**CITY OF ENCINITAS**
**STORMWATER INTAKE FORM AND PRIORITY DEVELOPMENT PROJECT STORMWATER QUALITY MANAGEMENT PLAN (SWQMP)**

**FOR:**

# SANTA FE 845 SUB-DIVISION

**51 LOT RESIDENTIAL DEVELOPMENT**
**MULTI-004398-2021**

845 SANTA FE DRIVE
ENCINITAS, CA 92024
260-132-23


**PREPARED BY:**
W. JUSTIN SUITER, RCE 68964
PASCO LARET SUITER & ASSOCIATES
119 ABERDEEN DRIVE CARDIFF, CA 92007
858-259-8212


**PREPARED FOR:**
SCOTT TRAVASOS
1144 N COAST HWY 101
ENCINITAS, CA 92024

**DATE OF SWQMP:**
NOVEMBER 2021
REVISED:
OCTOBER 2023
JUNE 2024
**SEPTEMBER 2024**


**GRADING PLAN PREPARED BY:**
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## PREPARER'S CERTIFICATION

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

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP Storm Water Quality Management Plan (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

W. Justin Suiter, RCE 68964
Print Name

Pasco, Laret, Suiter & Associates
Company

9/30/24
Date

Engineer's Seal

## PROJECT OWNER'S CERTIFICATION

This PDP SWQMP has been prepared for Scott Travasos by Pasco Laret Suiter & Associates. The PDP SWQMP is intended to comply with the PDP requirements of the City of Encinitas BMP Design Manual, which is a design manual for compliance with local City of Encinitas and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

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

Project Owner's Signature

Scott Travasos

Print Name

Sweetwood / Kopion / 845 Santa Fe

Company

9/25/24

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 the fourth column, summarize the changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

| Submittal Number | Date | Project Status | Summary of Changes |
|---|---|---|---|
| 1 | FEBURARY 2021 | ☑Preliminary Design / ☐Planning/ CEQA ☐Final Design | INITIAL SUBMITTAL |
| 2 | NOVEMBER 2021 | ☑Preliminary Design / ☐Planning/ CEQA ☐Final Design | REDESIGN |
| 3 | OCTOBER 2023 | ☑Preliminary Design / ☐Planning/ CEQA ☐Final Design | REDESIGN |
| 4 | JUNE 2024 | ☑Preliminary Design / ☐Planning/ CEQA ☐Final Design | REDESIGN |
| 5 | SEPTEMBER 2024 | ☑Preliminary Design / ☐Planning/ CEQA ☐Final Design | REDESIGN |
| 6 | | ☑Preliminary Design / ☐Planning/ CEQA ☐Final Design | |

## PROJECT IDENTIFICATION

| | |
|---|---|
| Project/Applicant Name: Santa Fe 845 Sub-Division | |
| Permit/Application Number: MULTI-004398-2021 | Date: September 2024 |
| Site Address: 845 Santa Fe Drive | APN: 260-132-23 |

Scope of work/project description:

THE PROPOSED PROJECT INCLUDES THE DEMOLITION OF ALL EXISTING ONSITE IMPROVEMENTS.

THE PROJECT PROPOSES A DENSITY BONUS, TENTATIVE MAP, DESIGN REVIEW PERMIT, COASTAL DEVELOPMENT PERMIT AND USE PERMIT MODIFICATION TO REVOKE COUNTY CHURCH USE PERMIT. IT INCLUDES THE DEMOLITION OF ALL ON-SITE IMPROVEMENTS AND THE DEVELOPMENT OF 35 SINGLE-FAMILY RESIDENTIAL LOTS, 8 DUPLEX LOTS WITH 16X NEW MULTI-FAMILY CONDOMINIUM UNITS, 7 RECREATIONAL / HOA AREA LOTS AND 1 PRIVATE ROAD LOT. THE PROJECT PROPOSES A TOTAL OF 51 RESIDENTIAL UNITS.

CONSTRUCTION OF THE RESIDENTIAL SUBDIVISION WILL INCLUDE SITE GRADING, DRAINAGE, PUBLIC UTILITY IMPROVEMENTS, AND A PRIVATE STREET.

SANTA FE IMPROVEMENTS ALONG THE FRONTAGE INCLUDE CLOSING OFF EXISTING DRIVEWAYS AND CONSTRUCTING A NEW ENTRANCE, CURB RAMPS AND SIDEWALK. WHERE ENTRANCE CONFLICTS WITH EXISTING IMPROVEMENTS PER 131-SI, THOSE ARE TO BE REMOVED AND REPLACED, INCLUDING A BUS STOP AND CURB RAMP RELOCATION.

MUNEVAR IMPROVEMENTS ALONG THE FRONTAGE INCLUDE 3 NEW DRIVEWAY APRONS WITH SIDEWALK PER SDRSD G-14A, AND TWO CURB OUTLETS PER SDRSD D-25A. A 239 LF +/- PUBLIC SEWER MAIN EXTENSION WITHIN MUNEVAR IS ALSO PROPOSED.

# DETERMINATION OF PROJECT STATUS AND REQUIREMENTS

This form will identify permanent, post construction BMP requirements. Refer to City of Encinitas Stormwater BMP Design Manual for guidance.

| | | |
|---|---|---|
| **Step 1:** Is the project a "development project"? Development projects are defined as "construction, rehabilitation, redevelopment, or reconstruction of any public or private projects". See Section 1.3 and Table 1-2 of the manual for guidance. For example, interior remodels, roof replacements, and electrical and plumbing work are not development projects. | √ Yes | ***Go to Step 2.*** |
| | □No | ***Stop.*** Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below. |

If "No", provide discussion / justification explaining why the project is not a "development project":

**Step 2:** Complete questions below for Project Type Determination.

The project is (select one): □ New Development √ Redevelopment

The total proposed, newly created and/or replaced impervious area is: 154,137 ft$^2$

Is the project in any of the following categories, (a) through (f) below?

| | | | |
|---|---|---|---|
| Yes √ | No □ | (a) | New development projects or redevelopment projects that create and/or replaced 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects. |
| Yes √ | No □ | (b) | Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects. |
| Yes □ | No √ | (c) | New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses:<br>(i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812).<br>(ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater.<br>(iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.<br>(iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles. |
| Yes □ | No √ | (d) | New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharge directly to an Environmentally Sensitive Area (ESA). "Discharge 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).<br>Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and SDRWQCB; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and SDRWQCB; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See manual Section 1.4.2 for additional guidance. |
| Yes<br>□ | No<br>√ | (e) | New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses:<br>(i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.<br>(ii) Retail gasoline outlets. This category includes retail gasoline outlets that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic of 100 or more vehicles per day. |
| Yes<br>√ | No<br>□ | (f) | New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction.<br>*Note: See manual Section 1.4.2 for additional guidance.* |

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

✓ Yes – **The project is a <u>Priority Development Project</u>, the applicant shall provide PDP Post Construction BMPs and *continue to Step 3*.**

□No – **The project is a <u>Standard or Basic Project</u>. *Stop here and complete the "City of Encinitas Stormwater Intake Form for All Developments and Standard Projects SWQMP".***

The following is for <u>*redevelopment PDPs*</u> only:

The area of existing (pre-project) impervious area at the project site is: 59,231 $ft^2$ (A)
The total proposed newly created or replaced impervious area is: 154,137 $ft^2$ (B)
Percent impervious surface created or replaced (B/A)*100: 260%
The percent impervious surface created or replaced is (select one based on the above calculation):

□ Less than or equal to fifty percent (50%) – only new and/or replaced impervious areas are considered PDP subject to treatment and HMP criteria
OR

✓ Greater than fifty percent (50%) – the entire site is a PDP; treatment and HMP criteria apply to entire site regardless of whether it is replaced

| | | |
|---|---|---|
| **<u>Step 3 (PDPs only):</u>**<br>Do hydromodification control requirements apply?<br>See Section 1.6 of the BMP Design Manual for guidance. | √ Yes | PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6).<br>***Go to Step 4.*** |
| | □No | PDP structural BMPs required for pollutant control (Chapter 5) only.<br>Provide brief discussion of exemption to hydromodification control below.<br>***Go to "Site Information Checklist"*** |

| Discussion / justification if hydromodification control requirements do not apply: | | |
|---|---|---|
| **Step 4 (PDPs subject to treatment and hydromodification controls):** Does protection of critical coarse sediment yield areas apply based on review of City of Encinitas Potential Critical Coarse Sediment Yield Area Map? See Section 6.2 of the BMP Design Manual for guidance. | □Yes | Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). ***Go to "Site Information Checklist"*** |
| | √ No | Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. ***Go to "Site Information Checklist"*** |

# SITE INFORMATION CHECKLIST

| | |
|---|---|
| Project's Watershed<br>(Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier) | Carlsbad Hydrologic Unit, Escondido Creek Area, San Elijo Sub-Area, 904.61 |
| Parcel Area<br>(Total area of Assessor's Parcel(s) associated with the project) | 5.20 Acres Gross (4.87 ac net) |
| Area to be Disturbed by the Project<br>(Project Area) | 4.96 Acres |
| Project Proposed Impervious Area<br>(Subset of Project Area) | 3.54 Acres |
| Project Proposed Pervious Area<br>(Subset of Project Area) | 1.42 Acres |
| Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area. | |

**Description of Existing Site Condition**

Current status of the site (select all that apply):

√ Existing development

□Previously graded but not built out

□Demolition completed without new construction

□Agricultural or other non-impervious use

□Vacant, undeveloped/natural

Description / Additional Information:
The site exists as a church, with associated buildings, playground hardscape, landscape and parking lot.

Existing Land Cover includes (select all that apply):

√ Vegetative Cover

√ Non-Vegetated Pervious Areas

√ Impervious Areas

Description / Additional Information:
Existing asphalt driveway, concrete walkways, lawn, trees, gravel, and other landscape.

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:
No existing natural hydrologic features exist.

**Description of Existing Site Drainage Patterns**

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

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

Describe existing site drainage patterns:

In the existing condition, storm water runoff mainly flows overland from the northeast corner of the property toward the southwest corner of the property where it flows into a manmade vegetated swale along the western PL and into the Munevar Road right-of-way. There is no storm water infrastructure onsite. The swale discharges onto the sidewalk on Munevar Road and flows to the gutter which conveys flows westerly to MacKinnon Ave. Runoff then flows southerly to a curb inlet at the northeast corner of MacKinnon Ave. and Cathy Ln. Storm water is then conveyed via a 36" CMP westerly into a drainage channel and picked up through a headwall and 54" CIPIP which continues westerly through the Encinitas Community Park into an unlined open channel and then into a natural creek which flows southwesterly. Storm water is then conveyed to a 60" RCP at Birmingham Dr. which discharges to a concrete channel that runs southerly along Highway 101. The concrete channel drains to the mouth of the San Elijo Lagoon approximately 800 feet east of the Pacific Ocean. The total distance traveled from the site to the outlet is approximately 1.6 miles.

Offsite storm water along the eastern boundary of the site is collected in a concrete ditch that runs parallel to the property line. The ditch conveys flow southerly to a 3'x3' concrete catch basin which outlets via a curb outlet onto Munevar Road. Small landscaped areas of off-site run-on exist to the east that are not captured in the concrete ditch and flow onto the project site.

| Drainage Basin | Area (ac) | Q100 (cfs) |
|---|---|---|
| Pre-project | 5.0 | 11.31 |

| **Description of Proposed Site Development** |
|---|
| Project Description / Proposed Land Use and/or Activities:<br><br>The project proposes to develop the existing site into forty-three residential lots, one private road lot, and 7 recreational HOA lots. The proposed project consists of grading to create pads suitable for the construction of structures including a private access driveway, associated underground utilities, and one Hydromodification (HMP) Biofiltration with Partial Infiltration basin to meet the requirements for hydromodification management flow control and storm water pollutant control. |
| List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):<br><br>The proposed project includes the demolition of all existing onsite improvements and the construction of 35 single-family residences and 16 duplex residences, private asphalt roadway, hardscape walkways and patios, landscape, associated utilities and one (1) Hydromodification (HMP) Biofiltration with Partial Infiltration basin to meet the requirements for hydromodification management flow control, storm water pollutant control and to mitigate for the 100-year 6-hour storm event.<br><br>Santa Fe improvements along the frontage include closing off existing driveways and constructing an new entrance, curb ramps and sidewalk. Where the new entrance conflicts with existing improvements per 131-SI will be removed and replaced, including a bust stop and curb ramp relocation.<br><br>Munevar improvements along the frontage include 3 new driveway aprons with sidewalk per SDRSD G-14A.<br><br>City of Encinitas requires a 15% impervious area on-site contingency for subdivisions to allow for potential future homeowner improvements. Per the DMA exhibit in attachment 1, that equates to 20,105 sf of potential extra impervious area to be accounted for in stormwater calculations and sizing. |
| List/describe proposed pervious features of the project (e.g., landscape areas):<br><br>Proposed pervious features of the project include landscaped areas, permeable pavers and HMP Biofiltration with Partial Infiltration basin. |

Does the project include grading and changes to site topography?

√ Yes
□ No

Description / Additional Information:

Yes, the site will be graded to accommodate buildings pads, proposed streets and additional infrastructure. The majority of the site is in a cut condition, with a small portion of small fill in the northeast corner. Retaining walls are proposed along the project property lines to accommodate the grade differential between existing neighbor elevations and proposed project elevations.

**Description of Proposed Site Drainage Patterns**

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

√ Yes

□ No

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

Describe proposed site drainage patterns:

As in the existing condition, offsite storm water along the eastern boundary of the site is collected in a concrete ditch that runs parallel to the property line. The ditch conveys flow southerly to a 3'x3' concrete catch basin which outlets via a curb outlet onto Munevar Road. Small landscaped areas of off-site run-on exist to the east that are not captured in the concrete ditch and flow onto the project site and will be collected in the proposed stormdrain infrastructure located at the top of the proposed retaining walls. All offsite run-on will be collected and routed to the existing curb outlet onto Munevar Road.

In the proposed condition, storm water runoff from the project site in general flows from northeast to southwest and is either conveyed via the proposed private street's gutters, or captured in stormdrain on each lot that is collected in on-site private stormdrain that outlets to the HMP Biofiltration with Partial Infiltration basin in the southwestern corner of the property. Stormwater from the street is captured in curb inlet that also outlets to the basin. The BMP will discharge via a pipe and into an SDRSD D-9 type A8 cleanout, then out via two SDRSD curb outlets to Munevar Road gutter.

The HMP Biofiltration with Partial Infiltration basin will provide storm water pollutant control for the site and combined with the gravel storage system will provide hydromodification management flow control to meet the requirements the California Regional Water Quality Control Board San Diego Region municipal storm water permit (Order No. R9-2013-0001, referred to as MS4 Permit). The basin will also provide mitigation for the 100-year storm event peak discharge. See project Hydrology Report for detailed calculations.

| Drainage Basin | Pre-project | | Post-Project Unmitigated | | Post-Project Mitigated | |
|---|---|---|---|---|---|---|
| | Area (ac) | Q100 (cfs) | Area (ac) | Q100 (cfs) | Area (ac) | Q100 (cfs) |
| A | 5.0 | 11.31 | 4.9 | 21.28 | 4.9 | 6.98 |

**Identification and Narrative of Receiving Water and Pollutants of Concern**

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

Runoff from the site drains from northeast to southwest and onto Munevar Road. It then flows south and westerly to a curb inlet at the northeast corner of MacKinnon Ave. and Cathy Ln. Storm water is then conveyed via a 36" CMP westerly into a drainage channel and picked up through a headwall and 54" CIPIP which continues westerly through the Encinitas Community Park into an unlined open channel and then into a natural creek which flows southwesterly. Storm water is then conveyed to a 60" RCP at Birmingham Dr. which discharges to a concrete channel that runs southerly along Highway 101. The concrete channel drains to the mouth of the San Elijo Lagoon approximately 800 feet east of the Pacific Ocean. The total distance traveled from the site to the outlet is approximately 1.6 miles.

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

| 303(d) Impaired Water Body | Pollutant(s)/Stressor(s) | TMDLs / WQIP Highest Priority Pollutant |
|---|---|---|
| San Elijo Lagoon | Eutrophic | TMDL: None at this time<br>WQIP HPWQC: None at this time |
| San Elijo Lagoon | Indicator Bacteria | TMDL: None at this time<br>WQIP HPWQC: None at this time |
| San Elijo Lagoon | Oxygen, Dissolved | TMDL: None at this time<br>WQIP HPWQC: None at this time |
| San Elijo Lagoon | Phosphorus | TMDL: None at this time<br>WQIP HPWQC: None at this time |
| San Elijo Lagoon | Sedimentation/Siltation | TMDL: None at this time<br>WQIP HPWQC: None at this time |
| San Elijo Lagoon | Toxicity | TMDL: None at this time<br>WQIP HPWQC: None at this time |
| San Elijo Lagoon | Turbidity | TMDL: None at this time<br>WQIP HPWQC: None at this time |
| Pacific Ocean Shoreline, San Elijo HSA, at Cardiff State Beach at San Elijo Lagoon | Indicator Bacteria | TMDL: None at this time<br>WQIP HPWQC: None at this time |

| **Identification of Project Site Pollutants*** <br> ***Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)** | | | |
|---|---|---|---|
| Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6): | | | |
| **Pollutant** | **Not Applicable to the Project Site** | **Expected from the Project Site** | **Also a Receiving Water Pollutant of Concern** |
| Sediment | | | |
| Nutrients | | | |
| Heavy Metals | | | |
| Organic Compounds | | | |
| Trash & Debris | | | |
| Oxygen Demanding Substances | | | |
| Oil & Grease | | | |
| Bacteria & Viruses | | | |
| Pesticides | | | |

**Hydromodification Management Requirements**

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

√ Yes, hydromodification management flow control structural BMPs required.

□ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

□ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

□ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

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

**Critical Coarse Sediment Yield Areas***

*This section only required if hydromodification management requirements apply

Based on the maps provided within the City of Encinitas Engineering Design Manual dated January 2016, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

□ Yes

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

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

□ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite

□ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment

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

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

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

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

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

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

Discussion / Additional Information:

Pursuant to the City of Encinitas Potential Critical Coarse Sediment Yield Area GIS layer, critical coarse sediment yield areas do not exist on the site within proposed grading areas. Refer to the exhibit in Attachment 2b.

**Flow Control for Post-Project Runoff***

*This section only required if hydromodification management requirements apply

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

There is one POC for the project, POC-1, located at the southwest corner of the site. Refer to the HMP exhibit located in Attachment 2a.

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 low flow threshold 0.1Q2

□ Yes, the result is low flow threshold 0.3Q2

□ Yes, the result is low flow threshold 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.

A Biofiltration with Partial Infiltration with gravel storage will be utilized for this project to meet hydromodification flow control and pollutant control requirements. Detained stormwater runoff will then slowly release via a low flow orifice.

**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.

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

# SOURCE CONTROL BMP CHECKLIST

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 manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the 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 |
| **SC-2** Storm Drain Stenciling or Signage | √ Yes | □No | □N/A |
| **SC-3** Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal | □Yes | □No | √ N/A |
| **SC-4** Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal | □Yes | □No | √ N/A |
| **SC-5** Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal | □Yes | □No | √N/A |
| **SC-6** Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below) | | | |
| √ Onsite storm drain inlets | √ Yes | No | N/A |
| □Interior floor drains and elevator shaft sump pumps drain to sewer | Yes | No | √ N/A |
| □Interior parking garages drain to sewer | 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/Trash areas must be covered | √ Yes | No | N/A |
| □Industrial processes | Yes | No | √ N/A |
| □Outdoor storage of equipment or materials must be covered | Yes | No | √ N/A |
| □Vehicle and equipment cleaning | Yes | No | √ N/A |
| □Vehicle/equipment repair and maintenance | Yes | No | √ N/A |
| □Fuel dispensing areas | Yes | No | √ N/A |
| □Loading docks | Yes | No | √ N/A |
| ☐ Fire sprinkler test water | Yes | No | √N/A |
| √ Miscellaneous drain or wash water | √ Yes | No | N/A |
| √ Plazas, sidewalks, and parking lots | √ Yes | No | N/A |

Discussion / justification if SC-1 through SC-6 not implemented. Justification must be provided for ALL "No" answers shown above.

- Effective irrigation will be provided to minimize overspray and subsequent runoff.
- New catch basins and curb inlets in the proposed design will include stenciling and signage describing storm water pollution prevention information.

- Home owners will keep trash cans within garages
- Pest control management measures will include integrated pest management information provided to owners, lessees, and operators. This may include: Seal all penetrations in the foundation wall and at joints between the foundation and exterior above grade walls.
Seal all cracks around plumbing and wiring penetrations and cover with metal flashing.
In moderate to heavy termite areas, take additional precautions including using solid concrete or filled concrete block at the top of foundation walls, reinforcing concrete slabs and walls to minimize cracking, and using treated wood or metal sill plates.
Employ durable mesh and screening at all vents, use bug screens on all openable windows, install flashing around doors and windows, use weather stripping and tight-fitting metal and/or rubber door sweeps to reduce pest access at these common entry points.
- Proposed landscaping will be maintained using minimal to no pesticides.
- Miscellaneous drain or wash water will be inspected for any potential runoff issues.
- Plazas, sidewalks, and parking lots will be swept and cleaned regularly to prevent runoff of debris.

## SITE DESIGN BMP CHECKLIST

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 manual for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

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

| Source Control Requirement | Applied? | | |
|---|---|---|---|
| **SD-1** Maintain Natural Drainage Pathways and Hydrologic Features | ☐Yes | □No | √N/A |
| **SD-2** Conserve Natural Areas, Soils, and Vegetation | Yes | □No | √ N/A |
| **SD-3** Minimize Impervious Area | √ Yes | □No | □N/A |
| **SD-4** Minimize Soil Compaction | √ Yes | □No | □N/A |
| **SD-5** Impervious Area Dispersion - Directly Connected Impervious Areas (e.g. roof downspouts connected to street) are not allowed | √ Yes | □No | □N/A |
| **SD-6** Runoff Collection | √ Yes | □No | □N/A |
| **SD-7** Landscaping with Native or Drought Tolerant Species | √ Yes | □No | □N/A |
| **SD-8** Harvesting and Using Precipitation | □Yes | √ No | □N/A |

Discussion / justification if SD-1 through SD-8 not implemented. Justification must be provided for ALL "No" answers shown above.

- Impervious areas have been minimized with the use of permeable pavers, and the streets and sidewalks have been designed to the minimum widths.
- Soil compaction will be minimized in the proposed landscape areas.
- Impervious area dispersion is provided with the use of permeable paver driveways and hardscape to drain over landscape or into landscaped BMP.
- Runoff collection is provided with the use of permeable pavers and stormdrain that outlets into BMP.
- Landscaping design shall consist of native and drought tolerant species.
- Harvest and use of precipitation is not implemented because the amount of landscaped area is less than 30% of the project footprint which is required per Section B.1.4 of the BMPDM.

## PDP STRUCTURAL BMPS

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

PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity (see Section 7 of the BMP Design Manual). The local jurisdiction will confirm the maintenance annually.

Use this section 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.

Step 1A: The DMA is not self-mitigating, de minimis, or self-retaining.

Step 1B: Permeable pavers are proposed as a site design BMP for the project and therefore, the runoff factor has been adjusted accordingly.

Step 2: Harvest and use is not feasible. Refer to Attachment 1c.

Step 3: Partial infiltration is feasible. Refer to Attachment 1d.

Step 3C: PR-1 Biofiltration with Partial Infiltration BMP has been selected and sized per the design criteria to meet pollutant control and hydromodification management flow control requirements. A green belt along the Munevar Road frontage will be kept with existing trees and be maintained.

## STRUCTURAL BMP SUMMARY INFORMATION

Copy this page as necessary to provide information on each individual proposed structural BMP

| | |
|---|---|
| Structural BMP ID No: BMP-A | DMA No: A |
| Construction Plan Sheet No: C8, C11, C13 | |
| Type of structural BMP:<br>□Retention by harvest and use (HU-1)<br>□Retention by infiltration basin (INF-1)<br>□Retention by bioretention (INF-2)<br>□Retention by permeable pavement (INF-3)<br>√ Partial retention by biofiltration with partial retention (PR-1)<br>□ Biofiltration (BF-1)<br>√ Biofiltration with Nutrient Sensitive Media Design (BF-2)<br>□Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F<br>□Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)<br>□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)<br>□Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below)<br>□Detention pond or vault for hydromodification management<br>□Other (describe in discussion section below) | |
| Purpose:<br>□Pollutant control only<br>□Hydromodification control only<br>√ Combined pollutant control and hydromodification control<br>□Pre-treatment/forebay for another structural BMP<br>□Other (describe in discussion section below) | |
| Who will inspect and certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms required by the City Engineer (See Section 1.12 of the BMP Design Manual) | W. Justin Suiter, RCE 68964<br>Pasco Laret Suiter & Associates<br>119 Aberdeen Drive<br>Cardiff, CA 92007 |
| Who will be the final owner of this BMP? | HOA |
| Who will maintain this BMP into perpetuity? | HOA |
| What is the funding mechanism for maintenance? | HOA |

## ATTACHMENT 1 - BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

**Indicate which items are included behind this cover sheet:**

| Attachment | Contents | Checklist |
|---|---|---|
| Attachment 1a | DMA Exhibit (Required)<br><br>See DMA Exhibit Checklist on the back of this Attachment cover sheet. | √ Included |
| Attachment 1b | Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)*<br><br>*Provide table in this Attachment OR on DMA Exhibit in Attachment 1a | √ Included on DMA Exhibit in Attachment 1a<br>√ 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)<br><br>Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7. | √ Included<br>□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)<br><br>Refer to Appendices C and D of the BMP Design Manual to complete Form I-8. | √ Included<br>□Not included because the entire project will use harvest and use BMPs |
| Attachment 1e | Pollutant Control BMP Design Worksheets / Calculations (Required)<br><br>Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines | √ Included |

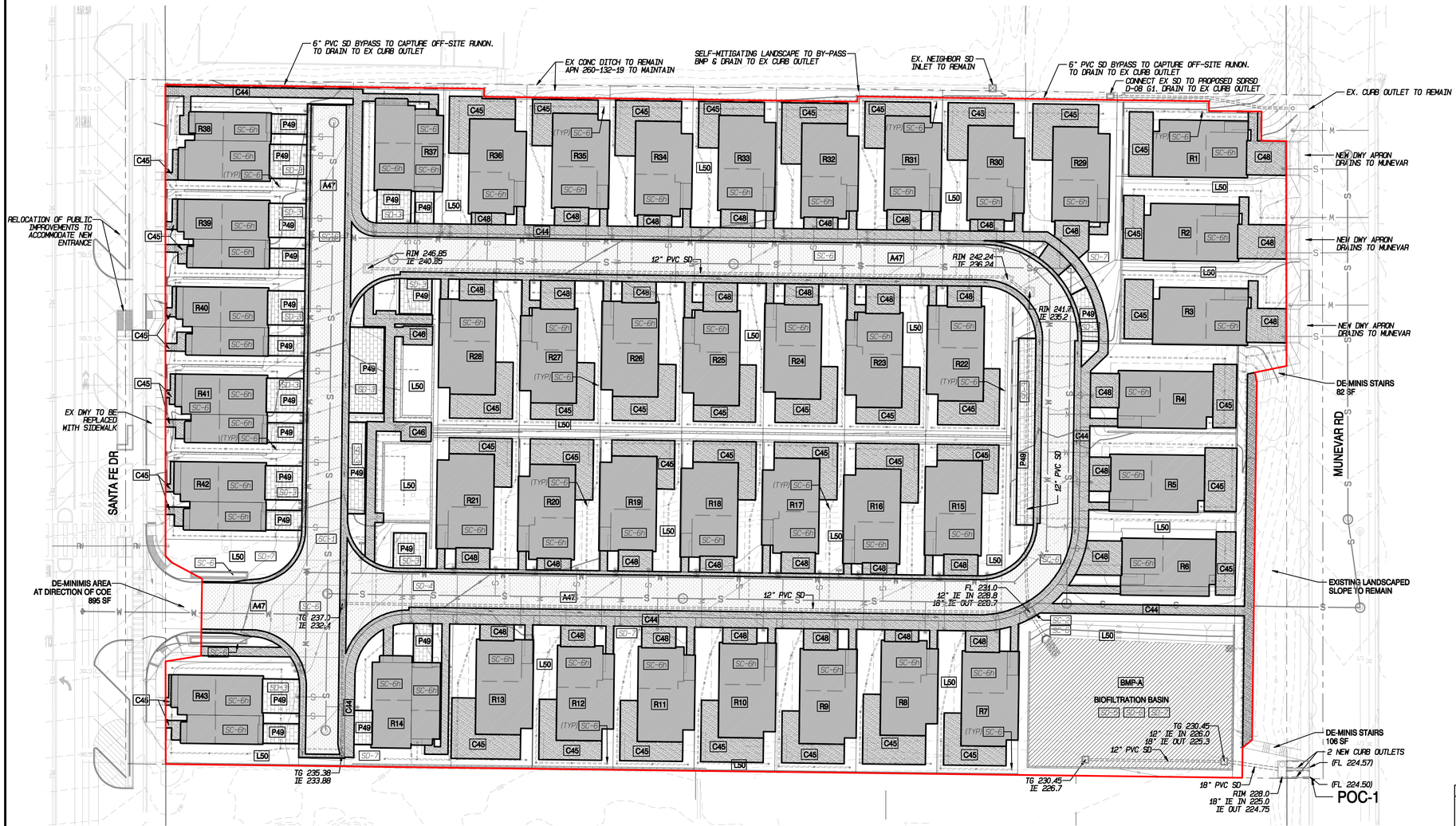
**ATTACHMENT 1A/1B**

**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 (if present)
☑ 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)
☑ Structural BMPs (identify location and type of BMP)
☑Tabular DMA Summary

# DRAINAGE MANAGEMENT AREA & HMP EXHIBIT
# 845 SANTA FE DRIVE
# MULTI-004398-2021




## BASIN A WQV SIZING

| DMA NAME | DMA AREA | PPST | DMA RF | RF * AREA | SOIL TYPE | IMP NAME |
|---|---|---|---|---|---|---|
| | | | | | D | BMP-A |
| R1 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R2 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R3 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R4 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R5 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R6 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R7 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R8 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R9 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R10 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R11 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R12 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R13 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R14 | 2,275 | ROOF | 0.9 | 2,048 | | |
| R15 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R16 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R17 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R18 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R19 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R20 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R21 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R22 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R23 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R24 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R25 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R26 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R27 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R28 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R29 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R30 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R31 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R32 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R33 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R34 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R35 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R36 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R37 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R38 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R39 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R40 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R41 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R42 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R43 | 1,636 | ROOF | 0.9 | 1,472 | | |
| C44 | 16,914 | PCC | 0.9 | 15,223 | | |
| C45 | 18,753 | PCC | 0.9 | 16,878 | | |
| C46 | 1,325 | PCC | 0.9 | 1,193 | | |
| A47 | 24,747 | AC | 0.9 | 22,272 | | |
| C48 | 7,702 | PCC | 0.9 | 6,932 | | |
| P49 | 7,158 | PAV | 0.1 | 716 | IMP | MIN PROP |
| L50 | 63,185 | L | 0.3 | 18,956 | SF | AREA AREA |
| TOTAL | 204,375 | TOTAL | | 140,301 | 0.03 | 4,209 7,053 IMP AREA |

## WQV 15% CONTINGENCY

PROPOSED IMPERVIOUS SURFACE AREA = 134,032 SF
15% CONTINGENCY = 20,105 SF

TOTAL TREATMENT AREA = 204,375 SF
CONTINGENCY IMPERVIOUS AREA = 154,137 SF
CONTINGENCY PERVIOUS AREA = 50,238 SF

| DMA NAME | DMA AREA | PPST | DMA RF | RF * AREA | SOIL TYPE | IMP NAME |
|---|---|---|---|---|---|---|
| | | | | | D | BMP-A |
| 1 | 154,137 | IMPV | 0.9 | 138,723 | | |
| 2 | 50,238 | PERV | 0.3 | 15,071 | IMP | MIN PROP |
| | | | | | SF | AREA AREA |
| | | TOTAL | | 153,794 | 0.03 | 4,614 7,053 IMP AREA |

## LEGEND

- SUBDIVISION BOUNDARY
- DMA AREA
- DMA BOUNDARY DRAINING TO BMP
- DRAINAGE MANAGEMENT AREA (DMA) X#
- PROPOSED ROOF
- PROPOSED ASPHALT CONCRETE
- PROPOSED CONCRETE
- PROPOSED PERMEABLE PAVERS
- BMP-A BIOFILTRATION BASIN

GRAPHIC SCALE 1"=30'
0 30 60 90

## SOIL TYPE INFORMATION

HYDROLOGIC SOIL TYPE: D
*TYPE D PER USGS WEB SOIL SURVEY

## DEPTH OF GROUNDWATER

DEPTH TO GROUNDWATER > 20 FEET

## EXISTING NATURAL HYDROLOGIC FEATURES

NO EXISTING NATURAL HYDROLOGIC FEATURES EXIST ON SITE

## COARSE SEDIMENT YIELD

NO CRITICAL COARSE SEDIMENT YEILD AREAS TO BE PROTECTED. REFER TO CRITICAL COARSE SEDIMENT YIELD AREA EXHIBIT PREPARED BY PASCO LARET SUITER AND ASSOCIATES

## EXISTING TOPO & IMPERVIOUS AREAS

EXISTING IMPERVIOUS AREA: 59,231 SF

SEE PROJECT EXISTING HYDROLOGY MAPS FOR MORE INFORMATION

## PROPOSED GRADING & IMPERVIOUS AREAS

SEE PROJECT PLANS FOR MORE INFORMATION

## SOURCE CONTROL BMPS

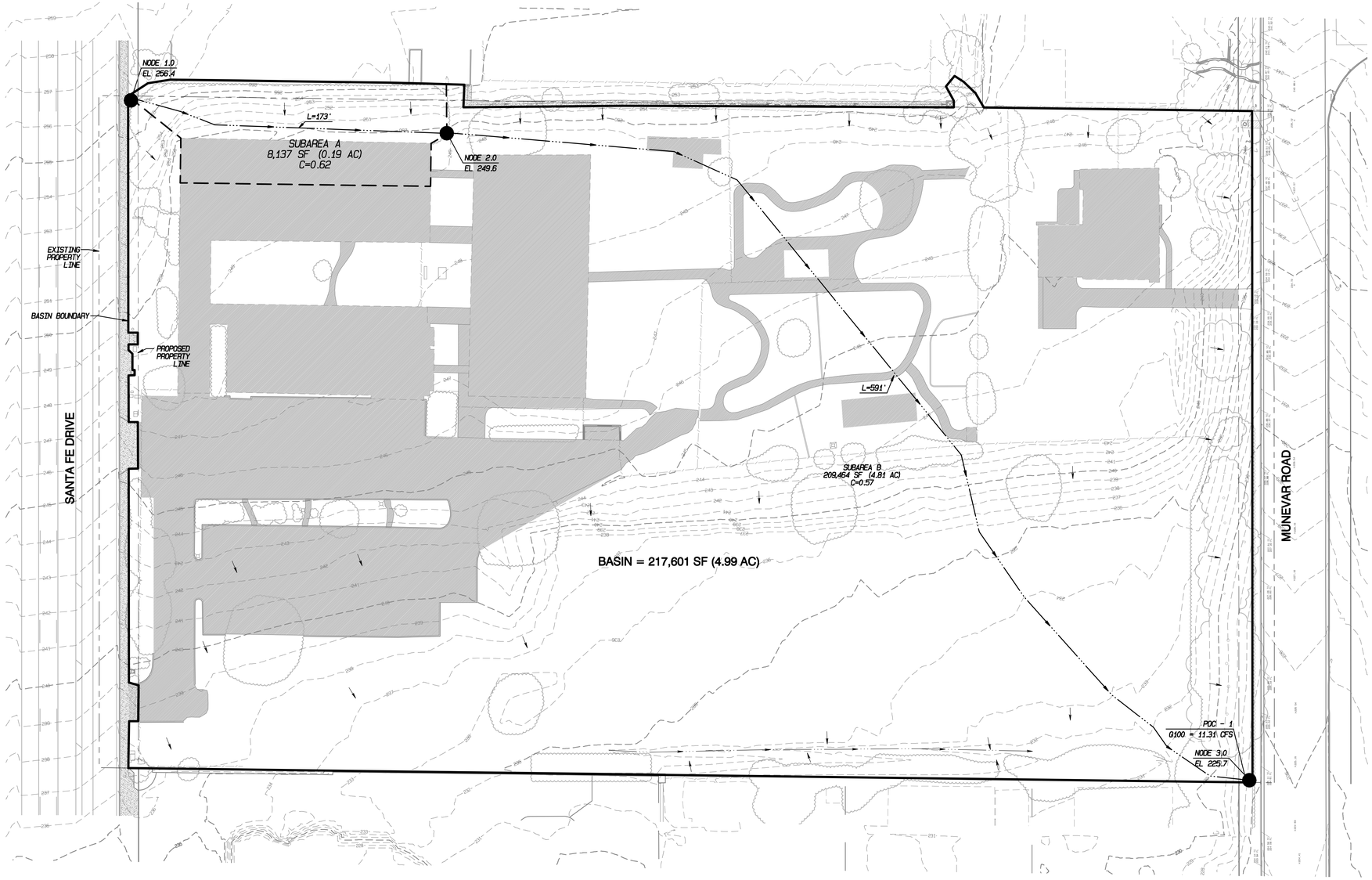
- SC-1 PREVENTION OF ILLICIT DISCHARGES INTO THE STORM DRAIN
- SC-2 STORM DRAIN STENCILING OR SIGNAGE
- SC-6 ON-SITE STORMDRAIN INLETS
  NEED FOR FUTURE INDOOR & STRUCTURAL PEST CONTROL
  LANDSCAPE/OUTDOOR PESTICIDE USE
  POOLS, SPAS, PONDS, DECORATIVE FOUNTAINS, & OTHER WATER FEATURES
  REFUSE/TRASH AREAS MUST BE COVERED (ALSO SC-5)
  FIRE SPRINKLER TEST WATER
  MISCELLANEOUS DRAIN OR WASH WATER
  PLAZAS, SIDEWALKS AND PARKING LOTS
- SD-3 MINIMIZE IMPERVIOUS AREA
- SD-4 MINIMIZE SOIL COMPACTION
- SD-5 IMPERVIOUS AREA DISPERSION
- SD-6 RUNOFF COLLECTION
- SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES

| POTENTIAL POLLUTANT SOURCE | SOURCE CONTROL |
|---|---|
| ONSITE STORM DRAIN INLETS | MARK ALL INLETS WITH THE WORDS "NO DUMPING! FLOWS TO OCEAN" OR SIMILAR. MAINTAIN AND PERIODICALLY REPAINT OR REPLACE INLET MARKINGS. PROVIDE STORM WATER POLLUTION PREVENTION INFORMATION TO NEW SITE OWNERS, LESSEES, OR OPERATORS. INCLUDE THE FOLLOWING IN LEASE AGREEMENTS: "TENANT SHALL NOT ALLOW ANYONE TO DISCHARGE ANYTHING TO STORM DRAINS OR TO STORE OR DEPOSIT MATERIALS SO AS TO CREATE A POTENTIAL DISCHARG TO STORM DRAINS." |
| FUTURE INDOOR & STURCTURAL PEST CONTROL | PEST CONTROL MANAGEMENT MEASURES WILL INCLUDE INTEGRATED PEST MANAGEMENT INFORMATION PROVIDED TO OWNERS, LESSEES, AND OPERATORS. THIS MAY INCLUDE: SEAL ALL PENETRATIONS IN THE FOUNDATION WALL AND AT JOINTS BETWEEN THE FOUNDATION AND EXTERIOR ABOVE GRADE WALLS. SEAL ALL CRACKS AROUND PLUMBING AND WIRING PENETRATIONS AND COVER WITH METAL FLASHING. IN MODERATE TO HEAVY TERMITE AREAS, TAKE ADDITIONAL PRECAUTIONS INCLUDING USING SOLID CONCRETE OR FILLED CONCRETE BLOCK AT THE TOP OF FOUNDATION WALLS, REINFORCING CONCRETE SLABS AND WALLS TO MINIMIZE CRACKING, AND USING TREATED WOOD OR METAL SILL PLATES. EMPLOY DURABLE MESH AND SCREENING AT ALL VENTS, USE BUG SCREENS ON ALL OPENABLE WINDOWS, INSTALL FLASHING AROUND DOORS AND WINDOWS, USE WEATHER STRIPPING AND TIGHT-FITTING METAL AND/OR RUBBER DOOR SWEEPS TO REDUCE PEST ACCESS AT THESE COMMON ENTRY POINTS. |
| LANDSCAPE/OUTDOOR PESTICIDE USE | FINAL LANDSCAPE PLANS SHALL:<br>PRESERVE EXISTING DROUGHT TOLERANT TREES, SHRUBS, AND GROUND COVER TO THE MAXIMUM EXTENT POSSIBLE.<br>BE DESIGNED TO MINIMIZE IRRIGATION AND RUNOFF, PROMOTE SURFACE INFILTRATION WHERE APPROPRIATE, AND MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES.<br>SPECIFY PLANTS THAT ARE TOLERANT OF PERIODIC SATURATED SOIL CONDITIONS FOR AREAS TO RETAIN OR DETAIN STORMWATER.<br>CONSIDER THE USE OF PEST-RESISTANT PLANTS, ESPECIALLY ADJACENT TO HARDSCAPE.<br>SELECT PLANTS APPROPRIATE TO SITE SOILS, SLOPES, CLIMATE, SUN, WIND, RAIN, LAND USE, AIR MOVEMENT, ECOLOGICAL CONSISTENCY, AND PLANT INTERACTIONS.<br>MAINTAIN LANDSCAPING USING MINIMUM OR NO PESTICIDES. |
| MISCELLANEOUS DRAIN OR WASH WATER | MISCELLANEOUS DRAIN OR WASH WATER WILL BE INSPECTED FOR ANY POTENTIAL RUNOFF ISSUES. |
| PLAZA, SIDEWALKS, AND PARKING LOTS | PLAZAS, SIDEWALKS, AND PARKING LOTS SHALL BE SWEPT REGULARLY TO PREVENT THE ACCUMULATIONS OF LITTER AND DEBRIS. DEBRIS FROM PRESSURE WASHING SHALL BE COLLECTED TO PREVENT ENTRY INTO THE STORM DRAIN SYSTEM. WASHWATER CONTAINING ANY CLEANING AGENT OR DEGREASER SHALL BE COLLECTED AND DISCHARGED TO THE SANITARY SEWER AND NOT DISCHARGED TO A STORM DRAIN. |

PREPARED BY:
PASCO LARET SUITER & ASSOCIATES
San Diego | Encinitas | Orange County
Phone 858.259.8212 | www.plsaengineering.com

# PRE-DEVELOPMENT HYDROLOGIC MAP
# 845 SANTA FE DRIVE






## 'C' CALCULATION

PER COUNTY HYDROLOGY MANUAL 3.1.2
C=0.9 X (IMPERVIOUS AREA) + Cp X (PERVIOUS AREA) / TOTAL AREA
Cp = 0.45 PER CITY OF ENCINITAS EDM

SUB AREA 'A'
C= (3,151 * 0.9) + (4,986 * 0.45) / (8,137)
C = 0.62

SUB AREA 'B'
C= (56,080 * 0.9) + (153,384 * 0.45) / (209,464)
C = 0.57

## LEGEND

- PROPERTY LINE
- BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- FLOWLINE (LONGEST RUN)
- FLOWLINE (LOCAL)
- IMPERVIOUS AREA — 59,231 SF

GRAPHIC SCALE 1"=30'

0 30 60 90

PREPARED BY:
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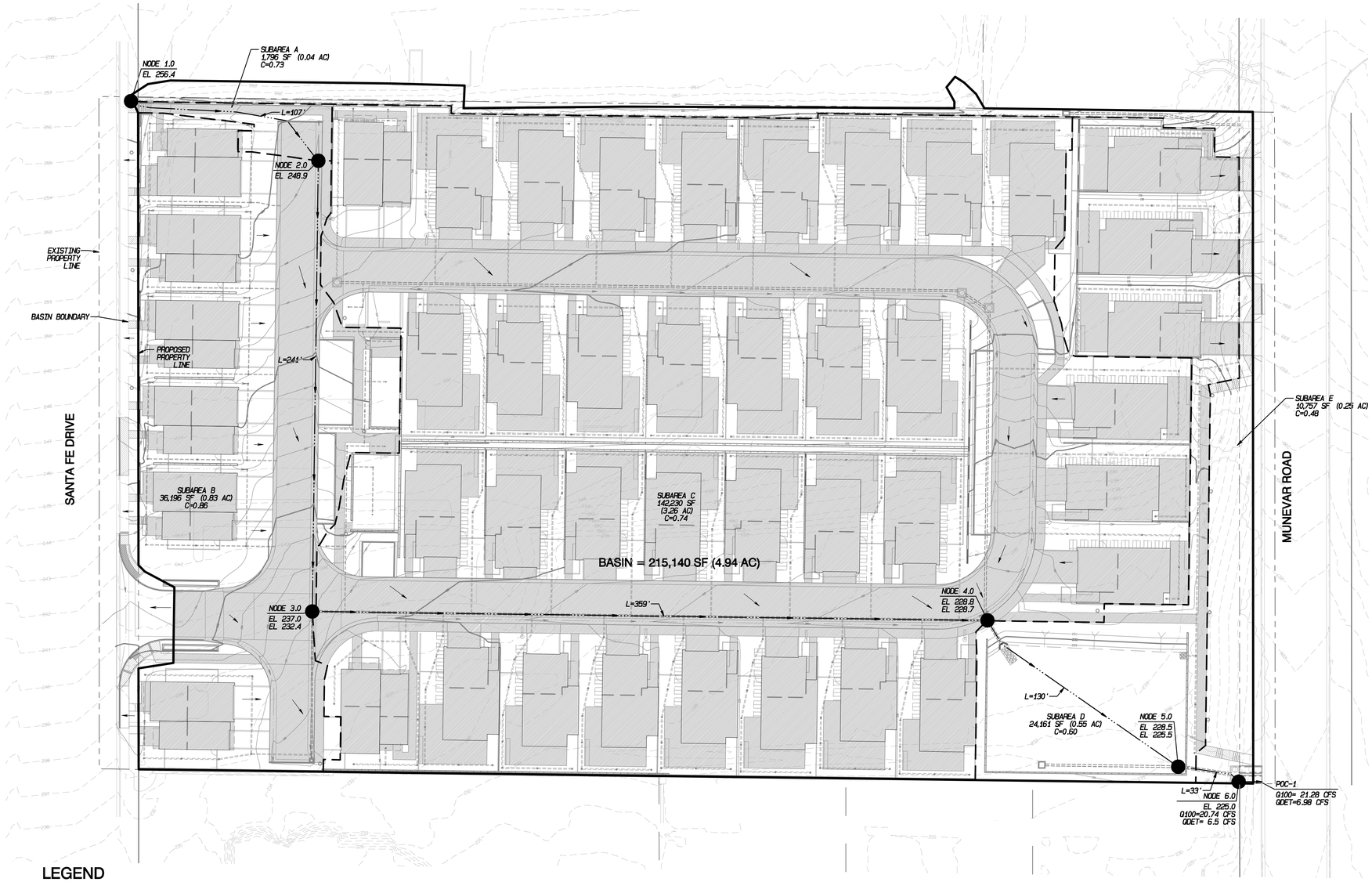
PLSA 3376 TM 6/27/2024

# POST-DEVELOPMENT HYDROLOGIC MAP
# 845 SANTA FE DRIVE




## 'C' CALCULATION

PER COUNTY HYDROLOGY MANUAL 3.1.2
C=0.9 X (IMPERVIOUS AREA) + Cp X (PERVIOUS AREA) / TOTAL AREA
Cp = 0.45 PER CITY OF ENCINITAS EDM

SUB AREA 'A'
C= (1,100 * 0.9) + (696 * 0.45) / (1,796)
C = 0.73

SUB AREA 'B'
C= (33,197 * 0.9) + (2,999 * 0.45) / (36,196)
C = 0.86

SUB AREA 'C'
C= (91,457 * 0.9) + (50,773 * 0.45) / (142,230)
C = 0.74

SUB AREA 'D'
C= (8,278 * 0.9) + (15,883 * 0.45) / (24,161)
C = 0.60

SUB AREA 'E'
C= (749 * 0.9) + (10,008 * 0.45) / (10,757)
C = 0.48

## LEGEND

| | |
|---|---|
| PROPERTY LINE | |
| BASIN BOUNDARY | |
| SUB-BASIN BOUNDARY | |
| FLOWLINE (LONGEST RUN) | |
| FLOWLINE (LOCAL) | |
| PROPOSED STORMDRAIN | |
| IMPERVIOUS AREA DRAINING TO BASIN | 134,032 SF |
| IMPERVIOUS AREA DRAINING OFF-SITE | 1,459 SF |

GRAPHIC SCALE 1"=30'

0 30 60 90

PREPARED BY:
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Phone 858.259.8212 | www.plsaengineering.com

PLSA 3376 TM 6/27/2024

**ATTACHMENT 1C**

**Worksheet B.3-1. Harvest and Use Feasibility Screening**

| **Harvest and Use Feasibility Screening** | **Worksksheet B.3-1** |
|---|---|

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.

Toilet/Urinal Flushing
(9.3 gal/person-day) x (0.13368 cf/gal) x (1.5 days) = 1.86 cf/person-36hr
Assume (3 people per house x 51 houses) x (1.86 cf/person-36 hr) = **285 cf/36hr**

Landscape Irrigation
(1.53 ac irrigated) x (1,470 gal/ac-36hr) x (0.13368 cuft/gal) = **301 cf/36hr**

**Total = 285 cf/36hr + 301 cf/36hr = 586 cuft/36hr**

3. Calculate the DCV using worksheet B-2.1.

DCV = 6,438 cf

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

**ATTACHMENT 1D**

| Categorization of Infiltration Feasibility Condition | FORM I-8 |
|---|---|

**Part 1 - Full Infiltration Feasibility Screening Criteria**

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

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

Provide basis:

Based on our field percolation testing, the in-situ infiltration rates of the soils within the limits of proposed residential development are generally less than 0.5 inches per hour (Leighton, 2020). The calculated infiltration rates via the Porchet Method and applied safety factor of 2 ranges from 0.007 to 0.098 inches per hour.

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

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

Provide basis:

The geotechnical hazards would not be increased provided mitigation is performed for any underground utilities/structures, slopes (i.e., setbacks) and undocumented fill depths greater than 5 feet within the proposed limits of Hydromodification Basins at the subject site. The calculated infiltration rates via the Porchet Method and applied safety factor of 2 ranges from 0.007 to 0.098 inches per hour.

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

| FORM I-8 Page 2 of 4 | | | |
|---|---|---|---|
| Criteria | Screening Question | **Yes** | **No** |
| 3 | **Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br><br>If the infiltration rates were greater than 0.5 inches per hour, it may be possible that the risk of groundwater contamination would not be increased provided there are no known contaminated soil or groundwater sites within 250 feet of the proposed Hydromodification Basins at the subject site. The calculated infiltration rates via the Porchet Method and applied safety factor of 2 ranges from 0.007 to 0.098 inches per hour.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 4 | **Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br><br>If the infiltration rates were greater than 0.5 inches per hour, it may be possible that potential water balance issues would not be affected provided there are no unlined site drainages/creeks/streams within 250 feet of the proposed Hydromodification Basins at the subject site. The calculated infiltration rates via the Porchet Method and applied safety factor of 2 ranges from 0.007 to 0.098 inches per hour.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| **Part 1 Result*** | If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration**<br><br>If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2 | | Go to Part 2 |

## FORM I-8 Page 3 of 4

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

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

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

Provide basis:

Based on our field percolation testing, the in-situ infiltration rates of the soils within the limits of proposed the site are less than 0.5 inches per hour (Leighton, 2020), but greater than 0.01 inches per hour. The calculated infiltration rates via the Porchet Method and applied safety factor of 2 ranges from 0.007 to 0.098 inches per hour.

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

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

Provide basis:

For a partial infiltration condition (greater than 0.01 inches per hour), the risk of geotechnical hazards will not be increased by partial infiltration provided mitigation is performed for any underground utilities/structures, slopes (i.e., setbacks) and undocumented fill depths greater than 5 feet within the vicinity of proposed Hydromodification Basins at the subject site. Mitigation includes subsurface vertical barriers and subdrains to limit perched ground water mounding conditions.

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

| FORM I-8 Page 4 of 4 | | | |
|---|---|---|---|
| Criteria | Screening Question | **Yes** | **No** |
| 7 | **Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br><br>For a partial infiltration condition (greater than 0.01 inches per hour), the risk of groundwater contamination will not be increased by partial infiltration provided there are no known contaminated soil or groundwater sites within 250 feet of the proposed Hydromodification Basins at the subject site.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates. | | | |
| 8 | **Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br><br>For a partial infiltration condition (greater than 0.01 inches per hour), violation of downstream water rights is not anticipated based on the site location and that there are no unlined site drainages/creeks/streams within 250 feet of the proposed Hydromodification Basins at the subject site.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates. | | | |
| **Part 2 Result*** | If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.**<br><br>If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.** | | Yes, Partial Infiltration feasibility |

**ATTACHMENT 1E**

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

| Category | # | Description | *i* | Units |
|---|---|---|---|---|
| Standard Drainage Basin Inputs | 1 | Drainage Basin ID or Name | A | unitless |
| | 2 | 85th Percentile 24-hr Storm Depth | 0.54 | inches |
| | 3 | Impervious Surfaces Not Directed to Dispersion Area (C=0.90) | 154,137 | sq-ft |
| | 4 | Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30) | 0 | sq-ft |
| | 5 | Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10) | 50,238 | sq-ft |
| | 6 | Natural Type A Soil Not Serving as Dispersion Area (C=0.10) | 0 | sq-ft |
| | 7 | Natural Type B Soil Not Serving as Dispersion Area (C=0.14) | 0 | sq-ft |
| | 8 | Natural Type C Soil Not Serving as Dispersion Area (C=0.23) | 0 | sq-ft |
| | 9 | Natural Type D Soil Not Serving as Dispersion Area (C=0.30) | 0 | sq-ft |
| Dispersion Area, Tree Well & Rain Barrel Inputs (Optional) | 10 | Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels? | No | yes/no |
| | 11 | Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90) | | sq-ft |
| | 12 | Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30) | | sq-ft |
| | 13 | Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10) | | sq-ft |
| | 14 | Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10) | | sq-ft |
| | 15 | Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14) | | sq-ft |
| | 16 | Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23) | | sq-ft |
| | 17 | Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30) | | sq-ft |
| | 18 | Number of Tree Wells Proposed per SD-A | | # |
| | 19 | Average Mature Tree Canopy Diameter | | ft |
| | 20 | Number of Rain Barrels Proposed per SD-E | | # |
| | 21 | Average Rain Barrel Size | | gal |
| Initial Runoff Factor Calculation | 22 | Total Tributary Area | 204,375 | sq-ft |
| | 23 | Initial Runoff Factor for Standard Drainage Areas | 0.70 | unitless |
| | 24 | Initial Runoff Factor for Dispersed & Dispersion Areas | 0.00 | unitless |
| | 25 | Initial Weighted Runoff Factor | 0.70 | unitless |
| | 26 | Initial Design Capture Volume | 6,438 | cubic-feet |
| Dispersion Area Adjustments | 27 | Total Impervious Area Dispersed to Pervious Surface | 0 | sq-ft |
| | 28 | Total Pervious Dispersion Area | 0 | sq-ft |
| | 29 | Ratio of Dispersed Impervious Area to Pervious Dispersion Area | n/a | ratio |
| | 30 | Adjustment Factor for Dispersed & Dispersion Areas | 1.00 | ratio |
| | 31 | Runoff Factor After Dispersion Techniques | 0.70 | unitless |
| | 32 | Design Capture Volume After Dispersion Techniques | 6,438 | cubic-feet |
| Tree & Barrel Adjustments | 33 | Total Tree Well Volume Reduction | 0 | cubic-feet |
| | 34 | Total Rain Barrel Volume Reduction | 0 | cubic-feet |
| Results | 35 | Final Adjusted Runoff Factor | 0.70 | unitless |
| | 36 | Final Effective Tributary Area | 143,063 | sq-ft |
| | 37 | Initial Design Capture Volume Retained by Site Design Elements | 0 | cubic-feet |
| | 38 | Final Design Capture Volume Tributary to BMP | 6,438 | cubic-feet |

**No Warning Messages**

# Automated Worksheet B.2: Retention Requirements (V2.0)

| Category | # | Description | *i* | Units |
|---|---|---|---|---|
| Basic Analysis | 1 | Drainage Basin ID or Name | A | unitless |
| | 2 | 85th Percentile Rainfall Depth | 0.54 | inches |
| | 3 | Predominant NRCS Soil Type Within BMP Location | D | unitless |
| | 4 | Is proposed BMP location Restricted or Unrestricted for Infiltration Activities? | Unrestricted | unitless |
| | 5 | Nature of Restriction | n/a | unitless |
| | 6 | Do Minimum Retention Requirements Apply to this Project? | Yes | yes/no |
| | 7 | Are Habitable Structures Greater than 9 Stories Proposed? | No | yes/no |
| Advanced Analysis | 8 | Has Geotechnical Engineer Performed an Infiltration Analysis? | Yes | yes/no |
| | 9 | Design Infiltration Rate Recommended by Geotechnical Engineer | 0.049 | in/hr |
| Result | 10 | Design Infiltration Rate Used To Determine Retention Requirements | 0.049 | in/hr |
| | 11 | Percent of Average Annual Runoff that Must be Retained within DMA | 4.5% | percentage |
| | 12 | Fraction of DCV Requiring Retention | 0.02 | ratio |
| | 13 | Required Retention Volume | 129 | cubic-feet |

**No Warning Messages**

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

| Category | # | Description | *i* | Units |
|---|---|---|---|---|
| BMP Inputs | 1 | Drainage Basin ID or Name | A | sq-ft |
| | 2 | Design Infiltration Rate Recommended | 0.049 | in/hr |
| | 3 | Design Capture Volume Tributary to BMP | 6,438 | cubic-feet |
| | 4 | Is BMP Vegetated or Unvegetated? | Vegetated | unitless |
| | 5 | Is BMP Impermeably Lined or Unlined? | Unlined | unitless |
| | 6 | Does BMP Have an Underdrain? | Underdrain | unitless |
| | 7 | Does BMP Utilize Standard or Specialized Media? | Standard | unitless |
| | 8 | Provided Surface Area | 7,053 | sq-ft |
| | 9 | Provided Surface Ponding Depth | 18 | inches |
| | 10 | Provided Soil Media Thickness | 18 | inches |
| | 11 | Provided Gravel Thickness (Total Thickness) | 17 | inches |
| | 12 | Underdrain Offset | 3 | inches |
| | 13 | Diameter of Underdrain or Hydromod Orifice (Select Smallest) | 2.20 | inches |
| | 14 | Specialized Soil Media Filtration Rate | | in/hr |
| | 15 | Specialized Soil Media Pore Space for Retention | | unitless |
| | 16 | Specialized Soil Media Pore Space for Biofiltration | | unitless |
| | 17 | Specialized Gravel Media Pore Space | | unitless |
| Retention Calculations | 18 | Volume Infiltrated Over 6 Hour Storm | 173 | cubic-feet |
| | 19 | Ponding Pore Space Available for Retention | 0.00 | unitless |
| | 20 | Soil Media Pore Space Available for Retention | 0.05 | unitless |
| | 21 | Gravel Pore Space Available for Retention (Above Underdrain) | 0.00 | unitless |
| | 22 | Gravel Pore Space Available for Retention (Below Underdrain) | 0.40 | unitless |
| | 23 | Effective Retention Depth | 2.10 | inches |
| | 24 | Fraction of DCV Retained (Independent of Drawdown Time) | 0.22 | ratio |
| | 25 | Calculated Retention Storage Drawdown Time | 43 | hours |
| | 26 | Efficacy of Retention Processes | 0.35 | ratio |
| | 27 | Volume Retained by BMP (Considering Drawdown Time) | 2,230 | cubic-feet |
| | 28 | Design Capture Volume Remaining for Biofiltration | 4,208 | cubic-feet |
| Biofiltration Calculations | 29 | Max Hydromod Flow Rate through Underdrain | 0.2566 | cfs |
| | 30 | Max Soil Filtration Rate Allowed by Underdrain Orifice | 1.57 | in/hr |
| | 31 | Soil Media Filtration Rate per Specifications | 5.00 | in/hr |
| | 32 | Soil Media Filtration Rate to be used for Sizing | 1.57 | in/hr |
| | 33 | Depth Biofiltered Over 6 Hour Storm | 9.43 | inches |
| | 34 | Ponding Pore Space Available for Biofiltration | 1.00 | unitless |
| | 35 | Soil Media Pore Space Available for Biofiltration | 0.20 | unitless |
| | 36 | Gravel Pore Space Available for Biofiltration (Above Underdrain) | 0.40 | unitless |
| | 37 | Effective Depth of Biofiltration Storage | 27.20 | inches |
| | 38 | Drawdown Time for Surface Ponding | 11 | hours |
| | 39 | Drawdown Time for Effective Biofiltration Depth | 17 | hours |
| | 40 | Total Depth Biofiltered | 36.63 | inches |
| | 41 | Option 1 - Biofilter 1.50 DCV: Target Volume | 6,312 | cubic-feet |
| | 42 | Option 1 - Provided Biofiltration Volume | 6,312 | cubic-feet |
| | 43 | Option 2 - Store 0.75 DCV: Target Volume | 3,156 | cubic-feet |
| | 44 | Option 2 - Provided Storage Volume | 3,156 | cubic-feet |
| | 45 | Portion of Biofiltration Performance Standard Satisfied | 1.00 | ratio |
| Result | 46 | Do Site Design Elements and BMPs Satisfy Annual Retention Requirements? | Yes | yes/no |
| | 47 | Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor) | 1.00 | ratio |
| | 48 | **Deficit of Effectively Treated Stormwater** | **0** | cubic-feet |

**No Warning Messages**

# E.18 PR-1 Biofiltration with Partial Retention

*Location: 805 and Bonita Road, Chula vista, CA.*

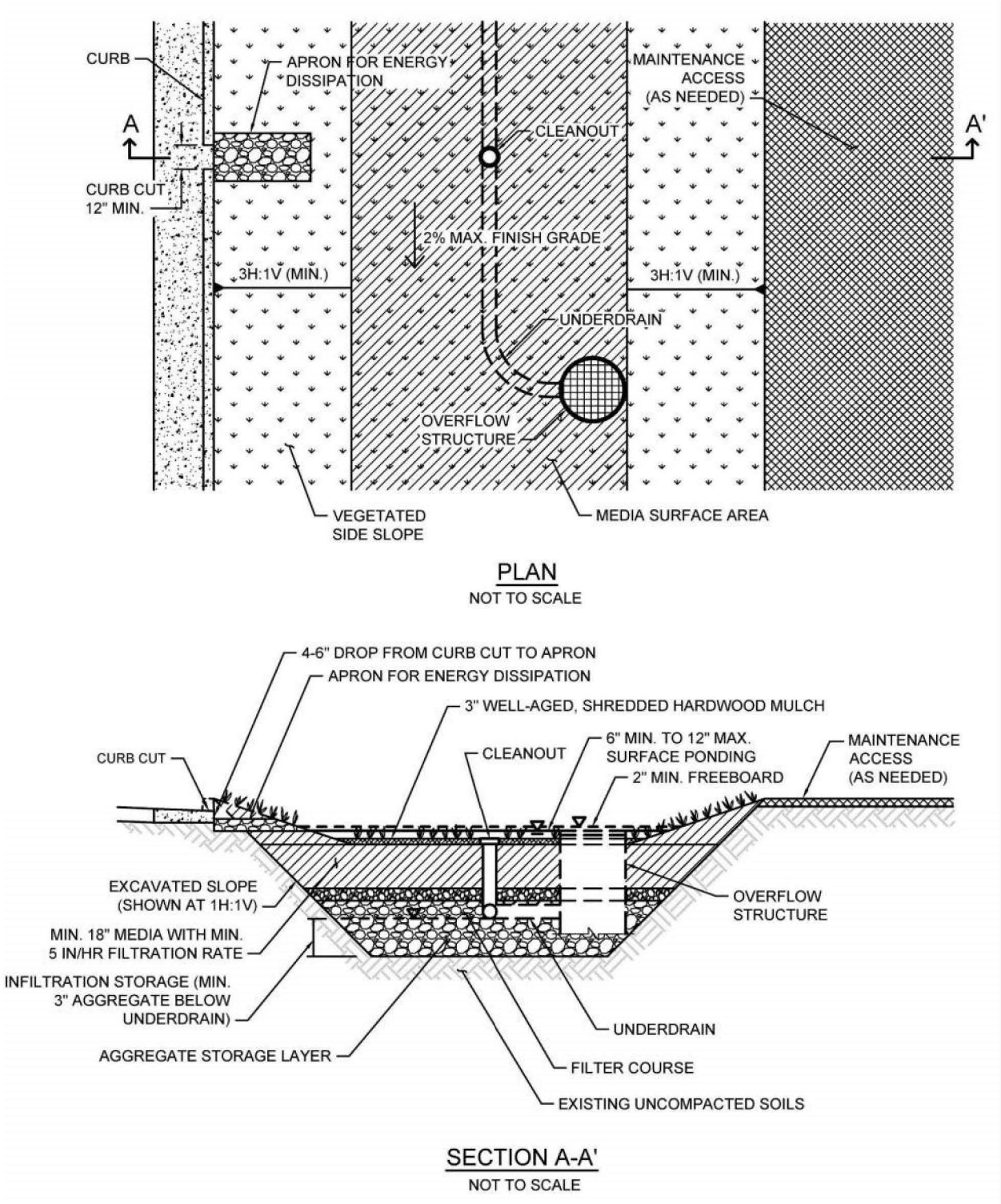
| MS4 Permit Category |
|---|
| NA |
| **Manual Category** |
| Partial Retention |
| **Applicable Performance Standard** |
| Pollutant Control |
| Flow Control |
| **Primary Benefits** |
| Volume Reduction |
| Treatment |
| Peak Flow Attenuation |

## *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 (Optional)
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the optional aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Uncompacted native soils at the bottom of the facility
- Overflow structure




**Typical plan and Section view of a Biofiltration with Partial Retention BMP**

### *Design Adaptations for Project Goals*

**Partial infiltration BMP with biofiltration treatment for stormwater 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 stormwater 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.

### *Recommended Siting Criteria*

| *Siting Criteria* | | *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.<br>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 |

| *Siting Criteria* | *Intent/Rationale* |
|---|---|
| | channelization within the facility. |

***Recommended BMP Component Dimensions***

| *BMP Component* | *Dimension* | *Intent/Rationale* |
|---|---|---|
| Freeboard | ≥ 2 inches | Freeboard provides room for head over overflow structures and minimizes risk of uncontrolled surface discharge. |
| Surface Ponding | ≥ 6 and ≤ 12 inches | Surface ponding capacity lowers subsurface storage requirements. Deep surface ponding raises safety concerns.<br>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. |
| Ponding Area Side Slopes | 3H:1V or shallower | Gentler side slopes are safer, less prone to erosion, able to establish vegetation more quickly and easier to maintain. |
| Mulch | ≥ 3 inches | 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 | ≥ 18 inches | A deep media layer provides additional filtration and supports |

| *BMP Component* | *Dimension* | *Intent/Rationale* |
|---|---|---|
| | | plants with deeper roots.<br><br>Standard specifications shall be followed.<br><br>For non-standard or proprietary designs, compliance with Appendix F.1 ensures that adequate treatment performance will be provided. |
| Underdrain Diameter | ≥ 6 inches | Smaller diameter underdrains are prone to clogging. |
| Cleanout Diameter | ≥ 6 inches | Properly spaced cleanouts will facilitate underdrain maintenance. |

### *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:

| *Design Criteria* | | *Intent/Rationale* |
|---|---|---|
| ***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. |
| ***Vegetation*** | | |
| ☒ | Plantings are suitable for the climate and expected ponding depth. A plant list to aid in selection can be found in Appendix E.26 | 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 (Optional or Mandatory – Dependent on jurisdiction)*** | | |

| | *Design Criteria* | *Intent/Rationale* |
|---|---|---|
| ☒ | 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*** | |
| ☒ | Media maintains a minimum filtration rate of 5 in/hr over lifetime of facility. An initial filtration rate of 8 to 12 in/hr is recommended to allow for clogging over time; the initial filtration rate should not exceed 12 inches per hour. | 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 either of these two media specifications:<br>Section F.3 Bioretention Soil Media (BSM) or specific jurisdictional guidance.<br>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.<br>Standard specifications shall be followed.<br>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.<br>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. |

| *Design Criteria* | | *Intent/Rationale* |
|---|---|---|
| ☒ | 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*** | | |
| ☒ | 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. 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 |
| ☐ | Filter course 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. |
| ***Aggregate Storage Layer*** | | |
| ☒ | Class 2 Permeable per Caltrans specification 68-1.025 is recommended for the storage layer. Washed, open-graded crushed rock may be used, however a 4-6 inch washed pea gravel filter course layer at the top of the crushed rock is required. | Washing aggregate will help eliminate fines that could clog the aggregate storage layer void spaces or subgrade. |
| ☒ | 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. |

| *Design Criteria* | | *Intent/Rationale* |
|---|---|---|
| ☒ | 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 6 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. |
| ☒ | An underdrain cleanout with a minimum 6-inch diameter and lockable cap is placed every 250 to 300 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. |

### *Nutrient Sensitive Media Design*

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

### *Conceptual Design and Sizing Approach for Stormwater Pollutant Control Only*

To design biofiltration with partial retention and an underdrain for stormwater 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.

### *Conceptual Design and Sizing Approach when Stormwater 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 stormwater 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

3. -level orifices can be used within an outlet structure to control the full range of flows.

4. 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.

5. After biofiltration with partial retention has been designed to meet flow control requirements, calculations must be completed to verify if stormwater pollutant control requirements to treat the DCV have been met.

### *Maintenance Overview*

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

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

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.

- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace such as media, filter course, and aggregate layers.

- Erosion due to concentrated storm water runoff flow that is not readily corrected by adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.

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

***Summary of Standard Inspection and Maintenance***

The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district.

Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.

| Threshold/Indicator | Maintenance Action | Typical Maintenance Frequency |
|---|---|---|
| Accumulation of sediment, litter, or debris | Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer. | • Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event.<br>• Remove any accumulated materials found at each inspection. |
| Obstructed inlet or outlet structure | Clear blockage. | • Inspect monthly and after every 0.5-inch or larger storm event.<br>• Remove any accumulated materials found at each inspection. |
| Damage to structural components such as weirs, inlet or outlet structures | Repair or replace as applicable. | • Inspect annually.<br>• Maintain when needed. |
| Poor vegetation establishment | Re-seed, re-plant, or re-establish vegetation per original plans. | • Inspect monthly.<br>• Maintain when needed. |

| Threshold/Indicator | Maintenance Action | Typical Maintenance Frequency |
|---|---|---|
| Dead or diseased vegetation | Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans. | • Inspect monthly.<br>• Maintain when needed. |
| Overgrown vegetation | Mow or trim as appropriate. | • Inspect monthly.<br>• Maintain when needed. |
| 2/3 of mulch has decomposed, or mulch has been removed | Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches. | • Inspect monthly.<br>• Replenish mulch annually, or more frequently when needed based on inspection. |
| Erosion due to concentrated irrigation flow | Repair/re-seed/re-plant eroded areas and adjust the irrigation system. | • Inspect monthly.<br>• Maintain when needed. |
| Erosion due to concentrated storm water runoff flow | Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction. | • Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event.<br>• Maintain when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction. |
| Standing water in BMP for longer than 24 hours following a storm event<br><br>Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health | Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils. | • Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event.<br>• Maintain when needed. |

| Threshold/Indicator | Maintenance Action | Typical Maintenance Frequency |
|---|---|---|
| Presence of mosquitos/larvae<br><br>For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology | If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water.<br><br>If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required. | • Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event.<br>• Maintain when needed. |
| Underdrain clogged | Clear blockage. | Inspect if standing water is observed for longer than 24-96 hours following a storm event.<br>Maintain when needed. |

# E.20 BF-2 Nutrient Sensitive Media Design

Some studies of bioretention with underdrains have observed export of nutrients, particularly inorganic nitrogen (nitrate and nitrite) and dissolved phosphorus. This has been observed to be a short-lived phenomenon in some studies or a long term issue in some studies. The composition of the soil media, including the chemistry of individual elements is believed to be an important factor in the potential for nutrient export. Organic amendments, often compost, have been identified as the most likely source of nutrient export. The quality and stability of organic amendments can vary widely.

The biofiltration media specifications contained in the County of San Diego Low Impact Development Handbook: Appendix G -Bioretention Soil Specification (June 2014, unless superseded by more recent edition) and the City of San Diego Low Impact Development Design Manual (page B-18) (July 2011, unless superseded by more recent edition) were developed with consideration of the potential for nutrient export. These specifications include criteria for individual component characteristics and quality in order to control the overall quality of the blended mixes. As of the publication of this manual, the June 2014 County of San Diego specifications provide more detail regarding mix design and quality control.

The City and County specifications noted above were developed for general purposes to meet permeability and treatment goals. In cases where the BMP discharges to receiving waters with nutrient impairments or nutrient TMDLs, the biofiltration media should be designed with the specific goal of minimizing the potential for export of nutrients from the media. Therefore, in addition to adhering to the City or County media specifications, the following guidelines should be followed:

**1. Select plant palette to minimize plant nutrient needs**

A landscape architect or agronomist should be consulted to select a plant palette that minimizes nutrient needs. Utilizing plants with low nutrient needs results in less need to enrich the biofiltration soil mix. If nutrient quantity is then tailored to plants with lower nutrient needs, these plants will generally have less competition from weeds, which typically need higher nutrient content. The following practices are recommended to minimize nutrient needs of the plant palette:

- **Utilize native, drought-tolerant plants and grasses where possible.** Native plants generally have a broader tolerance for nutrient content, and can be longer lived in leaner/lower nutrient soils.

- **Start plants from smaller starts or seed.** Younger plants are generally more tolerant of lower nutrient levels and tend to help develop soil structure as they grow. Given the lower cost of smaller plants, the project should be able to accept a plant mortality rate that is somewhat higher than starting from larger plants and providing high organic content.

## 2. Minimize excess nutrients in media mix

Once the low-nutrient plant palette is established (item 1), the landscape architect and/or agronomist should be consulted to assist in the design of a biofiltration media to balance the interests of plant establishment, water retention capacity (irrigation demand), and the potential for nutrient export. The following guidelines should be followed:

- **The mix should not exceed the nutrient needs of plants.** In conventional landscape design, the nutrient needs of plants are often exceeded intentionally in order to provide a factor of safety for plant survival. This practice must be avoided in biofiltration media as excess nutrients will increase the chance of export. The mix designer should keep in mind that nutrients can be added later (through mulching, tilling of amendments into the surface), but it is not possible to remove nutrients, once added.

- **The actual nutrient content and organic content of the selected organic amendment source should be determined when specifying mix proportions.** Nutrient content (i.e., C:N ratio; plant extractable nutrients) and organic content (i.e, % organic material) are relatively inexpensive to measure via standard agronomic methods and can provide important information about mix design. If mix design relies on approximate assumption about nutrient/organic content and this is not confirmed with testing (or the results of prior representative testing), it is possible that the mix could contain much more nutrient than intended.

- **Nutrients are better retained in soils with higher cation exchange capacity.** Cation exchange capacity can be increased through selection of organic material with naturally high cation exchange capacity, such as peat or coconut coir pith, and/or selection of inorganic material with high cation exchange capacity such as some sands or engineered minerals (e.g., low P-index sands, zeolites, rhyolites, etc). Including higher cation exchange capacity materials would tend to reduce the net export of nutrients. Natural silty materials also provide cation exchange capacity; however potential impacts to permeability need to be considered.

- **Focus on soil structure as well as nutrient content.** Soil structure is loosely defined as the ability of the soil to conduct and store water and nutrients as well as the degree of aeration of the soil. Soil structure can be more important than nutrient content in plant survival and biologic health of the system. If a good soil structure can be created with very low amounts of organic amendment, plants survivability should still be provided. While soil structure generally develops with time, biofiltration media can be designed to promote earlier development of soil structure. Soil structure is enhanced by the use of amendments with high humus content (as found in well-aged organic material). In addition, soil structure can be enhanced through the use of organic material with a distribution of particle sizes (i.e., a more heterogeneous mix).

- **Consider alternatives to compost.** Compost, by nature, is a material that is continually evolving and decaying. It can be challenging to determine whether tests previously done on a given compost stock are still representative. It can also be challenging to determine how the properties of the compost will change once placed in the media bed. More stable materials such as aged coco coir pith, peat, biochar, shredded bark, and/or other amendments should be considered.

With these considerations, it is anticipated that less than 10 percent organic amendment by volume could be used, while still balancing plant survivability and water retention. If compost is used, designers should strongly consider utilizing less than 10 percent by volume.

### 3. Design with partial retention and/or internal water storage

An internal water storage zone, as described in Fact Sheet PR-1 is believed to improve retention of nutrients. For lined systems, an internal water storage zone worked by providing a zone that fluctuates between aerobic and anaerobic conditions, resulting in nitrification/denitrification. In soils that will allow infiltration, a partial retention design (PR-1) allows significant volume reduction and can also promote nitrification/denitrification.

Acknowledgment: This fact sheet has been adapted from the Orange County Technical Guidance Document (May 2011). It was originally developed based on input from: Deborah Deets, City of Los Angeles Bureau of Sanitation, Drew Ready, Center for Watershed Health, Rick Fisher, ASLA, City of Los Angeles Bureau of Engineering, Dr. Garn Wallace, Wallace Laboratories, Glen Dake, GDML, and Jason Schmidt, Tree People. The guidance provided herein does not reflect the individual opinions of any individual listed above and should not be cited or otherwise attributed to those listed.

# ATTACHMENT 2 - BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

□Mark this box if this attachment is not included because the project is exempt from PDP hydromodification management requirements.

**Indicate which items are included behind this cover sheet:**

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

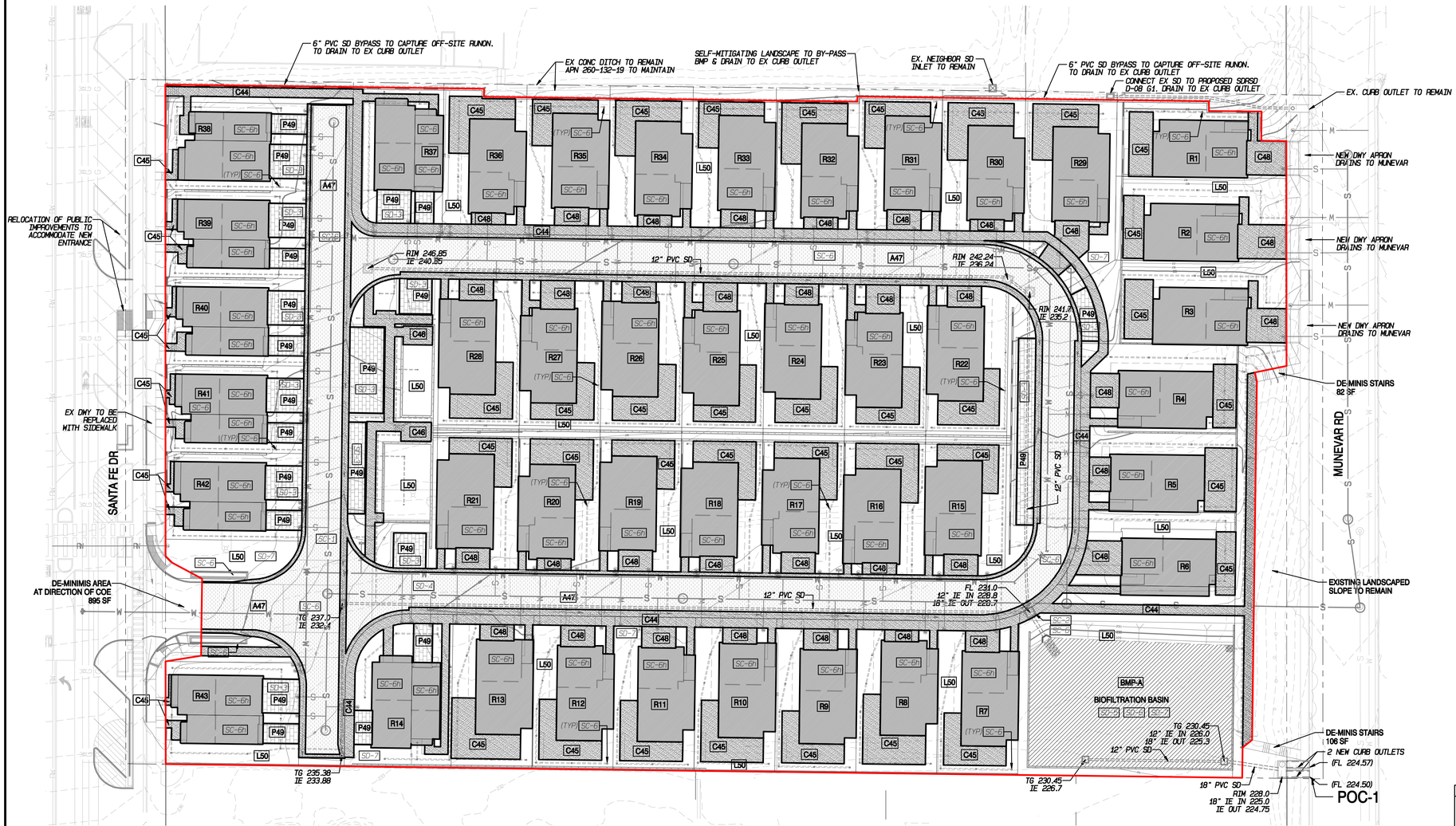
**ATTACHMENT 2A**

## 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 (if present)
☑ 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)

# DRAINAGE MANAGEMENT AREA & HMP EXHIBIT
# 845 SANTA FE DRIVE
# MULTI-004398-2021




## BASIN A WQV SIZING

| DMA NAME | DMA AREA | PPST | DMA RF | RF * AREA | SOIL TYPE | IMP NAME |
|---|---|---|---|---|---|---|
| | | | | | D | BMP-A |
| R1 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R2 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R3 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R4 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R5 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R6 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R7 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R8 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R9 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R10 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R11 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R12 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R13 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R14 | 2,275 | ROOF | 0.9 | 2,048 | | |
| R15 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R16 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R17 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R18 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R19 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R20 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R21 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R22 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R23 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R24 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R25 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R26 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R27 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R28 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R29 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R30 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R31 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R32 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R33 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R34 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R35 | 1,468 | ROOF | 0.9 | 1,321 | | |
| R36 | 1,425 | ROOF | 0.9 | 1,283 | | |
| R37 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R38 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R39 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R40 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R41 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R42 | 1,636 | ROOF | 0.9 | 1,472 | | |
| R43 | 1,636 | ROOF | 0.9 | 1,472 | | |
| C44 | 16,914 | PCC | 0.9 | 15,223 | | |
| C45 | 18,753 | PCC | 0.9 | 16,878 | | |
| C46 | 1,325 | PCC | 0.9 | 1,193 | | |
| A47 | 24,747 | AC | 0.9 | 22,272 | | |
| C48 | 7,702 | PCC | 0.9 | 6,932 | | |
| P49 | 7,158 | PAV | 0.1 | 716 | IMP | MIN PROP |
| L50 | 63,185 | L | 0.3 | 18,956 | SF | AREA AREA |
| TOTAL | 204,375 | TOTAL | | 140,301 | 0.03 | 4,209 7,053 IMP AREA |

## WQV 15% CONTINGENCY

PROPOSED IMPERVIOUS SURFACE AREA = 134,032 SF
15% CONTINGENCY = 20,105 SF

TOTAL TREATMENT AREA = 204,375 SF
CONTINGENCY IMPERVIOUS AREA = 154,137 SF
CONTINGENCY PERVIOUS AREA = 50,238 SF

| DMA NAME | DMA AREA | PPST | DMA RF | RF * AREA | SOIL TYPE | IMP NAME |
|---|---|---|---|---|---|---|
| | | | | | D | BMP-A |
| 1 | 154,137 | IMPV | 0.9 | 138,723 | | |
| 2 | 50,238 | PERV | 0.3 | 15,071 | IMP | MIN PROP |
| | | | | | SF | AREA AREA |
| | | TOTAL | | 153,794 | 0.03 | 4,614 7,053 IMP AREA |

## LEGEND

- SUBDIVISION BOUNDARY
- DMA AREA
- DMA BOUNDARY DRAINING TO BMP
- DRAINAGE MANAGEMENT AREA (DMA) X#
- PROPOSED ROOF
- PROPOSED ASPHALT CONCRETE
- PROPOSED CONCRETE
- PROPOSED PERMEABLE PAVERS
- BMP-A BIOFILTRATION BASIN

GRAPHIC SCALE 1"=30'
0 30 60 90

## SOIL TYPE INFORMATION

HYDROLOGIC SOIL TYPE: D
*TYPE D PER USGS WEB SOIL SURVEY

## DEPTH OF GROUNDWATER

DEPTH TO GROUNDWATER > 20 FEET

## EXISTING NATURAL HYDROLOGIC FEATURES

NO EXISTING NATURAL HYDROLOGIC FEATURES EXIST ON SITE

## COARSE SEDIMENT YIELD

NO CRITICAL COARSE SEDIMENT YEILD AREAS TO BE PROTECTED. REFER TO CRITICAL COARSE SEDIMENT YIELD AREA EXHIBIT PREPARED BY PASCO LARET SUITER AND ASSOCIATES

## EXISTING TOPO & IMPERVIOUS AREAS

EXISTING IMPERVIOUS AREA: 59,231 SF

SEE PROJECT EXISTING HYDROLOGY MAPS FOR MORE INFORMATION

## PROPOSED GRADING & IMPERVIOUS AREAS

SEE PROJECT PLANS FOR MORE INFORMATION

## SOURCE CONTROL BMPS

- SC-1 PREVENTION OF ILLICIT DISCHARGES INTO THE STORM DRAIN
- SC-2 STORM DRAIN STENCILING OR SIGNAGE
- SC-6 ON-SITE STORMDRAIN INLETS
  NEED FOR FUTURE INDOOR & STRUCTURAL PEST CONTROL
  LANDSCAPE/OUTDOOR PESTICIDE USE
  POOLS, SPAS, PONDS, DECORATIVE FOUNTAINS, & OTHER WATER FEATURES
  REFUSE/TRASH AREAS MUST BE COVERED (ALSO SC-5)
  FIRE SPRINKLER TEST WATER
  MISCELLANEOUS DRAIN OR WASH WATER
  PLAZAS, SIDEWALKS AND PARKING LOTS
- SD-3 MINIMIZE IMPERVIOUS AREA
- SD-4 MINIMIZE SOIL COMPACTION
- SD-5 IMPERVIOUS AREA DISPERSION
- SD-6 RUNOFF COLLECTION
- SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES

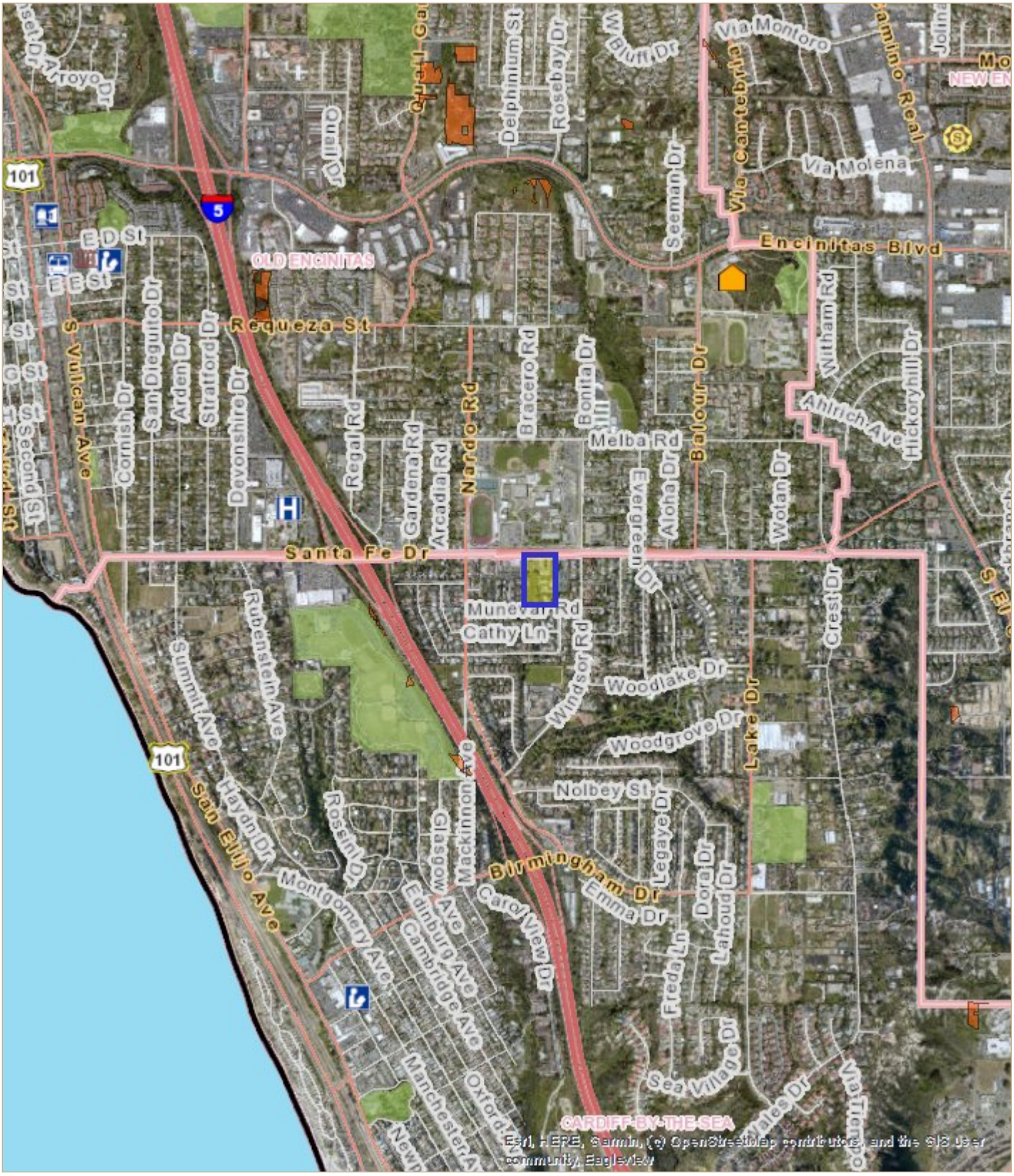
| POTENTIAL POLLUTANT SOURCE | SOURCE CONTROL |
|---|---|
| ONSITE STORM DRAIN INLETS | MARK ALL INLETS WITH THE WORDS "NO DUMPING! FLOWS TO OCEAN" OR SIMILAR. MAINTAIN AND PERIODICALLY REPAINT OR REPLACE INLET MARKINGS. PROVIDE STORM WATER POLLUTION PREVENTION INFORMATION TO NEW SITE OWNERS, LESSEES, OR OPERATORS. INCLUDE THE FOLLOWING IN LEASE AGREEMENTS: "TENANT SHALL NOT ALLOW ANYONE TO DISCHARGE ANYTHING TO STORM DRAINS OR TO STORE OR DEPOSIT MATERIALS SO AS TO CREATE A POTENTIAL DISCHARG TO STORM DRAINS." |
| FUTURE INDOOR & STURCTURAL PEST CONTROL | PEST CONTROL MANAGEMENT MEASURES WILL INCLUDE INTEGRATED PEST MANAGEMENT INFORMATION PROVIDED TO OWNERS, LESSEES, AND OPERATORS. THIS MAY INCLUDE: SEAL ALL PENETRATIONS IN THE FOUNDATION WALL AND AT JOINTS BETWEEN THE FOUNDATION AND EXTERIOR ABOVE GRADE WALLS. SEAL ALL CRACKS AROUND PLUMBING AND WIRING PENETRATIONS AND COVER WITH METAL FLASHING. IN MODERATE TO HEAVY TERMITE AREAS, TAKE ADDITIONAL PRECAUTIONS INCLUDING USING SOLID CONCRETE OR FILLED CONCRETE BLOCK AT THE TOP OF FOUNDATION WALLS, REINFORCING CONCRETE SLABS AND WALLS TO MINIMIZE CRACKING, AND USING TREATED WOOD OR METAL SILL PLATES. EMPLOY DURABLE MESH AND SCREENING AT ALL VENTS, USE BUG SCREENS ON ALL OPENABLE WINDOWS, INSTALL FLASHING AROUND DOORS AND WINDOWS, USE WEATHER STRIPPING AND TIGHT-FITTING METAL AND/OR RUBBER DOOR SWEEPS TO REDUCE PEST ACCESS AT THESE COMMON ENTRY POINTS. |
| LANDSCAPE/OUTDOOR PESTICIDE USE | FINAL LANDSCAPE PLANS SHALL:<br>PRESERVE EXISTING DROUGHT TOLERANT TREES, SHRUBS, AND GROUND COVER TO THE MAXIMUM EXTENT POSSIBLE.<br>BE DESIGNED TO MINIMIZE IRRIGATION AND RUNOFF, PROMOTE SURFACE INFILTRATION WHERE APPROPRIATE, AND MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES.<br>SPECIFY PLANTS THAT ARE TOLERANT OF PERIODIC SATURATED SOIL CONDITIONS FOR AREAS TO RETAIN OR DETAIN STORMWATER.<br>CONSIDER THE USE OF PEST-RESISTANT PLANTS, ESPECIALLY ADJACENT TO HARDSCAPE.<br>SELECT PLANTS APPROPRIATE TO SITE SOILS, SLOPES, CLIMATE, SUN, WIND, RAIN, LAND USE, AIR MOVEMENT, ECOLOGICAL CONSISTENCY, AND PLANT INTERACTIONS.<br>MAINTAIN LANDSCAPING USING MINIMUM OR NO PESTICIDES. |
| MISCELLANEOUS DRAIN OR WASH WATER | MISCELLANEOUS DRAIN OR WASH WATER WILL BE INSPECTED FOR ANY POTENTIAL RUNOFF ISSUES. |
| PLAZA, SIDEWALKS, AND PARKING LOTS | PLAZAS, SIDEWALKS, AND PARKING LOTS SHALL BE SWEPT REGULARLY TO PREVENT THE ACCUMULATIONS OF LITTER AND DEBRIS. DEBRIS FROM PRESSURE WASHING SHALL BE COLLECTED TO PREVENT ENTRY INTO THE STORM DRAIN SYSTEM. WASHWATER CONTAINING ANY CLEANING AGENT OR DEGREASER SHALL BE COLLECTED AND DISCHARGED TO THE SANITARY SEWER AND NOT DISCHARGED TO A STORM DRAIN. |

PREPARED BY:
PASCO LARET SUITER & ASSOCIATES
San Diego | Encinitas | Orange County
Phone 858.259.8212 | www.plsaengineering.com

**ATTACHMENT 2B**

MyEncinitas Web Map

**APN: 2601322300** **Address: 846 MUNEVAR RD**



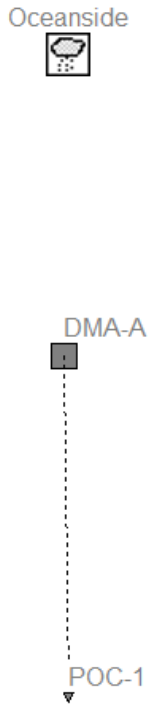
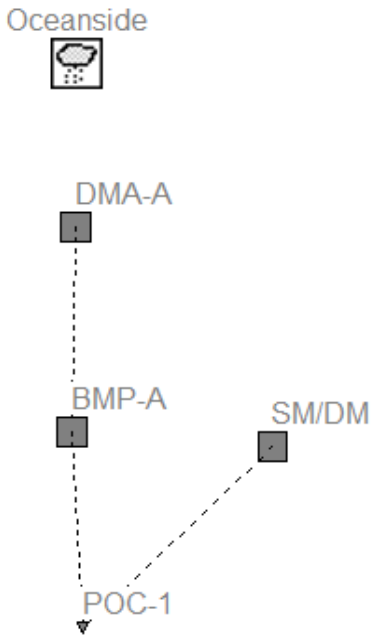

map created: 2/4/2021 18:30 PM

**ATTACHMENT 2C**

**NOT APPLICABLE**

**ATTACHMENT 2D**

# SWMM MODEL SCHEMATICS

| PRE-DEVELOPMENT MODEL | POST-PROJECT MODEL |
|---|---|
|  |  |

3376 845 Santa Fe Dr
8/8/2024

# SWMM INPUT

## PRE-DEVELOPMENT

| DMA | BMP | Area (ac) | Width (Area/Flow Length) (ft) | Flowlength (ft) | % Slope | % Impervious | % "B" Soils | % "C" Soils | % "D" Soils | Weighted Infiltration (in/hr): | Weighted Suction Head (in): | Weighted Initial Deficit: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | NA | 4.8 | 857 | 244 | 5.0% | 0% | 0% | 0% | 100% | 0.025 | 9.000 | 0.300 |
| | **Total:** | **4.8** | | | | | | | | | | |

## POST-PROJECT

| DMA | BMP | Area (ac) | Width (Area/Flow Length) (ft) | Flowlength (ft) | % Impervious* | % Slope | % "B" Soils | % "C" Soils | % "D" Soils | Weighted Infiltration (in/hr): | Weighted Suction Head (in): | Weighted Initial Deficit: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | BMP-A | 4.528 | 3868 | 51 | 78% | 4.0% | 0% | 0% | 100% | 0.019 | 9.000 | 0.300 |
| SM/DM | NA | 0.155 | 225 | 30 | 3% | 22.0% | 0% | 0% | 100% | 0.019 | 9.000 | 0.300 |
| BMP-A | A | 0.16191 | 78 | 90 | 0% | 0.0% | 0% | 0% | 100% | 0.025 | 9.000 | 0.300 |
| | **Total:** | **4.8** | | | | | | | | | | |

| Infiltration: | | |
|---|---|---|
| D: | 0.025 | in/hr |

| Suction Head: | | |
|---|---|---|
| D: | 9 | in |

| Initial Deficit | |
|---|---|
| D: | 0.33 |

* Include 15% City of Encinitas Impervious Area lot contingency

# POC-1

```
[TITLE]
;;Project Title/Notes
3376   845 Santa Fe Drive
Pre-Development Condition

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

START_DATE           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

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

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .03    .05    .08    .11    .13    .15    .15    .13    .11    .08    .04    .02
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
```

# POC-1

```
;;-------------- --------- ------ ------ ----------
Oceanside        INTENSITY 1:00     1.0      TIMESERIES Oceanside

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-A            Oceanside        POC-1            4.8      0        857      5        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-A            0.012      0.08       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
DMA-A            9          .025       .3

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

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Oceanside        FILE "Rain Data\oceanside.dat"

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

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            990.019            4250.034

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

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

# POC-1

```
;;-------------- ------------------ ------------------
DMA-A            964.001            5975.900

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Oceanside        1000.000           7500.000
```

# POC-1

```
[TITLE]
;;Project Title/Notes
3376   845 Santa Fe Drive
Post-Project Condition

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

START_DATE           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

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

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .03    .05    .08    .11    .13    .15    .15    .13    .11    .08    .04    .02
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
```

# POC-1

```
;;-------------- --------- ------ ------ ----------
Oceanside        INTENSITY 1:00     1.0      TIMESERIES Oceanside

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-A            Oceanside        BMP-A            4.528    78       3868     4        0
SM/DM            Oceanside        POC-1            .155     3        225      22       0
BMP-A            Oceanside        POC-1            0.16191  0        78       0        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-A            0.012      0.06       0.05       0.1        25         OUTLET
SM/DM            .012       0.06       0.05       .1         25         OUTLET
BMP-A            0.012      0.06       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
DMA-A            9          .019       .3
SM/DM            9          0.019      .3
BMP-A            9          .025       .3

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BMP-A            BC
BMP-A            SURFACE    18.63      0          0          0          5
BMP-A            SOIL       21         0.4        0.2        0.1        5          5          1.5
BMP-A            STORAGE    17         0.67       0          0          NO
BMP-A            DRAIN      0.2265     0.5        3          6          0          0

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp    ToPerv     RptFile                    DrainTo
FromPerv
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- ------------------------ ------------
---- ----------
BMP-A            BMP-A            1       7052.80    0          0          100        0          *                          *
0

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

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Oceanside        FILE "Rain Data\oceanside.dat"
```

# POC-1

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

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            990.019            4250.034

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-A            964.001            5975.900
SM/DM            1797.312           5027.996
BMP-A            946.424            5095.465

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Oceanside        979.843            6674.132
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
------------------------------------------------------------

3376   845 Santa Fe Drive
Pre-Development Condition

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Starting Date ............ 08/28/1951 05:00:00
Ending Date .............. 05/23/2008 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Total Precipitation ......       270.036       675.090
Evaporation Loss .........         6.437        16.093
Infiltration Loss ........       206.951       517.379
Surface Runoff ...........        60.505       151.263
Final Storage ............         0.000         0.000
Continuity Error (%) .....        -1.429


*************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        60.505        19.717
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        60.505        19.717
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000
```

**********
Subcatchment Runoff Summary
**********

| Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS | Runoff Coeff |
|---|---|---|---|---|---|---|---|---|---|---|
| DMA-A | 675.09 | 0.00 | 16.09 | 517.38 | 0.00 | 151.26 | 151.26 | 19.72 | 5.39 | 0.224 |

Analysis begun on: Thu Aug 8 13:52:28 2024
Analysis ended on: Thu Aug 8 13:52:49 2024
Total elapsed time: 00:00:21

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
  ------------------------------------------------------------

  3376   845 Santa Fe Drive
  Post-Project Condition

  ****************
  Analysis Options
  ****************
  Flow Units ............... CFS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... NO
    Water Quality .......... NO
  Infiltration Method ...... GREEN_AMPT
  Starting Date ............ 08/28/1951 05:00:00
  Ending Date .............. 05/23/2008 23:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 01:00:00
  Wet Time Step ............ 00:15:00
  Dry Time Step ............ 04:00:00


  *************************        Volume         Depth
  Runoff Quantity Continuity     acre-feet        inches
  *************************     ---------       -------
  Initial LID Storage ......         0.028         0.070
  Total Precipitation ......       272.563       675.090
  Evaporation Loss .........        35.917        88.960
  Infiltration Loss ........        45.193       111.934
  Surface Runoff ...........        10.991        27.223
  LID Drainage .............       184.809       457.740
  Final Storage ............         0.053         0.131
  Continuity Error (%) .....        -1.604


  *************************        Volume        Volume
  Flow Routing Continuity        acre-feet      10^6 gal
  *************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......       195.800        63.804
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........         0.000         0.000
  External Outflow .........       195.800        63.804
  Flooding Loss ............         0.000         0.000
  Evaporation Loss .........         0.000         0.000
  Exfiltration Loss ........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......         0.000         0.000
  Continuity Error (%) .....         0.000
```

**********
Subcatchment Runoff Summary
**********

| Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS | Runoff Coeff |
|---|---|---|---|---|---|---|---|---|---|---|
| DMA-A | 675.09 | 0.00 | 64.97 | 104.07 | 473.26 | 43.95 | 517.21 | 63.59 | 5.40 | 0.766 |
| SM/DM | 675.09 | 0.00 | 16.11 | 458.53 | 18.41 | 194.03 | 212.44 | 0.89 | 0.18 | 0.315 |
| BMP-A | 675.09 | 14464.17 | 829.48 | 0.00 | 0.00 | 0.00 | 14308.39 | 62.91 | 5.59 | 0.945 |

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

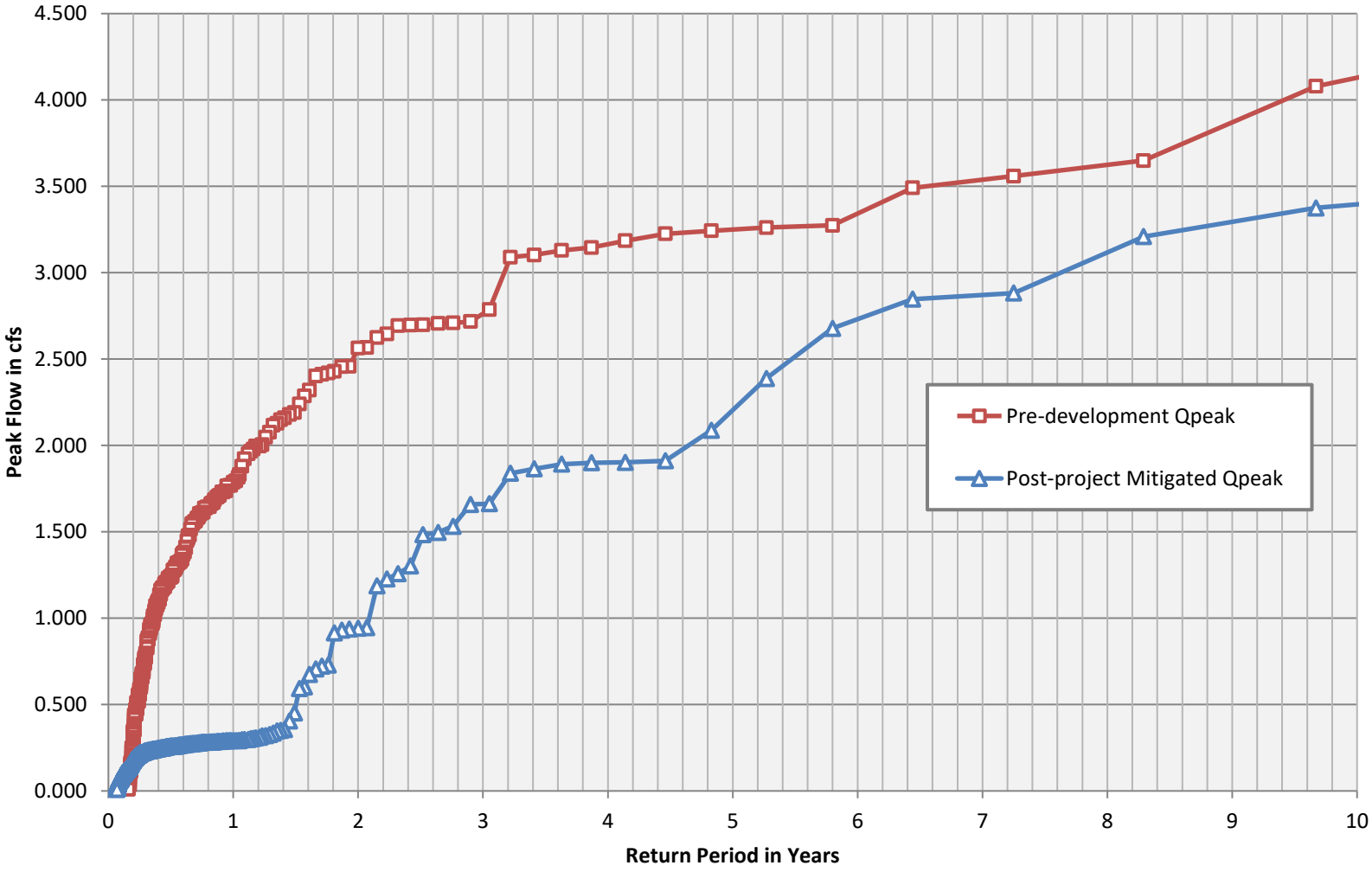
| Subcatchment | LID Control | Total Inflow in | Evap Loss in | Infil Loss in | Surface Outflow in | Drain Outflow in | Initial Storage in | Final Storage in | Continuity Error % |
|---|---|---|---|---|---|---|---|---|---|
| BMP-A | BMP-A | 15139.26 | 829.51 | 0.00 | 611.24 | 13697.67 | 2.10 | 3.03 | -0.00 |

Analysis begun on: Thu Aug 8 13:57:30 2024
Analysis ended on: Thu Aug 8 13:58:03 2024
Total elapsed time: 00:00:33

## Peak Flow Frequency Summary

| Return Period | Pre-development Qpeak (cfs) | Post-project - Mitigated Q (cfs) |
|---|---|---|
| LF = 0.1xQ2 | 0.256 | 0.094 |
| 2-year | 2.563 | 0.942 |
| 5-year | 3.250 | 2.204 |
| 10-year | 4.129 | 3.395 |

# Peak Flow Frequency Curves

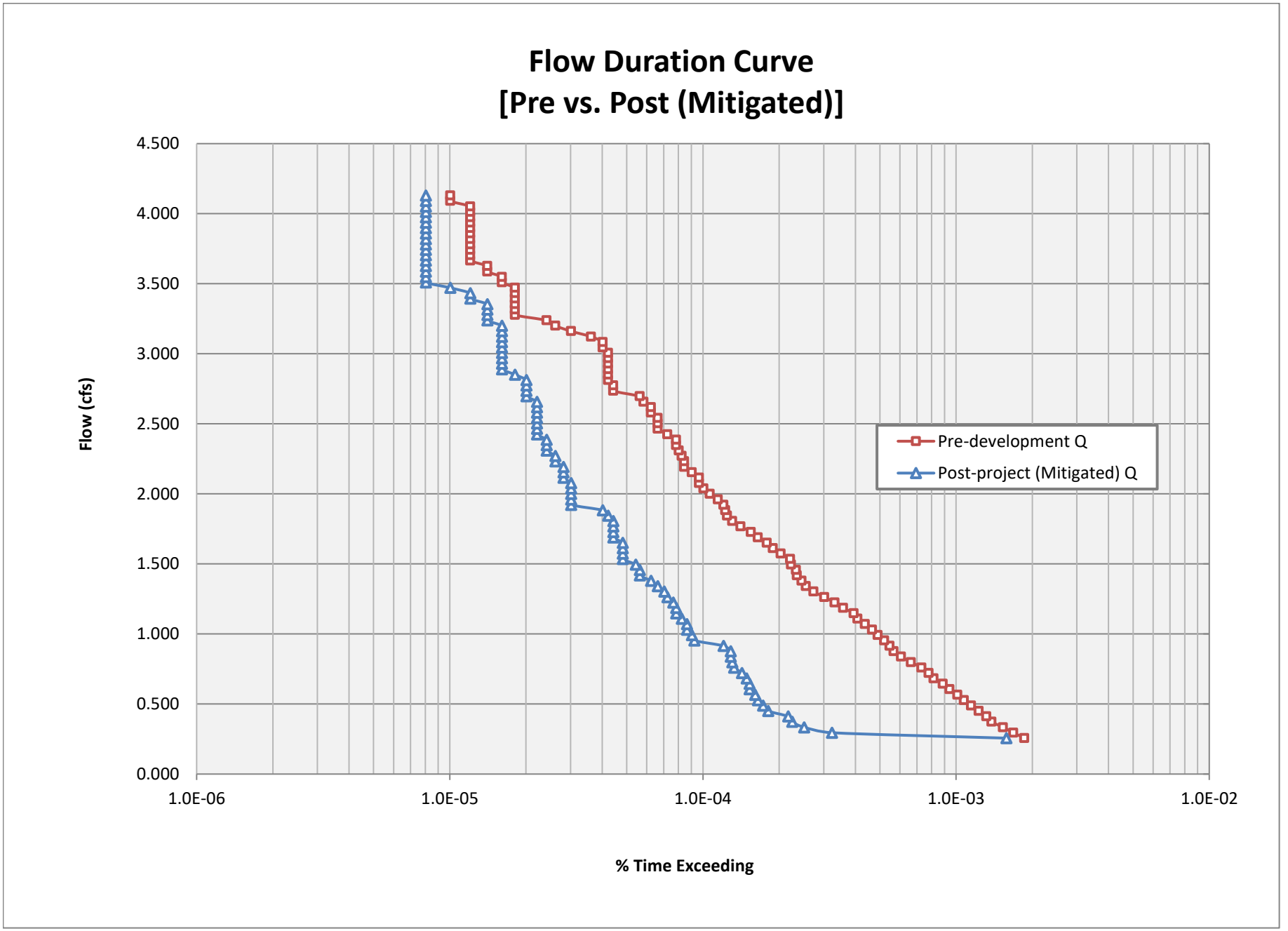


| | | |
|---|---|---|
| **Low-flow Threshold:** | 10% | |
| **0.1xQ2 (Pre):** | 0.256 | cfs |
| **Q10 (Pre):** | 4.129 | cfs |
| **Ordinate #:** | 100 | |
| **Incremental Q (Pre):** | 0.03873 | cfs |
| **Total Hourly Data:** | 497370 | hours |

**The proposed BMP:** PASSED

| Interval | Pre-development Flow (cfs) | Pre-development Hours | Pre-development % Time Exceeding | Post-project Hours | Post-project % Time Exceeding | Percentage | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 0 | 0.256 | 926 | 1.86E-03 | 786 | 1.58E-03 | 85% | Pass |
| 1 | 0.295 | 838 | 1.68E-03 | 161 | 3.24E-04 | 19% | Pass |
| 2 | 0.334 | 763 | 1.53E-03 | 125 | 2.51E-04 | 16% | Pass |
| 3 | 0.372 | 687 | 1.38E-03 | 112 | 2.25E-04 | 16% | Pass |
| 4 | 0.411 | 655 | 1.32E-03 | 108 | 2.17E-04 | 16% | Pass |
| 5 | 0.450 | 612 | 1.23E-03 | 90 | 1.81E-04 | 15% | Pass |
| 6 | 0.489 | 571 | 1.15E-03 | 86 | 1.73E-04 | 15% | Pass |
| 7 | 0.527 | 534 | 1.07E-03 | 82 | 1.65E-04 | 15% | Pass |
| 8 | 0.566 | 504 | 1.01E-03 | 80 | 1.61E-04 | 16% | Pass |
| 9 | 0.605 | 469 | 9.43E-04 | 76 | 1.53E-04 | 16% | Pass |
| 10 | 0.644 | 441 | 8.87E-04 | 76 | 1.53E-04 | 17% | Pass |
| 11 | 0.682 | 406 | 8.16E-04 | 74 | 1.49E-04 | 18% | Pass |
| 12 | 0.721 | 388 | 7.80E-04 | 71 | 1.43E-04 | 18% | Pass |
| 13 | 0.760 | 363 | 7.30E-04 | 66 | 1.33E-04 | 18% | Pass |
| 14 | 0.798 | 330 | 6.63E-04 | 65 | 1.31E-04 | 20% | Pass |
| 15 | 0.837 | 302 | 6.07E-04 | 64 | 1.29E-04 | 21% | Pass |
| 16 | 0.876 | 282 | 5.67E-04 | 64 | 1.29E-04 | 23% | Pass |
| 17 | 0.915 | 272 | 5.47E-04 | 60 | 1.21E-04 | 22% | Pass |
| 18 | 0.953 | 259 | 5.21E-04 | 46 | 9.25E-05 | 18% | Pass |
| 19 | 0.992 | 244 | 4.91E-04 | 45 | 9.05E-05 | 18% | Pass |
| 20 | 1.031 | 232 | 4.66E-04 | 43 | 8.65E-05 | 19% | Pass |
| 21 | 1.070 | 217 | 4.36E-04 | 43 | 8.65E-05 | 20% | Pass |
| 22 | 1.108 | 203 | 4.08E-04 | 41 | 8.24E-05 | 20% | Pass |
| 23 | 1.147 | 196 | 3.94E-04 | 39 | 7.84E-05 | 20% | Pass |
| 24 | 1.186 | 178 | 3.58E-04 | 39 | 7.84E-05 | 22% | Pass |
| 25 | 1.224 | 165 | 3.32E-04 | 38 | 7.64E-05 | 23% | Pass |
| 26 | 1.263 | 150 | 3.02E-04 | 36 | 7.24E-05 | 24% | Pass |
| 27 | 1.302 | 136 | 2.73E-04 | 35 | 7.04E-05 | 26% | Pass |
| 28 | 1.341 | 127 | 2.55E-04 | 33 | 6.63E-05 | 26% | Pass |
| 29 | 1.379 | 122 | 2.45E-04 | 31 | 6.23E-05 | 25% | Pass |
| 30 | 1.418 | 117 | 2.35E-04 | 28 | 5.63E-05 | 24% | Pass |
| 31 | 1.457 | 116 | 2.33E-04 | 28 | 5.63E-05 | 24% | Pass |
| 32 | 1.496 | 111 | 2.23E-04 | 27 | 5.43E-05 | 24% | Pass |
| 33 | 1.534 | 110 | 2.21E-04 | 24 | 4.83E-05 | 22% | Pass |
| 34 | 1.573 | 101 | 2.03E-04 | 24 | 4.83E-05 | 24% | Pass |
| 35 | 1.612 | 94 | 1.89E-04 | 24 | 4.83E-05 | 26% | Pass |
| 36 | 1.650 | 89 | 1.79E-04 | 24 | 4.83E-05 | 27% | Pass |
| 37 | 1.689 | 82 | 1.65E-04 | 22 | 4.42E-05 | 27% | Pass |
| 38 | 1.728 | 77 | 1.55E-04 | 22 | 4.42E-05 | 29% | Pass |
| 39 | 1.767 | 70 | 1.41E-04 | 22 | 4.42E-05 | 31% | Pass |
| 40 | 1.805 | 65 | 1.31E-04 | 22 | 4.42E-05 | 34% | Pass |
| 41 | 1.844 | 62 | 1.25E-04 | 21 | 4.22E-05 | 34% | Pass |
| 42 | 1.883 | 61 | 1.23E-04 | 20 | 4.02E-05 | 33% | Pass |
| 43 | 1.922 | 60 | 1.21E-04 | 15 | 3.02E-05 | 25% | Pass |
| 44 | 1.960 | 57 | 1.15E-04 | 15 | 3.02E-05 | 26% | Pass |
| 45 | 1.999 | 53 | 1.07E-04 | 15 | 3.02E-05 | 28% | Pass |
| 46 | 2.038 | 50 | 1.01E-04 | 15 | 3.02E-05 | 30% | Pass |
| 47 | 2.076 | 48 | 9.65E-05 | 15 | 3.02E-05 | 31% | Pass |
| 48 | 2.115 | 48 | 9.65E-05 | 14 | 2.81E-05 | 29% | Pass |
| 49 | 2.154 | 45 | 9.05E-05 | 14 | 2.81E-05 | 31% | Pass |
| 50 | 2.193 | 42 | 8.44E-05 | 14 | 2.81E-05 | 33% | Pass |
| 51 | 2.231 | 42 | 8.44E-05 | 13 | 2.61E-05 | 31% | Pass |
| 52 | 2.270 | 41 | 8.24E-05 | 13 | 2.61E-05 | 32% | Pass |
| 53 | 2.309 | 40 | 8.04E-05 | 12 | 2.41E-05 | 30% | Pass |
| 54 | 2.348 | 39 | 7.84E-05 | 12 | 2.41E-05 | 31% | Pass |

| Interval | Pre-development Flow (cfs) | Pre-development Hours | Pre-development % Time Exceeding | Post-project Hours | Post-project % Time Exceeding | Percentage | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 55 | 2.386 | 39 | 7.84E-05 | 12 | 2.41E-05 | 31% | Pass |
| 56 | 2.425 | 36 | 7.24E-05 | 11 | 2.21E-05 | 31% | Pass |
| 57 | 2.464 | 33 | 6.63E-05 | 11 | 2.21E-05 | 33% | Pass |
| 58 | 2.502 | 33 | 6.63E-05 | 11 | 2.21E-05 | 33% | Pass |
| 59 | 2.541 | 33 | 6.63E-05 | 11 | 2.21E-05 | 33% | Pass |
| 60 | 2.580 | 31 | 6.23E-05 | 11 | 2.21E-05 | 35% | Pass |
| 61 | 2.619 | 31 | 6.23E-05 | 11 | 2.21E-05 | 35% | Pass |
| 62 | 2.657 | 29 | 5.83E-05 | 11 | 2.21E-05 | 38% | Pass |
| 63 | 2.696 | 28 | 5.63E-05 | 10 | 2.01E-05 | 36% | Pass |
| 64 | 2.735 | 22 | 4.42E-05 | 10 | 2.01E-05 | 45% | Pass |
| 65 | 2.774 | 22 | 4.42E-05 | 10 | 2.01E-05 | 45% | Pass |
| 66 | 2.812 | 21 | 4.22E-05 | 10 | 2.01E-05 | 48% | Pass |
| 67 | 2.851 | 21 | 4.22E-05 | 9 | 1.81E-05 | 43% | Pass |
| 68 | 2.890 | 21 | 4.22E-05 | 8 | 1.61E-05 | 38% | Pass |
| 69 | 2.928 | 21 | 4.22E-05 | 8 | 1.61E-05 | 38% | Pass |
| 70 | 2.967 | 21 | 4.22E-05 | 8 | 1.61E-05 | 38% | Pass |
| 71 | 3.006 | 21 | 4.22E-05 | 8 | 1.61E-05 | 38% | Pass |
| 72 | 3.045 | 20 | 4.02E-05 | 8 | 1.61E-05 | 40% | Pass |
| 73 | 3.083 | 20 | 4.02E-05 | 8 | 1.61E-05 | 40% | Pass |
| 74 | 3.122 | 18 | 3.62E-05 | 8 | 1.61E-05 | 44% | Pass |
| 75 | 3.161 | 15 | 3.02E-05 | 8 | 1.61E-05 | 53% | Pass |
| 76 | 3.199 | 13 | 2.61E-05 | 8 | 1.61E-05 | 62% | Pass |
| 77 | 3.238 | 12 | 2.41E-05 | 7 | 1.41E-05 | 58% | Pass |
| 78 | 3.277 | 9 | 1.81E-05 | 7 | 1.41E-05 | 78% | Pass |
| 79 | 3.316 | 9 | 1.81E-05 | 7 | 1.41E-05 | 78% | Pass |
| 80 | 3.354 | 9 | 1.81E-05 | 7 | 1.41E-05 | 78% | Pass |
| 81 | 3.393 | 9 | 1.81E-05 | 6 | 1.21E-05 | 67% | Pass |
| 82 | 3.432 | 9 | 1.81E-05 | 6 | 1.21E-05 | 67% | Pass |
| 83 | 3.471 | 9 | 1.81E-05 | 5 | 1.01E-05 | 56% | Pass |
| 84 | 3.509 | 8 | 1.61E-05 | 4 | 8.04E-06 | 50% | Pass |
| 85 | 3.548 | 8 | 1.61E-05 | 4 | 8.04E-06 | 50% | Pass |
| 86 | 3.587 | 7 | 1.41E-05 | 4 | 8.04E-06 | 57% | Pass |
| 87 | 3.625 | 7 | 1.41E-05 | 4 | 8.04E-06 | 57% | Pass |
| 88 | 3.664 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 89 | 3.703 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 90 | 3.742 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 91 | 3.780 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 92 | 3.819 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 93 | 3.858 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 94 | 3.897 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 95 | 3.935 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 96 | 3.974 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 97 | 4.013 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 98 | 4.051 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 99 | 4.090 | 5 | 1.01E-05 | 4 | 8.04E-06 | 80% | Pass |
| 100 | 4.129 | 5 | 1.01E-05 | 4 | 8.04E-06 | 80% | Pass |


Flow Duration Curve
[Pre vs. Post (Mitigated)]
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
Flow (cfs)
1.0E-06
1.0E-05
1.0E-04
1.0E-03
1.0E-02
% Time Exceeding
Pre-development Q
Post-project (Mitigated) Q

## SWMM Model Flow Coefficient Calculation

| BMP-A<br>PARAMETER | ABBREV. | Bio-Retention Cell LID BMP | |
|---|---|---|---|
| Ponding Depth | PD | 18 | in |
| Bioretention Soil Layer | S | 21 | in |
| Gravel Layer | G | 17 | in |
| TOTAL | | 4.7<br>56 | ft<br>in |
| Orifice Coefficient | $c_g$ | 0.6 | -- |
| Low Flow Orifice Diameter | D | 2.2 | in |
| Drain exponent | n | 0.5 | -- |
| Flow Rate (volumetric) | Q | 0.272 | cfs |
| Ponding Depth Surface Area | $A_{PD}$ | 7543 | $ft^2$ |
| Bioretention Surface Area | $A_S, A_G$ | 7053 | $ft^2$ |
| | $A_S, A_G$ | 0.1619 | ac |
| Porosity of Bioretention Soil | n | 0.40 | - |
| Flow Rate (per unit area) | q | 4.163 | in/hr |
| Effective Ponding Depth | $PD_{eff}$ | **18.63** | in |
| Flow Coefficient | C | **0.2265** | -- |

**Drawdown Calculation for BMP-A**

Project Name 845 Santa Fe

Project No 3376

| | | |
|---|---|---|
| **Surface Drawdown Time:** | 11.1 | **hr** |
| **Surface Area** | **7053** | **sq ft** |
| **Underdrain Orifice Diameter: in** | **2.2** | in |
| **C:** | **0.6** | |
| **Surface Ponding** (to invert of lowest surface discharge opening in outlet structure): | **1.5** | ft |
| **Amended Soil Depth:** | **1.75** | ft |
| **Gravel Depth:** | **1.167** | ft |
| **Orifice Q =** | **0.264** | cfs |
| **Effective Depth** | 27.8016 | in |
| **Infiltration controlled by orifice** | 1.618 | in/hr |

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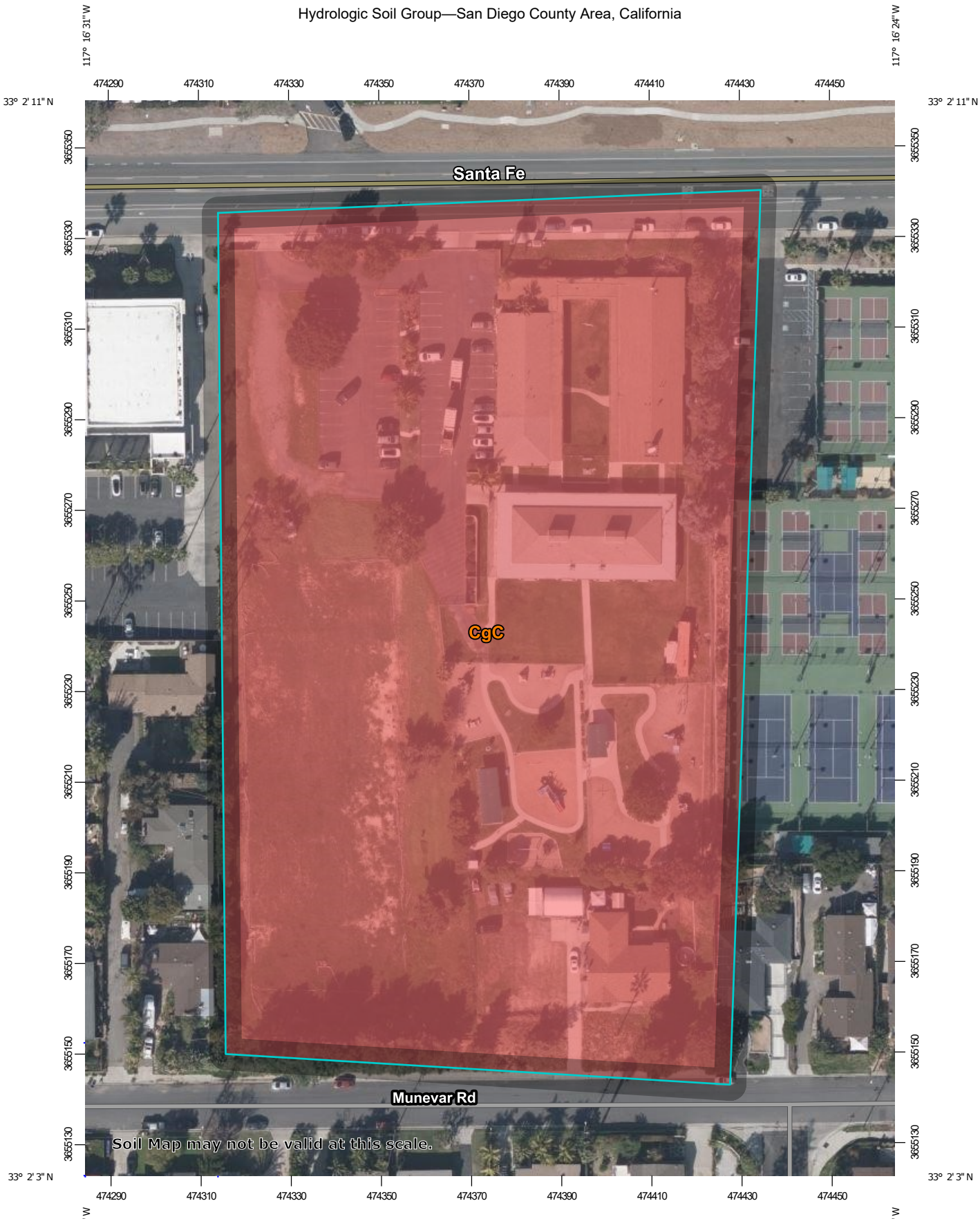
# Manning's *n* Values for Overland Flow[1]

The BMP Design Manuals within the County of San Diego allow for a land surface description other than short prairie grass to be used for hydromodification BMP design only if documentation provided is consistent with Table A.6 of the SWMM 5 User's Manual.

In January 2016, the EPA released the SWMM Reference Manual Volume I – Hydrology (SWMM Hydrology Reference Manual). The SWMM Hydrology Reference Manual complements the SWMM 5 User's Manual by providing an in-depth description of the program's hydrologic components. Table 3-5 of the SWMM Hydrology Reference Manual expounds upon Table A.6 of the SWMM 5 User's Manual by providing Manning's *n* values for additional overland flow surfaces. Therefore, in order to provide SWMM users with a wider range of land surfaces suitable for local application and to provide Copermittees with confidence in the design parameters, we recommend using the values published by Yen and Chow in Table 3-5 of the EPA SWMM Reference Manual Volume I – Hydrology. The values are provided in the table below:

| **Overland Surface** | **Manning value (*n*)** |
|---|---|
| Smooth asphalt pavement | 0.010 |
| Smooth impervious surface | 0.011 |
| Tar and sand pavement | 0.012 |
| Concrete pavement | 0.014 |
| Rough impervious surface | 0.015 |
| Smooth bare packed soil | 0.017 |
| Moderate bare packed soil | 0.025 |
| Rough bare packed soil | 0.032 |
| Gravel soil | 0.025 |
| Mowed poor grass | 0.030 |
| Average grass, closely clipped sod | 0.040 |
| Pasture | 0.040 |
| Timberland | 0.060 |
| Dense grass | 0.060 |
| Shrubs and bushes | 0.080 |
| **Land Use** | |
| Business | 0.014 |
| Semibusiness | 0.022 |
| Industrial | 0.020 |
| Dense residential | 0.025 |
| Suburban residential | 0.030 |
| Parks and lawns | 0.040 |

[1]Content summarized from *Improving Accuracy in Continuous Simulation Modeling: Guidance for Selecting Pervious Overland Flow Manning's n Values in the San Diego Region* (TRWE, 2016).




Map Scale: 1:1,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Lines**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Points**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

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

Date(s) aerial images were photographed: Jan 23, 2020—Feb 13, 2020

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

# Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| CgC | Chesterton-Urban land complex, 2 to 9 percent slopes | D | 5.5 | 100.0% |
| **Totals for Area of Interest** | | | **5.5** | **100.0%** |

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

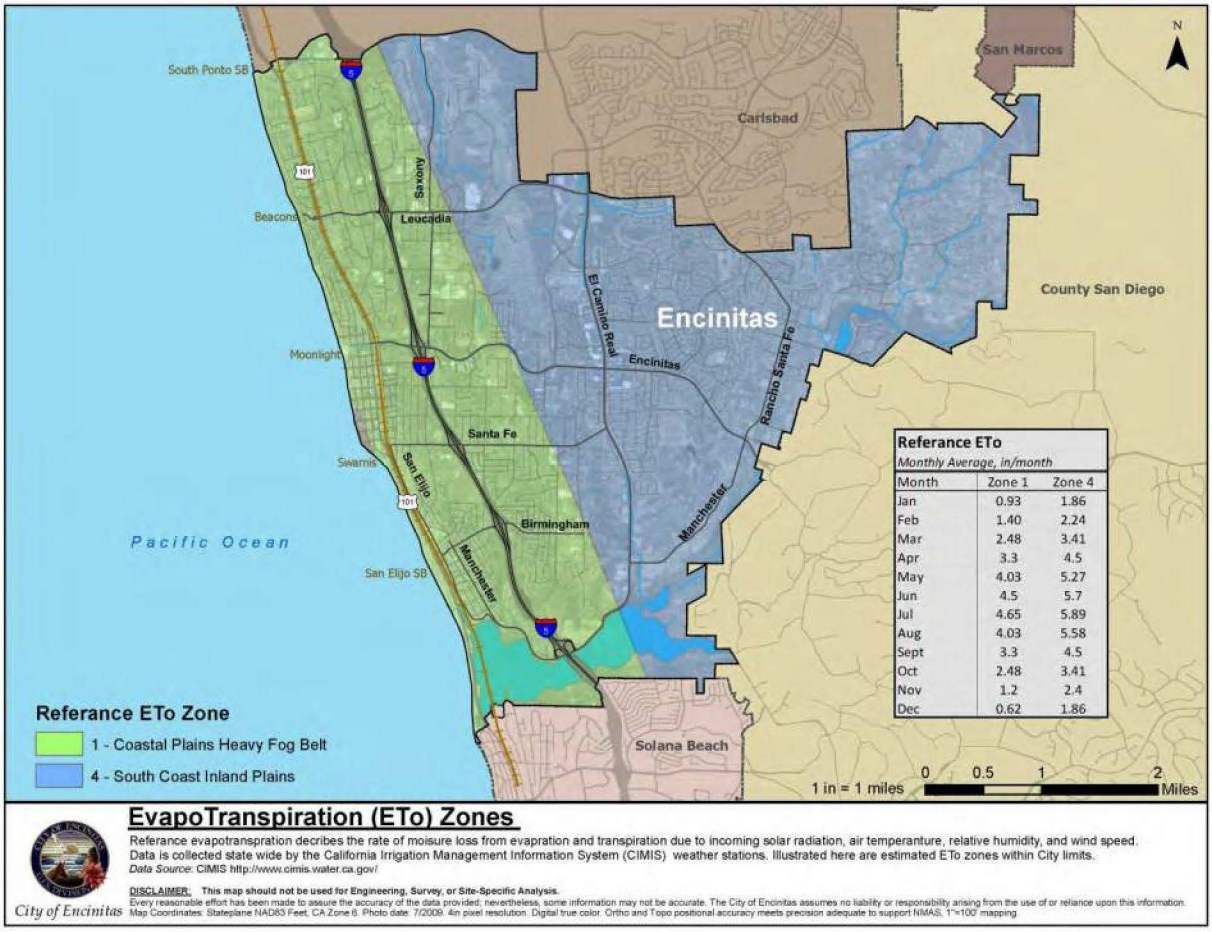



**Figure G.1-2: California Irrigation Management Information System "Reference Evapotranspiration Zones"**

**Table G.1-1: Monthly Average Reference Evapotranspiration by ETo Zone (inches/month and inches/day) for use in SWMM Models for Hydromodification Management Studies in San Diego County CIMIS Zones 1, 4, 6, 9, and 16 (See CIMIS ETo Zone Map)**

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month |
| 1 | 0.93 | 1.4 | 2.48 | 3.3 | 4.03 | 4.5 | 4.65 | 4.03 | 3.3 | 2.48 | 1.2 | 0.62 |
| 4 | 1.86 | 2.24 | 3.41 | 4.5 | 5.27 | 5.7 | 5.89 | 5.58 | 4.5 | 3.41 | 2.4 | 1.86 |
| 6 | 1.86 | 2.24 | 3.41 | 4.8 | 5.58 | 6.3 | 6.51 | 6.2 | 4.8 | 3.72 | 2.4 | 1.86 |
| 9 | 2.17 | 2.8 | 4.03 | 5.1 | 5.89 | 6.6 | 7.44 | 6.82 | 5.7 | 4.03 | 2.7 | 1.86 |
| 16 | 1.55 | 2.52 | 4.03 | 5.7 | 7.75 | 8.7 | 9.3 | 8.37 | 6.3 | 4.34 | 2.4 | 1.55 |
| | January | February | March | April | May | June | July | August | September | October | November | December |
| Days | 31 | 28 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 31 | 30 | 31 |
| Zone | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day |
| 1 | 0.030 | 0.050 | 0.080 | 0.110 | 0.130 | 0.150 | 0.150 | 0.130 | 0.110 | 0.080 | 0.040 | 0.020 |
| 4 | 0.060 | 0.080 | 0.110 | 0.150 | 0.170 | 0.190 | 0.190 | 0.180 | 0.150 | 0.110 | 0.080 | 0.060 |
| 6 | 0.060 | 0.080 | 0.110 | 0.160 | 0.180 | 0.210 | 0.210 | 0.200 | 0.160 | 0.120 | 0.080 | 0.060 |
| 9 | 0.070 | 0.100 | 0.130 | 0.170 | 0.190 | 0.220 | 0.240 | 0.220 | 0.190 | 0.130 | 0.090 | 0.060 |
| 16 | 0.050 | 0.090 | 0.130 | 0.190 | 0.250 | 0.290 | 0.300 | 0.270 | 0.210 | 0.140 | 0.080 | 0.050 |

**ATTACHMENT 2E**

**NOT APPLICABLE**

# ATTACHMENT 3 - STRUCTURAL BMP MAINTENANCE INFORMATION

**Indicate which items are included behind this cover sheet:**

| Attachment | Contents | Checklist |
|---|---|---|
| Attachment 3a | Structural BMP Maintenance Thresholds and Actions (Required) | √ Included<br><br>See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet. |
| Attachment 3b | Draft Maintenance Agreement (when applicable) | □Included<br>√ Not Applicable |

**ATTACHMENT 3A**

# E.18 PR-1 Biofiltration with Partial Retention

*Location: 805 and Bonita Road, Chula vista, CA.*

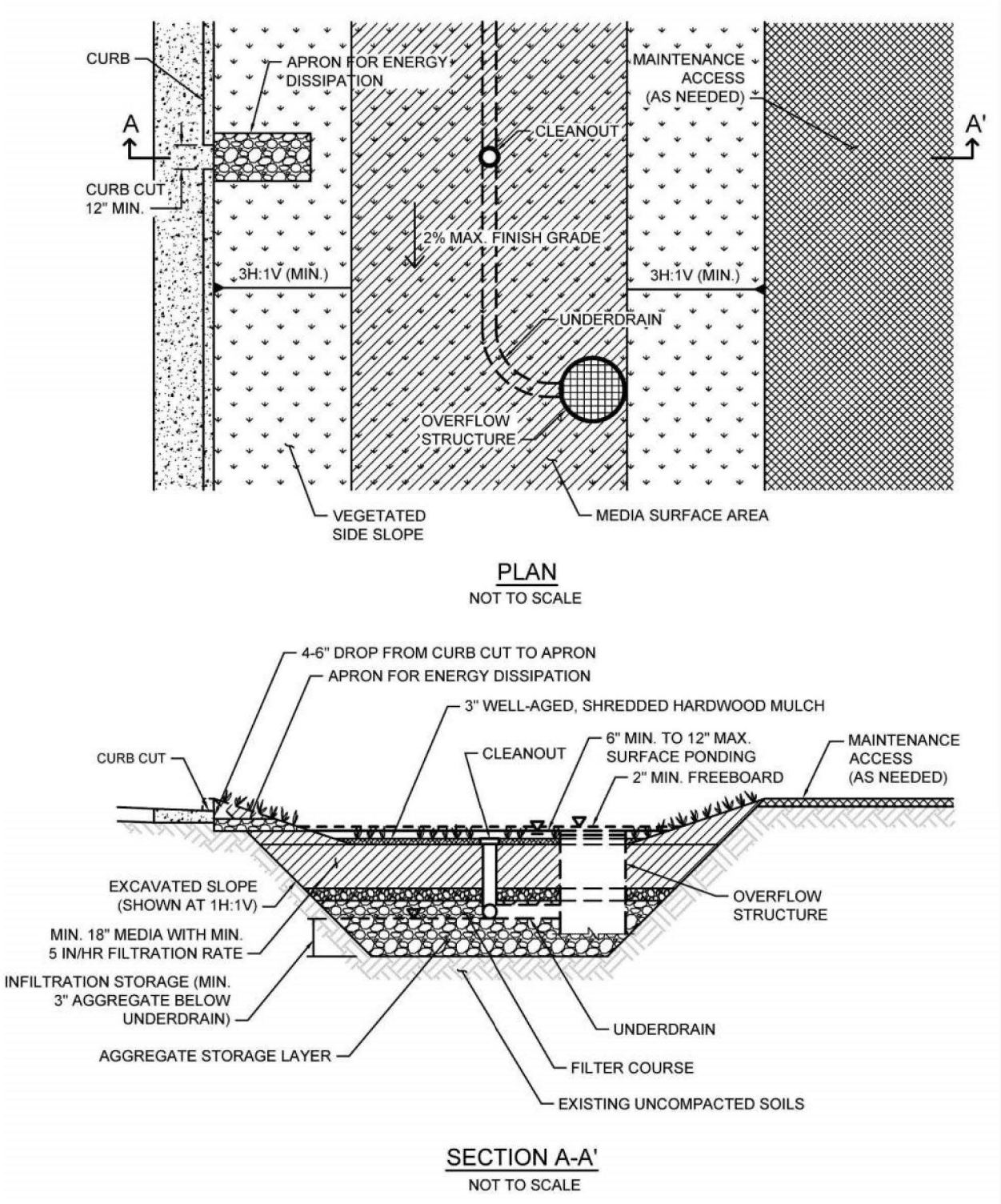
| MS4 Permit Category |
|---|
| NA |
| **Manual Category** |
| Partial Retention |
| **Applicable Performance Standard** |
| Pollutant Control |
| Flow Control |
| **Primary Benefits** |
| Volume Reduction |
| Treatment |
| Peak Flow Attenuation |

## *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 (Optional)
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the optional aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Uncompacted native soils at the bottom of the facility
- Overflow structure




**Typical plan and Section view of a Biofiltration with Partial Retention BMP**

### *Design Adaptations for Project Goals*

**Partial infiltration BMP with biofiltration treatment for stormwater 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 stormwater 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.

### *Recommended Siting Criteria*

| *Siting Criteria* | | *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.<br>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 |

| *Siting Criteria* | *Intent/Rationale* |
|---|---|
| | channelization within the facility. |

***Recommended BMP Component Dimensions***

| *BMP Component* | *Dimension* | *Intent/Rationale* |
|---|---|---|
| Freeboard | ≥ 2 inches | Freeboard provides room for head over overflow structures and minimizes risk of uncontrolled surface discharge. |
| Surface Ponding | ≥ 6 and ≤ 12 inches | Surface ponding capacity lowers subsurface storage requirements. Deep surface ponding raises safety concerns.<br>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. |
| Ponding Area Side Slopes | 3H:1V or shallower | Gentler side slopes are safer, less prone to erosion, able to establish vegetation more quickly and easier to maintain. |
| Mulch | ≥ 3 inches | 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 | ≥ 18 inches | A deep media layer provides additional filtration and supports |

| *BMP Component* | *Dimension* | *Intent/Rationale* |
|---|---|---|
| | | plants with deeper roots.<br><br>Standard specifications shall be followed.<br><br>For non-standard or proprietary designs, compliance with Appendix F.1 ensures that adequate treatment performance will be provided. |
| Underdrain Diameter | ≥ 6 inches | Smaller diameter underdrains are prone to clogging. |
| Cleanout Diameter | ≥ 6 inches | Properly spaced cleanouts will facilitate underdrain maintenance. |

### *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:

| *Design Criteria* | | *Intent/Rationale* |
|---|---|---|
| ***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. |
| ***Vegetation*** | | |
| ☐ | Plantings are suitable for the climate and expected ponding depth. A plant list to aid in selection can be found in Appendix E.26 | 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 (Optional or Mandatory – Dependent on jurisdiction)*** | | |

| *Design Criteria* | | *Intent/Rationale* |
|---|---|---|
| ☐ | 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*** | | |
| ☐ | Media maintains a minimum filtration rate of 5 in/hr over lifetime of facility. An initial filtration rate of 8 to 12 in/hr is recommended to allow for clogging over time; the initial filtration rate should not exceed 12 inches per hour. | 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 either of these two media specifications:<br>Section F.3 Bioretention Soil Media (BSM) or specific jurisdictional guidance.<br>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.<br>Standard specifications shall be followed.<br>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.<br>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. |

| *Design Criteria* | | *Intent/Rationale* |
|---|---|---|
| ☐ | 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*** | | |
| ☐ | 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. 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 |
| ☐ | Filter course 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. |
| ***Aggregate Storage Layer*** | | |
| ☐ | Class 2 Permeable per Caltrans specification 68-1.025 is recommended for the storage layer. Washed, open-graded crushed rock may be used, however a 4-6 inch washed pea gravel filter course layer at the top of the crushed rock is required. | Washing aggregate will help eliminate fines that could clog the aggregate storage layer void spaces or subgrade. |
| ☐ | 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. |

| *Design Criteria* | | *Intent/Rationale* |
|---|---|---|
| ☐ | 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 6 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. |
| ☐ | An underdrain cleanout with a minimum 6-inch diameter and lockable cap is placed every 250 to 300 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. |

### *Nutrient Sensitive Media Design*

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

### *Conceptual Design and Sizing Approach for Stormwater Pollutant Control Only*

To design biofiltration with partial retention and an underdrain for stormwater 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.

### *Conceptual Design and Sizing Approach when Stormwater 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 stormwater 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

3. -level orifices can be used within an outlet structure to control the full range of flows.

4. 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.

5. After biofiltration with partial retention has been designed to meet flow control requirements, calculations must be completed to verify if stormwater pollutant control requirements to treat the DCV have been met.

### *Maintenance Overview*

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

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

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.

- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace such as media, filter course, and aggregate layers.

- Erosion due to concentrated storm water runoff flow that is not readily corrected by adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.

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

***Summary of Standard Inspection and Maintenance***

The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district.

Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.

| Threshold/Indicator | Maintenance Action | Typical Maintenance Frequency |
|---|---|---|
| Accumulation of sediment, litter, or debris | Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer. | • Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event.<br>• Remove any accumulated materials found at each inspection. |
| Obstructed inlet or outlet structure | Clear blockage. | • Inspect monthly and after every 0.5-inch or larger storm event.<br>• Remove any accumulated materials found at each inspection. |
| Damage to structural components such as weirs, inlet or outlet structures | Repair or replace as applicable. | • Inspect annually.<br>• Maintain when needed. |
| Poor vegetation establishment | Re-seed, re-plant, or re-establish vegetation per original plans. | • Inspect monthly.<br>• Maintain when needed. |

| Threshold/Indicator | Maintenance Action | Typical Maintenance Frequency |
|---|---|---|
| Dead or diseased vegetation | Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans. | • Inspect monthly.<br>• Maintain when needed. |
| Overgrown vegetation | Mow or trim as appropriate. | • Inspect monthly.<br>• Maintain when needed. |
| 2/3 of mulch has decomposed, or mulch has been removed | Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches. | • Inspect monthly.<br>• Replenish mulch annually, or more frequently when needed based on inspection. |
| Erosion due to concentrated irrigation flow | Repair/re-seed/re-plant eroded areas and adjust the irrigation system. | • Inspect monthly.<br>• Maintain when needed. |
| Erosion due to concentrated storm water runoff flow | Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction. | • Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event.<br>• Maintain when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction. |
| Standing water in BMP for longer than 24 hours following a storm event<br><br>Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health | Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils. | • Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event.<br>• Maintain when needed. |

| Threshold/Indicator | Maintenance Action | Typical Maintenance Frequency |
|---|---|---|
| Presence of mosquitos/larvae<br><br>For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology | If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water.<br><br>If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required. | • Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event.<br>• Maintain when needed. |
| Underdrain clogged | Clear blockage. | Inspect if standing water is observed for longer than 24-96 hours following a storm event.<br>Maintain when needed. |

# E.20 BF-2 Nutrient Sensitive Media Design

Some studies of bioretention with underdrains have observed export of nutrients, particularly inorganic nitrogen (nitrate and nitrite) and dissolved phosphorus. This has been observed to be a short-lived phenomenon in some studies or a long term issue in some studies. The composition of the soil media, including the chemistry of individual elements is believed to be an important factor in the potential for nutrient export. Organic amendments, often compost, have been identified as the most likely source of nutrient export. The quality and stability of organic amendments can vary widely.

The biofiltration media specifications contained in the County of San Diego Low Impact Development Handbook: Appendix G -Bioretention Soil Specification (June 2014, unless superseded by more recent edition) and the City of San Diego Low Impact Development Design Manual (page B-18) (July 2011, unless superseded by more recent edition) were developed with consideration of the potential for nutrient export. These specifications include criteria for individual component characteristics and quality in order to control the overall quality of the blended mixes. As of the publication of this manual, the June 2014 County of San Diego specifications provide more detail regarding mix design and quality control.

The City and County specifications noted above were developed for general purposes to meet permeability and treatment goals. In cases where the BMP discharges to receiving waters with nutrient impairments or nutrient TMDLs, the biofiltration media should be designed with the specific goal of minimizing the potential for export of nutrients from the media. Therefore, in addition to adhering to the City or County media specifications, the following guidelines should be followed:

**1. Select plant palette to minimize plant nutrient needs**

A landscape architect or agronomist should be consulted to select a plant palette that minimizes nutrient needs. Utilizing plants with low nutrient needs results in less need to enrich the biofiltration soil mix. If nutrient quantity is then tailored to plants with lower nutrient needs, these plants will generally have less competition from weeds, which typically need higher nutrient content. The following practices are recommended to minimize nutrient needs of the plant palette:

- **Utilize native, drought-tolerant plants and grasses where possible.** Native plants generally have a broader tolerance for nutrient content, and can be longer lived in leaner/lower nutrient soils.

- **Start plants from smaller starts or seed.** Younger plants are generally more tolerant of lower nutrient levels and tend to help develop soil structure as they grow. Given the lower cost of smaller plants, the project should be able to accept a plant mortality rate that is somewhat higher than starting from larger plants and providing high organic content.

## 2. Minimize excess nutrients in media mix

Once the low-nutrient plant palette is established (item 1), the landscape architect and/or agronomist should be consulted to assist in the design of a biofiltration media to balance the interests of plant establishment, water retention capacity (irrigation demand), and the potential for nutrient export. The following guidelines should be followed:

- **The mix should not exceed the nutrient needs of plants.** In conventional landscape design, the nutrient needs of plants are often exceeded intentionally in order to provide a factor of safety for plant survival. This practice must be avoided in biofiltration media as excess nutrients will increase the chance of export. The mix designer should keep in mind that nutrients can be added later (through mulching, tilling of amendments into the surface), but it is not possible to remove nutrients, once added.

- **The actual nutrient content and organic content of the selected organic amendment source should be determined when specifying mix proportions.** Nutrient content (i.e., C:N ratio; plant extractable nutrients) and organic content (i.e, % organic material) are relatively inexpensive to measure via standard agronomic methods and can provide important information about mix design. If mix design relies on approximate assumption about nutrient/organic content and this is not confirmed with testing (or the results of prior representative testing), it is possible that the mix could contain much more nutrient than intended.

- **Nutrients are better retained in soils with higher cation exchange capacity.** Cation exchange capacity can be increased through selection of organic material with naturally high cation exchange capacity, such as peat or coconut coir pith, and/or selection of inorganic material with high cation exchange capacity such as some sands or engineered minerals (e.g., low P-index sands, zeolites, rhyolites, etc). Including higher cation exchange capacity materials would tend to reduce the net export of nutrients. Natural silty materials also provide cation exchange capacity; however potential impacts to permeability need to be considered.

- **Focus on soil structure as well as nutrient content.** Soil structure is loosely defined as the ability of the soil to conduct and store water and nutrients as well as the degree of aeration of the soil. Soil structure can be more important than nutrient content in plant survival and biologic health of the system. If a good soil structure can be created with very low amounts of organic amendment, plants survivability should still be provided. While soil structure generally develops with time, biofiltration media can be designed to promote earlier development of soil structure. Soil structure is enhanced by the use of amendments with high humus content (as found in well-aged organic material). In addition, soil structure can be enhanced through the use of organic material with a distribution of particle sizes (i.e., a more heterogeneous mix).

- **Consider alternatives to compost.** Compost, by nature, is a material that is continually evolving and decaying. It can be challenging to determine whether tests previously done on a given compost stock are still representative. It can also be challenging to determine how the properties of the compost will change once placed in the media bed. More stable materials such as aged coco coir pith, peat, biochar, shredded bark, and/or other amendments should be considered.

With these considerations, it is anticipated that less than 10 percent organic amendment by volume could be used, while still balancing plant survivability and water retention. If compost is used, designers should strongly consider utilizing less than 10 percent by volume.

### 3. Design with partial retention and/or internal water storage

An internal water storage zone, as described in Fact Sheet PR-1 is believed to improve retention of nutrients. For lined systems, an internal water storage zone worked by providing a zone that fluctuates between aerobic and anaerobic conditions, resulting in nitrification/denitrification. In soils that will allow infiltration, a partial retention design (PR-1) allows significant volume reduction and can also promote nitrification/denitrification.

Acknowledgment: This fact sheet has been adapted from the Orange County Technical Guidance Document (May 2011). It was originally developed based on input from: Deborah Deets, City of Los Angeles Bureau of Sanitation, Drew Ready, Center for Watershed Health, Rick Fisher, ASLA, City of Los Angeles Bureau of Engineering, Dr. Garn Wallace, Wallace Laboratories, Glen Dake, GDML, and Jason Schmidt, Tree People. The guidance provided herein does not reflect the individual opinions of any individual listed above and should not be cited or otherwise attributed to those listed.

# E.10 SD-D Permeable Pavement (Site Design BMP)

*Photo Credit: San Diego Low Impact Development Design Manual*

**MS4 Permit Category**
Site Design

**Manual Category**
Site Design

**Applicable Performance Standard**
Site Design

**Primary Benefits**

## *Description*

Permeable pavement is pavement that allows for percolation through void spaces in the pavement surface into subsurface layers. Permeable pavements reduce runoff volumes and rates and can provide pollutant control via infiltration, filtration, sorption, sedimentation, and biodegradation processes. When used as a site design BMP, the subsurface layers are designed to provide storage of storm water runoff so that outflow rates can be controlled via infiltration into subgrade soils. 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 and the underlying infiltration rates. As a site design BMP permeable pavement areas are designed to be self-retaining and are designed primarily for direct rainfall. Self-retaining permeable pavement areas have a ratio of total drainage area (including permeable pavement) to area of permeable pavement of 1.5:1 or less. Permeable pavement surfaces can be constructed from modular paver units or paver blocks, pervious concrete, porous asphalt, and turf pavers. Sites designed with permeable pavements can significantly reduce the impervious area of the project. Reduction in impervious surfaces decreases the DCV and can reduce the footprint of treatment control and flow control BMPs.

| Typical Permeable Pavement Components (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 |

### *Design Adaptations for Project Goals*

**Site design BMP to reduce impervious area and DCV.** Permeable pavement without an underdrain can be used as a site design feature to reduce the impervious area of the site by replacing traditional pavements, including roadways, parking lots, emergency access lanes, sidewalks, trails and driveways.

### *Conceptual Design and Sizing Approach for Site Design*

1. Determine the areas where permeable pavements can be used in the site design to replace conventional pavements to reduce the DCV. These 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.
2. Calculate the DCV per Appendix B.2, taking into account reduced runoff from permeable pavement areas.

### *Maintenance Overview*

**Normal Expected Maintenance.** Routine maintenance of permeable pavement includes: removal of materials such as trash and debris accumulated on the paving surface; vacuuming of the paving surface to prevent clogging; and flushing paving and subsurface gravel to remove fine sediment. If the BMP includes underdrains, check and clear underdrains. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

**Non-Standard Maintenance or BMP Failure.** If the permeable pavement area is not drained between storm events, or if runoff sheet flows across the permeable pavement area and flows off the permeable pavement area during storm events, the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. During storm events up to the 85th percentile storm event (approximately 0.5 to 1 inch of rainfall in San Diego County), runoff should not flow off the permeable pavement area. The permeable pavement area is expected to have adequate hydraulic conductivity and storage such that rainfall landing on the permeable pavement and runoff from the surrounding drainage area will go directly into the pavement without ponding or overflow (in properly designed systems, the surrounding drainage area is not more than half as large as the permeable pavement area). Following the storm event, there should be no standing water (puddles) on the permeable pavement area.

If storm water is flowing off the permeable pavement during a storm event, or if there is standing water on the permeable pavement surface following a storm event, this is an indicator of clogging somewhere within the system. Poor drainage can result from clogging of the permeable surface layer, any of the subsurface components, or the subgrade soils. The specific cause of the drainage issue must be determined and corrected. Surface or subsurface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Corrective maintenance, increased inspection and maintenance, BMP replacement, or a different BMP type will be required. If poor drainage persists after flushing of the paving, subsurface gravel, and/or underdrain(s) when applicable, or if it is determined that the underlying soils do not have the

infiltration capacity expected, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.

**Other Special Considerations.** Site design BMPs, such as permeable pavement, installed within a new development or redevelopment project are components of an overall storm water management strategy for the project. The presence of site design BMPs within a project is usually a factor in the determination of the amount of runoff to be managed with structural BMPs (i.e., the amount of runoff expected to reach downstream retention or biofiltration basins that process storm water runoff from the project as a whole). When site design BMPs are not maintained or are removed, this can lead to clogging or failure of downstream structural BMPs due to greater delivery of runoff and pollutants than intended for the structural BMP. Therefore, the [City Engineer] may require confirmation of maintenance of site design BMPs as part of their structural BMP maintenance documentation requirements. Site design BMPs that have been installed as part of the project should not be removed, nor should they be bypassed by re-routing roof drains or re-grading surfaces within the project. If changes are necessary, consult the [City Engineer] to determine requirements.

The runoff storage and infiltration surface area in this BMP are not readily accessible because they are subsurface. This means that clogging and poor drainage are not easily corrected. If the tributary area draining to the BMP includes unpaved areas, the sediment load from the tributary drainage area can be too high, reducing BMP function or clogging the BMP. All unpaved areas within the tributary drainage area should be stabilized with vegetation. Other pretreatment components to prevent transport of sediment to the paving surface, such as grass buffer strips, will extend the life of the subsurface components and infiltration surface. Along with proper stabilization measures and pretreatment within the tributary area, routine maintenance, including preventive vacuum/regenerative air street sweeping, is key to preventing clogging.

***Summary of Standard Inspection and Maintenance***

The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district.

Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.

| Threshold/Indicator | Maintenance Action | Typical Maintenance Frequency |
|---|---|---|
| Preventive vacuum/regenerative air street sweeping | Pavement should be swept with a vacuum power or regenerative air street sweeper to maintain infiltration through paving surface | • Schedule/perform this preventive action at least twice per year. |
| Accumulation of sediment, litter, or debris on permeable pavement surface | Remove and properly dispose of accumulated materials. Inspect tributary area for exposed soil or other sources of sediment and apply stabilization measures to sediment source areas. Apply source control measures as applicable to sources of litter or debris. | • Inspect monthly and after every 0.5-inch or larger storm event.<br>• Remove any accumulated materials found at each inspection. |

| Threshold/Indicator | Maintenance Action | Typical Maintenance Frequency |
|---|---|---|
| Weeds growing on/through the permeable pavement surface | Remove weeds and add features as necessary to prevent weed intrusion. Use non-chemical methods (e.g., instead of pesticides, control weeds using mechanical removal, physical barriers, and/or physical changes in the surrounding area adjacent to pavement that will preclude weed intrusion into the pavement). | • Inspect monthly.<br>• Remove any weeds found at each inspection. |
| Standing water in permeable paving area following a storm event, or runoff is observed overflowing off the permeable paving surface during a storm event | This condition requires investigation of why infiltration is not occurring. If feasible, corrective action shall be taken to restore infiltration (e.g., pavement should be swept with a vacuum power or regenerative air street sweeper to restore infiltration rates, clear underdrains if underdrains are present). BMP may require retrofit if infiltration cannot be restored. The [City Engineer] shall be contacted prior to any repairs or reconstruction. | • Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event.<br>• Maintain when needed. |

| Threshold/Indicator | Maintenance Action | Typical Maintenance Frequency |
|---|---|---|
| Presence of mosquitos/larvae<br><br>For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology | If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water.<br><br>If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria because the underlying soils do not have the infiltration capacity expected, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required. | • Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event.<br>• Maintain when needed. |
| Damage to permeable paving surface (e.g., cracks, settlement, misaligned paver blocks, void spaces between paver blocks need fill materials replenished) | Repair or replace damaged surface as appropriate. | • Inspect annually.<br>• Maintain when needed. |

**ATTACHMENT 3B**

**TO BE INCLUDED DURING CONSTRUCTION DRAWING PHASE**

# ATTACHMENT 4 - COPY OF PLAN SHEETS SHOWING PERMANENT STORM WATER BMPS

**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 J-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 (Not applicable)
☑ 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) (To be completed at CD phase)
☑ Recommended equipment to perform maintenance (To be completed at CD Phase)
☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management (Not Applicable)
☑ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
☑ All BMPs must be fully dimensioned on the plans
☐When proprietary BMPs are used, site-specific cross section with outflow, inflow, and model number shall be provided. Photocopies of general brochures are not acceptable. (Not Applicable)

# PRELIMINARY GRADING PLAN
# 845 SANTA FE DRIVE
# MULTI-004398-2021

SEE SHEET C9

SEE SHEET C6

LOT 16
3,247 SF
NET/GROSS
FF 233.67
PAD 233.00

LOT 15
3,219 SF NET/GROSS
FF 233.67
PAD 233.00

LOT E
PARKING & DRAINAGE
1,927 SF GROSS/NET

LOT 5
3,633 SF NET/GROSS
FF 235.47
PAD 234.80

LOT 6
3,334 SF NET/GROSS
FF 233.97
PAD 233.30

LOT 8
3,426 SF NET/GROSS
FF 232.97
PAD 232.30

LOT 7
3,457 SF NET/GROSS
FF 232.47
PAD 231.80

LOT F
PVT DRAINAGE
11,167 SF GROSS/NET

BIOFILTRATION BASIN
7,053 SF
228.5 FG

LOT G
HOA
6,117 SF GROSS/NET

MUNEVAR RD

APN 260-131-15
768 MUNEVAR RD
SEC 22-13-4W POR

APN 260-131-16
770 MUNEVAR RD
SEC 22-13-4W POR

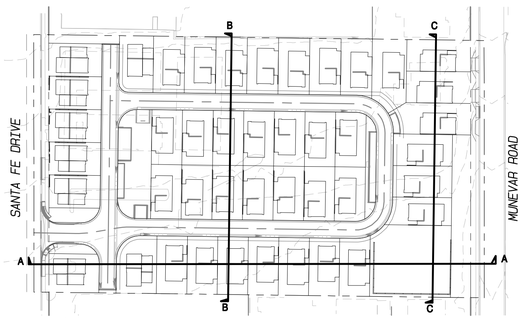

KEY MAP
NOT TO SCALE

GRAPHIC SCALE 1"=10'
0 10 20 30

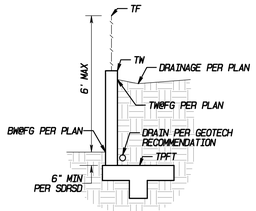
PREPARED BY:
PASCO LARET SUITER & ASSOCIATES
San Diego | Encinitas | Orange County
Phone 858.259.8212 | www.plsaengineering.com

PLSA 3376 TM 10/2/2024

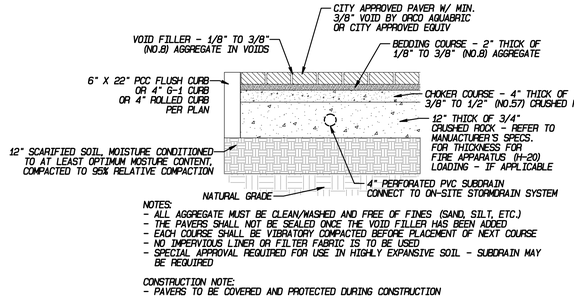
# DETAILS AND SECTIONS
# 845 SANTA FE DRIVE
# MULTI-004398-2021




## SECTION KEY MAP
SCALE: 1"=100'



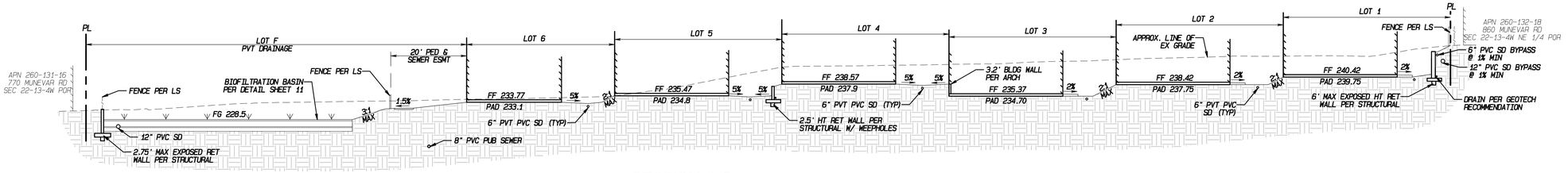

## TYPICAL WALL CALLOUTS
NOT TO SCALE



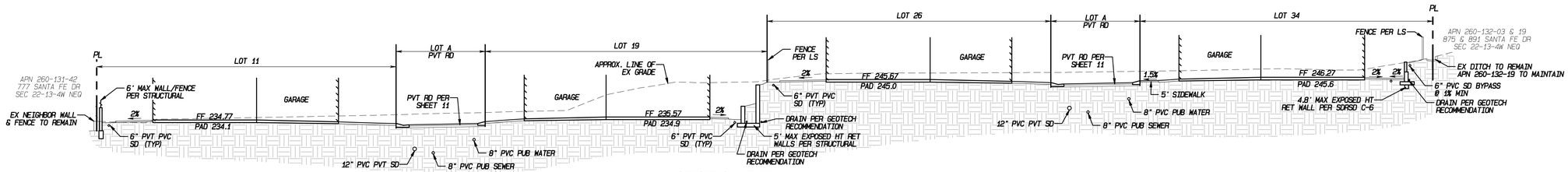

NOTES:
- ALL AGGREGATE MUST BE CLEAN/WASHED AND FREE OF FINES (SAND, SILT, ETC.)
- THE PAVERS SHALL NOT BE SEALED ONCE THE VOID FILLER HAS BEEN ADDED
- EACH COURSE SHALL BE VIBRATORY COMPACTED BEFORE PLACEMENT OF NEXT COURSE
- NO IMPERVIOUS LINER OR FILTER FABRIC IS TO BE USED
- SPECIAL APPROVAL REQUIRED FOR USE IN HIGHLY EXPANSIVE SOIL - SUBDRAIN MAY BE REQUIRED

CONSTRUCTION NOTE:
- PAVERS TO BE COVERED AND PROTECTED DURING CONSTRUCTION

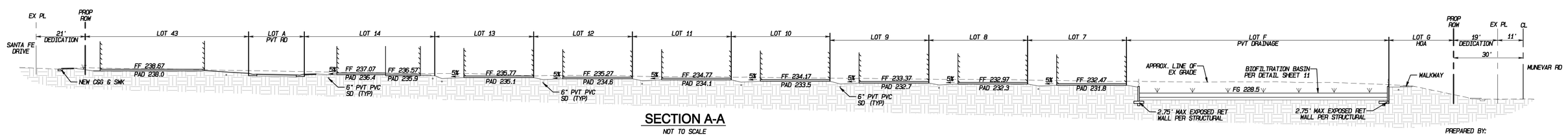
## PERMEABLE PAVERS
NOT TO SCALE



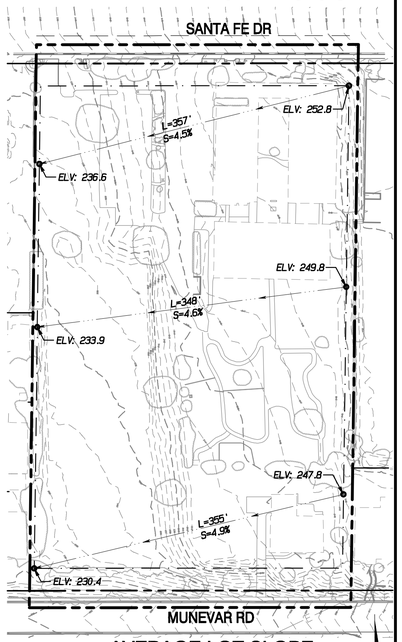

## SECTION C-C
NOT TO SCALE




## SECTION B-B
NOT TO SCALE




## SECTION A-A
NOT TO SCALE




## AVERAGE LOT SLOPE
SCALE: 1"=80'

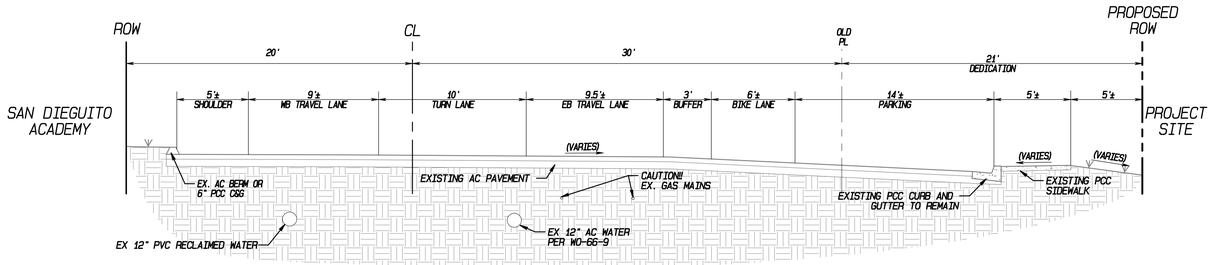
AVERAGE LOT SLOPE CALCULATION:
ΔE1 = 252.8'-236.6' = 16.2'
ΔE2 = 249.8'-233.9' = 15.9'
ΔE3 = 247.8'-230.4' = 17.4'

AVERAGE LOT SLOPE = (ΔE1+ΔE2+ΔE3) / (L1+L2+L3)
= (16.2'+15.9'+17.4') / (357'+ 348' + 355')
= 49.5' / 1,060'
= 4.67%

PREPARED BY:
PASCO LARET SUITER & ASSOCIATES
San Diego | Encinitas | Orange County
Phone 858.259.8212 | www.plsaengineering.com

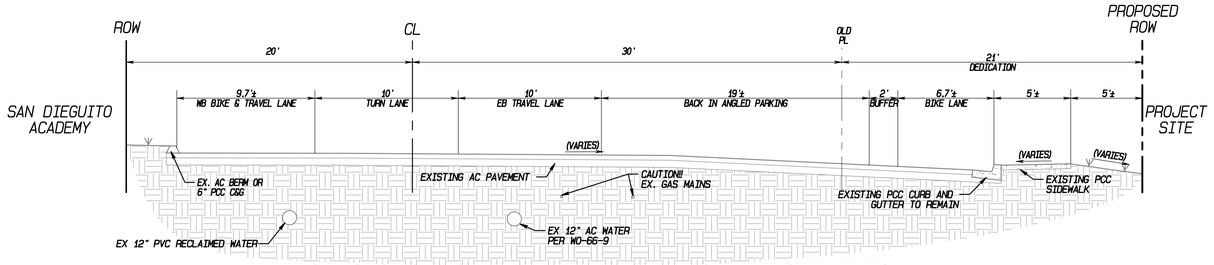
PLSA 3376 TM 10/2/2024

# DETAILS AND SECTIONS
# 845 SANTA FE DRIVE
# MULTI-004398-2021



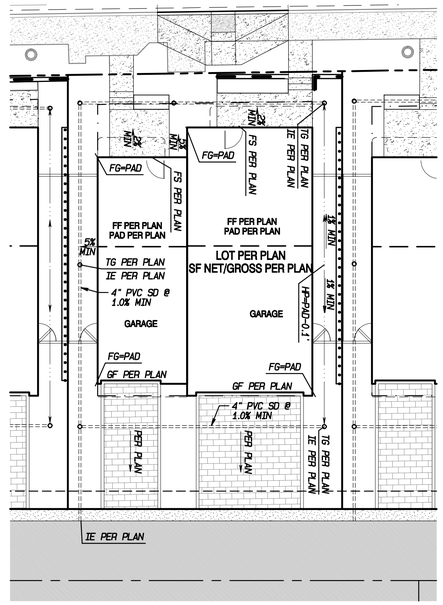

## TYPICAL SECTION - SANTA FE DRIVE EXISTING

NOT TO SCALE



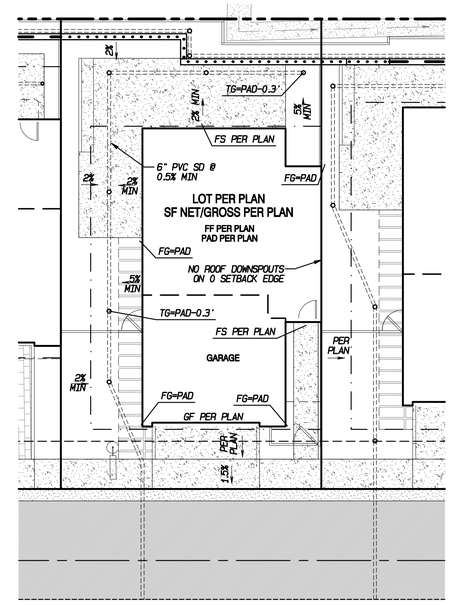

## TYPICAL SECTION - SANTA FE DRIVE FUTURE CIP IMPROVEMENTS

NOT TO SCALE



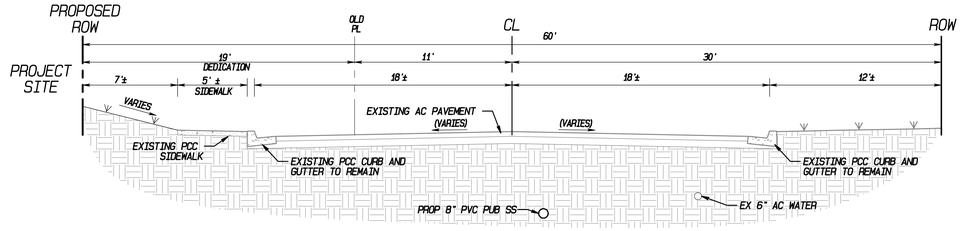

## TYPICAL LOT DRAINAGE DETAIL DUPLEX

NOT TO SCALE



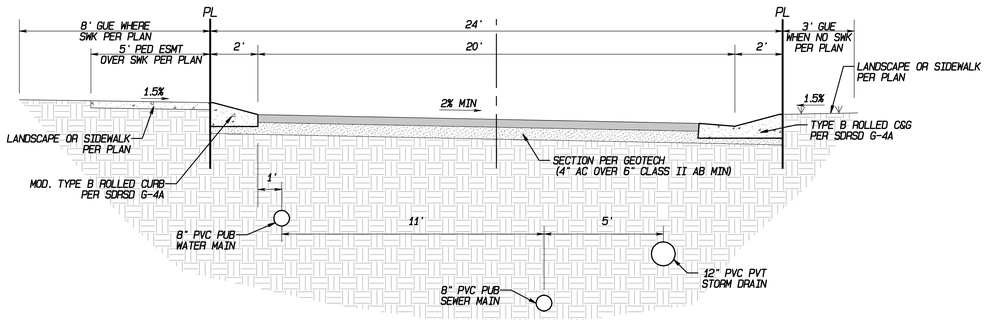

## TYPICAL LOT DRAINAGE DETAIL SFR

NOT TO SCALE



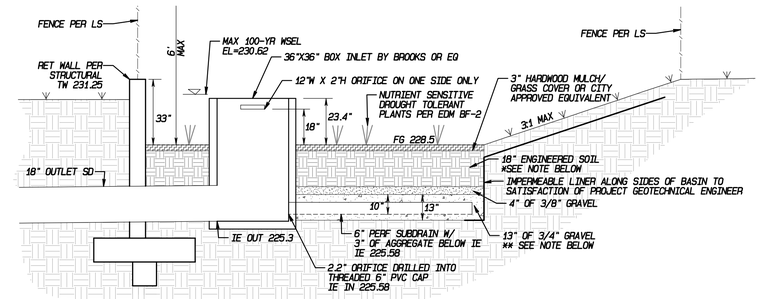

## TYPICAL SECTION - MUNEVAR ROAD

NOT TO SCALE




## TYPICAL SECTION - PRIVATE ROAD

NOT TO SCALE




* "ENGINEERED SOIL" LAYER SHALL BE MINIMUM 18" DEEP NUTRIENT SENSITIVE MEDIA. CONTRACTOR TO COORDINATE WITH LANDSCAPE ARCHITECT FOR EXACT MIX DESIGN TO MINIMIZE EXCESS NUTRIENTS IN MEDIA MIX PER EDM BF-2.

** 3/4" CRUSHED ROCK LAYER SHALL BE A MINIMUM OF 13" BUT MAY BE DEEPENED TO INCREASE THE INFILTRATION AND STORAGE ABILITY OF THE DETAIL

ALL BIOFILTRATION PLANTERS TO BE DEPRESSED AT LEAST 6" BELOW ADJACENT FINISHED SURFACE

## TYPICAL SECTION - BIOFILTRATION BASIN

NTS

PREPARED BY:
PASCO LARET SUITER & ASSOCIATES
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0 10' 20' 40'

SCALE: 1" = 20'-0"

## PLANT LEGEND

| SYMBOL | BOTANICAL NAME | COMMON NAME |
|---|---|---|
| | ARBUTUS MARINA | STRAWBERRY TREE |
| | CERCIDIUM X 'DESERT MUSEUM' | DESERT MUSEUM PALO VERDE |
| | CERCIS CANADENSIS 'FOREST PANSY' | FOREST PANSY REDBUD |
| | CHAMAEROPS HUMILIS | MEDITERRANEAN FAN PALM |
| | LAGERSTROEMIA INDICA X FAURIEI 'NATCHEZ' | NATCHEZ CRAPE MYRTLE |
| | PHOENIX DACTYLIFERA | MEDJOOL DATE PALM |
| | QUERCUS AGRIFOLIA | COAST LIVE OAK (NATIVE) |
| | QUERCUS CHRYSOLEPIS | CANYON LIVE OAK (NATIVE) |
| | QUERCUS ENGELMANNII | ENGELMANN OAK (NATIVE) |
| | WASHINGTONIA FILIFERA | CALIFORNIA FAN PALM |
| | **EXISTING TREE TO BE PROTECTED IN PLACE** | |
| | PINUS HALEPENSIS | ALEPPO PINE |
| | **SHRUBS/SUCCULENTS/GRASSES SUCH AS:** | |
| | **BIORETENTION PLANTS** | ASSUMES 25% 5 GALLON; 75% 1 GALLON |
| | **SHRUBS (ASSUMES 100% 15 GAL)** | |
| | BACCHARIS DOUGLASII | MARSH BACCHARIS |
| | **GRASSES & RUSHES & SEDGES (ASSUMES 100% 1 GAL)** | |
| | CAREX SPISSA | SAN DIEGO SEDGE |
| | CAREX PRAEGRACILIS | CLUSTERED FIELD SEDGE |
| | IVA HAYESIANA | SAN DIEGO MARSH ELDER |
| | JUNCUS PATENS | COMMON RUSH |
| | LEYMUS CONDENSATUS 'CANYON PRINCE' | CANYON PRINCE WILD RYE |
| | **SUCCULENTS & PERENNIALS (ASSUMES 75% 5 GAL, 25%** | |
| | ACHILLEA MILLEFOLIUM | YARROW |
| | MIMULUS CARDINALIS | SCARLET MONKEYFLOWER |
| | SISYRINCHIUM BELLUM | BLUE EYED GRASS |
| | **PLANTS MAINTAINED BY HOA & COMMON AREAS** | |
| | **SHRUBS (ASSUMES 100% 15 GAL)** | |
| | SALVIA LEUCOPHYLLA 'PT SAL' | PT. SAL PURPLE SAGE |
| | SANSEVIERIA TRIFASCIATA | MOTHER-IN-LAW'S TONGUE |
| | VERBENA LILACINA 'DE LA MINA' | CEDROS ISLAND VERBENA |
| | **VINE (ASSUMES 100% 5 GAL)** | |
| | CLEMATIS LIGUSTICIFOLIA | |
| | PASSIFLORA EDULIS | PURPLE PASSION FRUIT |
| | **PLANTS WITHIN PRIVATE RESIDENCE YARDS** | ASSUMES 30% 5 GALLON; 70% 1 GALLON |
| | **SHRUBS (ASSUMES 100% 15 GAL)** | |
| | LEUCADENDRON 'EBONY' | PURPLE LEUCADENDRON |
| | LIGUSTRUM JAPONICUM | JAPANESE PRIVOT |
| | RHAMNUS CALIFORNICA 'EVE CASE' | COFFEEBERRY |
| | **SUCCULENTS & PERENNIALS (ASSUMES 75% 5 GAL, 25%** | |
| | ACHILLEA MILLEFOLIUM | YARROW |
| | AGAVE ATTENUATA 'BLUE FLAME' | BLUE FLAME AGAVE |
| | AGAVE 'BLUE GLOW' | BLUE GLOW AGAVE |
| | DIANELLA CAERULEA CASSA BLUE | BLUE FLAX LILY |
| | EPILOBIUM CANUM | CALIFORNIA FUSCIA |
| | HESPERALOE PARVIFLORA 'BREAKLIGHTS' | RED YUCCA |
| | LAVANDULA STOECHAS | SPANISH LAVENDER |
| | ROSEMARINUS OFFICINALIS 'ROMAN BEAUTY' | ROMAN BEAUTY ROSEMARY |
| | SALVIA LEUCANTHA 'SANTA BARBARA' | SANTA BARBARA SAGE |
| | SANSEVIERIA TRIFASCIATA | MOTHER-IN-LAW'S TONGUE |
| | SENECIO MANDRALISCAE | BLUE FINGER CHALK STICKS |
| | VERBENA LILACINA 'DE LA MINA' | CEDROS ISLAND VERBENA |
| | **VINE (ASSUMES 100% 5 GAL)** | |
| | BOUGAINVILLEA 'SAN DIEGO RED' | SAN DIEGO RED BOUGAINVILLEA |
| | CEANOTHUS RAY HARTMAN | RAY HARTMAN CEANOTHUS |
| | HETEROMELES DAVIS GOLD | GOLDEN BERRY TOYON |
| | LEUCADENDRON 'EBONY' | PURPLE LEUCADENDRON |
| | SAMBUCUS MEXICANA | ELDERFLOWER |
| | WESTRINGIA 'BLUE GEM' | BLUE GEM COAST ROSEMARY |
| | **GRASSES & RUSHES & SEDGES (ASSUMES 100% 1 GAL)** | |
| | BOUTELOUA GRACILIS 'BLONDE AMBITION' | 'BLONDE AMBITION' GRAMA GRASS |
| | LOMANDRA PLATINUM BEAUTY | PLATINUM BEAUTY RUSH |
| | LOMANDRA 'LIME TUFF' | DWARF MAT RUSH |
| | **SUCCULENTS & PERENNIALS (ASSUMES 75% 5 GAL, 25%** | |
| | ACALYPHA CALIFORNICA | |
| | AGAVE A. 'BLUE FLAME' | BLUE FLAME AGAVE |
| | ALOE BARBADENSIS | ALOE VERA |
| | CALLIANDRA CALIFORNICA | |
| | CEANOTHUS YANKEE POINT | YANKEE POINT CEANOTHUS |
| | DIETES IRIDIOIDES | FORTNIGHT LILY |
| | DUDLEA BRITTONII | GIANT CHALK DUDLEYA |
| | ERIGERON GLAUCUS 'WR' | WAYNE RODERICK DAISY |
| | GRINDELIA STRICTA VENULOSA | GUMWEED |
| | JAUMEA CARNOSA | |
| | LEPECHINIA FRAGRANS | |
| | MIMULUS AURANTIACUS 'JELLY BEAN' | JELLY BEAN MONKEY FLOWER |
| | ROMNEYA COULTERI | COULTER'S MATILIJA POPPY |
| | SALVIA CLEVELANDII 'POZO BLUE' | |
| | SALVIA GREGGII 'FURMAN'S RED' | FURMAN'S RED AUTUMN SAGE |

| | | | | |
|---|---|---|---|---|
| NOT SHOWN | STONE MULCH TYPE 1 - SMALL, ANGULAR | STONE MULCH TYPE 1 - SMALL, ANGULAR- 'KETTLE' OR EQUAL-3/4" | PER SPECS | DECORATIVE STONE SOLUTIONS |
| NOT SHOWN | STONE MULCH TYPE 2 - MEDIUM, ANGULAR | STONE MULCH TYPE 2 - MEDIUM, ANGULAR 'KETTLE' OR EQUAL -50% 2"-4", 50% 3/4" OR EQUAL | PER SPECS | DECORATIVE STONE SOLUTIONS |
| 3 ① ② | BOULDERS | 1'-3' BOULDER - 'SUMMER CRUNCH' | PER SPECS | DECORATIVE STONE SOLUTIONS |

| | |
|---|---|
| **DRAWN BY:** | EG |
| **CHECKED BY:** | NH |
| **DATE:** | 10/01/24 |
| **REVISIONS:** | |
| CITY SUBMITTAL | 12/22/20 |
| CITY SUBMITTAL #2 | 11/24/21 |
| CITY SUBMITTAL #3 | 10/31/23 |
| CITY SUBMITTAL #4 | 07/02/24 |
| CITY SUBMITTAL #5 | 10/01/24 |

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San Diego, California 92109
P: 858.483.9817
F: 858.551.9021

# SANTA FE MULTI-FAMILY

845 SANTA FE DR, ENCINITAS CA 92024

LICENSED LANDSCAPE ARCHITECT
MATT C. BARKLEY
Signature
11/20/25
Renewal Date
10/01/24
Date
STATE OF CALIFORNIA

CITY STAMP

**SHEET TITLE**
Planting Plan

**SHEET NUMBER**
L3.00b

# PLANT LEGEND

| SYMBOL | BOTANICAL NAME | COMMON NAME | SIZE | FORM | WUCOLS | MATURE SIZE | QTY. |
|---|---|---|---|---|---|---|---|
| | ARBUTUS MARINA | STRAWBERRY TREE | 24" BOX | STANDARD; SINGLE TRUNK | MEDIUM | 40'H X 25'W | 14- HOA; 13- PRIVATE; 27 TOTAL |
| | CERCIDIUM X 'DESERT MUSEUM' | DESERT MUSEUM PALO VERDE | 36" BOX | STANDARD | LOW | 15'H X 15'W | 1- HOA; 5- PRIVATE; 6 TOTAL |
| | CERCIS CANADENSIS 'FOREST PANSY' | FOREST PANSY REDBUD | 36" BOX | MULTI | MEDIUM | 12'H X 15'W | 19- PRIVATE; 19 TOTAL |
| | CHAMAEROPS HUMILIS | MEDITERRANEAN FAN PALM | 36" BOX | MULTI | MEDIUM | 8'H X 10'W | 22- PRIVATE; 22 TOTAL |
| | LAGERSTROEMIA INDICA X FAURIEI 'NATCHEZ' | NATCHEZ CRAPE MYRTLE | 36" BOX | STANDARD | MEDIUM | 25'H X 20'W | 14- HOA; 26- PRIVATE; 40 TOTAL |
| | PHOENIX DACTYLIFERA | MEDJOOL DATE PALM | 16' BTH | MULTI | MEDIUM | 50'H X 20'W | 8- HOA; 4- PRIVATE; 12 TOTAL |
| | QUERCUS AGRIFOLIA | COAST LIVE OAK (NATIVE) | 36" BOX | STANDARD | MEDIUM | 40'H X 40'W | 4- HOA; 2- PRIVATE; 6 TOTAL |
| | QUERCUS CHRYSOLEPIS | CANYON LIVE OAK (NATIVE) | 36" BOX | STANDARD | MEDIUM | 30'H X 30'W | 5- HOA; 1- PRIVATE; 6 TOTAL |
| | QUERCUS ENGELMANNII | ENGELMANN OAK (NATIVE) | 36" BOX | STANDARD | MEDIUM | 25'H X 40'W | 9- HOA; 6- PRIVATE; 15 TOTAL |
| | WASHINGTONIA FILIFERA | CALIFORNIA FAN PALM | 10' BTH | STANDARD | MEDIUM | 40'H X 10'W | 5- HOA; 52- PRIVATE; 57 TOTAL |
| | **EXISTING TREE TO BE PROTECTED IN PLACE** | | | | | | |
| | PINUS HALEPENSIS | ALEPPO PINE | REFER TO PLAN | | | | 13 -HOA MAINTAINED |
| | **SHRUBS/SUCCULENTS/GRASSES SUCH AS:** | | **SIZE** | **SPACING** | **WUCOLS** | | **REMARKS** |
| | **BIORETENTION PLANTS** | ASSUMES 25% 5 GALLON; 75% 1 GALLON | | | | | |
| | **SHRUBS (ASSUMES 100% 15 GAL)** | | | | | | |
| | BACCHARIS DOUGLASII | MARSH BACCHARIS | 5 GALLON | 3' O.C. | LOW | | NATIVE |
| | **GRASSES & RUSHES & SEDGES (ASSUMES 100% 1 GAL)** | | | | | | |
| | CAREX SPISSA | SAN DIEGO SEDGE | 1 GALLON | 3'-0" | LOW | | NATIVE |
| | CAREX PRAEGRACILIS | CLUSTERED FIELD SEDGE | 1 GALLON | 3'-6" O.C. | MEDIUM | | NATIVE |
| | IVA HAYESIANA | SAN DIEGO MARSH ELDER | 1 GALLON | 3'-0" | VERY LOW | | NATIVE |
| | JUNCUS PATENS | COMMON RUSH | 1 GALLON | 2'-0" | LOW | | NATIVE |
| | LEYMUS CONDENSATUS 'CANYON PRINCE' | CANYON PRINCE WILD RYE | 1 GALLON | 30" O.C. | LOW | | NURSERY CULTIVAR OF NATIVE |
| | **SUCCULENTS & PERENNIALS (ASSUMES 75% 5 GAL, 25% 1 GAL)** | | | | | | |
| | ACHILLEA MILLEFOLIUM | YARROW | 1 GALLON | 1'-0" | LOW | | NATIVE |
| | MIMULUS CARDINALIS | SCARLET MONKEYFLOWER | 5 GALLON | 3' O.C. | MEDIUM | | NATIVE |
| | SISYRINCHIUM BELLUM | BLUE EYED GRASS | 1 GALLON | 1' O.C. | LOW | | NATIVE |
| | **PLANTS MAINTAINED BY HOA & COMMON AREAS** | | | | | | |
| | **SHRUBS (ASSUMES 100% 15 GAL)** | | | | | | |
| | CEANOTHUS RAY HARTMAN | RAY HARTMAN CEANOTHUS | 15 GALLON | 4'-0" | LOW | | NURSERY CULTIVAR OF NATIVE |
| | HETEROMELES DAVIS GOLD | GOLDEN BERRY TOYON | | | | | NURSERY CULTIVAR OF NATIVE |
| | LEUCADENDRON 'EBONY' | PURPLE LEUCADENDRON | 15 GALLON | 4' | LOW | | |
| | SAMBUCUS MEXICANA | ELDERFLOWER | 15 GALLON | 4'-0" | LOW | | NATIVE |
| | WESTRINGIA 'BLUE GEM' | BLUE GEM COAST ROSEMARY | 15 GALLON | 4'-0" | LOW | | |
| | **GRASSES & RUSHES & SEDGES (ASSUMES 100% 1 GAL)** | | | | | | |
| | BOUTELOUA GRACILIS 'BLONDE AMBITION' | 'BLONDE AMBITION' GRAMA GRASS | 1 GALLON | 1'-6" O.C. | LOW | | NURSERY CULTIVAR OF NATIVE |
| | LOMANDRA PLATINUM BEAUTY | PLATINUM BEAUTY RUSH | 1 GALLON | 3'-0" O.C. | LOW | | |
| | LOMANDRA 'LIME TUFF' | DWARF MAT RUSH | 1 GALLON | 3'-6" O.C. | LOW | | |
| | **SUCCULENTS & PERENNIALS (ASSUMES 75% 5 GAL, 25% 1 GAL)** | | | | | | |
| | ACALYPHA CALIFORNICA | | | | | | NATIVE |
| | AGAVE A. 'BLUE FLAME' | BLUE FLAME AGAVE | 5 GALLON | 3' O.C. | LOW | | |
| | ALOE BARBADENSIS | ALOE VERA | 5 GALLON | 2' O.C. | LOW | | |
| | CALLIANDRA CALIFORNICA | | | | | | NATIVE |
| | CEANOTHUS YANKEE POINT | YANKEE POINT CEANOTHUS | 5 GALLON | 4'-0" | LOW | | NATIVE |
| | DIETES IRIDIOIDES | FORTNIGHT LILY | 5 GALLON | 3' O.C. | LOW | | |
| | DUDLEA BRITTONII | GIANT CHALK DUDLEYA | 5 GALLON | 2' O.C. | LOW | | NATIVE |
| | ERIGERON GLAUCUS 'WR' | WAYNE RODERICK DAISY | 1 GALLON | 2' O.C. | LOW | | NURSERY CULTIVAR OF NATIVE |
| | GRINDELIA STRICTA VENULOSA | GUMWEED | 1 GALLON | 1'-0" O.C. | LOW | | NATIVE |
| | JAUMEA CARNOSA | | | | | | NATIVE |
| | LEPECHINIA FRAGRANS | | | | | | NATIVE |
| | MIMULUS AURANTIACUS 'JELLY BEAN' | JELLY BEAN MONKEY FLOWER | 5 GALLON | 3' O.C. | MEDIUM | | NURSERY CULTIVAR OF NATIVE |
| | ROMNEYA COULTERI | COULTER'S MATILIJA POPPY | 5 GALLON | 10'-0" | LOW | | NATIVE |
| | SALVIA CLEVELANDII 'POZO BLUE' | | | | | | NURSERY CULTIVAR OF NATIVE |
| | SALVIA GREGGII 'FURMAN'S RED' | FURMAN'S RED AUTUMN SAGE | 5 GALLON | 3'-0" | LOW | | |
| | SALVIA LEUCOPHYLLA 'PT SAL' | PT. SAL PURPLE SAGE | 5 GALLON | 5'-0" | VERY LOW | | NURSERY CULTIVAR OF NATIVE |
| | SANSEVIERIA TRIFASCIATA | MOTHER-IN-LAW'S TONGUE | 1 GALLON | 1'-0" | LOW | | |
| | VERBENA LILACINA 'DE LA MINA' | CEDROS ISLAND VERBENA | 5 GALLON | 4'-0" | LOW | | NURSERY CULTIVAR OF NATIVE |
| | **VINE (ASSUMES 100% 5 GAL)** | | | | | | |
| | CLEMATIS LIGUSTICIFOLIA | | | | | | NATIVE |
| | PASSIFLORA EDULIS | PURPLE PASSION FRUIT | 5 GALLON | PER PLAN | LOW | | |
| | **PLANTS WITHIN PRIVATE RESIDENCE YARDS** | ASSUMES 30% 5 GALLON; 70% 1 GALLON | | | | | |
| | **SHRUBS (ASSUMES 100% 15 GAL)** | | | | | | |
| | LEUCADENDRON 'EBONY' | PURPLE LEUCADENDRON | 15 GALLON | 4' | LOW | | |
| | LIGUSTRUM JAPONICUM | JAPANESE PRIVOT | 15 GALLON | 5'-0" | MEDIUM | | |
| | RHAMNUS CALIFORNICA 'EVE CASE' | COFFEEBERRY | 15 GALLON | 6' O.C. | VERY LOW | | |
| | **SUCCULENTS & PERENNIALS (ASSUMES 75% 5 GAL, 25% 1 GAL)** | | | | | | |
| | ACHILLEA MILLEFOLIUM | YARROW | 1 GALLON | 1'-0" | LOW | | NATIVE |
| | AGAVE ATTENUATA 'BLUE FLAME' | BLUE FLAME AGAVE | 5 GALLON | 30" O.C. | LOW | | |
| | AGAVE 'BLUE GLOW' | BLUE GLOW AGAVE | 5 GALLON | 2'-0" | LOW | | |
| | DIANELLA CAERULEA CASSA BLUE | BLUE FLAX LILY | 1 GALLON | 1'-6" O.C. | LOW | | |
| | EPILOBIUM CANUM | CALIFORNIA FUSCIA | | | | | NATIVE |
| | HESPERALOE PARVIFLORA 'BREAKLIGHTS' | RED YUCCA | 5 GALLON | 2'-6" O.C. | LOW | | |
| | LAVANDULA STOECHAS | SPANISH LAVENDER | 1 GALLON | 2' O.C. | LOW | | |
| | ROSEMARINUS OFFICINALIS 'ROMAN BEAUTY' | ROMAN BEAUTY ROSEMARY | 5 GALLON | 5' O.C. | LOW | | |
| | SALVIA LEUCANTHA 'SANTA BARBARA' | SANTA BARBARA SAGE | 1 GALLON | 2' O.C. | LOW | | |
| | SANSEVIERIA TRIFASCIATA | MOTHER-IN-LAW'S TONGUE | 1 GALLON | 1' O.C. | LOW | | |
| | SENECIO MANDRALISCAE | BLUE FINGER CHALK STICKS | 1 GALLON | 2'-6" | LOW | | |
| | VERBENA LILACINA 'DE LA MINA' | CEDROS ISLAND VERBENA | 1 GALLON | 3' O.C. | LOW | | NURSERY CULTIVAR OF NATIVE |
| | **VINE (ASSUMES 100% 5 GAL)** | | | | | | |
| | BOUGAINVILLEA 'SAN DIEGO RED' | SAN DIEGO RED BOUGAINVILLEA | 5 GALLON | AS SHOWN | LOW | | |
| | CLEMATIS PAUCIFLORA | | | | | | NATIVE |
| | FICUS PUMILA | CREEPING FIG | 5 GALLON | AS SHOWN | MEDIUM | | |
| | TRACHELOSPERMUM JASMINOIDES | STAR JASMINE | 5 GALLON | PER PLAN | MEDIUM | | |

## NOTES:

1. ALL PLANTING AREAS TO RECEIVE MULCH AS INDICATED ON THE MULCH PLAN. 3" DEPTH LAYER PER SPECIFICATIONS.
2. REMOVE ANY CONCRETE, ASPHALT AND ASSOCIATED BASE COURSE FROM ALL PLANTING AREAS. ALL NEW PLANTING AREAS TO BE RIPPED AND RECOMPACTED PER SPECIFICATIONS.
3. ALL PLANTING AREAS TO RECEIVE IRRIGATION.
4. THE LANDSCAPE DESIGN FOR THIS PROJECT SHALL COMPLY WITH CHAPTER 7, LANDSCAPE GUIDELINES OF THE CITY OF ENCINITAS DESIGN GUIDELINES DOCUMENTS.

# MULCH + BOULDER LEGEND

| SYMBOL | MULCH | COLOR & SIZE | | | |
|---|---|---|---|---|---|
| NOT SHOWN | STONE MULCH TYPE 1 - SMALL, ANGULAR | STONE MULCH TYPE 1 - SMALL, ANGULAR- 'KETTLE' OR EQUAL-3/4" | PER SPECS | DECORATIVE STONE SOLUTIONS | PLANTING AREAS |
| NOT SHOWN | STONE MULCH TYPE 2 - MEDIUM, ANGULAR | STONE MULCH TYPE 2 - MEDIUM, ANGULAR 'KETTLE' OR EQUAL -50% 2"-4", 50% 3/4" OR EQUAL | PER SPECS | DECORATIVE STONE SOLUTIONS | BIORETENTION BASIN |
| 3 1 2 | BOULDERS | 1'-3' BOULDER - 'SUMMER CRUNCH' | PER SPECS | DECORATIVE STONE SOLUTIONS | |

# MINIMUM TREE SEPARATION DISTANCE:

| | |
|---|---|
| TRAFFIC SIGNAL, STOP SIGN | 20 FEET |
| UNDERGROUND UTILITY LINES | 5 FEET |
| SEWERS | 10 FEET |
| ABOVE GROUND UTILITY STRUCTURES | 10 FEET |
| DRIVEWAYS (ENTRIES) | 10 FEET |
| INTERSECTIONS | 25 FEET |

# PLANTING NOTES

**GENERAL REQUIREMENTS**

1 IF THE MOISTURE CONTENT OF THE SOIL SHOULD REACH SUCH A LEVEL THAT WORKING IT WOULD DESTROY SOIL STRUCTURE, SPREADING AND GRADING OPERATIONS SHALL BE SUSPENDED UNTIL, IN THE OPINION OF THE OWNERS REPRESENTATIVE, THE MOISTURE CONTENT IS INCREASED OR REDUCED TO ACCEPTABLE LEVELS AND THE DESIRED RESULTS ARE LIKELY TO BE OBTAINED.

2 ACTUAL PLANTING SHALL BE PERFORMED DURING THOSE PERIODS WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE IN ACCORDANCE WITH LOCALLY ACCEPTED HORTICULTURAL PRACTICE AS APPROVED BY THE OWNERS REPRESENTATIVE. CONTRACTOR SHALL ONLY INSTALL AS MANY PLANTS PER DAY AS CAN BE PLANTED AND WATERED ON THAT SAME DAY.

3 ALL SCALED DIMENSIONS ARE APPROXIMATE. BEFORE PROCEEDING WITH ANY WORK, THE CONTRACTOR SHALL CAREFULLY CHECK AND VERIFY ALL DIMENSIONS AND SHALL IMMEDIATELY INFORM THE OWNERS REPRESENTATIVE OF ANY DISCREPANCY BETWEEN THE DRAWINGS AND/OR SPECIFICATIONS AND ACTUAL CONDITIONS.

4 PLANT MATERIAL QUANTITIES SHOWN ARE FOR CONVENIENCE ONLY. VERIFY COUNT AND PROVIDE NUMBER TO FULFILL INTENT OF DRAWINGS PRIOR TO ORDERING FROM NURSERIES.

5 PROTECTION OF EXISTING TREES, SHRUBS, AND GROUNDCOVER:

A THE CLIENT OR CLIENTS REPRESENTATIVE SHALL IDENTIFY EXISTING TREES AND SHRUBS OF WHICH ARE TO BE PRESERVED WITHIN THE PROJECT LIMITS. PRIOR TO THE START WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH PLANT MATERIAL TO BE PRESERVED, RELOCATED, AND REMOVED.

B ALL PLANTING TO REMAIN SHALL BE PROTECTED AT ALL TIMES FROM DAMAGE BY PERSONS AND EQUIPMENT. WHERE IT IS NECESSARY TO EXCAVATE ADJACENT TO EXISTING TREES, THE CONTRACTOR SHALL USE ALL POSSIBLE CARE TO AVOID INJURY TO TREES AND ROOTS. EXCAVATION IN AREAS WHERE TWO (2) INCH AND LARGER ROOTS OCCUR SHALL BE DONE BY HAND. TUNNELING UNDER ROOTS 2" AND LARGER SHALL BE DONE AND ONLY DONE AFTER RECEIPT OF WRITTEN APPROVAL OF THE OWNER'S REPRESENTATIVE. CONTRACTOR SHALL PAINT CUT ROOTS WITHIN 24 HOURS; WHERE THIS IS NOT POSSIBLE, KEEP THE SIDE OF EXCAVATION ADJACENT TO TREE SHADED WITH MOIST BURLAP OR CANVAS. ALL MINOR DAMAGE BY CONTRACTOR TO EXISTING TREES AND SHRUBS SHALL BE REPAIRED AT HIS EXPENSE BY A LICENSED TREE SURGEON OR OTHER APPROVED PERSONNEL.

C DAMAGE TO A TREE OR SHRUB, WHICH RESULTS IN DEATH OR PERMANENT DISFIGURATION, SHALL RESULT IN THE CONTRACTORS COMPLETE REMOVAL OF SAID TREE OR SHRUB, INCLUDING ROOTS, FROM THE SITE. THE CONTRACTOR SHALL REPLACE THE TREE OR SHRUB AS ESTABLISHED BY THE OWNERSS REPRESENTATIVE WITH ONE OF EQUAL VALUE AT THE CONTRACTORS EXPENSE, OR SHALL REIMBURSE TO THE OWNER THE COST OF SAID REPLACEMENT. THE OWNERS REPRESENTATIVE SHALL BE THE SOLE JUDGE OF THE CONDITION OF ANY TREE OR SHRUB.

D ALL PLANTS TO REMAIN ON-SITE WILL BE IRRIGATED AS NECESSARY DURING THE ENTIRE CONSTRUCTION CONTRACT.

**DEEP WATER LEACHING**

1 FILL IN ALL DEPRESSIONS, VOIDS, EROSION SCARS, OR SETTLED TRENCHES GENERATED BY THE DEEP LEACHING WITH CONDITIONED SOIL, LEAVING A FINAL GRADE SMOOTH AND EVEN (IF LEACHING IS REQUIRED).

**FINAL GRADES**

1 MINOR MODIFICATIONS TO GRADE MAY BE REQUIRED TO ESTABLISH THE FINAL GRADES.

2 CLEAN ALL PLANTING AREAS TO A DEPTH OF TWELVE (12) INCHES, REMOVING ALL WEEDS, DEBRIS, ROCKS, OR OTHER DELETERIOUS MATTER 1" DIAMETER OR LARGER FROM THE SITE.

3 ALL UNDULATIONS AND IRREGULARITIES IN THE PLANTING SURFACES SHALL RESULTING FROM TILLAGE, ROTOTILLING, AND ALL OTHER OPERATIONS BE LEVELED AND FLOATED OUT BEFORE PLANTING.

4 THE CONTRACTOR SHALL TAKE EVERY PRECAUTION TO PROTECT AND AVOID DAMAGE TO SPRINKLER HEADS, IRRIGATION LINES, AND OTHER UNDERGROUND UTILITIES DURING GRADING AND CONDITIONING OPERATIONS.

5 CONTRACTOR SHALL COORDINATE ALL DRAINAGE WORK WITH ALL OTHER TRADES. ESTABLISHED SITE DRAINAGE SHALL BE MAINTAINED BY CONTRACTOR DURING ALL PHASES OF LANDSCAPE CONSTRUCTION.

6 FINAL FINISH GRADES SHALL INSURE POSITIVE DRAINAGE OF THE SITE WITH ALL SURFACE DRAINAGE AWAY FROM BUILDINGS, WALLS AND TOWARD DRAINS AND CATCH BASINS.

7 FINAL GRADES SHALL BE APPROVED IN WRITING BY THE OWNERS REPRESENTATIVE BEFORE PLANTING OPERATIONS WILL BE ALLOWED TO BEGIN.

**WEED CONTROL**

1 PRIOR TO PLANTING, ERADICATE WEEDS WITHIN THE LIMITS OF WORK IN THE FOLLOWING ORDER:

A IRRIGATE TWICE EACH DAY FOR APPROXIMATELY 5 TO 10 MINUTES EACH WATERING TIME (AS APPROPRIATE TO SITE CONDITIONS) FOR A PERIOD OF 30 CALENDAR DAYS.

B APPLY POST EMERGENT HERBICIDE (SUCH AS "ROUND-UP PRO') PER CALIFORNIA LICENSED PEST CONTROL ADVISOR AND ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. TAKE CARE TO PROTECT EXISTING PLANT MATERIAL WHICH IS TO REMAIN AS SHOWN ON THE PLANS.

C WAIT THE REQUIRED PERIOD FOR THE HERBICIDE TO TAKE EFFECT (APPROXIMATELY 7-14 DAYS).

D PHYSICALLY REMOVE WEEDS DEAD OR ALIVE WITHIN THE PROJECT LIMITS.

2 EXISTING NATIVE VEGETATION SHALL NOT BE IRRIGATED AND IRRIGATION RUN-OFF SHALL NOT SPREAD TO AREAS WITH EXISTING NATIVE PLANTS.

**SOIL CONDITIONING AND FERTILIZING**

1 GRUB / CLEAN AND ROTOTILL ALL PLANTING AREAS TO A DEPTH OF EIGHTEEN (18) INCHES, REMOVING ALL WEEDS, DEBRIS, ROCKS, OR OTHER DELETERIOUS MATTER 1' DIAMETER OR LARGER FROM THE SITE TO 12 INCH DEPTH(UNLESS SPECIFIED OTHERWISE). THEN BLEND IN CONDITIONERS CALLED FOR IN SPECIFICATIONS BASED ON SOILS REPORT.

2 PLANTER SOIL FOR RAISED PLANTER (S) SHALL BE AMENDED NATIVE TOPSOIL PER SPECIFICATIONS.

**GENERAL PLANTING**

1 PRUNING SHALL NOT BE DONE EXCEPT BY APPROVAL OF REPRESENTATIVE.

2 PLANT LOCATIONS SHALL BE CHECKED FOR POSSIBLE INTERFERENCE WITH EXISTING UNDERGROUND PIPING, PRIOR TO EXCAVATION OF HOLES. IF UNDERGROUND CONSTRUCTION OR UTILITY LINES ARE ENCOUNTERED IN THE EXCAVATION OF PLANTING AREAS, NOTIFY THE OWNER. EXPENSES FOR REPAIR OF DAMAGE TO EXISTING UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. MINIMUM TREE SEPARATION DISTANCES ARE AS FOLLOWS:

A TRAFFIC SIGNALS (STOP SIGNS) - 20 FEET
B UNDERGROUND UTILITY LINES - 5 FEET
C ABOVE GROUND UTILITY STRUCTURES -10 FEET
D DRIVEWAY (ENTRIES) -10 FEET
E INTERSECTIONS (INTERSECTING CURB LINES OF TWO STREETS) -25 FEET

3 ALL EXCAVATED HOLES SHALL HAVE VERTICAL SIDES WITH ROUGHENED SURFACES AND SHALL BE OF THE MINIMUM SIZES INDICATED ON DRAWINGS. HOLES SHALL BE, IN ALL CASES, LARGE ENOUGH TO PERMIT HANDLING AND PLANTING WITHOUT INJURY OR BREAKAGE OF ROOT BALLS OR ROOTS.

4 GROUNDCOVER ON SLOPES 3:1 AND STEEPER SHALL BE PLANTED AT 12 INCHES (MAX.) ON CENTER SPACING.

**PLANT AVAILABILITY**

1 THE ACT OF PROVIDING A BID FOR THIS PROJECT ESTABLISHES THE CONTRACTORS UNDERSTANDING THAT THE PLANTS SPECIFIED HEREIN MAY BE UNUSUAL AND MORE DIFFICULT TO LOCATE THAN THE INDUSTRY STANDARD AND THAT THE CONTRACTOR AGREES TO THE FOLLOWING:

A THE CONTRACTOR SHALL SEARCH FOR EACH PLANT SPECIFIED. LISTED BELOW ARE PLANT NURSERY SOURCES TO BE CONTACTED DURING CONTRACTORS SEARCH. IF ANY OF THE LISTED NURSERIES, OR ANY NURSERIES IN CALIFORNIA OR ARIZONA HAVE THE SPECIFIED PLANTS IN THE CONTAINER SIZES SPECIFIED, THE CONTRACTOR SHALL BE OBLIGATED TO PURCHASE AND OBTAIN DELIVERY OF SAID PLANTS.

B WITHIN TWENTY-ONE (21) DAYS AFTER AWARD OF CONTRACT, CONTRACTOR SHALL SUBMIT A PLANT LIST WITH NURSERY SOURCES, PLANT QUANTITIES AND PLANT SIZES; PLANT LIST SHALL INDICATE ALL UNAVAILABLE PLANTS AND WHICH NURSERIES WERE CONTACTED DURING CONTRACTORS SEARCH. (LANDSCAPE ARCHITECT SHALL SUGGEST PLANT SUBSTITUTION BASED UPON INFORMATION IN CONTRACTOR SUBMITTAL.)

C UPON ACCEPTANCE OF CONTRACTOR PLANT SUBMITTAL BY LANDSCAPE ARCHITECT, CONTRACTOR SHALL SECURE PLANTS WITHIN FIVE (5) DAYS AND ARRANGE FOR DELIVERY FROM NURSERIES.

**TREES, SHRUBS, AND VINES**

1 EACH TREE AND SHRUB SHALL BE PLACED IN THE CENTER OF THE HOLE AND SHALL BE SET PLUMB AND HELD RIGIDLY IN POSITION UNTIL THE PLANTING BACKFILL HAS BEEN TAMPED DOWN AROUND EACH ROOTBALL.

2 ALL PLANTS SHALL BE SET AT SUCH A LEVEL THAT AFTER SETTLING THEY ARE 2" HIGHER THAN THE SURROUNDING FINISH GRADE AS DETAILED UNLESS OTHERWISE NOTED

3 ALL PLANTS SHALL BE THOROUGHLY WATERED INTO THE FULL DEPTH OF EACH PLANTING HOLE IMMEDIATELY AFTER PLANTING.

4 ROOT BARRIERS: ROOT CONTROL BARRIERS SHALL BE INSTALLED WHERE INDICATED ON PLANTING PLANS. INSTALL ROOT BARRIERS ADJACENT, AND PARALLEL TO, EDGE OF HARDSCAPE PER MANUFACTURERS INSTRUCTIONS. (LINEAR APPLICATION) AND NOT ENCIRCLING ROOTBALL. BARRIERS SHALL BE 20- FT. MIN. LENGTH; CENTER STRIP OF ROOT BARRIER ON THE TREE TRUNK.

**PERCOLATION TESTING AND DRAINAGE**

1 A MINIMUM OF FOUR (4) SOILS PERCOLATION TESTS SHALL BE PERFORMED BY FILLING TREE PLANTING PITS (SEE PLANS FOR APPROPRIATE SIZE OF TREE PIT) WITH WATER, WAITING 12 HOURS AND THEN COMPLETELY REFILLING. IF ALL THE WATER IS NOT ABSORBED WITHIN 12 HOURS OF THE SECOND FILLING IT HAS FAILED THE TEST. UPON FAILURE, CONTACT OWNERS REPRESENTATIVE FOR WITH REMEDIAL MEASURES PER SPECIFICATIONS.

2 BID PRICE SHALL BE BASED ON STANDARD TREE PLANTING PIT DETAILS SHOWN ON THE PLANS.

**MAINTENANCE PERIOD**

1 LANDSCAPE AREAS SHALL BE KEPT FREE OF WEEDS, NOXIOUS GRASS, AND ALL OTHER UNDESIRED VEGETATIVE GROWTH AND DEBRIS.

2 PLANT MATERIALS SHALL BE KEPT IN A HEALTHY, OPTIMUM GROWING CONDITION AND IN A VISUALLY PLEASING APPEARANCE BY WATERING, PRUNING, MOWING, FERTILIZING, RESTAKING, PEST AND DISEASE CONTROLLING, SPRAYING, WEEDING, CLEAN-UP AND ANY MAINTENANCE OPERATION NECESSARY TO INSURE A HEALTHY, VIGOROUS STAND OF PLANTS AT THE TIME OF FINAL INSPECTION.

3 REFER TO SPECIFICATION SECTION 329316 - 2.7F IN THE EXTERIOR PLANTS SPECIFICATIONS FOR APPLICATION OF THE POST PLANTING FERTILIZER AT THE RATE SPECIFIED.

4 CONTRACTOR IS RESPONSIBLE FOR THE LANDSCAPE MAINTENANCE FOR ALL PLANTED AND/OR IRRIGATED AREAS SHOWN ON THE PLANS FOR THE INITIAL 90-DAY MAINTENANCE PERIOD.

| | |
|---|---|
| **DRAWN BY:** | EG |
| **CHECKED BY:** | NH |
| **DATE:** | 10/01/24 |
| **REVISIONS:** | |
| CITY SUBMITTAL | 12/22/20 |
| CITY SUBMITTAL #2 | 11/24/21 |
| CITY SUBMITTAL #3 | 10/31/23 |
| CITY SUBMITTAL #4 | 07/02/24 |
| CITY SUBMITTAL #5 | 10/01/24 |


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**SANTA FE MULTI-FAMILY**
845 SANTA FE DR, ENCINITAS CA 92024

LICENSED LANDSCAPE ARCHITECT
REX C. STANLEY
Signature
11/30/25
Renewal Date
10/01/24
Date
STATE OF CALIFORNIA

CITY STAMP

**SHEET TITLE**
Planting Legend

**SHEET NUMBER**
L3.02