Precipitation obtained from San Diego County Water Authority

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-M1-M3 & M6-M7 (AREA FOR EACH IMP)	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	972	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	40	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	60	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	16	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	30	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	23	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-3)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	26	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	26	sq. ft.
23	Provided BMP Footprint	31	sq. ft.
24	Is Line 23 > Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-M1-M3 & M6-M7 (AREA FOR EACH IMP)	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	972	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	40	cu. ft.
BMP Parameters			
5	Footprint of the BMP	31	sq. ft.
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Media retained pore space [50% of (FC-WP)]	0.05	in/in
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Porosity of aggregate storage	0.4	in/in
Volume Retention Requirement			
10	Measured infiltration rate in the DMA	0.05	in/hr.
11	Factor of safety	2	
12	Reliable infiltration rate, for biofiltration BMP sizing [Line 10/ Line 11] Note: This worksheet is not applicable if Line 12 < 0.01 in/hr.	0.025	in/hr.
13	Average annual volume reduction target (Figure B.5-2) When Line 12 ≥ 0.01 in/hr. = Minimum (40, 166.9 x Line 12 +6.62)	10.8	%
14	Fraction of DCV to be retained (Figure B.5-3) $0.0000013 \times \text{Line } 13^3 - 0.000057 \times \text{Line } 13^2 + 0.0086 \times \text{Line } 13 - 0.014$	0.074	
15	Target volume retention [Line 14 x Line 4]	3	cu. ft.
Evapotranspiration: Average Annual Volume Retention			
16	Effective evapotranspiration depth [Line 6 x Line 7]	0.9	inches
17	Retained Pore Volume [(Line 16 x Line 5)/12]	2	cu. ft.
18	Fraction of DCV retained in pore spaces [Line 17/Line 4]	0.06	
19	Evapotranspiration average annual capture [ET nomographs in Figure B.5-5]	4.5	%
Infiltration: Average Annual Volume Retention			
20	Drawdown for infiltration storage [(Line 8 x Line 9)/Line 12]	48	hours
21	Equivalent DCV fraction from evapotranspiration (use Line 19 and Line 20 in Figure B.4-1; Refer to Appendix B.4.2.2)	0.03	
22	Infiltration volume storage [(Line 5 x Line 8 x Line 9)/12]	3	cu. ft.
23	Infiltration Storage Fraction of DCV [Line 22/Line 4]	0.08	
24	Total Equivalent Fraction of DCV [Line 21 + Line 23]	0.11	
25	Biofiltration BMP average annual capture [use Line 24 and 20 in Figure B.4-1]	15.04	%
Volume retention required from site design and other BMPs			
26	Fraction of DCV retained (Figure B.5-3) $0.0000013 \times \text{Line } 25^3 - 0.000057 \times \text{Line } 25^2 + 0.0086 \times \text{Line } 25 - 0.014$	0.107	
27	Remaining target DCV retention [(Line 14 – Line 26) x Line 4] Note: If Line 27 is equal to or smaller than 0 then the BMP meets the volume retention performance standard. If Line 27 is greater than 0, the applicant must implement site design and/or other BMPs within the DMA that will retain DCV equivalent to or greater than Line 27 to meet the volume retention performance standard	-1	cu. ft.
Volume Retention Performance Standard is Met			

The City of SAN DIEGO	Project Name	GARNET MIXED USE
	BMP ID	IMP-M1-M3 & M6-M7 (AREA FOR EA IMP)
Alternative Minimum Footprint Sizing Factor		**Worksheet B.5-3**

1	Area draining to the BMP	972	sq. ft.
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	Load to Clog	2	lb/sq. ft.
4	Allowable Period to Accumulate Clogging Load (T_L)	10	years

Volume Weighted EMC Calculation

Land Use	Fraction of Total DCV	TSS EMC (mg/L)	Product
Single Family Residential	0	123	0
Commercial		128	0
Industrial	0	125	0
Education (Municipal)		132	0
Transportation		78	0
Multi-family Residential	1	40	40
Roof Runoff		14	0
Low Traffic Areas		50	0
Open Space		216	0
Other, specify:			0
Other, specify:			0
Other, specify:			0

5	Volume Weighted EMC (sum of all products)	40	mg/L

Sizing Factor for Clogging

6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."	0	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]	10.34	inches
8	Calculate the Average Annual Runoff (Line 7 x Line 1/12) x Line2	754	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10^6	2	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3	9	sq. ft.
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]	0.011	

Discussion:

Annual Precipitation obtained from San Diego County Water Authority

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-M4	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	788	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	33	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	49	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	13	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	24	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	19	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-3)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	21	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	21	sq. ft.
23	Provided BMP Footprint	31	sq. ft.
24	Is Line 23 > Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-M4	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	788	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	33	cu. ft.
BMP Parameters			
5	Footprint of the BMP	31	sq. ft.
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Media retained pore space [50% of (FC-WP)]	0.05	in/in
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Porosity of aggregate storage	0.4	in/in
Volume Retention Requirement			
10	Measured infiltration rate in the DMA	0.05	in/hr.
11	Factor of safety	2	
12	Reliable infiltration rate, for biofiltration BMP sizing [Line 10/ Line 11] Note: This worksheet is not applicable if Line 12 < 0.01 in/hr.	0.025	in/hr.
13	Average annual volume reduction target (Figure B.5-2) When Line 12 ≥ 0.01 in/hr. = Minimum (40, 166.9 x Line 12 +6.62)	10.8	%
14	Fraction of DCV to be retained (Figure B.5-3) 0.0000013 x Line 13^3 - 0.000057 x Line 13^2 + 0.0086 x Line 13 - 0.014	0.074	
15	Target volume retention [Line 14 x Line 4]	2	cu. ft.
Evapotranspiration: Average Annual Volume Retention			
16	Effective evapotranspiration depth [Line 6 x Line 7]	0.9	inches
17	Retained Pore Volume [(Line 16 x Line 5)/12]	2	cu. ft.
18	Fraction of DCV retained in pore spaces [Line 17/Line 4]	0.07	
19	Evapotranspiration average annual capture [ET nomographs in Figure B.5-5]	5.2	%
Infiltration: Average Annual Volume Retention			
20	Drawdown for infiltration storage [(Line 8 x Line 9)/Line 12]	48	hours
21	Equivalent DCV fraction from evapotranspiration (use Line 19 and Line 20 in Figure B.4-1; Refer to Appendix B.4.2.2)	0.04	
22	Infiltration volume storage [(Line 5 x Line 8 x Line 9)/12]	3	cu. ft.
23	Infiltration Storage Fraction of DCV [Line 22/Line 4]	0.10	
24	Total Equivalent Fraction of DCV [Line 21 + Line 23]	0.14	
25	Biofiltration BMP average annual capture [use Line 24 and 20 in Figure B.4-1]	17.82	%
Volume retention required from site design and other BMPs			
26	Fraction of DCV retained (Figure B.5-3) 0.0000013 x Line 25^3 - 0.000057 x Line 25^2 + 0.0086 x Line 25 - 0.014	0.129	
27	Remaining target DCV retention [(Line 14 – Line 26) x Line 4] Note: If Line 27 is equal to or smaller than 0 then the BMP meets the volume retention performance standard. If Line 27 is greater than 0, the applicant must implement site design and/or other BMPs within the DMA that will retain DCV equivalent to or greater than Line 27 to meet the volume retention performance standard	-2	cu. ft.

Volume Retention Performance Standard is Met

The City of SAN DIEGO	Project Name	GARNET MIXED USE
	BMP ID	IMP-M4
Alternative Minimum Footprint Sizing Factor		**Worksheet B.5-3**

1	Area draining to the BMP	788	sq. ft.
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	Load to Clog	2	lb/sq. ft.
4	Allowable Period to Accumulate Clogging Load (T_L)	10	years

Volume Weighted EMC Calculation

Land Use	Fraction of Total DCV	TSS EMC (mg/L)	Product
Single Family Residential	0	123	0
Commercial		128	0
Industrial	0	125	0
Education (Municipal)		132	0
Transportation		78	0
Multi-family Residential	1	40	40
Roof Runoff		14	0
Low Traffic Areas		50	0
Open Space		216	0
Other, specify:			0
Other, specify:			0
Other, specify:			0

5	Volume Weighted EMC (sum of all products)	40	mg/L

Sizing Factor for Clogging

6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."	0	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]	10.34	inches
8	Calculate the Average Annual Runoff (Line 7 x Line 1/12) x Line2	611	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10^6	2	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3	8	sq. ft.
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]	0.011	

Discussion:

Annual Precipitation obtained from San Diego County Water Authority

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-M5	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	972	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	40	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	60	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	16	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	30	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	23	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-3)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	26	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	26	sq. ft.
23	Provided BMP Footprint	30	sq. ft.
24	Is Line 23 > Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-M5	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	972	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	40	cu. ft.
BMP Parameters			
5	Footprint of the BMP	30	sq. ft.
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Media retained pore space [50% of (FC-WP)]	0.05	in/in
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Porosity of aggregate storage	0.4	in/in
Volume Retention Requirement			
10	Measured infiltration rate in the DMA	0.05	in/hr.
11	Factor of safety	2	
12	Reliable infiltration rate, for biofiltration BMP sizing [Line 10/ Line 11] Note: This worksheet is not applicable if Line 12 < 0.01 in/hr.	0.025	in/hr.
13	Average annual volume reduction target (Figure B.5-2) When Line 12 ≥ 0.01 in/hr. = Minimum (40, 166.9 x Line 12 +6.62)	10.8	%
14	Fraction of DCV to be retained (Figure B.5-3) $0.0000013 \times \text{Line } 13^3 - 0.000057 \times \text{Line } 13^2 + 0.0086 \times \text{Line } 13 - 0.014$	0.074	
15	Target volume retention [Line 14 x Line 4]	3	cu. ft.
Evapotranspiration: Average Annual Volume Retention			
16	Effective evapotranspiration depth [Line 6 x Line 7]	0.9	inches
17	Retained Pore Volume [(Line 16 x Line 5)/12]	2	cu. ft.
18	Fraction of DCV retained in pore spaces [Line 17/Line 4]	0.06	
19	Evapotranspiration average annual capture [ET nomographs in Figure B.5-5]	4.5	%
Infiltration: Average Annual Volume Retention			
20	Drawdown for infiltration storage [(Line 8 x Line 9)/Line 12]	48	hours
21	Equivalent DCV fraction from evapotranspiration (use Line 19 and Line 20 in Figure B.4-1; Refer to Appendix B.4.2.2)	0.03	
22	Infiltration volume storage [(Line 5 x Line 8 x Line 9)/12]	3	cu. ft.
23	Infiltration Storage Fraction of DCV [Line 22/Line 4]	0.07	
24	Total Equivalent Fraction of DCV [Line 21 + Line 23]	0.10	
25	Biofiltration BMP average annual capture [use Line 24 and 20 in Figure B.4-1]	13.93	%
Volume retention required from site design and other BMPs			
26	Fraction of DCV retained (Figure B.5-3) $0.0000013 \times \text{Line } 25^3 - 0.000057 \times \text{Line } 25^2 + 0.0086 \times \text{Line } 25 - 0.014$	0.098	
27	Remaining target DCV retention [(Line 14 – Line 26) x Line 4] Note: If Line 27 is equal to or smaller than 0 then the BMP meets the volume retention performance standard. If Line 27 is greater than 0, the applicant must implement site design and/or other BMPs within the DMA that will retain DCV equivalent to or greater than Line 27 to meet the volume retention performance standard	-1	cu. ft.
Volume Retention Performance Standard is Met			

The City of SAN DIEGO	Project Name	GARNET MIXED USE
	BMP ID	IMP-M5
Alternative Minimum Footprint Sizing Factor		**Worksheet B.5-3**

1	Area draining to the BMP	972	sq. ft.
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	Load to Clog	2	lb/sq. ft.
4	Allowable Period to Accumulate Clogging Load (T_L)	10	years

Volume Weighted EMC Calculation

Land Use	Fraction of Total DCV	TSS EMC (mg/L)	Product
Single Family Residential	0	123	0
Commercial		128	0
Industrial	0	125	0
Education (Municipal)		132	0
Transportation		78	0
Multi-family Residential	1	40	40
Roof Runoff		14	0
Low Traffic Areas		50	0
Open Space		216	0
Other, specify:			0
Other, specify:			0
Other, specify:			0

5	Volume Weighted EMC (sum of all products)	40	mg/L

Sizing Factor for Clogging

6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."	0	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]	10.34	inches
8	Calculate the Average Annual Runoff (Line 7 x Line 1/12) x Line2	754	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10^6	2	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3	9	sq. ft.
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]	0.011	

Discussion:

Annual Precipitation obtained from San Diego County Water Authority

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-M8	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	756	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	31	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	47	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	12	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	23	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	18	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-3)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	20	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	20	sq. ft.
23	Provided BMP Footprint	31	sq. ft.
24	Is Line 23 > Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO

	Project Name	GARNET MIXED USE	
	BMP ID	IMP-M8	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	756	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	31	cu. ft.
BMP Parameters			
5	Footprint of the BMP	31	sq. ft.
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Media retained pore space [50% of (FC-WP)]	0.05	in/in
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Porosity of aggregate storage	0.4	in/in
Volume Retention Requirement			
10	Measured infiltration rate in the DMA	0.05	in/hr.
11	Factor of safety	2	
12	Reliable infiltration rate, for biofiltration BMP sizing [Line 10/ Line 11] Note: This worksheet is not applicable if Line 12 < 0.01 in/hr.	0.025	in/hr.
13	Average annual volume reduction target (Figure B.5-2) When Line 12 ≥ 0.01 in/hr. = Minimum (40, 166.9 x Line 12 +6.62)	10.8	%
14	Fraction of DCV to be retained (Figure B.5-3) $0.0000013 \times \text{Line } 13^3 - 0.000057 \times \text{Line } 13^2 + 0.0086 \times \text{Line } 13 - 0.014$	0.074	
15	Target volume retention [Line 14 x Line 4]	2	cu. ft.
Evapotranspiration: Average Annual Volume Retention			
16	Effective evapotranspiration depth [Line 6 x Line 7]	0.9	inches
17	Retained Pore Volume [(Line 16 x Line 5)/12]	2	cu. ft.
18	Fraction of DCV retained in pore spaces [Line 17/Line 4]	0.07	
19	Evapotranspiration average annual capture [ET nomographs in Figure B.5-5]	5.2	%
Infiltration: Average Annual Volume Retention			
20	Drawdown for infiltration storage [(Line 8 x Line 9)/Line 12]	48	hours
21	Equivalent DCV fraction from evapotranspiration (use Line 19 and Line 20 in Figure B.4-1; Refer to Appendix B.4.2.2)	0.04	
22	Infiltration volume storage [(Line 5 x Line 8 x Line 9)/12]	3	cu. ft.
23	Infiltration Storage Fraction of DCV [Line 22/Line 4]	0.10	
24	Total Equivalent Fraction of DCV [Line 21 + Line 23]	0.14	
25	Biofiltration BMP average annual capture [use Line 24 and 20 in Figure B.4-1]	17.82	%
Volume retention required from site design and other BMPs			
26	Fraction of DCV retained (Figure B.5-3) $0.0000013 \times \text{Line } 25^3 - 0.000057 \times \text{Line } 25^2 + 0.0086 \times \text{Line } 25 - 0.014$	0.129	
27	Remaining target DCV retention [(Line 14 – Line 26) x Line 4] Note: If Line 27 is equal to or smaller than 0 then the BMP meets the volume retention performance standard. If Line 27 is greater than 0, the applicant must implement site design and/or other BMPs within the DMA that will retain DCV equivalent to or greater than Line 27 to meet the volume retention performance standard	-2	cu. ft.

Volume Retention Performance Standard is Met

The City of SAN DIEGO	Project Name	GARNET MIXED USE
	BMP ID	IMP-M8
Alternative Minimum Footprint Sizing Factor		**Worksheet B.5-3**

1	Area draining to the BMP	756	sq. ft.
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	Load to Clog	2	lb/sq. ft.
4	Allowable Period to Accumulate Clogging Load (T_L)	10	years

Volume Weighted EMC Calculation

Land Use	Fraction of Total DCV	TSS EMC (mg/L)	Product
Single Family Residential	0	123	0
Commercial		128	0
Industrial	0	125	0
Education (Municipal)		132	0
Transportation		78	0
Multi-family Residential	1	40	40
Roof Runoff		14	0
Low Traffic Areas		50	0
Open Space		216	0
Other, specify:			0
Other, specify:			0
Other, specify:			0

5	Volume Weighted EMC (sum of all products)	40	mg/L

Sizing Factor for Clogging

6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."	0	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]	10.34	inches
8	Calculate the Average Annual Runoff (Line 7 x Line 1/12) x Line2	586	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10^6	1	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3	7	sq. ft.
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]	0.011	

Discussion:

Annual Precipitation obtained from San Diego County Water Authority

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-EB	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	3234	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	133	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	200	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	53	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	100	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	77	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-3)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	87	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	87	sq. ft.
23	Provided BMP Footprint	178	sq. ft.
24	Is Line 23 > Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO

Project Name	GARNET MIXED USE
BMP ID	IMP-EB

Sizing Method for Volume Retention Criteria		Worksheet B.5-2	
1	Area draining to the BMP	3234	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	133	cu. ft.
BMP Parameters			
5	Footprint of the BMP	187	sq. ft.
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Media retained pore space [50% of (FC-WP)]	0.05	in/in
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Porosity of aggregate storage	0.4	in/in
Volume Retention Requirement			
10	Measured infiltration rate in the DMA	0.05	in/hr.
11	Factor of safety	2	
12	Reliable infiltration rate, for biofiltration BMP sizing [Line 10/ Line 11] Note: This worksheet is not applicable if Line 12 < 0.01 in/hr.	0.025	in/hr.
13	Average annual volume reduction target (Figure B.5-2) When Line 12 ≥ 0.01 in/hr. = Minimum (40, 166.9 x Line 12 +6.62)	10.8	%
14	Fraction of DCV to be retained (Figure B.5-3) $0.0000013 \times \text{Line } 13^3 - 0.000057 \times \text{Line } 13^2 + 0.0086 \times \text{Line } 13 - 0.014$	0.074	
15	Target volume retention [Line 14 x Line 4]	10	cu. ft.
Evapotranspiration: Average Annual Volume Retention			
16	Effective evapotranspiration depth [Line 6 x Line 7]	0.9	inches
17	Retained Pore Volume [(Line 16 x Line 5)/12]	14	cu. ft.
18	Fraction of DCV retained in pore spaces [Line 17/Line 4]	0.11	
19	Evapotranspiration average annual capture [ET nomographs in Figure B.5-5]	7.9	%
Infiltration: Average Annual Volume Retention			
20	Drawdown for infiltration storage [(Line 8 x Line 9)/Line 12]	48	hours
21	Equivalent DCV fraction from evapotranspiration (use Line 19 and Line 20 in Figure B.4-1; Refer to Appendix B.4.2.2)	0.06	
22	Infiltration volume storage [(Line 5 x Line 8 x Line 9)/12]	19	cu. ft.
23	Infiltration Storage Fraction of DCV [Line 22/Line 4]	0.14	
24	Total Equivalent Fraction of DCV [Line 21 + Line 23]	0.20	
25	Biofiltration BMP average annual capture [use Line 24 and 20 in Figure B.4-1]	24.47	%
Volume retention required from site design and other BMPs			
26	Fraction of DCV retained (Figure B.5-3) $0.0000013 \times \text{Line } 25^3 - 0.000057 \times \text{Line } 25^2 + 0.0086 \times \text{Line } 25 - 0.014$	0.181	
27	Remaining target DCV retention [(Line 14 – Line 26) x Line 4] Note: If Line 27 is equal to or smaller than 0 then the BMP meets the volume retention performance standard. If Line 27 is greater than 0, the applicant must implement site design and/or other BMPs within the DMA that will retain DCV equivalent to or greater than Line 27 to meet the volume retention performance standard	-14	cu. ft.

Volume Retention Performance Standard is Met

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP-EB	
Alternative Minimum Footprint Sizing Factor		**Worksheet B.5-3**	
1	Area draining to the BMP	3234	sq. ft.
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	Load to Clog	2	lb/sq. ft.
4	Allowable Period to Accumulate Clogging Load (T_L)	10	years

Volume Weighted EMC Calculation

Land Use	Fraction of Total DCV	TSS EMC (mg/L)	Product
Single Family Residential	0	123	0
Commercial		128	0
Industrial	0	125	0
Education (Municipal)		132	0
Transportation		78	0
Multi-family Residential	1	40	40
Roof Runoff		14	0
Low Traffic Areas		50	0
Open Space		216	0
Other, specify:			0
Other, specify:			0
Other, specify:			0

5	Volume Weighted EMC (sum of all products)	40	mg/L

Sizing Factor for Clogging

6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."	0	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]	10.34	inches
8	Calculate the Average Annual Runoff (Line 7 x Line 1/12) x Line2	2508	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10^6	6	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3	31	sq. ft.
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]	0.011	

Discussion:

Annual Precipitation obtained from San Diego County Water Authority

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP W (treats DMA-DWN,DWS & P)	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	10194	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	421	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	631	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	166	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	315	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	243	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-3)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	275	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	275	sq. ft.
23	Provided BMP Footprint	360	sq. ft.
24	Is Line 23 > Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO	Project Name	GARNET MIXED USE	
	BMP ID	IMP W (treats DMA-DWN,DWS & P)	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	10194	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	85th percentile 24-hour rainfall depth	0.55	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	421	cu. ft.
BMP Parameters			
5	Footprint of the BMP	360	sq. ft.
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Media retained pore space [50% of (FC-WP)]	0.05	in/in
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Porosity of aggregate storage	0.4	in/in
Volume Retention Requirement			
10	Measured infiltration rate in the DMA	0.05	in/hr.
11	Factor of safety	2	
12	Reliable infiltration rate, for biofiltration BMP sizing [Line 10/ Line 11] Note: This worksheet is not applicable if Line 12 < 0.01 in/hr.	0.025	in/hr.
13	Average annual volume reduction target (Figure B.5-2) When Line 12 ≥ 0.01 in/hr. = Minimum (40, 166.9 x Line 12 +6.62)	10.8	%
14	Fraction of DCV to be retained (Figure B.5-3) $0.0000013 \times \text{Line } 13^3 - 0.000057 \times \text{Line } 13^2 + 0.0086 \times \text{Line } 13 - 0.014$	0.074	
15	Target volume retention [Line 14 x Line 4]	31	cu. ft.
Evapotranspiration: Average Annual Volume Retention			
16	Effective evapotranspiration depth [Line 6 x Line 7]	0.9	inches
17	Retained Pore Volume [(Line 16 x Line 5)/12]	27	cu. ft.
18	Fraction of DCV retained in pore spaces [Line 17/Line 4]	0.06	
19	Evapotranspiration average annual capture [ET nomographs in Figure B.5-5]	4.5	%
Infiltration: Average Annual Volume Retention			
20	Drawdown for infiltration storage [(Line 8 x Line 9)/Line 12]	48	hours
21	Equivalent DCV fraction from evapotranspiration (use Line 19 and Line 20 in Figure B.4-1; Refer to Appendix B.4.2.2)	0.03	
22	Infiltration volume storage [(Line 5 x Line 8 x Line 9)/12]	36	cu. ft.
23	Infiltration Storage Fraction of DCV [Line 22/Line 4]	0.09	
24	Total Equivalent Fraction of DCV [Line 21 + Line 23]	0.12	
25	Biofiltration BMP average annual capture [use Line 24 and 20 in Figure B.4-1]	16.14	%
Volume retention required from site design and other BMPs			
26	Fraction of DCV retained (Figure B.5-3) $0.0000013 \times \text{Line } 25^3 - 0.000057 \times \text{Line } 25^2 + 0.0086 \times \text{Line } 25 - 0.014$	0.115	
27	Remaining target DCV retention [(Line 14 – Line 26) x Line 4] Note: If Line 27 is equal to or smaller than 0 then the BMP meets the volume retention performance standard. If Line 27 is greater than 0, the applicant must implement site design and/or other BMPs within the DMA that will retain DCV equivalent to or greater than Line 27 to meet the volume retention performance standard	-17	cu. ft.

Volume Retention Performance Standard is Met

The City of SAN DIEGO	Project Name	GARNET MIXED USE
	BMP ID	IMP W (treats DMA-DWN,DWS & P)
Alternative Minimum Footprint Sizing Factor		**Worksheet B.5-3**

1	Area draining to the BMP	10194	sq. ft.
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
3	Load to Clog	2	lb/sq. ft.
4	Allowable Period to Accumulate Clogging Load (T_L)	10	years

Volume Weighted EMC Calculation

Land Use	Fraction of Total DCV	TSS EMC (mg/L)	Product
Single Family Residential	0	123	0
Commercial		128	0
Industrial	0	125	0
Education (Municipal)		132	0
Transportation		78	0
Multi-family Residential	1	40	40
Roof Runoff		14	0
Low Traffic Areas		50	0
Open Space		216	0
Other, specify:			0
Other, specify:			0
Other, specify:			0

5	Volume Weighted EMC (sum of all products)	40	mg/L

Sizing Factor for Clogging

6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."	0	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]	10.34	inches
8	Calculate the Average Annual Runoff (Line 7 x Line 1/12) x Line2	7905	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10^6	20	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3	99	sq. ft.
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]	0.011	

Discussion:

Annual Precipitation obtained from San Diego County Water Authority


PASEO MEWS
Hydromodification Exemption Exhibit
Legend
Hornblend St & Bayard St
Mission Bl
Pacific Ocean
Hornblend St & Bayard St
Grand Ave
Garnet Ave
Google earth
© 2016 Google
© 2016 INEGI
300 ft
N

E.12. PR-1 Biofiltration with Partial Retention

Location: 805 and Bonita Road, Chula Vista, CA.

MS4 Permit Category

NA

Manual Category

Partial Retention

Applicable Performance Standard

Pollutant Control

Flow Control

Primary Benefits

Volume Reduction

Treatment

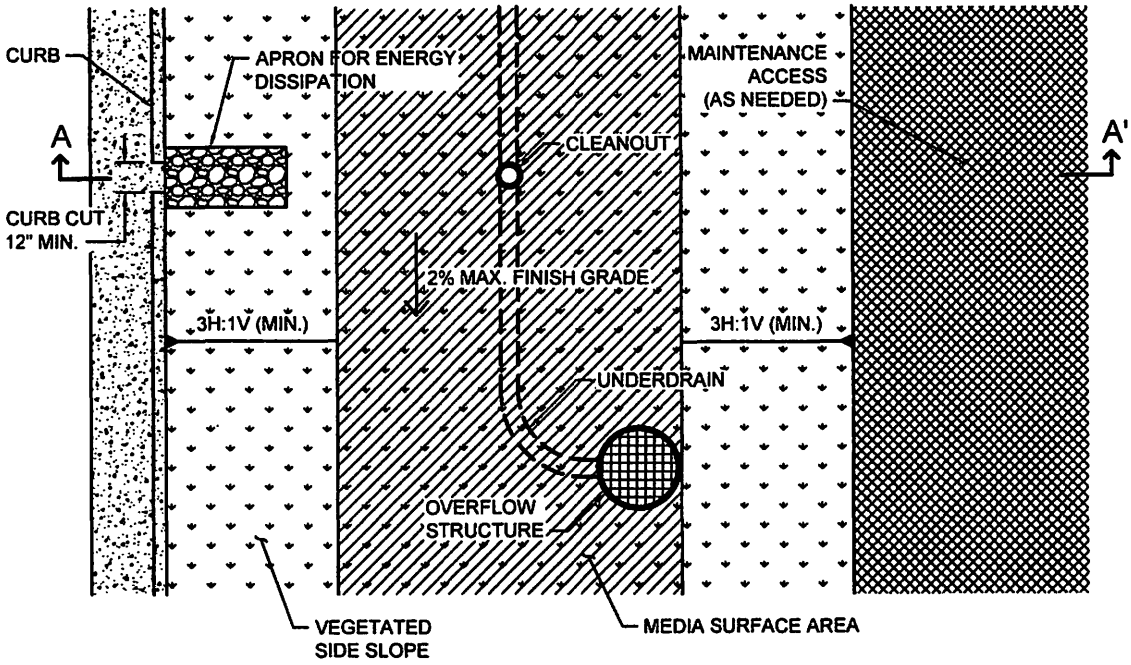
Peak Flow Attenuation

Description

Biofiltration with partial retention (partial infiltration and biofiltration) facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to infiltrating into native soils, discharge via underdrain, or overflow to the downstream conveyance system. Where feasible, these BMPs have an elevated underdrain discharge point that creates storage capacity in the aggregate storage layer. Biofiltration with partial retention facilities are commonly incorporated into the site within parking lot landscaping, along roadsides, and in open spaces. They can be constructed in ground or partially aboveground, such as planter boxes with open bottoms to allow infiltration. Treatment is achieved through filtration, sedimentation, sorption, infiltration, biochemical processes and plant uptake.

Typical biofiltration with partial retention components include:

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



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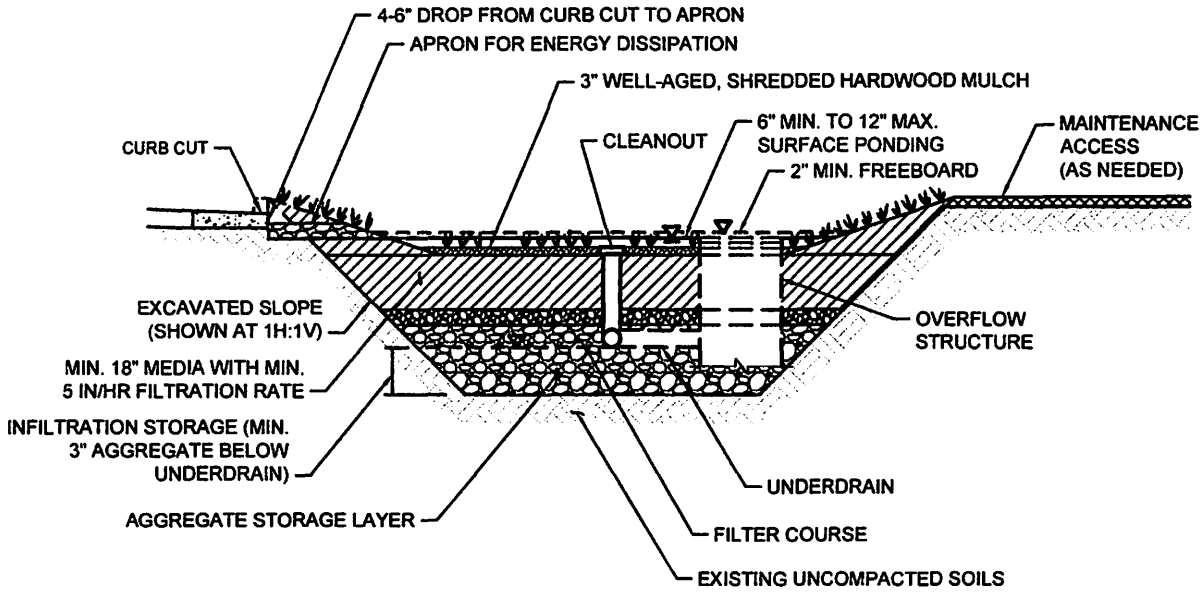

SECTION A-A'
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Figure E.12-E.12-1: Typical plan and Section view of a Biofiltration with Partial Retention BMP

Design Adaptations for Project Goals

Partial infiltration BMP with biofiltration treatment for storm water pollutant control. Biofiltration with partial retention can be designed so that a portion of the DCV is infiltrated by

providing infiltration storage below the underdrain invert. The infiltration storage depth should be determined by the volume that can be reliably infiltrated within drawdown time limitations. Water discharged through the underdrain is considered biofiltration treatment. Storage provided above the underdrain within surface ponding, media, and aggregate storage is included in the biofiltration treatment volume.

Integrated storm water flow control and pollutant control configuration. The system can be designed to provide flow rate and duration control by primarily providing increased surface ponding and/or having a deeper aggregate storage layer. This will allow for significant detention storage, which can be controlled via inclusion of an orifice in an outlet structure at the downstream end of the underdrain.

Design Criteria and Considerations

Biofiltration with partial retention must meet the following design criteria and considerations. Deviations from the below criteria may be approved at the discretion of the City Engineer if it is determined to be appropriate:

	Siting and Design	Intent/Rationale
□	Placement observes geotechnical recommendations regarding potential hazards (e.g., slope stability, landslides, liquefaction zones) and setbacks (e.g., slopes, foundations, utilities).	Must not negatively impact existing site geotechnical concerns.
□	Selection and design of basin is based on infiltration feasibility criteria and appropriate design infiltration rate (See Appendix C and D).	Must operate as a partial infiltration design and must be supported by drainage area and in-situ infiltration rate feasibility findings.
□	Contributing tributary area shall be ≤ 5 acres (≤ 1 acre preferred).	Bigger BMPs require additional design features for proper performance. Contributing tributary area greater than 5 acres may be allowed at the discretion of the City Engineer if the following conditions are met: 1) incorporate design features (e.g. flow spreaders) to minimizing short circuiting of flows in the BMP and 2) incorporate additional design features requested by the City Engineer for proper performance of the regional BMP.
□	Finish grade of the facility is ≤ 2%.	Flatter surfaces reduce erosion and channelization within the facility.
Surface Ponding		
□	Surface ponding is limited to a 24-hour drawdown time.	Surface ponding limited to 24 hours for plant health. Surface ponding drawdown time greater than 24-hours but less than 96 hours may be allowed at the discretion of the City Engineer if certified by a landscape architect or agronomist.

	Siting and Design	Intent/Rationale
☐	Surface ponding depth is ≥ 6 and ≤ 12 inches.	Surface ponding capacity lowers subsurface storage requirements. Deep surface ponding raises safety concerns. Surface ponding depth greater than 12 inches (for additional pollutant control or surface outlet structures or flow-control orifices) may be allowed at the discretion of the City Engineer if the following conditions are met: 1) surface ponding depth drawdown time is less than 24 hours; and 2) safety issues and fencing requirements are considered (typically ponding greater than 18" will require a fence and/or flatter side slopes) and 3) potential for elevated clogging risk is considered.
☐	A minimum of 2 inches of freeboard is provided.	Freeboard provides room for head over overflow structures and minimizes risk of uncontrolled surface discharge.
☐	Side slopes are stabilized with vegetation and are = 3H:1V or shallower.	Gentler side slopes are safer, less prone to erosion, able to establish vegetation more quickly and easier to maintain.
Vegetation		
☐	Plantings are suitable for the climate and expected ponding depth. A plant list to aid in selection can be found in Appendix E.20	Plants suited to the climate and ponding depth are more likely to survive.
☐	An irrigation system with a connection to water supply should be provided as needed.	Seasonal irrigation might be needed to keep plants healthy.
Mulch (Mandatory)		
☐	A minimum of 3 inches of well-aged, shredded hardwood mulch that has been stockpiled or stored for at least 12 months is provided. Mulch must be non-floating to avoid clogging of overflow structure.	Mulch will suppress weeds and maintain moisture for plant growth. Aging mulch kills pathogens and weed seeds and allows the beneficial microbes to multiply.
Media Layer		

	Siting and Design	Intent/Rationale
□	Media maintains a minimum filtration rate of 5 in/hr over lifetime of facility. Additional Criteria for media hydraulic conductivity described in the bioretention soil media model specification (Appendix F.4)	A filtration rate of at least 5 inches per hour allows soil to drain between events, and allows flows to relatively quickly enter the aggregate storage layer, thereby minimizing bypass. The initial rate should be higher than long term target rate to account for clogging over time. However an excessively high initial rate can have a negative impact on treatment performance, therefore an upper limit is needed.
□	Media is a minimum 18 inches deep, meeting the following media specifications: Model bioretention soil media specification provided in Appendix F.4 or County of San Diego Low Impact Development Handbook: Appendix G - Bioretention Soil Specification (June 2014, unless superseded by more recent edition). Alternatively, for proprietary designs and custom media mixes not meeting the media specifications, the media meets the pollutant treatment performance criteria in Section F.1.	A deep media layer provides additional filtration and supports plants with deeper roots. Standard specifications shall be followed. For non-standard or proprietary designs, compliance with Appendix F.1 ensures that adequate treatment performance will be provided.
□	Media surface area is 3% of contributing area times adjusted runoff factor or greater. Unless demonstrated that the BMP surface area can be smaller than 3%.	Greater surface area to tributary area ratios: a) maximizes volume retention as required by the MS4 Permit and b) decrease loading rates per square foot and therefore increase longevity. Adjusted runoff factor is to account for site design BMPs implemented upstream of the BMP (such as rain barrels, impervious area dispersion, etc.). Refer to Appendix B.2 guidance. Use Worksheet B.5-1 Line 26 to estimate the minimum surface area required per this criteria.
□	Where receiving waters are impaired or have a TMDL for nutrients, the system is designed with nutrient sensitive media design (see fact sheet BF-2).	Potential for pollutant export is partly a function of media composition; media design must minimize potential for export of nutrients, particularly where receiving waters are impaired for nutrients.
Filter Course Layer		

	Siting and Design	Intent/Rationale
☐	A filter course is used to prevent migration of fines through layers of the facility. Filter fabric is not used.	Migration of media can cause clogging of the aggregate storage layer void spaces or subgrade and can result in poor water quality performance for turbidity and suspended solids. Filter fabric is more likely to clog.
☐	Filter course is washed and free of fines.	Washing aggregate will help eliminate fines that could clog the facility
☐	To reduce clogging potential, a two-layer filter course (aka choking stone system) is used consisting of one 3" layer of clean and washed ASTM 33 Fine Aggregate Sand overlying a 3" layer of ASTM No 8 Stone (Appendix F.5)	This specification has been developed to maintain permeability while limiting the migration of media material into the stone reservoir and underdrain system.
Aggregate Storage Layer		
☐	ASTM #57 open graded stone is used for the storage layer and a two layer filter course (detailed above) is used above this layer	This layer provides additional storage capacity. ASTM #8 stone provides an acceptable choking/bridging interface with the particles in ASTM #57 stone.
☐	Maximum aggregate storage layer depth below the underdrain invert is determined based on the infiltration storage volume that will infiltrate within a 36-hour drawdown time.	A maximum drawdown time is needed for vector control and to facilitate providing storm water storage for the next storm event.
Inflow, Underdrain, and Outflow Structures		
☐	Inflow, underdrains and outflow structures are accessible for inspection and maintenance.	Maintenance will prevent clogging and ensure proper operation of the flow control structures.
☐	Inflow velocities are limited to 3 ft/s or less or use energy dissipation methods. (e.g., riprap, level spreader) for concentrated inflows.	High inflow velocities can cause erosion, scour and/or channeling.
☐	Curb cut inlets are at least 12 inches wide, have a 4-6 inch reveal (drop) and an apron and energy dissipation as needed.	Inlets must not restrict flow and apron prevents blockage from vegetation as it grows in. Energy dissipation prevents erosion.
☐	Underdrain outlet elevation should be a minimum of 3 inches above the bottom elevation of the aggregate storage layer.	A minimal separation from subgrade or the liner lessens the risk of fines entering the underdrain and can improve hydraulic performance by allowing perforations to remain unblocked.
☐	Minimum underdrain diameter is 8 inches.	Smaller diameter underdrains are prone to clogging.

	Siting and Design	Intent/Rationale
□	Underdrains should be affixed with an upturned elbow to an elevation at least 9 to 12 inches above the invert of the underdrain.	An upturned elbow reduces velocity in the underdrain pipe and can help reduce mobilization of sediments from the underdrain and media bed.
□	Underdrains are made of slotted, PVC pipe conforming to ASTM D 3034 or equivalent or corrugated, HDPE pipe conforming to AASHTO 252M or equivalent.	Slotted underdrains provide greater intake capacity, clog resistant drainage, and reduced entrance velocity into the pipe, thereby reducing the chances of solids migration.
□	An underdrain cleanout with a minimum 8-inch diameter and lockable cap is placed every 50 feet as required based on underdrain length.	Properly spaced cleanouts will facilitate underdrain maintenance.
□	Overflow is safely conveyed to a downstream storm drain system or discharge point. Size overflow structure to pass 100-year peak flow for on-line infiltration basins and water quality peak flow for off-line basins.	Planning for overflow lessens the risk of property damage due to flooding.

Conceptual Design and Sizing Approach for Storm Water Pollutant Control Only

To design biofiltration with partial retention and an underdrain for storm water pollutant control only (no flow control required), the following steps should be taken:

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Calculate the DCV per Appendix B based on expected site design runoff for tributary areas.
3. Generalized sizing procedure is presented in Appendix B.5. The surface ponding should be verified to have a maximum 24-hour drawdown time. Surface ponding drawdown time greater than 24-hours but less than 96 hours may be allowed at the discretion of the City Engineer if certified by a landscape architect or agronomist.

Conceptual Design and Sizing Approach when Storm Water Flow Control is Applicable

Control of flow rates and/or durations will typically require significant surface ponding and/or aggregate storage volumes, and therefore the following steps should be taken prior to determination of storm water pollutant control design. Pre-development and allowable post-project flow rates and durations should be determined as discussed in Chapter 6 of the manual.

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Iteratively determine the facility footprint area, surface ponding and/or aggregate storage layer depth required to provide detention and/or infiltration storage to reduce flow rates and durations to allowable limits. Flow rates and durations can be controlled from detention

storage by altering outlet structure orifice size(s) and/or water control levels. Multi-level orifices can be used within an outlet structure to control the full range of flows.

3. If biofiltration with partial retention cannot fully provide the flow rate and duration control required by this manual, an upstream or downstream structure with significant storage volume such as an underground vault can be used to provide remaining controls.
4. After biofiltration with partial retention has been designed to meet flow control requirements, calculations must be completed to verify if storm water pollutant control requirements to treat the DCV have been met.

E.11. INF-3 Permeable Pavement (Pollutant Control)

Location: Kellogg Park, San Diego, California

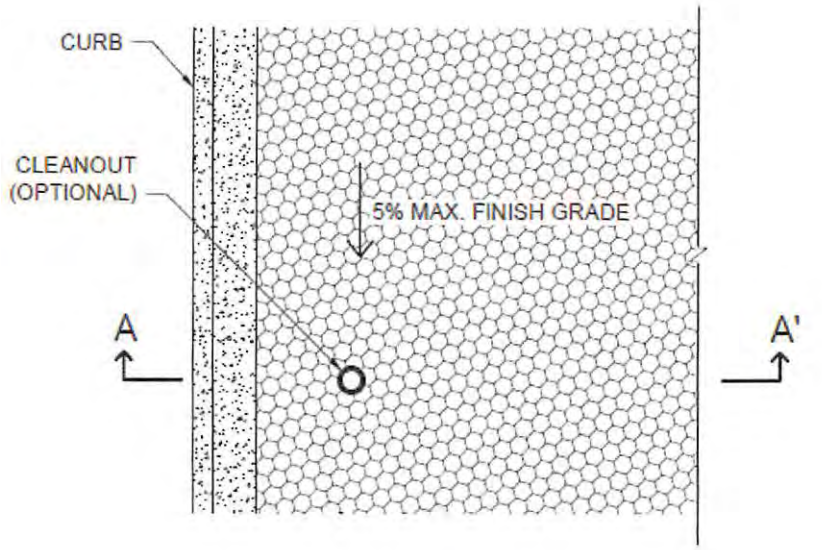
MS4 Permit Category
Retention
Flow-thru Treatment Control
Manual Category
Infiltration
Flow-thru Treatment Control
Applicable Performance Standard
Pollutant Control
Flow Control
Primary Benefits
Volume Reduction
Peak Flow Attenuation

Description

Permeable pavement is pavement that allows for percolation through void spaces in the pavement surface into subsurface layers. The subsurface layers are designed to provide storage of storm water runoff so that outflows, primarily via infiltration into subgrade soils or release to the downstream conveyance system, can be at controlled rates. Varying levels of storm water treatment and flow control can be provided depending on the size of the permeable pavement system relative to its drainage area, the underlying infiltration rates, and the configuration of outflow controls. Pollutant control permeable pavement is designed to receive runoff from a larger tributary area than site design permeable pavement (see SD-6B). Pollutant control is provided via infiltration, filtration, sorption, sedimentation, and biodegradation processes. **Permeable pavements proposed as a retention or partial retention BMP should not have an impermeable liner**.

Typical permeable pavement components include, from top to bottom:

- Permeable surface layer
- Bedding layer for permeable surface
- Aggregate storage layer with optional underdrain(s)
- Optional final filter course layer over uncompacted existing subgrade



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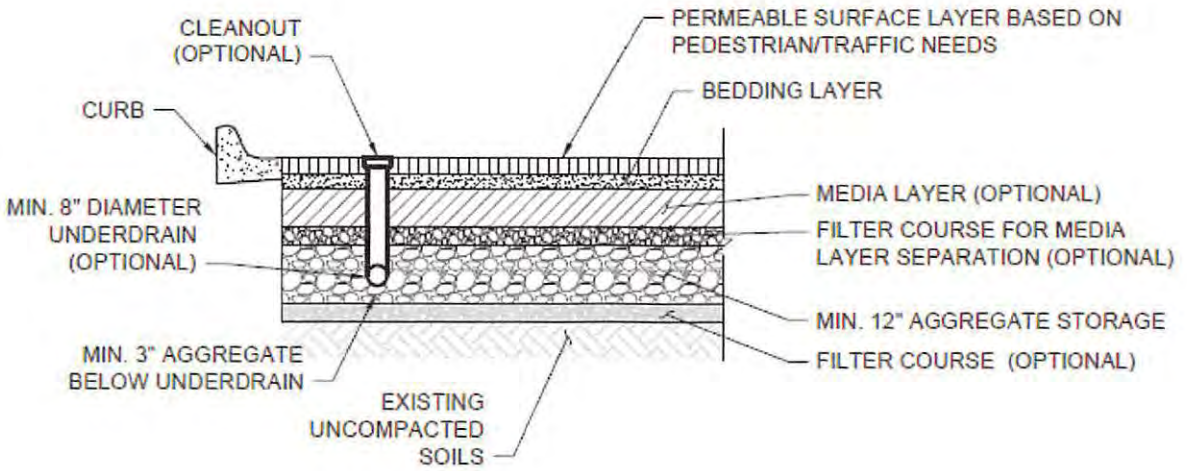

SECTION A-A'
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Figure E.11-E.11-1: Typical plan and Section view of a Permeable Pavement BMP

Subcategories of permeable pavement include modular paver units or paver blocks, pervious concrete, porous asphalt, and turf pavers. These subcategory variations differ in the material used for the permeable surface layer but have similar functions and characteristics below this layer.

Design Adaptations for Project Goals

Site design BMP to reduce impervious area and DCV. See site design option SD-6B.

Full infiltration BMP for storm water pollutant control. Permeable pavement without an underdrain and without impermeable liners can be used as a pollutant control BMP, designed to infiltrate runoff from direct rainfall as well as runoff from adjacent areas that are tributary to the pavement. The system must be designed with an infiltration storage volume (a function of the aggregate storage volume) equal to the full DCV and able to meet drawdown time limitations.

Partial infiltration BMP with flow-thru treatment for storm water pollutant control. Permeable pavement can be designed so that a portion of the DCV is infiltrated by providing an underdrain with infiltration storage below the underdrain invert. The infiltration storage depth should be determined by the volume that can be reliably infiltrated within drawdown time limitations. Water discharged through the underdrain is considered flow-thru treatment and is not considered biofiltration treatment. Storage provided above the underdrain invert is included in the flow-thru treatment volume.

Flow-thru treatment BMP for storm water pollutant control. The system may be lined and/or installed over impermeable native soils with an underdrain provided at the bottom to carry away filtered runoff. Water quality treatment is provided via unit treatment processes other than infiltration. This configuration is considered to provide flow-thru treatment, not biofiltration treatment. Significant aggregate storage provided above the underdrain invert can provide detention storage, which can be controlled via inclusion of an orifice in an outlet structure at the downstream end of the underdrain. **PDPs have the option to add saturated storage to the flow-thru configuration in order to reduce the DCV that the BMP is required to treat.** Saturated storage can be added to this design by including an upturned elbow installed at the downstream end of the underdrain or via an internal weir structure designed to maintain a specific water level elevation. The DCV can be reduced by the amount of saturated storage provided.

Integrated storm water flow control and pollutant control configuration. With any of the above configurations, the system can be designed to provide flow rate and duration control. This may include having a deeper aggregate storage layer that allows for significant detention storage above the underdrain, which can be further controlled via inclusion of an outlet structure at the downstream end of the underdrain.

Design Criteria and Considerations

Permeable pavements must meet the following design criteria. Deviations from the below criteria may be approved at the discretion of the City Engineer if it is determined to be appropriate:

	Siting and Design	Intent/Rationale
□	Placement observes geotechnical recommendations regarding potential hazards (e.g., slope stability, landslides, liquefaction zones) and setbacks (e.g., slopes, foundations, utilities).	Must not negatively impact existing site geotechnical concerns.
□	Selection must be based on infiltration feasibility criteria.	Full or partial infiltration designs must be supported by drainage area feasibility findings.

	Siting and Design	Intent/Rationale
☐	An impermeable liner or other hydraulic restriction layer is included if site constraints indicate that infiltration should not be allowed.	Lining prevents storm water from impacting groundwater and/or sensitive environmental or geotechnical features. Incidental infiltration, when allowable, can aid in pollutant removal and groundwater recharge.
☐	Permeable pavement is not placed in an area with significant overhanging trees or other vegetation.	Leaves and organic debris can clog the pavement surface.
☐	For pollutant control permeable pavement, the ratio of the total drainage area (including the permeable pavement) to the permeable pavement should not exceed 4:1.	Higher ratios increase the potential for clogging but may be acceptable for relatively clean tributary areas.
☐	Finish grade of the permeable pavement has a slope ≤ 5%.	Flatter surfaces facilitate increased runoff capture.
☐	Minimum depth to groundwater and bedrock ≥ 10 ft.	A minimum separation facilitates infiltration and lessens the risk of negative groundwater impacts.
☐	Contributing tributary area includes effective sediment source control and/or pretreatment measures such as raised curbed or grass filter strips.	Sediment can clog the pavement surface.
☐	Direct discharges to permeable pavement are only from downspouts carrying "clean" roof runoff that are equipped with filters to remove gross solids.	Roof runoff typically carries less sediment than runoff from other impervious surfaces and is less likely to clog the pavement surface.
Permeable Surface Layer		
☐	Permeable surface layer type is appropriately chosen based on pavement use and expected vehicular loading.	Pavement may wear more quickly if not durable for expected loads or frequencies.
☐	Permeable surface layer type is appropriate for expected pedestrian traffic.	Expected demographic and accessibility needs (e.g., adults, children, seniors, runners, high-heeled shoes, wheelchairs, strollers, bikes) requires selection of appropriate surface layer type that will not impede pedestrian needs.
Bedding Layer for Permeable Surface		

	Siting and Design	Intent/Rationale
□	Bedding thickness and material is appropriate for the chosen permeable surface layer type.	Porous asphalt requires a 2- to 4-inch layer of asphalt and a 1- to 2-inch layer of choker course (single-sized crushed aggregate, one-half inch) to stabilize the surface. Pervious concrete also requires an aggregate course of clean gravel or crushed stone with a minimum amount of fines. Permeable Interlocking Concrete Paver requires 1 or 2 inches of sand or No. 8 aggregate to allow for leveling of the paver blocks. Similar to Permeable Interlocking Concrete Paver, plastic grid systems also require a 1- to 2-inch bedding course of either gravel or sand. For Permeable Interlocking Concrete Paver and plastic grid systems, if sand is used, a geotextile should be used between the sand course and the reservoir media to prevent the sand from migrating into the stone media.
□	Aggregate used for bedding layer is washed prior to placement.	Washing aggregate will help eliminate fines that could clog the permeable pavement system aggregate storage layer void spaces or underdrain.
Media Layer (Optional) –used between bedding layer and aggregate storage layer to provide pollutant treatment control		
□	The pollutant removal performance of the media layer is documented by the applicant.	Media used for BMP design should be shown via research or testing to be appropriate for expected pollutants of concern and flow rates.
□	A filter course is provided to separate the media layer from the aggregate storage layer.	Migration of media can cause clogging of the aggregate storage layer void spaces or underdrain.
□	If a filter course is used, calculations assessing suitability for particle migration prevention have been completed.	Gradation relationship between layers can evaluate factors (e.g., bridging, permeability, and uniformity) to determine if particle sizing is appropriate or if an intermediate layer is needed.
□	Consult permeable pavement manufacturer to verify that media layer provides required structural support.	Media must not compromise the structural integrity or intended uses of the permeable pavement surface.
Aggregate Storage Layer		

	Siting and Design	Intent/Rationale
☐	Aggregate used for the aggregate storage layer is washed and free of fines.	Washing aggregate will help eliminate fines that could clog aggregate storage layer void spaces or underdrain.
☐	Minimum layer depth is 6 inches and for infiltration designs, the maximum depth is determined based on the infiltration storage volume that will infiltrate within a 36-hour drawdown time.	A minimum depth of aggregate provides structural stability for expected pavement loads.
Underdrain and Outflow Structures		
☐	Underdrains and outflow structures, if used, are accessible for inspection and maintenance.	Maintenance will improve the performance and extend the life of the permeable pavement system.
☐	Underdrain outlet elevation should be a minimum of 3 inches above the bottom elevation of the aggregate storage layer.	A minimal separation from subgrade or the liner lessens the risk of fines entering the underdrain and can improve hydraulic performance by allowing perforations to remain unblocked.
☐	Minimum underdrain diameter is 8 inches.	Smaller diameter underdrains are prone to clogging.
☐	Underdrains are made of slotted, PVC pipe conforming to ASTM D 3034 or equivalent or corrugated, HDPE pipe conforming to AASHTO 252M or equivalent.	Slotted underdrains provide greater intake capacity, clog resistant drainage, and reduced entrance velocity into the pipe, thereby reducing the chances of solids migration.
Filter Course (Optional)		
☐	Filter course is washed and free of fines.	Washing aggregate will help eliminate fines that could clog subgrade and impede infiltration.

Conceptual Design and Sizing Approach for Site Design

1. Determine the areas where permeable pavement can be used in the site design to replace traditional pavement to reduce the impervious area and DCV. These permeable pavement areas can be credited toward reducing runoff generated through representation in storm water calculations as pervious, not impervious, areas but are not credited for storm water pollutant control. These permeable pavement areas should be designed as self-retaining with the appropriate tributary area ratio identified in the design criteria.
2. Calculate the DCV per Appendix B, taking into account reduced runoff from self-retaining permeable pavement areas.

Conceptual Design and Sizing Approach for Storm Water Pollutant Control Only

To design permeable pavement for storm water pollutant control only (no flow control required), the following steps should be taken:

1. Verify that siting and design criteria have been met, including placement requirements, maximum finish grade slope, and the recommended tributary area ratio for non-self-retaining permeable pavement. If infiltration is infeasible, the permeable pavement can be designed as flow-thru treatment per the sizing worksheet. If infiltration is feasible, calculations should follow the remaining design steps.
2. Calculate the DCV per Appendix B based on expected site design runoff for tributary areas.
3. Use the sizing worksheet to determine if full or partial infiltration of the DCV is achievable based on the available infiltration storage volume calculated from the permeable pavement footprint, aggregate storage layer depth, and in-situ soil design infiltration rate for a maximum 36-hour drawdown time. The applicant has an option to use a different drawdown time up to 96 hours if the volume of the facility is adjusted using the percent capture method in Appendix B.4.2.
4. Where the DCV cannot be fully infiltrated based on the site or permeable pavement constraints, an underdrain must be incorporated above the infiltration storage to carry away runoff that exceeds the infiltration storage capacity.
5. The remaining DCV to be treated should be calculated for use in sizing downstream BMP(s).

Conceptual Design and Sizing Approach when Storm Water Flow Control is Applicable

Control of flow rates and/or durations will typically require significant aggregate storage volumes, and therefore the following steps should be taken prior to determination of storm water pollutant control design. Pre-development and allowable post-project flow rates and durations should be determined as discussed in Chapter 6 of the manual.

1. Verify that siting and design criteria have been met, including placement requirements, maximum finish grade slope, and the recommended tributary area ratio for non-self-retaining permeable pavement. Design for flow control can be achieving using various design configurations, but a flow-thru treatment design will typically require a greater aggregate storage layer volume than designs which allow for full or partial infiltration of the DCV.
2. Iteratively determine the area and aggregate storage layer depth required to provide infiltration and/or detention storage to reduce flow rates and durations to allowable limits. Flow rates and durations can be controlled from detention storage by altering outlet structure orifice size(s) and/or water control levels. Multi-level orifices can be used within an outlet structure to control the full range of flows.
3. If the permeable pavement system cannot fully provide the flow rate and duration control required by this manual, a downstream structure with sufficient storage volume such as an underground vault can be used to provide remaining controls.
4. After permeable pavement has been designed to meet flow control requirements, calculations must be completed to verify if storm water pollutant control requirements to treat the DCV have been met.

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

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

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	☐ Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☐ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite ○ Not Performed
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	○ Included ◉ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	○ Included ◉ Submitted as separate stand-alone document ○ Included
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	◉ Not required because BMPs will drain in less than 96 hours

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

The Hydromodification Management Exhibit must identify:

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

ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

Indicate which Items are Included:

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

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

Preliminary Design / Planning / CEQA level submittal:

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

Final Design level submittal:

Attachment 3a must identify:

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

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

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

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

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

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

APPROVAL NUMBER:	ASSESSOR'S PARCEL NUMBER:	PROJECT NUMBER:

This agreement is made by and between the City of San Diego, a municipal corporation [City] and

the owner or duly authorized representative of the owner [Property Owner] of property located at:

(PROPERTY ADDRESS)

and more particularly described as:

(LEGAL DESCRIPTION OF PROPERTY)

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

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

_____

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

Continued on Page 2

NOW, THEREFORE, the parties agree as follows:

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

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

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

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

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

See Attached Exhibits(s):

_____
(Owner Signature)

_____
(Print Name and Title)

_____
(Company/Organization Name)

_____
(Date)

THE CITY OF SAN DIEGO

APPROVED:

_____
(City Control engineer Signature

_____
(Print Name)

_____
(Date)

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

ATTACHMENT 4
COPY OF PLAN SHEETS SHOWING PERMANENT STORM WATER BMPS

This is the cover sheet for Attachment 4.

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

The plans must identify:

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

COASTAL DEVELOPMENT PERMIT
PRELIMINARY GRADING PLAN

SCALE: 1" = 20'

0 20 40 60 80

GRADING DATA

AREA OF SITE - 0.854 AC (37,172 SF) (DOES NOT INCLUDE ALLEY (2,996 SF)
AREA OF SITE TO BE GRADED 0.779 (33,938 SF) (0.848 AC (36,934 SF) INCLUDING ALLEY REMOVAL AND REPLACEMENT)
PERCENT OF SITE TO BE GRADED 92.3%
AMOUNT OF SITE WITH 25% SLOPES OR GREATER: AREA - 0 SF, PERCENT OF TOTAL SITE - 0%.
AMOUNT OF CUT - 910 C.Y.
AMOUNT OF FILL - 40 C.Y.
AMOUNT OF EXPORT - 870 C.Y.
MAXIMUM DEPTH OF FILL- 1'
MAXIMUM DEPTH OF CUT - 3 ' (4' TO PAD)
NO CUT OR FILL SLOPES
RETAINING WALL: NONE NOT PART OF BUILDING
EARTHWORK IS APPROXIMATE TO FINISH SURFACE

IMPERVIOUS AREA:

EXISTING - 0.712 AC
PROPOSED - 0.710 AC

A DEVIATION IS BEING REQUESTED FOR STREET VISIBILITY TRIANGLES LESS THAN STANDARD PER SDMC 113.0273 (C) (2)

THE PROJECT TAKES ACCESS FROM THE ALLEY. THE PROPOSED PARKING LOT IS ONE WAY AND EXITS ONTO HORNBLEND. PARKING LOT

CONSTRUCTION NOTES

1. PROPOSED CURB OUTLET PER D-25 Q100 = 2.19 CFS V100 = 4.0 FPS
2. VISIBILITY TRIANGLE. NOTHING GREATER THAN 3' IN HEIGHT ALLOWED IN THIS AREA
3. PROPOSED 24' COMMERCIAL DRIVEWAY PER SDG-163
4. PROPOSED STREET TREE (TYPICAL) SEE LANDSCAPE PLAN
5. EX PED RAMP. PROTECT IN PLACE
6. EX ALLEY PED RAMP. PROTECT IN PLACE
7. EX WATER SERVICE TO BE KILLED
8. EX SEWER LAT TO BE ABANDONED
9. PROPOSED NORTH SITE SEWER LATERAL
10. PROPOSED SOUTH SITE SEWER LATERAL
11. PROPOSED NORTH SITE 2" WATER SERVICE
12. PROPOSED SOUTH SITE 2" WATER SERVICE
13. PROPOSED DRAIN FROM BIORETENTION BASINS TO CURB OUTLET
14. PROPOSED DRAIN FROM DRIVEWAY TRENCH DRAINS TO CATCH BASIN NORTHERLYU OF WESTERLY BIORETENTION BASIN
15. PROPOSED BIORETENTION BASIN (TYPICAL)
16. PROPOSED 6" DRIVEWAY TRENCH DRAIN (TYPICAL)
17. PORTION OF EX BUILDING TO REMAIN
18. EX PARKING LOT IMPROVEMENTS TO BE REMOVED AND REPLACED
19. PROPOSED 6" PARKING LOT TRENCH DRAIN TO TO DRAIN OT 3636 CATCH BASIN
20. PROPOSED 3636 CATCH BASIN WITH SOLID LID AND PUMP TO CONVEY RUNOFF FROM PARKING LOT TRENCH DRAIN TO WEST BIORETENTION BASIN
21. PROPOSED 3636 CATCH BASIN WITH SOLID LID AND PUMP TO CONVEY RUNOFF FROM WEST BIORETENTION BASIN TO CURB OUTLET
22. PROPOSED WEST BIORETENTION BASINS
23. EXISTING ALLEY TO BE REPLACE WITH STANDARD ALLEY
24. PROPOSED 3636 CATCH BASIN AND PUMP TO CONVEY RUNOFF FROM UNIT DRIVEWAY TRENCH DRAINS TO WESTERLY BIORETENTION BASINS
25. STREET INTERSECTION VISIBILITY TRIANGLE
26. PROPOSED ONSITE PRIVATE SEWER (TYPICAL)
27. PROPOSED ONSITE PRIVATE WATER (TYPICAL)
28. PROPOSED ONSITE PRIVATE 6" CURB PER G-1
29. EX DRIVEWAY TO BE CLOSED AND REPLACED WITH STANDARD CURB GUTTER AND SIDEWALK
30. EX ALLEY APRON TO BE REPLACED WITH STANDARD APRON
31. SEWER CLEANOUT
32. DOMESTIC WATER BFP
33. 4" FIRE SERVICE TO SUPPLY NORTH AND SOUTH STRUCTURES
34. FIRE SERVICE BFP
35. PRIVATE FIRE SERVICE IN R/W TO SUPPLY NORTH STRUCTURES
36. IRRIGATION SERVICE AND BFP
37. WATER METER (TYPICAL)

NOTE:

STREET VISIBILITY TRIANGLES ARE 15' PER ZONE REGULATIONS.

THE PROJECT TAKES ACCESS FROM THE HORNBLEM. THE PROPOSED PARKING LOT IS ONE WAY AND EXITS ONTO THE ALLEY.

DOOS ALONG BAYARD (IF ANY) SHALL NOT SWING INTO THE RIGHT OF WAY

JUNE 17, 2017

ANTONY K. CHRISTENSEN, RCE 54021 LS 7508 — Date

REGISTERED PROFESSIONAL ENGINEER ANTONY K. CHRISTENSEN No. 54021 Exp. 12-31-17 CIVIL STATE OF CALIFORNIA

Prepared By:

CHRISTENSEN ENGINEERING & SURVEYING
7888 SILVERTON AVENUE, SUITE "J"
SAN DIEGO, CA 92126
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Project Address:

875 GARNET AVENUE
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Revision 5:
Revision 4:
Revision 3:
Revision 2: 06-17-17 ADDRESS CITY COMMENTS
Revision 1: 04-28-17 ADDRESS CITY COMMENTS

Project Name:

PASEO MEWS

Original Date: FEBRUARY 10, 2017

Sheet Title:

PRELIMINARY GRADING PLAN

Sheet

DEP# _____

C-3

JN A2016-73

COASTAL DEVELOPMENT PERMIT
PRELIMINARY GRADING PLAN

LEGAL DESCRIPTION

LOTS 15-26 IN BLOCK 225, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 875, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY JULY 10, 1901..

APN: 423-044-04-00,-05-00,-07-00,-08-00,-12-00 & -13-00

BENCHMARK

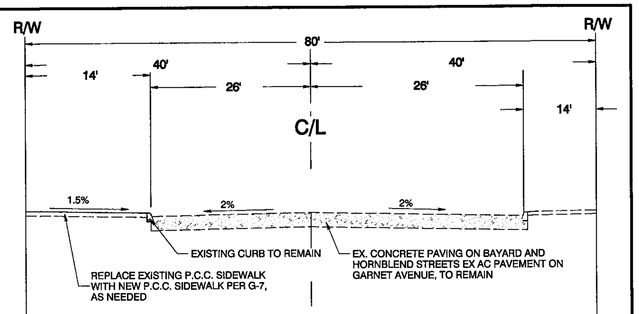
CITY OF SAN DIEGO BENCHMARK LOCATED AT THE NORTHWESTERLY CORNER OF BAYARD STREET AND FELSPAR STREET. ELEVATION 31.17' MEAN SEA LEVEL (N.G.V.D. 1929).

NOTES

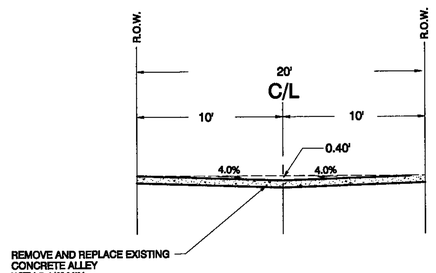
1. THE SOURCE OF THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS AN AERIAL SURVEY BY CHRISTENSEN ENGINEERING & SURVEYING, DATED DECEMBER 17, 2016.
2. THE EXISITNG USE IS COMMERCIAL AND PARKING. THE PROPOSED USE OF THE PROPERTY IS FOR MIXED USE, PHASED DEVELOPMENT.
3. THE SUBJECT PROPERTY IS SERVED BY CITY OF SAN DIEGO SANITARY SEWER AND WATER MAINS.
4. PRIOR TO ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE.
5. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS.
6. AN ENCROACHMENT MAINTENANCE AND REMOVAL AGREEMENT WILL BE REQUIRED FOR THE PRIVATE STORM DRAINS, LANDSCAPE AND IRRIGATION PRIVATE FIRE SERVICE AND CURB OUTLET WITHIN THE PUBLIC RIGHTS OF WAY.
7. PROPERTY AREA IS 0.854 AC.
8. A DEVIATION IS BEING REQUESTED FOR STREET VISIBILITY TRIANGLES LESS THAN STANDARD PER SDMC 113.0273 (C) (2)
9. THE PROJECT TAKES ACCESS FROM THE ALLEY. THE PROPOSED PARKING LOT IS ONE WAY AND EXITS ONTO HORNBLEND PARKING LOT.
10. NO OBSTRUCTION, INCLUDING SOLID WALLS IN THE VISIBILITY AREA SHALL EXCEED 3 FEET IN HEIGHT. PLANT MATERIAL, OTHER THAN TREES, WITHIN THE PUBLIC RIGHT OF WAY THAT IS LOCATED IN THE VISIBILITY AREA SHALL NOT EXCEED 24 INCHES IN HEIGHT, MEASURED FROM THE TOP OF THE ADJACENT CURB.
11. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITEE SHALL SUBMIT A WATER POLLUTION CONTROL PLAN (WPCP). THE WPCP SHALL BE PREPARED IN ACCORDANCE WITH THE GUIDLINES IN PART 2 CONSTRUCTION BMP STANDARDS CHAPTER 4 OF THE CITY'S STORM WATER STANDARDS.

LEGEND

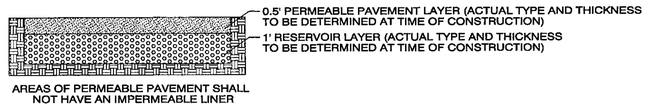
- PROPERTY LINE
- EXISTING CONTOUR
- EXISTING GAS LINE (G)
- EXISTING SEWER LINE (S)
- EXISTING WATER LINE (W)
- PROPOSED PVC DRAIN FROM UNIT TRENCH DRAINS
- EX FIRE HYDRANT
- EX SEWER MANHOLE
- PROPOSED PVC DRAIN FROM UNIT BIOFILTRATION BASINS
- PROPOSED PVT 6" PVC SEWER LATERAL (S)
- PROPOSED 2" WATER SERVICE (W)
- PROPOSED CATCH BASIN WITH PUMP AS SHOWN ON PLAN
- PROPOSED STAMPED CONCRETE SURFACE
- PROPOSED PERMEABLE PAVER SURFACE
- PROPOSED ONSITE CURB PER G-1
- PROPOSED CURB OUTLET PER D-25
- BIOFILTRATION BASIN
- PROPOSED DRIVEWAY PER SDG-163



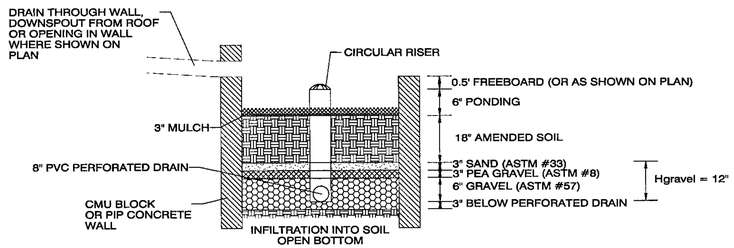
TYPICAL STREET SECTION: GARNET AVENUE, BAYARD STREET AND HORNBLEND STREET
NOT TO SCALE



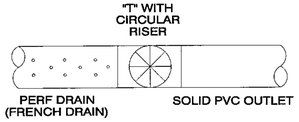
ALLEY SECTION
NOT TO SCALE



PERMEABLE PAVEMENT DETAIL (PVT)
(TYPICAL)
NOT TO SCALE



BIOFILTRATION BASIN DETAIL (PVT)
(TYPICAL)
NOT TO SCALE



BASIN OUTLET DETAIL (PVT)
(TYPICAL)
NOT TO SCALE

JUNE 17, 2017
ANTONY K. CHRISTENSEN, RCE 54021 LS 7508 — Date

REGISTERED PROFESSIONAL ENGINEER ANTONY K. CHRISTENSEN No. 54021 Exp. 12-31-17 CIVIL STATE OF CALIFORNIA

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PASEO MEWS

Original Date: FEBRUARY 10, 2017

Sheet Title:

Sheet

DEP#

PRELIMINARY GRADING PLAN

C-2

JN A2016-73

ATTACHMENT 5
DRAINAGE REPORT

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

Preliminary Drainage Study

Paseo Mews Mixed Use Development

LOTS 15-26 IN BLOCK 225, MAP NO. 875
875 Garnet Avenue
San Diego, California 92109

Prepared for:
875 Garnet Associates
10992 Cloverhurst Way
San Diego, California 92130

Prepared by:
Christensen Engineering & Surveying
7888 Silverton Avenue, Suite "J"
San Diego, CA 92126
(858) 271-9901

February 10, 2017
Revised April 29, 2017
Revised June 14, 2017

PTS No. 524566

Introduction

This project proposes the phased removal of most of the existing retail establishment and the majority of the existing parking with its replacement with a mixed use development eventually comprised of 12 strictly residential townhomes and 8 mixed use retail/apartment units, also retaining a portion of the existing retail space. The project is located on Lots 15-26 in block 225 of Map No.875. These lots are separated by a common alley. The project will include a substantial number of biofiltration units to treat the site runoff before it leaves the development. The site is exempt from hydromodification requirements as its runoff flows westerly along Hornblend Street to Mission Boulevard and then southerly to a curb inlet at the northwest corner of Mission Boulevard and Grand Avenue and then is conveyed by a public storm drain to the Pacific Ocean (an exempt water body).

The attached drainage area maps are from a topographic survey by Christensen Engineering & Surveying dated December 17, 2016. Prior to construction the northerly portion flows to the common alley and then westerly with a small portion flowing northerly to Garnet Avenue. The southerly portion of the project flows to Hornblend Street. The project prior to development is considered a commercial site. Following construction, the same general pattern of flow persists with the same portion of the northerly site flowing to Garnet Avenue but the remainder of the northerly site runoff being conveyed to Hornblend Street. The southerly portion of the site project continues to flow to Hornblend Street. The alley flows westerly both before and after construction. Since the project will be a residential multi-unit development the runoff coefficient is reduced resulting in less total runoff from the site. The runoff flowing to the north, onto Garnet Avenue is expected to reduce from 0.07 cfs to 0.05 cfs following development. The flow westerly along the alley will reduce from 1.49 cfs to 0.22 cfs. The flow to Hornblend is expected to increase from 1.34 cfs to 2.19 cfs. Total site and alley runoff will decrease from 2.90 cfs to 2.46 cfs.

The site has 0.712 ac of imperviousness and a proposed 0.710 area of imperviousness following development. A change from of 83.3% to 83.2% area of imperviousness.

Runoff from the subject site flows to a curb inlet at the NE corner of Mission Boulevard and Grand Avenue. There are no public drain improvements in Hornblend Street. The expected increase in runoff to Hornblend Street will have no detrimental effect on the capacity of Hornblend Street to convey the 0.85 cfs increase in runoff since the street gutter is expected to covey a total of 6.15 cfs of runoff (including the added

runoff). The attached exhibit demonstrates that at a slope of 0.6% the curb is adequate to convey the runoff at a velocity of 2.3 fps and depth of 0.43'.

Since total runoff from the site decreases there will be no adverse effect on the public storm drain system. Runoff along the alley to Mission Boulevard will decrease. Total runoff to Mission Boulevard will decrease. Runoff to the curb inlet at the NE corner of Mission Boulevard and Grand Avenue will decrease.

There is no runoff from the project onto neighboring properties and so no adverse effect will be experienced by them.

Since the project discharges by a hardened conveyance system to the Pacific Ocean (an exempt waterbody) it is exempt from hydromodification requirements.

Section 404 of CWA regulates the discharge of dredged or fill material into waters of the United States. Section 404 is regulated by the Army Corps of Engineers. Section 401 of CWA requires that the State provide certification that any activity authorized under Section 404 is in compliance with effluent limits, the state's water quality standards, and any other appropriate requirements of state law. Section 401 is administered by the State Regional Water Quality Control Board. The project does not require a Federal CWA Section 404 permit nor Section 401 Certification because it does not cause dredging or filling in waters of the United States and is in compliance with the State Water Quality Standards. See separate SWQMP

The Rational Method was used to calculate the anticipated flow for the 100-year storm return frequency event using the method outlined in the City of San Diego Drainage Design Manual.

Antony K. Christensen
RCE 54021
Exp. 12-31-17
JN A2016-73

06-14-17
Date

Calculations

1. *Intensity Calculation*

(From the City of San Diego Drainage Design Manual, Page 86)
Tc = Time of concentration

$Tc = 1.8\ (1.1\text{-}C)\ (D)^{1/2} / S^{1/3}$

Since the difference in elevation is 4' (27-23') and the distance traveled is 195' (S=2.1%). C=0.70.

Tc = 7.9 minutes

From table on Page 83

I_{100} = 3.7 inches

2. *Coefficient Determination*

The site and the area offsite that will contribute to runoff is included in this study.

From Page 82

Pre-Construction:
Since the property is developed as a commercial site a value of C = 0.85 is used.

Post construction:
From Page 82 for Multi-Unit Residential

C = 0.70

3. *Volume calculations*

Q = CIA

Areas of Drainage

While the procedure used by the City of San Diego Drainage Design Manual indicates that areas of similar use should employ the same runoff coefficient using that method for this project would result in the same, pre- and post-construction total runoff. Therefore, the weighted average is used below.

Pre-Construction

Area of northerly site flowing to alley	A = 0.406 Acre
Area of northerly site flowing to Garnet Avenue	B = 0.021 Acre
Area of southerly site flowing To Hornblend Street	C = 0.427 Acre
Area of alley (not part of site) flows westerly	PC-A = 0.069 Acre

Post-Construction

Area northerly draining to Hornblend Street curb outlet. 0.074 Ac Commercial 0.332 Ac Multi-residential	PC-N = 0.406 Acre
Area northerly draining to Garnet Avenue	PC-P = 0.021 Acre
Area southerly draining to Hornblend Street curb outlet.	PC-S = 0.427 Acre
Area of alley (not part of site) flows westerly as before construction	PC-A = 0.069 Acre

Pre-Construction

Q_{100A} = (0.85) (3.7) (0.406)
Q_{100B} = (0.85) (3.7) (0.021)
Q_{100C} = (0.85) (3.7) (0.427)
$Q_{100PC\text{-}A}$ = (0.85) (3.7) (0.069)

Q_{100A} = 1.27 cfs
Q_{100B} = 0.07 cfs
Q_{100C} = 1.34 cfs
$Q_{100PC\text{-}A}$ = 0.22 cfs

Post-Construction

$Q_{100PC\text{-}N\ multi\text{-}residential}$ = (0.70) (3.7) (0.332)
$Q_{100PC\text{-}N\ commercial}$ = (0.85) (3.7) (0.074)

$Q_{100PC\text{-}P}$ = (0.70) (3.7) (0.021)
$Q_{100PC\text{-}S}$ = (0.70) (3.7) (0.427)
$Q_{100PC\text{-}A}$ = (0.85) (3.7) (0.069)

$Q_{100PC\text{-}N\ multi\text{-}residential}$ = 0.86 cfs
$Q_{100PC\text{-}N\ commercial}$ = 0.23 cfs

$Q_{100PC\text{-}P}$ = 0.05 cfs
$Q_{100PC\text{-}S}$ = 1.10 cfs
$Q_{100PC\text{-}A}$ = 0.22 cfs

4. Discussion

The project is comprised of two portions of the same block containing 6 lots each and separated by a common alley. Prior to construction the northerly portion flows to the common alley and then westerly with a small portion flowing northerly to Garnet Avenue. The southerly portion of the project flows to Hornblend Street. The project prior to development is considered a commercial site. Following construction, the same general pattern of flow persists with the same portion of the northerly site flowing to Garnet Avenue but the remainder of the northerly site runoff being conveyed to Hornblend Street. The southerly portion of theproject continues to flow to Hornblend Street. The alley flows westerly both before and after construction. Since the project will be a residential multi-unit development the runoff coefficient is reduced resulting in less total runoff from the site. The runoff from flowing to the north, onto Garnet Avenue is expected to reduce from 0.07 cfs to 0.05 cfs following development. The flow westerly along the alley will reduce from 1.49 cfs to 0.22 cfs. The flow to Hornblend is expected to increase from 1.34 cfs to 2.19 cfs.

Calculations for Runoff to Hornblend

The following calculations are intended to demonstrate the adequacy of Hornblend Street to convey the additional runoff conveyed to it from development of the project. Runoff onto Mission Boulevard is expected to decrease since total runoff leaving the site is less than the current volume of runoff.

A. Intensity Calculation

For the area of the portion of Bayard Street and the part of the block fronting and conveying runoff to Hornblend Street between Bayard and Mission:

(From the City of San Diego Drainage Design Manual, Page 86)
Tc = Time of concentration

$Tc = 1.8\ (1.1\text{-}C)\ (D)^{1/2} / S^{1/3}$

Since the difference in elevation is 10' and the distance traveled is 630' (S=1.9%). C=0.85.

Tc = 9.1 minutes

From table on Page 83

I_{100} = 3.9 inches

B. Coefficient Determination

The site and the area offsite that will contribute to runoff is included in this study.

From Page 82

Since the area under consideration is primarily Commercial, both prior to development and following development, a conservative value of C=0.85 is selected.

Volume calculations

Q = CIA

Area of Drainage

The area flowing to Hornblend and along the northerly gutter is shown on the attached drainage area map. It is an area of 1.6 Ac.

Pre-Construction

$Q_{100Hornblend\ Northerly\ Gutter}$ = (0.85) (3.9) (1.6)

$Q_{100Hornblend\ Northerly\ Gutter}$ = 5.3 cfs

Post-Construction

Runoff following development will be the pre-construction runoff plus the additional runoff to Hornblend of 0.85 cfs (see discussion above).

$Q_{100Hornblend\ Northerly\ Gutter}$ = 5.3 cfs + 0.85 cfs = 6.15 cfs

C. Discussion

The pre-construction runoff to the northerly Hornblend gutter is increased by 0.85 cfs. The total volume of runoff to the post-construction northerly gutter is 6.15 cfs. As shown on the attached gutter/roadway nomograph, the gutter is capable of conveying the additional runoff with no adverse effect on the public storm drain system. The total runoff to the public storm drain system beyond Hornblend is less than the pre-construction volume, and will have no adverse effect on it.

Type of conveyance is a: CURB OUTLET
Depth of channel equals .25 Feet
Bottom Width Equals 3
Side slope equals .01
Slope of conveyance equals 1.5 %
Roughness equals .0135
Flow quantity equals 2.159873 CFS
Area equals .5403246 Square Feet
Velocity equals 3.97909 FPS
Depth of flow equals .1800002 Feet

APPENDIX

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
	D
Residential:	
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

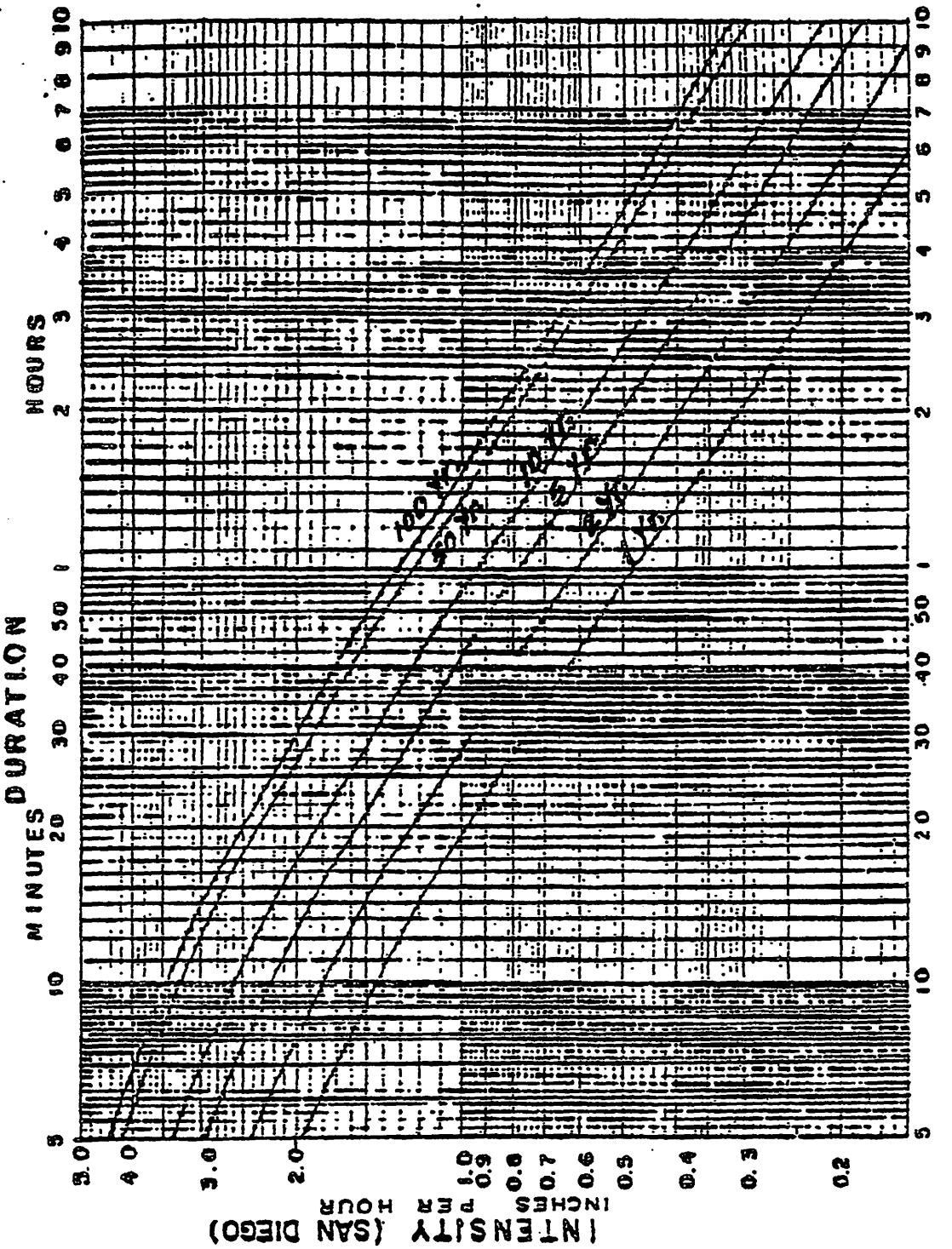
(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

Tabulated imperviousness = 80%

Revised C = $\frac{50}{80}$ x 0.85 = 0.53



ELEV.	FACTOR
0—1500	1.00
1500—3000	1.25
3000—4000	1.42
4000—5000	1.60
5000—6000	1.70
DESERT	1.25

To obtain correct intensity, multiply intensity on chart by factor for design elevation.

RAINFALL

INTENSITY - DURATION - FREQUENCY

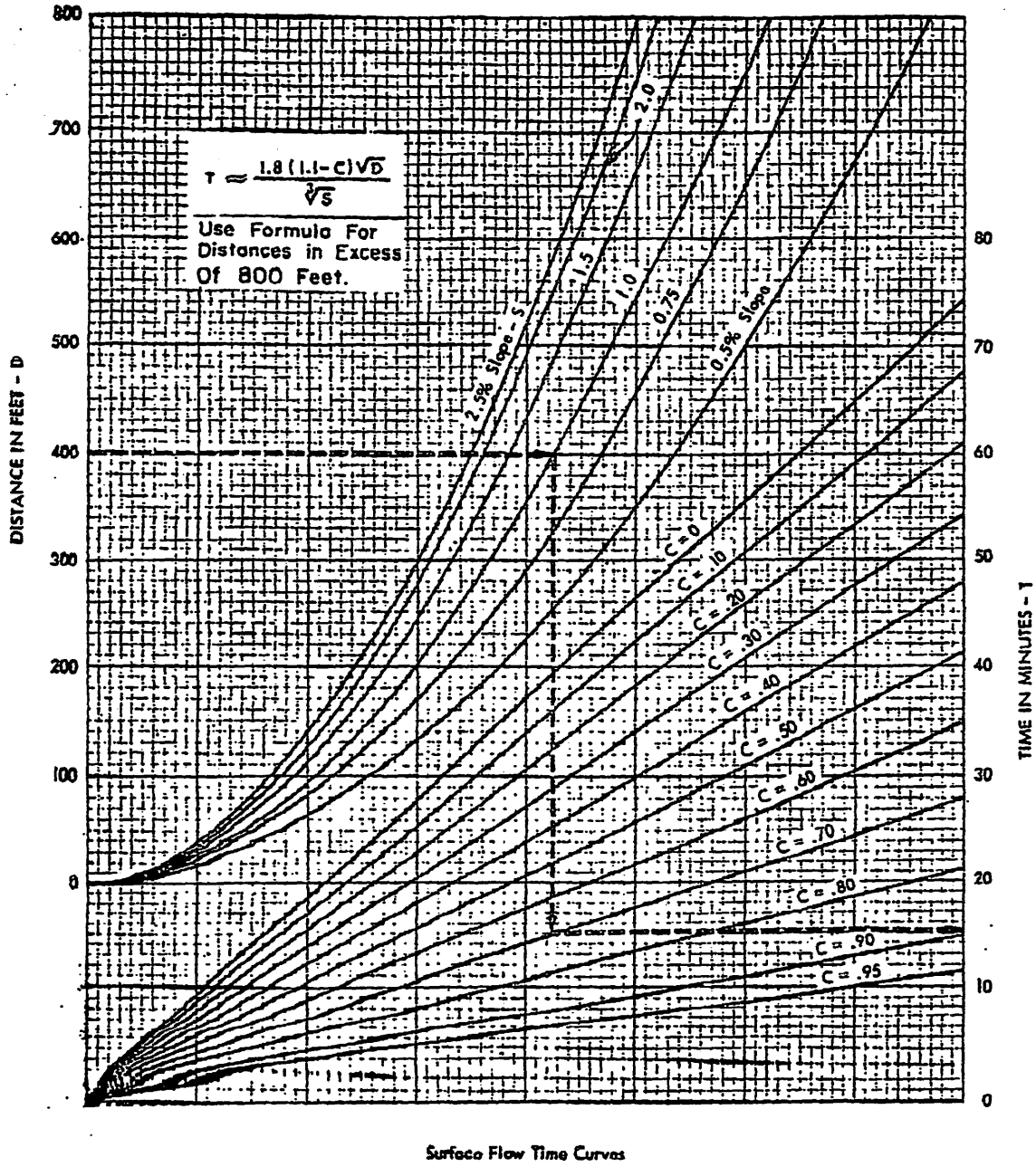
CURVES

for

COUNTY OF SAN DIEGO

APPENDIX I-

URBAN AREAS OVERLAND TIME OF FLOW CURVES



Surface Flow Time Curves

EXAMPLE:

GIVEN: LENGTH OF FLOW = 400 FT.
SLOPE = 1.0 %
COEFFICIENT OF RUNOFF C = .70

READ: OVERLAND FLOWTIME = 15 MINUTES

Drainage Area Map - To Hornblend

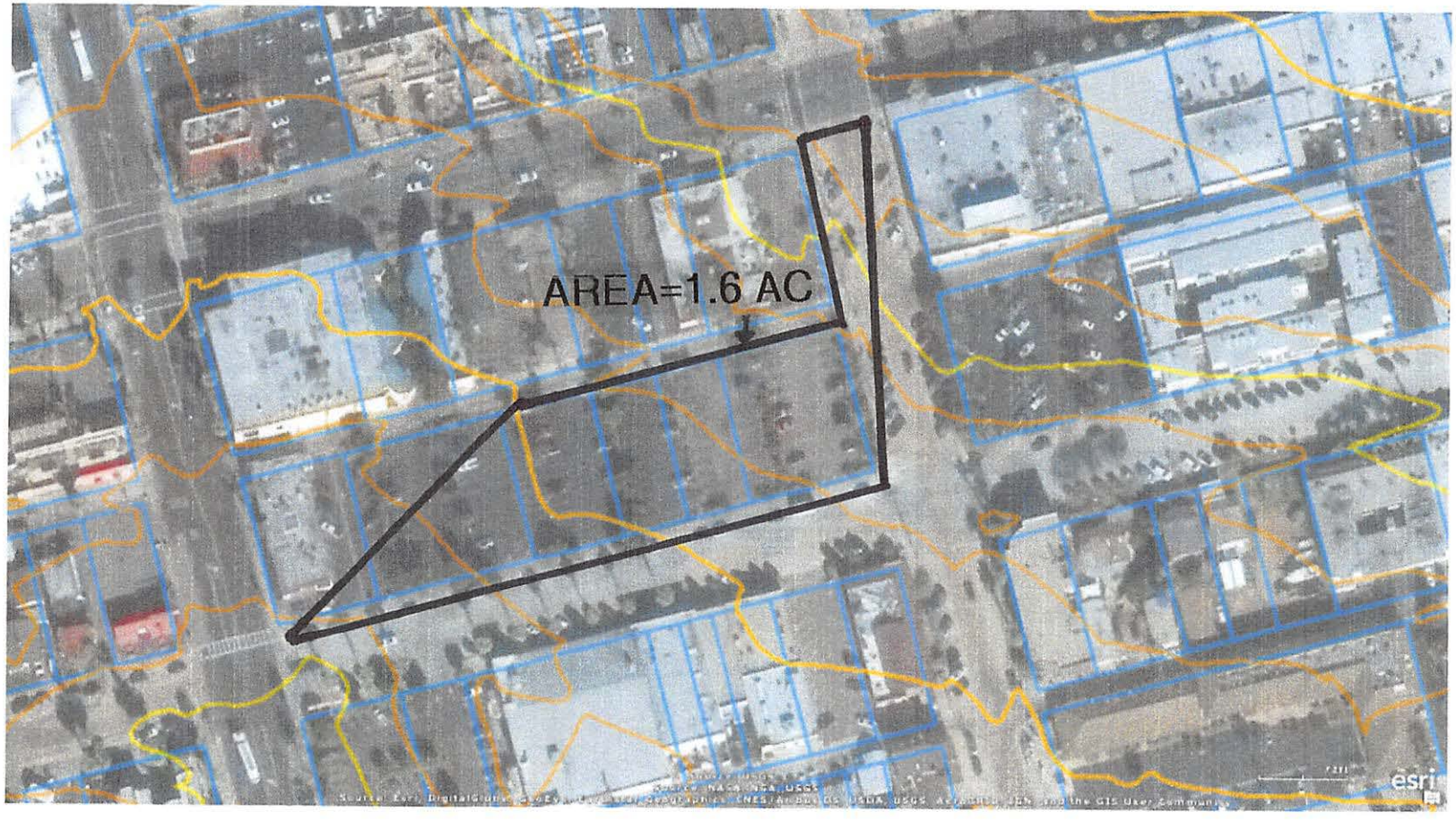
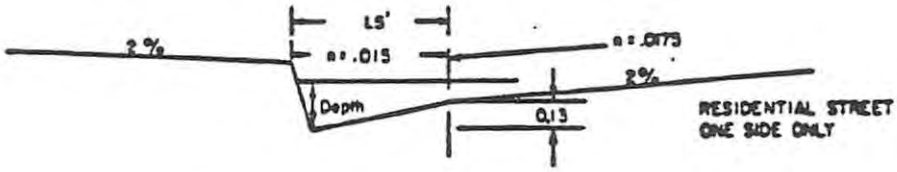
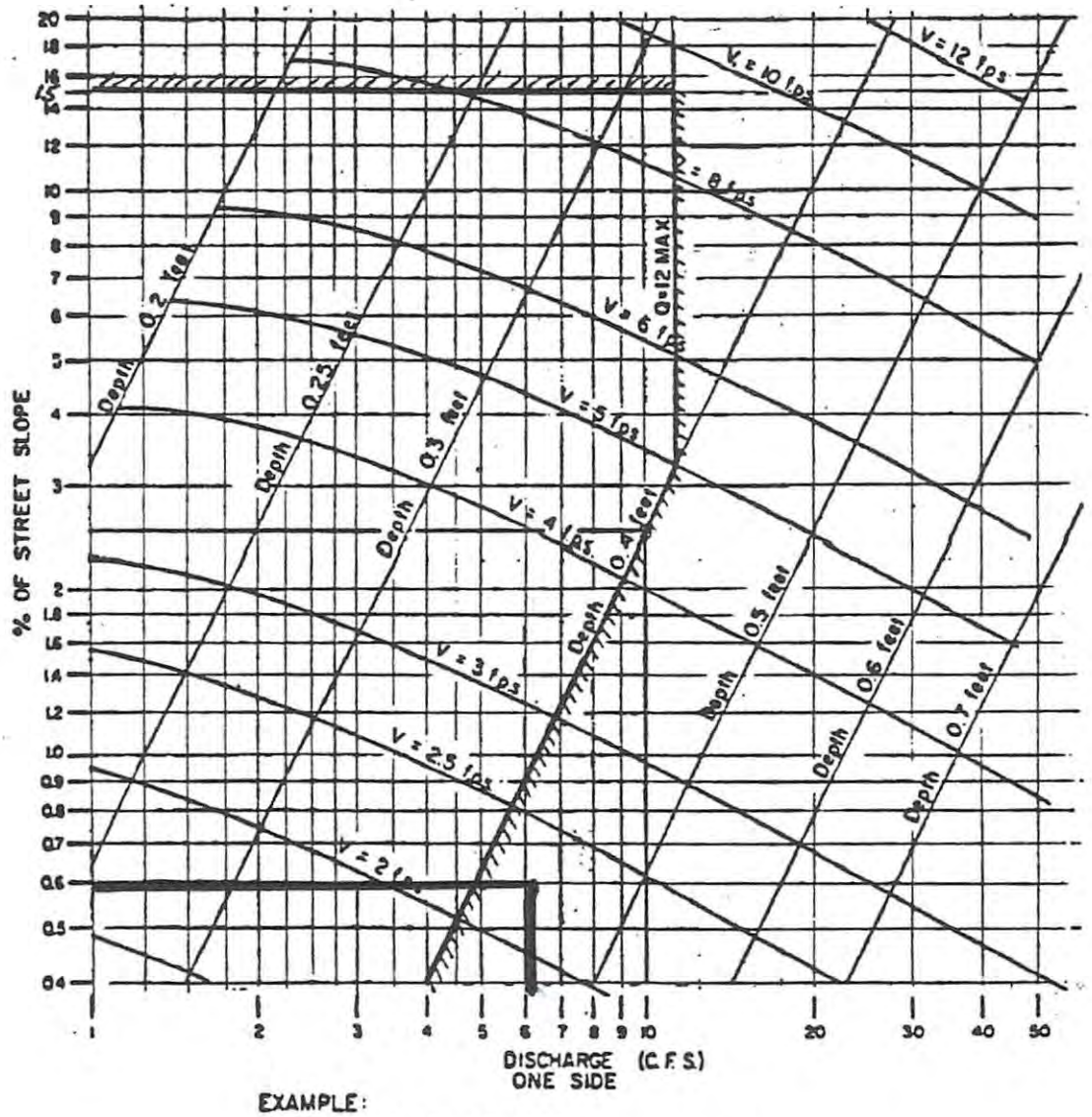


CHART I-104.12





EXAMPLE:

Given: Q = 10 S = 2.5%
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

$Q = 6.15$ cfs $V = 2.3$ fps
$S = 0.6\%$
$D = 0.43'$

REV.		CITY OF SAN DIEGO - DESIGN GUIDE	SHT. NO.
		GUTTER AND ROADWAY DISCHARGE-VELOCITY CHART	

DRAINAGE AREA MAPS

PRE-DEVELOPMENT DRAINAGE AREA MAP

PRE-CONSTRUCTION DRAINAGE AREA MAP

COASTAL DEVELOPMENT PERMIT
TOPOGRAPHIC SURVEY

LEGAL DESCRIPTION

LOTS 15-26 IN BLOCK 225, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 875, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY JULY 10, 1901..

APN: 423-044-04-00,-05-00,-07-00,-08-00,-12-00 & -13-00

BENCHMARK

CITY OF SAN DIEGO BENCHMARK LOCATED AT THE NORTHWESTERLY CORNER OF BAYARD STREET AND FELSPAR STREET. ELEVATION 31.17' MEAN SEA LEVEL (N.G.V.D. 1929).

NOTES

1. THE SOURCE OF THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS AN AERIAL SURVEY BY CHRISTENSEN ENGINEERING & SURVEYING, DATED DECEMBER 17, 2016.
2. THE EXISITNG USE IS COMMERCIAL AND PARKING. THE PROPOSED USE OF THE PROPERTY IS FOR MIXED USE, PHASED DEVELOPMENT.
3. THE SUBJECT PROPERTY IS SERVED BY CITY OF SAN DIEGO SANITARY SEWER AND WATER MAINS.
4. PRIOR TO ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE.
5. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS.
6. AN ENCROACHMENT MAINTENANCE AND REMOVAL AGREEMENT WILL BE REQUIRED FOR PRIVATE CURB OUTLET IN HORNBLEND STREET.
7. PROPERTY AREA IS 0.854 AC.

FEBRUARY 10, 2017
ANTONY K. CHRISTENSEN, RCE 54021 — Date
LS 7508

REGISTERED PROFESSIONAL ENGINEER — ANTONY K. CHRISTENSEN — No. 54021 — Exp. 12-31-17 — CIVIL — STATE OF CALIFORNIA

LICENSED LAND SURVEYOR — ANTONY K. CHRISTENSEN — Exp. 12-31-17 — LS 7508 — STATE OF CALIFORNIA

Prepared By:

CHRISTENSEN ENGINEERING & SURVEYING
7888 SILVERTON AVENUE, SUITE "J"
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PHONE (858)271-9901 FAX (858)271-8912

Project Address:

875 GARNET AVENUE
SAN DIEGO, CA 92109.

Revision 5:
Revision 4:
Revision 3:
Revision 2:
Revision 1:

Project Name:

PASEO MEWS

Original Date: FEBRUARY 10, 2017

Sheet Title:

TOPOGRAPHIC SURVEY

Sheet

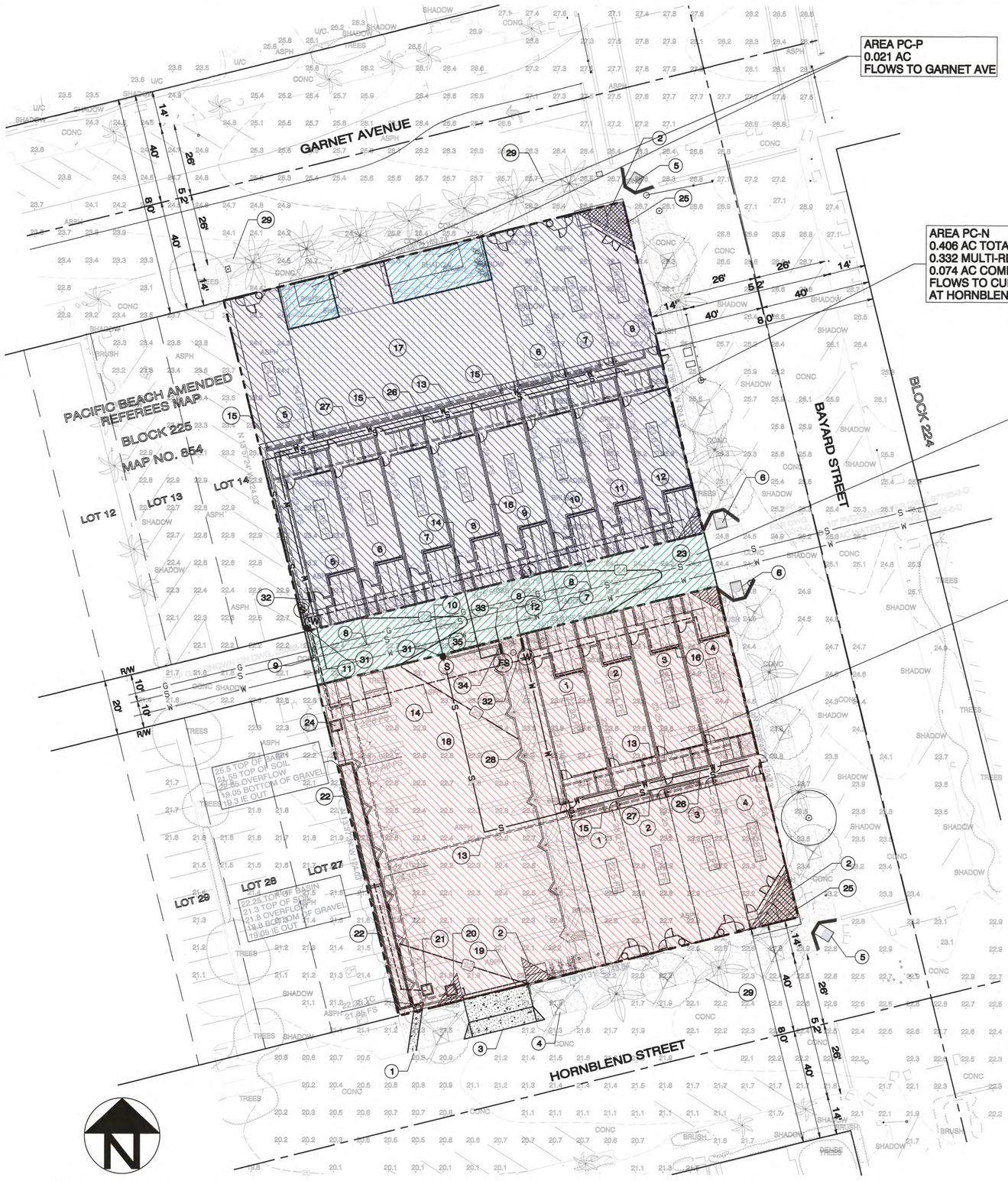
C-1

DEP#

JN A2016-73

POST-DEVELOPMENT DRAINAGE AREA MAP

POST-CONSTRUCTION DRAINAGE AREA MAP



SCALE: 1" = 20'

0 20 40 60 80

GRADING DATA

AREA OF SITE - 0.854 AC (37,172 SF) (DOES NOT INCLUDE ALLEY (2,996 SF)
AREA OF SITE TO BE GRADED 0.779 (33,938 SF) (0.848 AC (36,934 SF) INCLUDING ALLEY REMOVAL AND REPLACEMENT)
PERCENT OF SITE TO BE GRADED 92.3%
AMOUNT OF SITE WITH 25% SLOPES OR GREATER: AREA - 0 SF, PERCENT OF TOTAL SITE - 0%.
AMOUNT OF CUT - 910 C.Y.
AMOUNT OF FILL - 40 C.Y.
AMOUNT OF EXPORT - 870 C.Y.
MAXIMUM DEPTH OF FILL- 1'
MAXIMUM DEPTH OF CUT - 3 ' (4' TO PAD)
NO CUT OR FILL SLOPES
RETAINING WALL: NONE NOT PART OF BUILDING
EARTHWORK IS APPROXIMATE TO FINISH SURFACE

IMPERVIOUS AREA:

EXISTING - 0.712 AC
PROPOSED - 0.710 AC

A DEVIATION IS BEING REQUESTED FOR STREET VISIBILITY TRIANGLES LESS THAN STANDARD PER SDMC 113.0273 (C) (2)

THE PROJECT TAKES ACCESS FROM THE ALLEY. THE PROPOSED PARKING LOT IS ONE WAY AND EXITS ONTO HORNBLEND.
PARKING LOT

ANTONY K. CHRISTENSEN, RCE 54021 LS 7508 — Date: APRIL 28, 2017

REGISTERED PROFESSIONAL ENGINEER — ANTONY K. CHRISTENSEN — No. 54021 — Exp. 12-31-17 — CIVIL — STATE OF CALIFORNIA

COASTAL DEVELOPMENT PERMIT
PRELIMINARY GRADING PLAN

CONSTRUCTION NOTES

1. PROPOSED CURB OUTLET PER D-25 Q100 = 2.19 CFS V100 = 4.0 FPS
2. VISIBILITY TRIANGLE. NOTHING GREATER THAN 3' IN HEIGHT ALLOWED IN THIS AREA
3. PROPOSED 24' COMMERCIAL DRIVEWAY PER SDG-163
4. PROPOSED STREET TREE (TYPICAL) SEE LANDSCAPE PLAN
5. EX PED RAMP. PROTECT IN PLACE
6. EX ALLEY PED RAMP. PROTECT IN PLACE
7. EX WATER SERVICE TO BE KILLED
8. EX SEWER LAT TO BE ABANDONED
9. PROPOSED NORTH SITE SEWER LATERAL
10. PROPOSED SOUTH SITE SEWER LATERAL
11. PROPOSED NORTH SITE 2" WATER SERVICE
12. PROPOSED SOUTH SITE 2" WATER SERVICE
13. PROPOSED DRAIN FROM BIORETENTION BASINS TO CURB OUTLET
14. PROPOSED DRAIN FROM DRIVEWAY TRENCH DRAINS TO CATCH BASIN NORTHERLYU OF WESTERLY BIORETENTION BASIN
15. PROPOSED BIORETENTION BASIN (TYPICAL)
16. PROPOSED 6" DRIVEWAY TRENCH DRAIN (TYPICAL)
17. PORTION OF EX BUILDING TO REMAIN
18. EX PARKING LOT IMPROVEMENTS TO BE REMOVED AND REPLACED
19. PROPOSED 6" PARKING LOT TRENCH DRAIN TO TO DRAIN OT 3636 CATCH BASIN
20. PROPOSED 3636 CATCH BASIN WITH SOLID LID AND PUMP TO CONVEY RUNOFF FROM PARKING LOT TRENCH DRAIN TO WEST BIORETENTION BASIN
21. PROPOSED 3636 CATCH BASIN WITH SOLID LID AND PUMP TO CONVEY RUNOFF FROM WEST BIORETENTION BASIN TO CURB OUTLET
22. PROPOSED WEST BIORETENTION BASINS
23. EXISTING ALLEY TO BE REPLACE WITH STANDARD ALLEY
24. PROPOSED 3636 CATCH BASIN AND PUMP TO CONVEY RUNOFF FROM UNIT DRIVEWAY TRENCH DRAINS TO WESTERLY BIORETENTION BASINS
25. STREET INTERSECTION VISIBILITY TRIANGLE
26. PROPOSED ONSITE PRIVATE SEWER (TYPICAL)
27. PROPOSED ONSITE PRIVATE WATER (TYPICAL)
28. PROPOSED ONSITE PRIVATE 6" CURB PER G-1
29. EX DRIVEWAY TO BE CLOSED AND REPLACED WITH STANDARD CURB GUTTER AND SIDEWALK
30. EX ALLEY APRON TO BE REPLACED WITH STANDARD APRON
31. SEWER CLEANOUT
32. DOMESTIC WATER BFP
33. 4" FIRE SERVICE TO SUPPLY NORTH AND SOUTH STRUCTURES
34. FIRE SERVICE BFP
35. PRIVATE FIRE SERVICE IN R/W TO SUPPLY NORTH STRUCTURES

NOTE:

A DEVIATION IS BEING REQUESTED FOR STREET VISIBILITY TRIANGLES LESS THAN STANDARD PER SDMC 113.0273 (C) (2)

THE PROJECT TAKES ACCESS FROM THE ALLEY. THE PROPOSED PARKING LOT IS ONE WAY AND EXITS ONTO HORNBLEND.
PARKING LOT

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875 GARNET AVENUE
SAN DIEGO, CA 92109.

Revision 5:
Revision 4:
Revision 3:
Revision 2:
Revision 1: 04-28-17 ADDRESS CITY COMMENTS

Project Name:

PASEO MEWS

Original Date: FEBRUARY 10, 2017

Sheet Title:

PRELIMINARY GRADING PLAN

Sheet

DEP#

C-3

JN A2016-73

ATTACHMENT 6
GEOTECHNICAL AND GROUNDWATER INVESTIGATION REPORT

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