

CITY OF SANTEE

**PRIORITY DEVELOPMENT PROJECT (PDP)
STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
FOR
LANTERN CREST RIDGE II
P 2017-04**

**11010 SUNSET TRAIL
SANTEE, CALIFORNIA 92071**

**ASSESSOR'S PARCEL NUMBER(S):
384-142-04-00
ENGINEER OF WORK:**

JASON EVANS, P.E. C74792; EXPIRES 12/31/2019

PREPARED FOR:

DEVELOPMENT CONTRACTOR, INC.
110 TOWN CENTER PARKWAY
SANTEE, CALIFORNIA 92071
(619) 444-2054

PDP SWQMP PREPARED BY:

REC CONSULTANTS, INC.
2442 SECOND AVENUE
SAN DIEGO, CALIFORNIA 92101
(619) 232-9200

DATE OF SWQMP:
July, 2019

PLANS PREPARED BY:
REC CONSULTANTS, INC.
2442 SECOND AVENUE
SAN DIEGO, CALIFORNIA 92101
(619) 232-9200

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ACRONYMS

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

SWQMP PREPARER'S CERTIFICATION PAGE

Project Name: Lantern Crest Ridge II
Permit Application Number: P2017-04

PREPARER'S CERTIFICATION

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

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

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

Jason Evans, P.E. C74792, Expires 12/13/19

REC Consultants, Inc.

5/5/2018

Engineer's Seal:

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SWQMP PROJECT OWNER'S CERTIFICATION PAGE

Project Name: Lantern Crest Ridge II
Permit Application Number: P2017-04

PROJECT OWNER'S CERTIFICATION

This PDP SWQMP has been prepared for Development Contractor, Inc., by REC Consultants, Inc. The PDP SWQMP is intended to comply with the PDP requirements of the City of Santee BMP Design Manual, which is a design manual for compliance with local City of Santee Watershed Protection Ordinance 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

Print Name

Company

Date

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SUBMITTAL RECORD

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

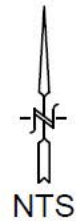
| Submittal Number | Date | Project Status | Summary of Changes |
|------------------|----------|--|-----------------------|
| 1 | 6/13/17 | <input checked="" type="checkbox"/> Preliminary Design / Planning/ CEQA <input type="checkbox"/> Final Design | Initial Submittal |
| 2 | 5/5/18 | <input checked="" type="checkbox"/> Preliminary Design / Planning/ CEQA <input type="checkbox"/> Final Design | Updates to design |
| 3 | 7/23/18 | <input checked="" type="checkbox"/> Preliminary Design / Planning/ CEQA <input type="checkbox"/> Final Design | Updates per comments. |
| 4 | 06/14/19 | <input checked="" type="checkbox"/> Preliminary Design / Planning/ CEQA <input type="checkbox"/> Final Design | Updates per comments |
| 5 | 07/29/19 | <input checked="" type="checkbox"/> Preliminary Design / Planning/ CEQA <input type="checkbox"/> Final Design | Updates per comments |
| 6 | XX/XX/XX | <input type="checkbox"/> Preliminary Design / Planning/ CEQA <input type="checkbox"/> Final Design | |

PROJECT VICINITY MAP

Project Name: Lantern Crest Ridge II
Permit Application Number: P2017-04



CITY OF SANTEE, CALIFORNIA



| Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications) | | Form I-1 Model BMP Design Manual [August 31, 2015] |
|--|---|--|
| Project Identification | | |
| Project Name: Lantern Crest Ridge II | | |
| Permit Application Number: P2-17-04 | | Date: 04/04/2019 |
| Project Address: 11010 Sunset Trail, Santee, California | | |
| Determination of Requirements | | |
| <p>The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short <u>summary</u> of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.</p> <p>Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop". Upon reaching a Stop, do not complete further Steps beyond the Stop.</p> <p>Refer to BMP Design Manual sections and/or separate forms referenced in each step below.</p> | | |
| Step | Answer | Progression |
| Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual for guidance. | <input checked="" type="checkbox"/> Yes | Go to Step 2. |
| | <input type="checkbox"/> No | Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below. |
| Discussion / justification if the project is <u>not</u> a "development project" (e.g., the project includes <i>only</i> interior remodels within an existing building): | | |
| Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual <i>in its entirety</i> for guidance, AND complete Form I-2, Project Type Determination. | <input type="checkbox"/> Standard Project | Stop. <u>Only</u> Standard Project requirements apply, including <u>Standard Project SWQMP</u> . |
| | <input checked="" type="checkbox"/> PDP | <u>Standard and PDP</u> requirements apply, including <u>PDP SWQMP</u> . Go to Step 3. |
| | <input type="checkbox"/> Exception to PDP definitions | Stop. <u>Standard Project</u> requirements apply, <u>and any additional requirements specific to the type of project</u> . Provide discussion and list any additional requirements below. Prepare <u>Standard Project SWQMP</u> . |

[Step 2 Continued from Page 1] Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:

| | | |
|---|--|---|
| Step 3 (PDPs only). Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual for guidance. | <input type="checkbox"/> Yes | Consult the [City Engineer] to determine requirements. Provide discussion and identify requirements below. Go to Step 4. |
| | <input checked="" type="checkbox"/> No | BMP Design Manual PDP requirements apply. Go to Step 4. |

Discussion / justification of prior lawful approval, and identify requirements (*not required if prior lawful approval does not apply*):

| | | |
|--|--|--|
| Step 4 (PDPs only). Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual for guidance. | <input type="checkbox"/> Yes | PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5. |
| | <input checked="" type="checkbox"/> No | Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below. |

Discussion / justification if hydromodification control requirements do not apply:
HMP exemption is due to the fact the runoff from proposed project will flow onto concrete lined channels, and will continue onto a portion of the San Diego River that has been classified as HMP exempt.

| | | |
|--|------------------------------|--|
| Step 5 (PDPs subject to hydromodification control requirements only). Does protection of critical coarse sediment yield areas apply based on review of WMAA Potential Critical Coarse Sediment Yield Area Map? See Section 6.2 of the BMP Design Manual for guidance. | <input type="checkbox"/> Yes | Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop. |
| | <input type="checkbox"/> No | Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop. |

| Priority Determination Form | | Form I-2 Model BMP Design Manual [August 31, 2015] | |
|---|---|--|---|
| Project Information | | | |
| Project Name: Lantern Crest Ridge II | | | |
| Permit Application Number: P2017-04 | | Date: 05/05/2018 | |
| Project Address: 110110 Sunset Trail, Santee, California. | | | |
| Project Type Determination: Standard Project or Priority Development Project (PDP) | | | |
| The project is (select one): <input checked="" type="checkbox"/> New Development <input type="checkbox"/> Redevelopment | | | |
| The total proposed newly created or replaced impervious area is: 55,487 ft ² (1.27) acres | | | |
| Is the project in any of the following categories, (a) through (f)? | | | |
| Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | (a) | New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. |
| Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> | (b) | Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. |
| Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | (c) | <p>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:</p> <ul style="list-style-type: none"> (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles. |

Form I-2 Page 2, Form Template Date: August 31, 2015

| | | | |
|--|---|-----|--|
| Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> | (d) | <p>New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).</p> <p><i>Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.</i></p> |
| Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> | (e) | <p>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:</p> <p>(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.</p> <p>(ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.</p> |
| Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | (f) | <p>New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction.</p> <p><i>Note: See BMP Design Manual Section 1.4.2 for additional guidance.</i></p> |
| <p>Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above?</p> <p><input type="checkbox"/> No – the project is <u>not</u> a Priority Development Project (Standard Project).</p> <p><input checked="" type="checkbox"/> Yes – the project is a Priority Development Project (PDP).</p> | | | |
| <p>The following is for redevelopment PDPs only:</p> <p>The area of existing (pre-project) impervious area at the project site is: 0.0 ft² (A)</p> <p>The total proposed newly created or replaced impervious area is 55,023 ft² (B)</p> <p>Percent impervious surface created or replaced (B/A)*100: 100%</p> <p>The percent impervious surface created or replaced is (select one based on the above calculation):</p> <p><input type="checkbox"/> less than or equal to fifty percent (50%) – only new impervious areas are considered PDP</p> <p>OR</p> <p><input checked="" type="checkbox"/> greater than fifty percent (50%) – the entire project site is a PDP</p> | | | |

| Site Design Checklist For PDPs | | Form I-3B (PDPs) Model BMP Design Manual [August 31, 2015] |
|--|--|--|
| Project Summary Information | | |
| Project Name | Lantern Crest Ridge II | |
| Project Address | 11010 Sunset Trail Santee, California 92071 | |
| Assessor's Parcel Number(s) (APN(s)) | 384-142-04-00 | |
| Permit Application Number | P2017-04 | |
| Project Hydrologic Unit | Select One: <input type="checkbox"/> Santa Margarita 902 <input type="checkbox"/> San Luis Rey 903 <input type="checkbox"/> Carlsbad 904 <input type="checkbox"/> San Dieguito 905 <input type="checkbox"/> Penasquitos 906 <input checked="" type="checkbox"/> San Diego 907 <input type="checkbox"/> Pueblo San Diego 908 <input type="checkbox"/> Sweetwater 909 <input type="checkbox"/> Otay 910 <input type="checkbox"/> Tijuana 911 | |
| Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier) | Lower San Diego River (907.12) | |
| Parcel Area (total area of Assessor's Parcel(s) associated with the project) | 2.74 Acres (119,398 Square Feet) | |
| Area to be Disturbed by the Project (Project Area) | 1.56 Acres (67,701 Square Feet) | |
| Project Proposed Impervious Area (subset of Project Area) | 1.27 Acres (55,4879 Square Feet) | |
| Project Proposed Pervious Area (subset of Project Area) | 0.29 Acres (12,214 Square Feet) | |
| Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area. | | |

Description of Existing Site Condition

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

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

Description / Additional Information:

The project site is currently an undisturbed area with natural vegetation with a natural slope from northeast to southwest.

Existing Land Cover Includes (select all that apply):

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

Description / Additional Information:

The proposed project area has a natural vegetative cover consisting of shrubs, trees, grass and some unvegetated areas.

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:

There are no natural hydrologic features within or adjacent to the proposed project boundary. Project site overland flows from northeast to southwest.

Description of Existing Site Drainage Patterns

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

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

Describe existing site drainage patterns:

The project site is 2.74 acres in size and is bounded to the east by the Lantern Crest Phase I residential care facility, on the west by a single and multi-family residential development, and on the south by the Lantern Crest Phase 2 residential care facility. The site is currently undeveloped, and slopes from northeast to southwest.

Runoff from the existing site drains to two (2) POCs, POC-1 and POC-2, which are both existing inlets located west of the project along Graves Avenue. Both POCs also receive offsite runoff from the adjacent hillside to the northeast and surrounding developments. The majority of the site and the adjacent hill flow from the northeast to the western edge of the property via overland flow. From there, the flows are conveyed through the existing development to the west of the site via gutter flow which then outlet onto Graves Avenue and enters the northern curb inlet (POC-1).

The southern portion of the site and the developments to the east and south of the site flow via overland flow and gutter flow down Sunset Trail and onto Graves Avenue where the flows enter the southern curb inlet (POC-2).

Both storm drain systems transports the runoff under Highway 67 to Magnolia Avenue; which subsequently heads north and ultimately discharges into the San Diego River.

Existing Conditions Peak Flows

| Discharge Location | AREA (ACRES) | 100-YEAR PEAK FLOW (CFS) |
|--------------------|--------------|--------------------------|
| POC-1 | 10.54 | 21.21 |
| POC-2B | 59.83 | 75.65 |

Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:

The project proposes a residential care development which will consist of one (1) large multi-story residential care building and four separate residential duplex units. A new enclosed bridge structure will connect the new care facility building with the Lantern Crest Phase I building to the east. Vehicular access to the site is provided via a new driveway along Sunset Trail.

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

Proposed impervious surfaces are comprised of rooftops, driveways and sidewalks.

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

Proposed pervious surfaces are comprised of landscape areas, street trees and three (3) biofiltration basins.

Does the project include grading and changes to site topography?

☒ Yes

☐ No

Description / Additional Information:

The project proposes grading that will consist of approximately 5,000 cubic yards of cut and fill. The grading design proposes to keep the runoff discharge locations to the west as in existing conditions.

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:

Runoff from DMA-1 and DMA-2 (6,381 SF and 9,620 SF, respectively) will be treated by proposed street trees. Since the project site sits on Type D soil (as determined by Web Soil Survey, results provided in Attachment 1) an outlet drain will be provided. The runoff from these DMAs, once through treatment, will be conveyed to the western edge of the property where it will outlet to existing concrete ditches then conveyed to POC-1.

Runoff from the remainder of the development will be directed to three (3) proposed biofiltration basins located in the southeast corner of the site via surface runoff and a proposed storm drain. These basins will serve to meet water quality and Q_{100} requirements. Once treated, runoff will be conveyed through a proposed storm drain system to the western edge of the property where it will outlet to the existing concrete ditch and be conveyed to POC-1.

A small portion of the proposed driveway (244 SF) cannot be captured by the proposed storm drain system and flows down Sunset Trail to POC-2. This area is considered de minimis per the City of Santee BMP Design Manual Section 5.2.2 bullet points 1 through 4.

Runoff from DMA Self-Mitigating-1 (36,744 SF), which is east of the project, will bypass the site via brow ditches and a proposed storm drain system. The storm drain system, which also will convey the treated flows from the biofiltration basins, will outlet along the west edge of the project site into the existing concrete ditch. From there, the flows will be conveyed to POC-1 as in existing conditions.

Similarly, runoff from DMA Self-Mitigating-2 (14,953 SF), which is west of the project, will flow to the west towards the existing concrete ditch. From there, the flows will be conveyed to POC-1 as in existing conditions.

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

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

Description / Additional Information:

On site Storm Drain Inlets

Onsite storm drain inlets will be stenciled with prohibitive language in accordance with City of Santee Requirements. Inlet markings will be maintained and periodically repainted or replaced when necessary. Storm water pollution prevention information will be provided to new site owners, lessees, or operators. The following will be included in in lease agreements "Tenants shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains." Also, fitting all storm drain inlets with a grate/screen or trash rack, and retrofitting any adjacent storm drain inlet structures to which the site discharges with trash capture devised. Said devised must be designed to capture debris of 5 mm or greater, while preventing flooding potential.

Interior Floor Drains and Elevator Shaft Sump Pumps

Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer. Inspect and maintain drains to prevent blockages and overflow.

Landscape/Outdoor Pesticide Use

Any pesticides (indoor or outdoor) shall be applied in accordance with the manufacturer instructions and not within 72 hours of an actual or predicted rain event. Landscaping will be maintained using minimum or no pesticides. Provide information to new owners, lessees, and operators.

(Continuation from previous page)

Food Service

An interior food service area (a dining hall) will be provided as part of this project. This area will be connected to a grease interceptor before discharging to sanitary sewer. The location of the grease interceptor will be provided during final engineering.

Fire sprinkler Test Water

Fire sprinkler test water drains will be plumbed to the sanitary sewer.

Plazas, sidewalks, and parking lots

Runoff from plazas, sidewalks and parking lots will sheet flow or be collected by the onsite storm drain system and conveyed to the proposed biofiltration basins or the proposed street trees to satisfy water quality requirements. Plazas, sidewalks, and parking lots will be swept regularly to prevent the accumulation of litter and debris.

The following features are not included as part of the proposed project: Interior parking garages, pools, spas, ponds, decorative fountains, and other water features, refuse areas, fuel dispensing areas, loading docks and/or industrial processes. The following activities are discouraged within the project site: outdoor storage of equipment or materials, vehicle and equipment cleaning, repair and maintenance.

Refuse Areas

The designated refuse and recycling area(s) will be covered, graded, and paved to prevent run- on and prevent wind dispersal.

Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.

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):

Site runoff is conveyed towards the project POC located to the southeast along Sunset Trail. The storm drain then ties into the storm drain system on Graves Avenue, and ultimately reaches the San Diego River.

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 |
|--|---|--|
| Upper San Diego River | | Indicator Bacteria |
| Lower San Diego River | Enterococcus, Fecal Coliform, DO, Mn, N, Ph, Total dissolved solids, toxicity | |
| Pacific Ocean Shoreline at the San Diego River Outlet at Dog Beach | Enterococcus, Total Coliform | |

Identification of Project Site Pollutants*

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

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

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

Hydromodification Management Requirements

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

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

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

Runoff from the site drains to an existing concrete ditch which then flows through a series of gutters then ultimately enters the existing storm drain system in Graves Avenue. For more detailed information please refer to Attachment 2a of this report.

Critical Coarse Sediment Yield Areas*

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

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

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

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

- ☐ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite
- ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment
- ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
- ☐ No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

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

- ☐ No critical coarse sediment yield areas to be protected based on verification of GLUs onsite
- ☐ Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 2.b of the SWQMP.
- ☐ Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

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.

N/A – HMP Exempt

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

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

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

Discussion / Additional Information: (optional)

Other Site Requirements and Constraints

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

Optional Additional Information or Continuation of Previous Sections As Needed

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

| Source Control BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects) | | Form I-4 Model BMP Design Manual [August 31, 2015] | |
|---|--|---|---|
| Project Identification | | | |
| Project Name Lantern Crest Ridge II | | | |
| Permit Application Number P2017-04 | | | |
| Source Control BMPs | | | |
| All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement source control BMPs shown in this checklist. | | | |
| Answer each category below pursuant to the following. | | | |
| <ul style="list-style-type: none"> • "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided. | | | |
| Source Control Requirement | | Applied? | |
| SC-1 Prevention of Illicit Discharges into the MS4 | | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| Discussion / justification if SC-1 not implemented: | | | |
| SC-2 Storm Drain Stenciling or Signage | | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| Discussion / justification if SC-2 not implemented: | | | |
| SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal | | <input type="checkbox"/> Yes | <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A |
| Discussion / justification if SC-3 not implemented: | | | |
| SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal | | <input type="checkbox"/> Yes | <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A |
| Discussion / justification if SC-4 not implemented: | | | |

| Source Control Requirement | Applied? | | |
|---|---|-----------------------------|---|
| SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| Discussion / justification if SC-5 not implemented: | | | |
| SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below) | | | |
| <input checked="" type="checkbox"/> On-site storm drain inlets | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Interior floor drains and elevator shaft sump pumps | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| <input type="checkbox"/> Interior parking garages | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Need for future indoor & structural pest control | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Landscape/Outdoor Pesticide Use | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| <input type="checkbox"/> Pools, spas, ponds, decorative fountains, and other water features | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Food service | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Refuse areas | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| <input type="checkbox"/> Industrial processes | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Outdoor storage of equipment or materials | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Vehicle and Equipment Cleaning | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Vehicle/Equipment Repair and Maintenance | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Fuel Dispensing Areas | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Loading Docks | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Fire Sprinkler Test Water | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Miscellaneous Drain or Wash Water | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Plazas, sidewalks, and parking lots | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above. | | | |
| <p>The following features are not part of the subject development:</p> <p>Interior parking garages, water features (pools, spas, ponds, fountains, etc.), refuse areas, loading docks, and industrial processes. Additionally the following activities will be discouraged onsite: outdoor material/equipment storage, and vehicle/equipment cleaning, repair and/or maintenance.</p> | | | |

| Site Design BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects) | | Form I-5 Model BMP Design Manual [August 31, 2015] | |
|---|--|---|--|
| Project Identification | | | |
| Project Name: Lantern Crest Ridge II | | | |
| Permit Application Number P2017-04 | | | |
| Site Design BMPs | | | |
| <p>All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement site design BMPs shown in this checklist.</p> <p>Answer each category below pursuant to the following.</p> <ul style="list-style-type: none"> • "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided. | | | |
| Site Design Requirement | | Applied? | |
| SD-1 Maintain Natural Drainage Pathways and Hydrologic Features | | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| Discussion / justification if SD-1 not implemented: | | | |
| SD-2 Conserve Natural Areas, Soils, and Vegetation | | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| Discussion / justification if SD-2 not implemented: | | | |
| SD-3 Minimize Impervious Area | | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| Discussion / justification if SD-3 not implemented: | | | |
| SD-4 Minimize Soil Compaction | | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| Discussion / justification if SD-4 not implemented: | | | |
| SD-5 Impervious Area Dispersion | | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| Discussion / justification if SD-5 not implemented: | | | |

Form I-5 Page 2 of 2, Form Template Date: August 31, 2015

| Site Design Requirement | Applied? | | |
|--|---|-----------------------------|---|
| SD-6 Runoff Collection | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| Discussion / justification if SD-6 not implemented: | | | |
| SD-7 Landscaping with Native or Drought Tolerant Species | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| Discussion / justification if SD-7 not implemented: California native/drought-tolerant plants shall be used to the maximum extent feasible to minimize the need for irrigation. Where irrigation is necessary, then the system shall be designed and installed to prevent overspray or irrigation runoff during normal operations and during a break in the line. | | | |
| SD-8 Harvesting and Using Precipitation | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| Discussion / justification if SD-8 not implemented: All runoff will be directed towards three (3) biofiltration basins and thirteen (13) street trees. Harvest and using precipitation is not feasible per Form I-7. | | | |

| | |
|---|--|
| <p align="center">Summary of PDP Structural BMPs</p> | <p align="center">Form I-6 (PDPs) Model BMP Design Manual [August 31, 2015]</p> |
| <p align="center">Project Identification</p> | |
| <p>Project Name: Lantern Crest Ridge II</p> | |
| <p>Permit Application Number: P2017-04</p> | |
| <p align="center">PDP Structural BMPs</p> | |
| <p>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).</p> <p>PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity and the local jurisdiction must confirm the maintenance (see Section 7 of the BMP Design Manual).</p> <p>Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).</p> | |
| <p>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.</p> <p>According to Section 5.1 of the BMP manual, it was determined that harvest/reuse was infeasible. Hydromodification is not required for the proposed project.</p> <p>Per the project's Geotechnical Report, infiltration is not recommended for the proposed project site due to existing bedrock underlying the site soils. The existing apartment project to the west of the site has a retaining wall near the boundary between the subject site and the apartment project. Allowing for infiltration will cause potential hazard to such wall.</p> <p>(Continue on page 2 as necessary.)</p> | |

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

(Continued from page 1)

Three biofiltration basins and thirteen (13) street trees have been strategically located throughout the project site to handle water quality requirements. The basins will also satisfy Q_{100} requirements for the project. In developed conditions, the basins will have a surface depth and a riser spillway structure. Flows will then discharge from the basins via the outlet structure or infiltrate through the base of the facilities to the receiving amended soil and low flow orifice. The riser structure will act as a spillway such that peak flows can be safely discharged to the receiving storm drain system.

Beneath the basins' invert lies the proposed LID biofiltration portion of the drainage facility. This portion of the basin is comprised of a 3-inch layer of mulch, a layer of amended soil (a highly sandy, organic rich composite with an infiltration capacity of at least 5 inches/hr) and a layer of gravel. The basins will be designed per BMP Design Manual Specifications. All BMPs will be lined to prevent infiltration and eliminate risks to nearby walls.

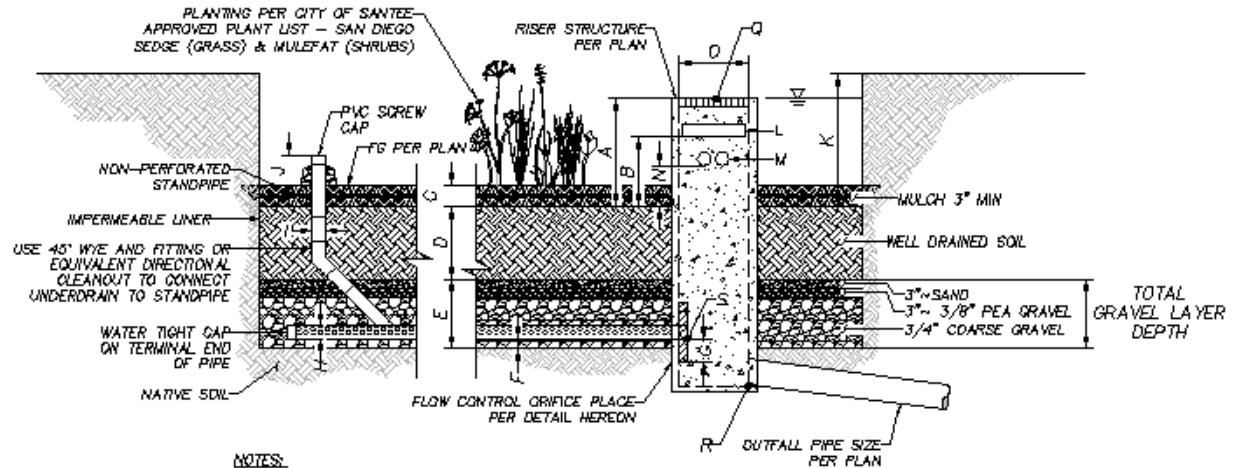
The street trees will have a volume of amended soil twice the area of the tree canopy as required in the City of Santee BMP Design Manual.

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

| | |
|---|--|
| Structural BMP ID No. BMP 1-1 | |
| Construction Plan Sheet No.: P2017-04, Sheet 2 | |
| Type of structural BMP: <input type="checkbox"/> Retention by harvest and use (HU-1) <input type="checkbox"/> Retention by infiltration basin (INF-1) <input type="checkbox"/> Retention by bioretention (INF-2) <input type="checkbox"/> Retention by permeable pavement (INF-3) <input type="checkbox"/> Partial retention by biofiltration with partial retention (PR-1) <input checked="" type="checkbox"/> Biofiltration (BF-1) <input type="checkbox"/> Biofiltration with Nutrient Sensitive Media Design (BF-2) <input type="checkbox"/> Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F <input type="checkbox"/> Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) <input type="checkbox"/> 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) <input type="checkbox"/> Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) <input type="checkbox"/> Detention pond or vault for hydromodification management <input type="checkbox"/> Other (describe in discussion section below) | |
| Purpose: <input checked="" type="checkbox"/> Pollutant control only <input type="checkbox"/> Hydromodification control only <input type="checkbox"/> Combined pollutant control and hydromodification control <input type="checkbox"/> Pre-treatment/forebay for another structural BMP <input type="checkbox"/> Other (describe in discussion section below) | |
| Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual) | Jason Evans, P.E. 2442 Second Avenue San Diego, California 92101 (619) 292-3200 |
| Who will be the final owner of this BMP? | Lantern Crest |
| Who will maintain this BMP into perpetuity? | Lantern Crest |
| What is the funding mechanism for maintenance? | Lantern Crest Private Funds |

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

(Continued from page 3)



NOTES:

1. SEE TABULATED DATA BELOW FOR BIOFILTRATION BASIN LAYER DEPTHS AND SPECS.
2. SOIL MIX PER CITY OF SANTEE LID MANUAL.
3. "WELL DRAINED SOIL" SHALL BE "SANDY LOAM" SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50-80% SAND, 20-30% COMPOST OR HARDWOOD MULCH, AND 20-30% TOPSOIL.
4. THE EMERGENCY OVERFLOWS FOR THE BASINS ARE THE CURB INLETS WHICH WILL CONVEY FLOWS TO THE CURB AND GUTTER PRIOR TO DISCHARGING TO GRAVES AVENUE

TABULATED DATA
BMP 1-1

| | | | |
|---|-----|----|---------------|
| A | 30" | I | 6" |
| B | N/A | J | 6" |
| C | 3" | K | 36" |
| D | 18" | L | N/A |
| E | 18" | M | 3 ~ 0.5" (Ø) |
| F | 3" | N | 9" |
| G | 6" | O | 24" Ø |
| H | 6" | *T | 18.7' x 61.3' |

| | |
|---|--------|
| Q = TOP OF GRATE ELEV. | 512.75 |
| R = FL OUT ELEV. (OUTFALL PIPE) | 510.25 |
| S = FL OUT ELEV. (PERFORATED UNDERDRAIN) | 507.75 |

NOTE: (1) ROWS L AND M CORRESPOND TO UPPER & LOWER SLOT/ORIFICE WHERE W=WIDTH; H=HEIGHT; D=DIAMETER. FIRST NUMBER REPRESENTS THE NUMBER OF UNITS, IF MORE THAN 1 SLOT IS INDICATED THEN EACH SLOT SHOULD BE INSTALLED IN A DIFFERENT FACES OF OUTLET STRUCTURE.

*T = APPROX. LENGTH x WIDTH

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

Structural BMP ID No. BMP 1-2

Construction Plan Sheet No.: P2017-04, Sheet 2

Type of structural BMP:

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

Purpose:

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

Who will certify construction of this BMP?
Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)

Jason Evans, P.E.
2442 Second Avenue
San Diego, California 92101
(619) 292-3200

Who will be the final owner of this BMP?

Lantern Crest

Who will maintain this BMP into perpetuity?

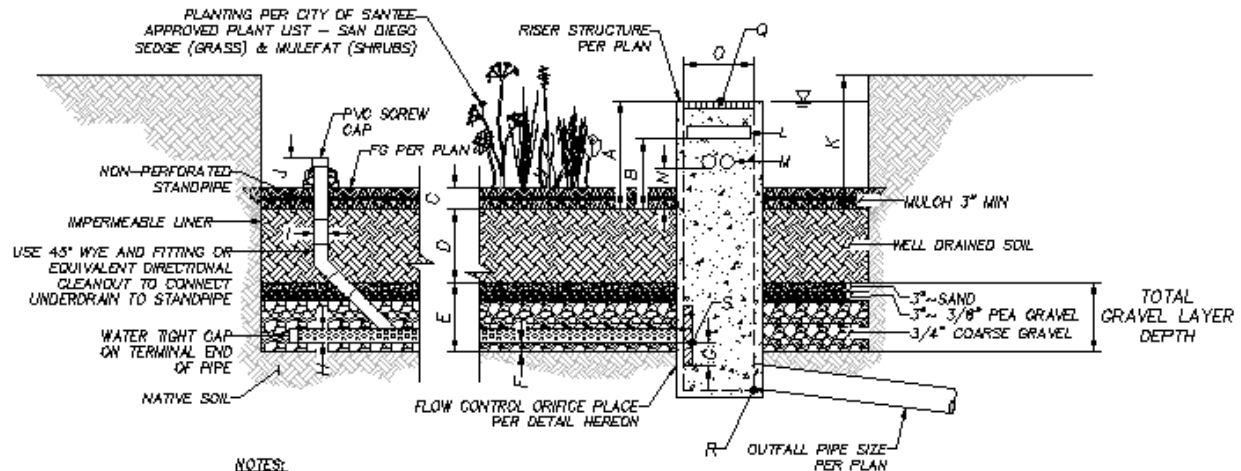
Lantern Crest

What is the funding mechanism for maintenance?

Lantern Crest Private Funds

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

(Continued from page 5)



NOTES:

1. SEE TABULATED DATA BELOW FOR BIOFILTRATION BASIN LAYER DEPTHS AND SPECS.
2. SOIL MIX PER CITY OF SANTEE LID MANUAL
3. "WELL DRAINED SOIL" SHALL BE "SANDY LOAM" SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50-80% SAND, 20-30% COMPOST OR HARDWOOD MULCH, AND 20-30% TOPSOIL.
4. THE EMERGENCY OVERFLOWS FOR THE BASINS ARE THE CURB INLETS WHICH WILL CONVEY FLOWS TO THE CURB AND GUTTER PRIOR TO DISCHARGING TO GRAVES AVENUE

TABULATED DATA
BMP 1-2

| | | | |
|---|-----|----|---------------|
| A | 21" | I | 6" |
| B | N/A | J | 6" |
| C | 3" | K | 27" |
| D | 18" | L | N/A |
| E | 18" | M | 1 ~ 0.25" (Ø) |
| F | 3" | N | 9" |
| G | 6" | O | 24" Ø |
| H | 6" | *T | 18.7' x 55' |

| | |
|---|--------|
| Q = TOP OF GRATE ELEV. | 509.75 |
| R = FL OUT ELEV. (OUTFALL PIPE) | 508.00 |
| S = FL OUT ELEV. (PERFORATED UNDERDRAIN) | 505.50 |

NOTE: (1) ROWS L AND M CORRESPOND TO UPPER & LOWER SLOT/ORIFICE WHERE W=WIDTH; H=HEIGHT; D=DIAMETER. FIRST NUMBER REPRESENTS THE NUMBER OF UNITS, IF MORE THAN 1 SLOT IS INDICATED THEN EACH SLOT SHOULD BE INSTALLED IN A DIFFERENT FACES OF OUTLET STRUCTURE.

*T = APPROX. LENGTH x WIDTH

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

Structural BMP ID No. BMP 1-3

Construction Plan Sheet No.: P2017-04, Sheet 2

Type of structural BMP:

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

Purpose:

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

Who will certify construction of this BMP?
Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)

Jason Evans, P.E.
2442 Second Avenue
San Diego, California 92101
(619) 292-3200

Who will be the final owner of this BMP?

Lantern Crest

Who will maintain this BMP into perpetuity?

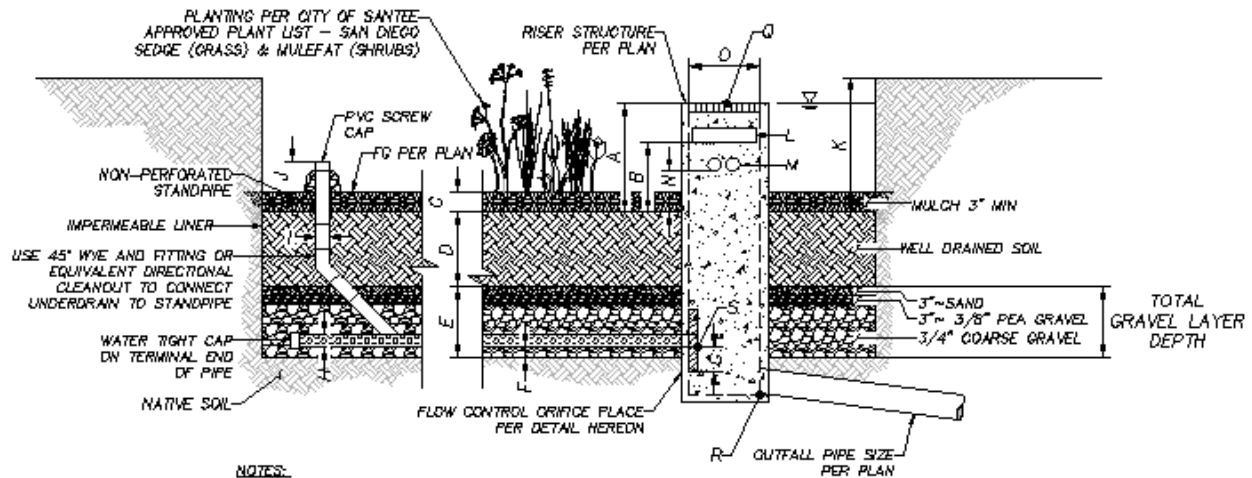
Lantern Crest

What is the funding mechanism for maintenance?

Lantern Crest Private Funds

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

(Continued from page 7)



NOTES:

1. SEE TABULATED DATA BELOW FOR BILOFILTRATION BASIN LAYER DEPTHS AND SPECS.
2. SOIL MIX PER CITY OF SANTEE UD MANUAL
3. "WELL DRAINED SOIL" SHALL BE "SANDY LOAM" SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50-80% SAND, 20-30% COMPOST OR HARDWOOD MULCH, AND 20-30% TOPSOIL.
4. THE EMERGENCY OVERFLOWS FOR THE BASINS ARE THE CURB INLETS WHICH WILL CONVEY FLOWS TO THE CURB AND GUTTER PRIOR TO DISCHARGING TO GRAVES AVENUE

**TABULATED DATA
BMP 1-3**

| | | | |
|---|-----|----|---------------|
| A | 21" | I | 6" |
| B | N/A | J | 6" |
| C | 3" | K | 27" |
| D | 18" | L | N/A |
| E | 18" | M | 3 ~ 0.25" (ø) |
| F | 3" | N | 9" |
| G | 6" | O | 24" ø |
| H | 6" | *T | 16.7' x 36.4' |

| | |
|---|--------|
| Q = TOP OF GRATE ELEV. | 504.75 |
| R = FL OUT ELEV. (OUTFALL PIPE) | 503.00 |
| S = FL OUT ELEV. (PERFORATED UNDERDRAIN) | 500.50 |

NOTE: (1) ROWS L AND M CORRESPOND TO UPPER & LOWER SLOT/ORIFICE WHERE W=WIDTH; H=HEIGHT; D=DIAMETER. FIRST NUMBER REPRESENTS THE NUMBER OF UNITS. IF MORE THAN 1 SLOT IS INDICATED THEN EACH SLOT SHOULD BE INSTALLED IN A DIFFERENT FACES OF OUTLET STRUCTURE.

*T = APPROX. LENGTH x WIDTH

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ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

| Attachment Sequence | Contents | Checklist |
|---------------------|--|---|
| Attachment 1a | DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet. | <input checked="" type="checkbox"/> Included |
| Attachment 1b | Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a | <input checked="" type="checkbox"/> Included on DMA Exhibit in Attachment 1a <input type="checkbox"/> Included as Attachment 1b, separate from DMA Exhibit |
| Attachment 1c | Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7. | <input checked="" type="checkbox"/> Included <input type="checkbox"/> Not included because the entire project will use infiltration BMPs |
| Attachment 1d | Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8. | <input checked="" type="checkbox"/> Included <input type="checkbox"/> Not included because the entire project will use harvest and use BMPs |
| Attachment 1e | Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines | <input checked="" type="checkbox"/> Included |

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

The DMA Exhibit must identify:

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

ATTACHMENT 1A & B
DMA EXHIBIT WITH TABULAR SUMMARY OF DMAs

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SITE DESIGN REQUIREMENTS

- SD-1: MAINTAIN NATURAL DRAINAGE PATHWAYS AND HYDROLOGIC FEATURES
SD-2: CONSERVE NATURAL AREAS, SOILS AND VEGETATION
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

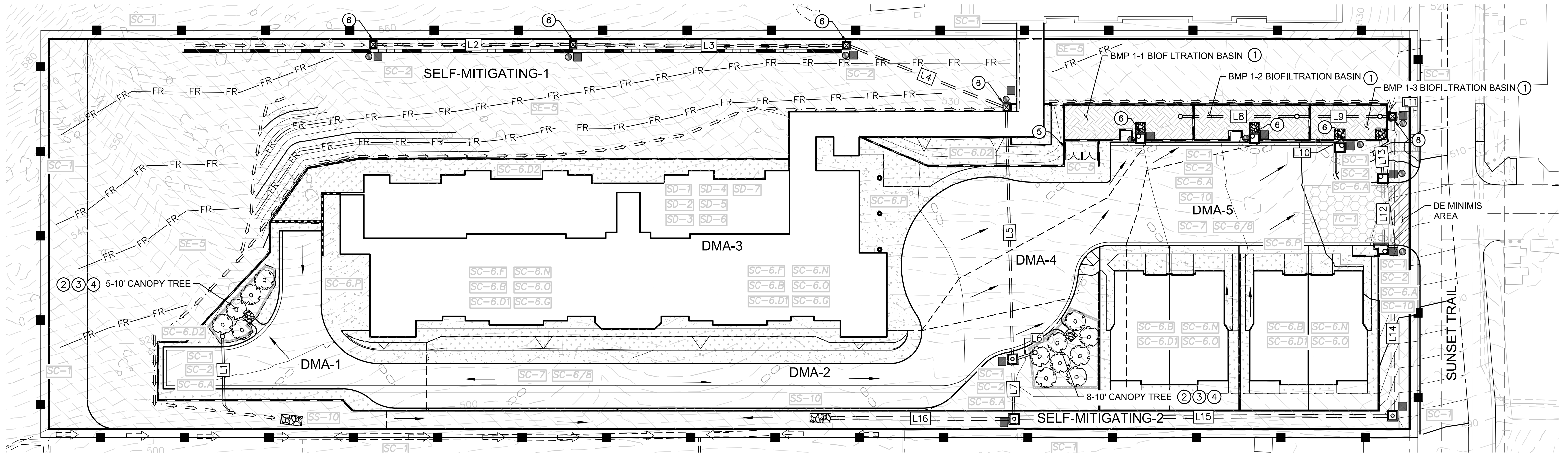
SELF MITIGATING AREAS REQUIREMENTS

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

NOTES

- * APPROXIMATE DEPTH TO GROUNDWATER > 20 FT
* UNDERLYING SOIL TYPE D

BMP PLAN SHEET
LANTERN CREST RIDGE II



| BMP TABLE | | | | | | | | |
|--------------------------------|---------------------------------------|--------|-----------|----------------------------|----------|--------------|-----------------------|--------------------------|
| TREATMENT AND DRAINAGE CONTROL | | | | | | | | |
| BMP ID # | BMP TYPE | SYMBOL | CASQA NO. | AREA | DWG. NO. | SHEET NO.(S) | *INSPECTION FREQUENCY | *MAINTENANCE FREQUENCY |
| 1 | BMP 1-1 THRU 1-3; BIOFILTRATION BASIN | | TC-32 | 7445 SF TOTAL | TBD | THIS SHEET | WEEKLY | ANNUALLY OR AS NECESSARY |
| 2 | SILT LEVEL POSTS | - | N/A | 2 EACH PER BASIN | TBD | THIS SHEET | MONTHLY | AS NEEDED |
| 3 | QTY. 13 - 10' CANOPY STREET TREES | | N/A | 5 FOR DMA-1 8 FOR DMA-2 | TBD | THIS SHEET | WEEKLY | AS NEEDED |
| 4 | SILT LEVEL POSTS FOR STREET TREE | - | N/A | 2 EACH PER TREE | TBD | THIS SHEET | MONTHLY | AS NEEDED |

MATERIALS & WASTE MANAGEMENT CONTROL BMPS:

- WM-4 SPILL PREVENTION AND CONTROL
WM-8 CONCRETE WASTE MANAGEMENT
WM-5 SOLID WASTE MANAGEMENT
WM-9 SANITARY WASTE MANAGEMENT
WM-6 HAZARDOUS WASTE MANAGEMENT

TEMPORARY RUNOFF CONTROL BMPS:

- SC-1 SILT FENCE
SC-6/B GRAVEL OR SAND BAGS
SC-7 STREET SWEEPING AND VACUUMING
SC-10 STORM DRAIN INLET PROTECTION
SC-9 FIBER ROLL
SS-10 RIPRAP ENERGY DISSIPATOR
TC-1 STABILIZED CONSTRUCTION ENTRANCE

| STORM DRAIN LATERAL DATA TABLE | | | |
|--------------------------------|---------------|---------|---------|
| # | BEARING | LENGTH | NOTES |
| L1 | N 89°20'58" W | 29.59' | 6" PVC |
| L2 | S 01°47'13" W | 92.27' | 12" PVC |
| L3 | S 01°56'26" W | 127.85' | 12" PVC |
| L4 | S 23°23'42" W | 79.02' | 12" PVC |
| L5 | S 89°38'43" E | 116.00' | 12" PVC |
| L6 | N 17°08'36" W | 8.25' | 6" PVC |
| L7 | S 89°38'43" E | 24.32' | 12" PVC |
| L8 | S 01°44'46" W | 53.21' | 6" PVC |
| L9 | S 01°44'46" W | 37.41' | 6" PVC |
| L10 | S 88°15'08" E | 1.70' | 8" PVC |
| L11 | S 01°44'46" W | 3.54' | 6" PVC |
| L12 | S 88°30'26" E | 29.67' | 8" PVC |
| L13 | N 88°07'11" E | 16.40' | 12" PVC |
| L14 | S 88°15'15" E | 138.72' | 12" PVC |
| L15 | N 01°28'15" E | 175.53' | 12" PVC |
| L16 | N 02°00'32" E | 85.02' | 18" PVC |

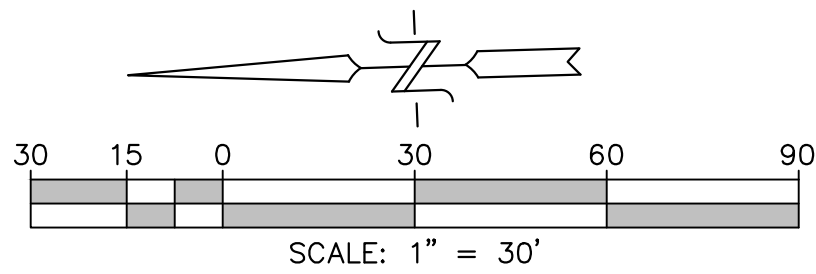
| SOURCE CONTROL | | | | | | | | | |
|----------------|---|------------|--------------|--------------------------------------|--------------------------------------|--|-----------------------|------------------------|---|
| BMP ID # | BMP TYPE | SYMBOL | CASQA NO. | AREA | DWG. NO. | SHEET NO.(S) | *INSPECTION FREQUENCY | *MAINTENANCE FREQUENCY | MAINTENANCE ACTIVITY |
| 5 | TRASH ENCLOSURE | | SD-32 | 1 EA | TBD | 2 | MONTHLY | AS NEEDED | INSPECT REGULARLY. CLEAR TRASH & DEBRIS. REPLACE LEAKING BINS. CLEAN STORAGE AREAS REGULARLY. POST SIGNS INFORMING TO NOT DISPOSE OF LIQUIDS & TO KEEP BIN LIDS CLOSED. |
| 6 | STENCILS | NO DUMPING | SD-13, SC-2 | 3 EACH | TBD | THIS SHEET | MONTHLY | AS NEEDED | INSPECT AND MAINTAIN/REPLACE AS NEEDED. |
| BMP ID # | BMP TYPE | DWG. NO. | SHEET NO.(S) | *INSPECTION FREQUENCY | *MAINTENANCE FREQUENCY | MAINTENANCE ACTIVITY | | | |
| SC-1 | PREVENTION OF ILLICIT DISCHARGES INTO MS4 | TBD | THIS SHEET | CONTINUOUS | - | ALL PROJECTS MUST EFFECTIVELY ELIMINATE DISCHARGES OF NON-STORM WATER INTO THE STORM WATER CONVEYANCE SYSTEM. | | | |
| SC-2 | STORM DRAIN STENCILING OR SIGNAGE | TBD | THIS SHEET | CONTINUOUS | REGULARLY | LABELING SHALL BE PROVIDED FOR ALL STORM WATER CONVEYANCE SYSTEM INLETS AND CATCH BASINS WITHIN THE PROJECT AREA. INLET STENCILING MAY INCLUDE CONCRETE STAMPING, CONCRETE PAINTING. INSPECT AND MAINTAIN MARKINGS AS NEEDED. | | | |
| SC-3 | PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, RUNOFF, AND WIND DISPERSAL | TBD | THIS SHEET | REGULARLY | REGULARLY | <ul style="list-style-type: none">ENSURE TRASH ENCLOSURE AREAS ARE FULLY CONTAINED (THREE WALLS, DOOR, ROOF)PROVIDE ATTACHED LIDS ON ALL TRASH CONTAINERS. KEEP CONTAINERS AWAY FROM STORM DRAIN VICINITY.POST SIGNS ON ALL ENCLOSURES AND/OR DUMPSTERS INFORMING USERS TO KEEP LID CLOSED AND NOT TO DISPOSE OF LIQUIDS OR HAZARDOUS MATERIALS.INSPECT TRASH STORAGE AREAS TO ENSURE INTEGRITY OF CONTAINERS AND THAT AREA IS KEPT CLEANREPLACE LEAKING BINSCLEAN TRASH STORAGE AREAS REGULARLY | | | |
| SC-6 | ADDITIONAL BMPS BASED ON POTENTIAL SOURCES OF RUNOFF POLLUTANTS | TBD | THIS SHEET | REGULARLY OR AS DETERMINED NECESSARY | REGULARLY OR AS DETERMINED NECESSARY | <p>SC-6.A: ON-SITE STORM DRAIN INLETS</p> <ul style="list-style-type: none">MAINTAIN AND PERIODICALLY REPAIR OR REPLACE INLET MARKINGSPROVIDE STORM WATER POLLUTION PREVENTION INFORMATION TO NEW SITE OWNERS, LESSEES, OR OPERATORS <p>SC-6.B: INTERIOR FLOOR DRAINS AND ELEVATOR SHAFT SUMP PUMPS</p> <ul style="list-style-type: none">INSPECT AND MAINTAIN DRAINS TO PREVENT BLOCKAGE AND OVERFLOW <p>SC-6.D1: NEED FOR FUTURE INDOOR AND STRUCTURAL PEST CONTROL</p> <ul style="list-style-type: none">PROVIDE INTEGRATED PEST MANAGEMENT INFORMATION TO OWNERS, LESSEES AND OPERATORS. <p>SC-6.D2: LANDSCAPE/OUTDOOR PESTICIDE USE</p> <ul style="list-style-type: none">OWNER SHALL MAINTAIN LANDSCAPING USING MINIMUM OR NO PESTICIDESPROVIDE IPM INFORMATION TO NEW OWNERS, LESSEES AND OPERATORS <p>SC-6.F: FOOD SERVICE</p> <p>SC-6.G: REFUSE AREAS</p> <p>SC-6.N: FIRE SPRINKLER TEST WATER</p> <ul style="list-style-type: none">FIRE SPRINKLER TEST WATER SHALL BE DRAINED TO SANITARY SEWER SYSTEM.DURING A FIRE SPRINKLER TEST, THE FIRE RISER DISCHARGE SHALL BE CONNECTED BY A HOSE TO THE SEWER CLEANOUT. <p>SC-6.O: MISCELLANEOUS DRAIN OR WASH WATER</p> <p>SC-6.P: PLAZAS, SIDEWALK AND PARKING LOTS</p> <ul style="list-style-type: none">SWEEP REGULARLY TO PREVENT ACCUMULATION OF LITTER AND DEBRIS.DEBRIS FROM PRESSURE WASHING MUST BE COLLECTED TO PREVENT ENTRY INTO STORM DRAIN SYSTEM. WASHWATER CONTAINING ANY CLEANING AGENT OR DEGREASER MUST BE COLLECTED AND DISCHARGED TO THE SANITARY SEWER AND NOT DISCHARGED TO A STORM DRAIN.CLEAN ALL PAVEMENT AT LEAST ONCE A YEAR. | | | |

LEGEND

- PROJECT BOUNDARY
DMA BOUNDARY
SELF-MITIGATING
DE-MINIMIS AREA
PERVIOUS AREA
BMP AREA
STORM DRAIN STENCILING
PROHIBITIVE SIGNAGE (SEE SAMPLE BELOW)
STREET TREE (DMA-1)
TREE WELL SOIL



SAMPLE PROHIBITIVE SIGNAGE
NTS



ENGINEER OF WORK

REC CONSULTANTS, INC.
2442 SECOND AVENUE
SAN DIEGO, CA 92101
(619)232-9200 (619)232-9210 FAX

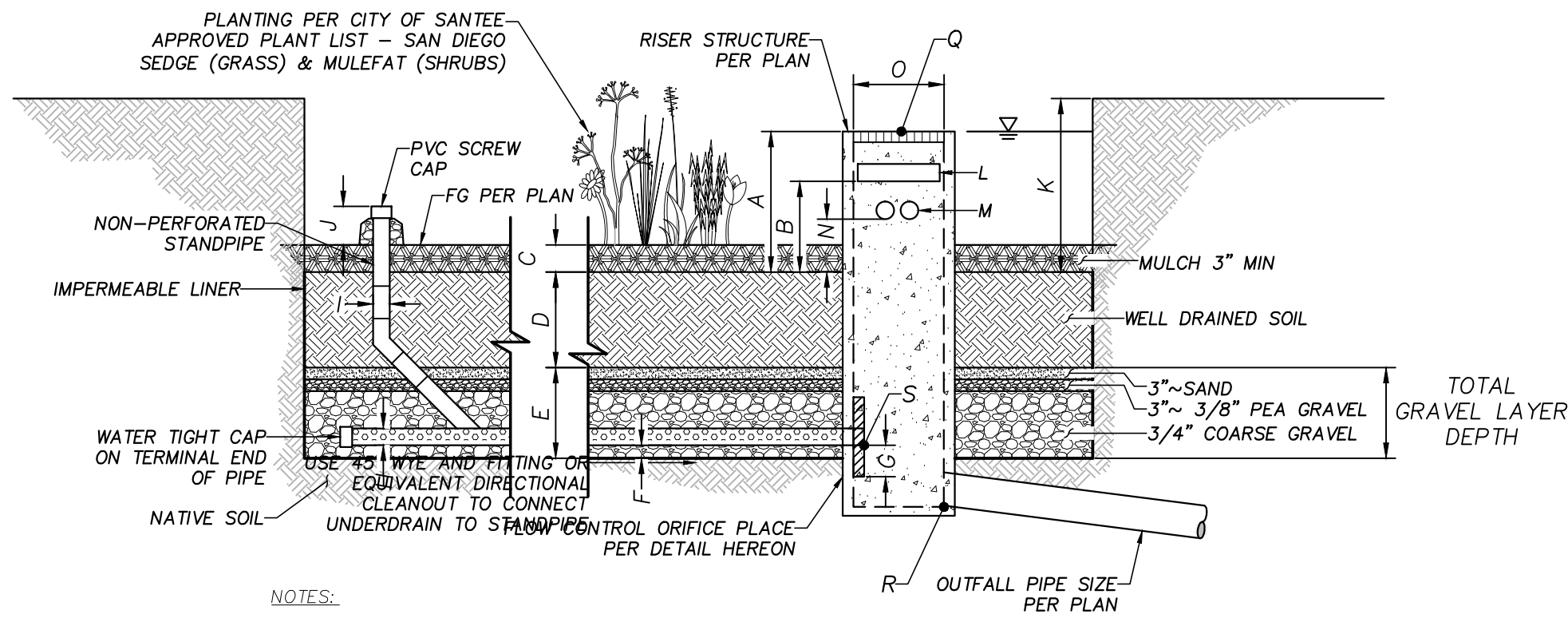


JONATHAN RAAB RYDEEN
R.C.E. 64811
DATE
EXP. 6-30-21

SHEET 5 CITY OF SANTEE OF 6 SHEETS

D.R. SITE PLAN &
PRELIMINARY GRADING PLAN
LANTERN CREST RIDGE II

BMP DETAILS SHEET
LANTERN CREST RIDGE II



NOTES:

- SEE TABULATED DATA BELOW FOR BIOLTRATION BASIN LAYER DEPTHS AND SPECS.
- SEE DETAIL BELOW FOR PIPE SPECS.
- SOIL MIX PER CITY OF SANTEE LID MANUAL
- "WELL DRAINED SOIL" SHALL BE "SANDY LOAM" SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50-60% SAND, 20-30% COMPOST OR HARDWOOD MULCH, AND 20-30% TOPSOIL.
- THE EMERGENCY OVERFLOWS FOR THE BASINS ARE THE CURB INLETS WHICH WILL CONVEY THE FLOWS TO THE CURB AND GUTTER PRIOR TO DISCHARGING TO GRAVES AVENUE.

TABULATED DATA

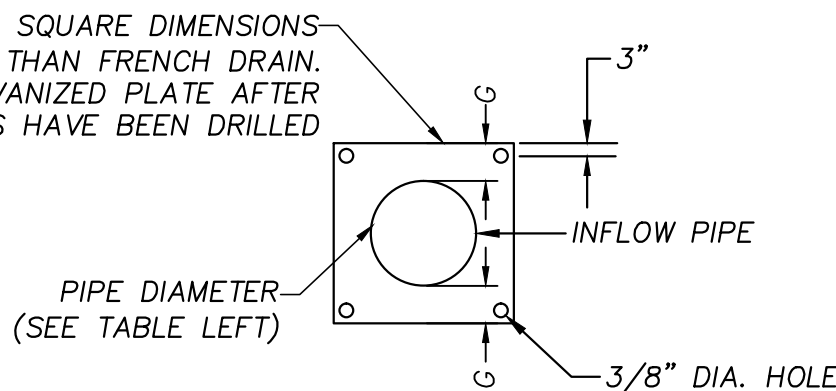
| | BMP 1-1 | BMP 1-2 | BMP 1-3 |
|--|---------------|---------------|---------------|
| A | 30" | 21" | 21" |
| B | N/A | N/A | N/A |
| C | 3" | 3" | 3" |
| D | 18" | 18" | 18" |
| E | 18" | 18" | 18" |
| F | 3" | 3" | 3" |
| G | 6" | 6" | 6" |
| H | 6" | 6" | 6" |
| I | 6" | 6" | 6" |
| J | 6' | 6" | 6" |
| K | 36" | 27" | 27" |
| L | N/A | N/A | N/A |
| M | 3 ~ 0.5" (Ø) | 1 ~ 0.25" (Ø) | 3 ~ 0.25" (Ø) |
| N | 9" | 9" | 9" |
| O | 24" Ø | 24" Ø | 24" Ø |
| Q = TOP OF GRATE ELEV. | 512.75 | 509.75 | 504.75 |
| R = FL OUT ELEV. (OUTFALL PIPE) | 510.25 | 508.00 | 503.00 |
| S = FL OUT ELEV. (PERFORATED UNDERDRAIN) | 507.75 | 505.50 | 500.50 |
| *T | 16.7' x 61.3' | 16.7' x 55' | 16.7' x 36.4' |

NOTE: (1) ROWS L AND M CORRESPOND TO UPPER & LOWER SLOT/ORIFICE WHERE W=WIDTH; H=HEIGHT; D=DIAMETER. FIRST NUMBER REPRESENTS THE NUMBER OF UNITS, IF MORE THAN 1 SLOT IS INDICATED THEN EACH SLOT SHOULD BE INSTALLED IN A DIFFERENT FACES OF OUTLET STRUCTURE.

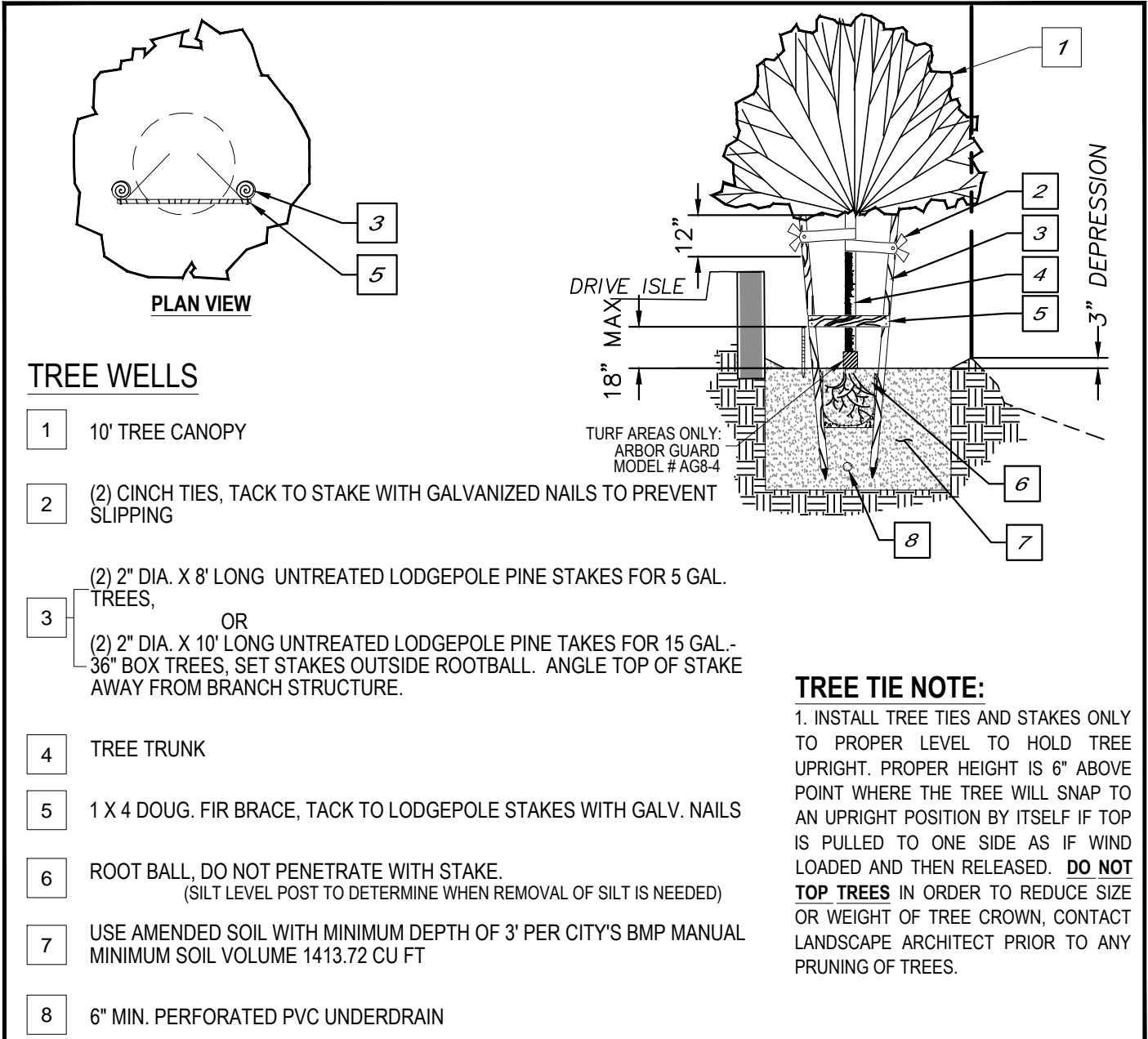
*T = APPROX. LENGTH x WIDTH

| BMP | REQUIRED AREA (sq-ft) | PROVIDED AREA (sq-ft) | REQUIRED VOLUME (cu-ft) | PROVIDED VOLUME (cu-ft) |
|-----|-----------------------|-----------------------|-------------------------|-------------------------|
| 1-1 | 761 | 940 | 1010 | 3384 |
| 1-2 | 175 | 845 | 154 | 2408 |
| 1-3 | 259 | 580 | 462 | 1653 |

| DMA DATA SUMMARY | | | | | | |
|-------------------|-----------|-----------------|---------------|-----------------|----------------|-------|
| AREA | SOIL TYPE | IMPERVIOUS (AC) | PERVIOUS (AC) | TOTAL AREA (AC) | TREATMENT TYPE | POC |
| DMA-1 | D | 0.12 | 0.03 | 0.15 | TREE WELL | POC-1 |
| DMA-2 | D | 0.17 | 0.04 | 0.21 | TREE WELL | |
| DMA-3 | D | 0.60 | 0.14 | 0.74 | BMP 1-1 | |
| DMA-4 | D | 0.09 | 0.03 | 0.12 | BMP 1-2 | |
| DMA-5 | D | 0.28 | 0.05 | 0.33 | BMP 1-3 | |
| SELF-MITIGATING-1 | D | 0.00 | 0.84 | 0.84 | BYPASS | POC-2 |
| SELF-MITIGATING-2 | D | 0.00 | 0.34 | 0.34 | BYPASS | |
| DE MINIMIS | D | 0.01 | 0.00 | 0.01 | - | |
| TOTAL | - | 1.27 | 1.47 | 2.74 | - | - |



FLOW CONTROL PIPE PLATE
NTS



STREET TREE DETERMINATION

| DMA | DMA DCV (FT³) | CANOPY DIAMETER (FT) | NUMBER OF STREET TREES | TOTAL CANOPY AREA (FT²) | TCV PER TREE (FT³) | CANOPY AREA OVER IMP SURFACE (FT²) | APPLICABLE CANOPY AREA (FT²) | APPLICABLE PERCENTAGE (%) | ADJUSTED TCV PER DMA (FT³) | FINAL DCV PER DMA (FT³) |
|-----|---------------|----------------------|------------------------|-------------------------|--------------------|------------------------------------|------------------------------|---------------------------|----------------------------|-------------------------|
| 1 | 199 | 10 | 5 | 393 | 40 | 0 | 393 | 100 | 200 | -1 |
| 2 | 308 | 10 | 8 | 628 | 40 | 0 | 628 | 100 | 320 | -12 |

STREET TREE STRUCTURAL SOIL REQUIREMENTS

| DMA | CANOPY DIAMETER (FT) | NUMBER OF STREET TREES | REQUIRED VOLUME (FT³) | PROPOSED SOIL DEPTH (FT) | REQUIRED SOIL AREA (FT²) | PROPOSED SOIL WIDTH (FT) | PROPOSED SOIL LENGTH (FT) | PROPOSED SOIL AREA (FT²) | PROVIDED SOIL VOLUME (FT³) |
|-----|----------------------|------------------------|-----------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|----------------------------|
| 1 | 10 | 5 | 785 | 3 | 262 | 11 | 24 | 264 | 792 |
| 2 | 10 | 8 | 1257 | 3 | 419 | 14 | 30 | 420 | 1260 |

NOTES

- * APPROXIMATE DEPTH TO GROUNDWATER > 20 FT
- * UNDERLYING SOIL TYPE D



Civil Engineering-Environmental
Land Surveying

2442 Second Avenue
San Diego, CA 92101

Consultants, Inc. (619)232-9200 (619)232-9210 Fax

ENGINEER OF WORK

REC CONSULTANTS, INC.
2442 SECOND AVENUE
SAN DIEGO, CA 92101
(619)232-9200 (619)232-9210 FAX



JONATHAN RAAB RYDEEN
R.C.E. 64811

DATE
EXP. 6-30-21

July 26, 2019

SHEET 6 CITY OF SANTEE OF 6 SHEETS

D.R. SITE PLAN &
PRELIMINARY GRADING PLAN
LANTERN CREST RIDGE II

ATTACHMENT 1C
HARVEST AND USE FEASIBILITY SCREENING CHECKLIST
(Form I-7)

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| Harvest and Use Feasibility Checklist | | Form I-7 |
|--|--|---|
| <p>1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?</p> <p><input checked="" type="checkbox"/> Toilet and urinal flushing</p> <p><input checked="" type="checkbox"/> Landscape irrigation</p> <p><input type="checkbox"/> Other: _____</p> | | |
| <p>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.</p> <p>Toilet and urinal flushing demand: $\left(\frac{9.3 \text{ gal}}{\text{person-day}}\right) \left(\frac{1 \text{ ft}^3}{7.48 \text{ gal}}\right) (1 \text{ Building}) \left(\frac{40 \text{ person}}{\text{building}}\right) (1.5 \text{ day}) = 74 \text{ ft}^3$</p> <p>Toilet and urinal flushing demand: $\left(\frac{9.3 \text{ gal}}{\text{person-day}}\right) \left(\frac{1 \text{ ft}^3}{7.48 \text{ gal}}\right) (4 \text{ Buildings}) \left(\frac{10 \text{ person}}{\text{building}}\right) (1.5 \text{ day}) = 75 \text{ ft}^3$</p> <p>Irrigation demand: $\left(\frac{1470 \text{ gal}}{\text{acre-day}}\right) \left(\frac{1 \text{ ft}^3}{7.48 \text{ gal}}\right) (1.5 \text{ day}) (0.3 \text{ acre}) = 88 \text{ ft}^3$</p> <p>Total: 237 cubic-feet</p> | | |
| <p>3. Calculate the DCV using worksheet B-2.1.</p> <p>1734 cubic-feet</p> | | |
| <p>3a. Is the 36-hour demand greater than or equal to the DCV?</p> <p><input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No ➡</p> <p>↓</p> | <p>3b. Is the 36-hour demand greater than 0.25DCV but less than the full DCV?</p> <p><input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No ➡</p> <p>↓</p> | <p>3c. Is the 36-hour demand less than 0.25DCV?</p> <p><input checked="" type="checkbox"/> Yes</p> <p>↓</p> |
| <p>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.</p> | <p>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.</p> | <p>Harvest and use is considered to be infeasible.</p> <p>$0.25 \times (1734) > 237$ $434 > 237$</p> |
| <p>Is harvest and use feasible based on further evaluation?</p> <p><input type="checkbox"/> Yes, refer to Appendix E to select and size harvest and use BMPs.</p> <p><input checked="" type="checkbox"/> No, select alternate BMPs.</p> <p>Note: All rainwater harvest and use must comply with the California Plumbing Code (Sections 1702.9.3, 1702.9.4, etc.).</p> | | |

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ATTACHMENT 1D
CATEGORIZATION OF INFILTRATION FEASIBILITY CONDITION
(Form I-8)

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Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

| Categorization of Infiltration Feasibility Condition | | Worksheet C.4-1 | |
|--|--|-----------------|----|
| 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: Two borehole percolation tests were conducted at the site on March 24, 2017 in general accordance with the Borehole Percolation Test method (Riverside County Percolation Test, 2011) as referenced in the 2016 City of Santee BMP Design Manual. The boreholes were drilled using a track-mounted limited access drill rig equipped with six-inch diameter hollow stem augers. The depth of each infiltration test was approximately five feet. Following drilling, test holes were constructed by cleaning the sidewalls, placing about 2 inches of pea gravel at the bottom of the hole, placing a 5-foot long section of 4-inch diameter slotted PVC casing into the hole, and backfilling the annulus between the sidewalls and casing with pea gravel. The test holes were then pre-soaked with a water column of about 36 inches for a period of about 18 hours prior to the start of the percolation test. The field measured, gravel-corrected, stabilized percolation rates were converted to a stabilized infiltration rate using the Porchet Method. The stabilized infiltration rates were 0.13 and 1.20 inches per hour. The design infiltration rate (stabilized infiltration rate divided by factor of safety) were 0.06 and 0.60 inches per hour using a 2.0 factor of safety. The average design infiltration rate was 0.33 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: As discussed in Part 1, Criteria 1 above, the average design infiltration rate based on borehole percolation testing at the site was 0.33 inches per hour, which is less than 0.5 inches per hour. Geotechnical risks, such as slope stability, groundwater mounding, utilities, or other factors, associated with infiltration in any appreciate quantity that cannot be mitigated to an acceptable level are discussed in Part 2, Criteria 6 below. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |

Appendix C: Geotechnical and Groundwater Investigation Requirements

| Worksheet C.4-1 Page 2 of 4 | | | |
|---|---|-----|---------------------------------|
| Criteria | Screening Question | Yes | No |
| 3 | <p>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.</p> | | X |
| <p>Provide basis:</p> <p>As discussed in Part 1, Criteria 1 above, the average design infiltration rate based on borehole percolation testing at the site was 0.33 inches per hour, which is less than 0.5 inches per hour. The risks of groundwater related concerns, such as shallow water table, storm water pollutants, or other factors, associated with infiltration in any appreciate quantity are considered low.</p> <p>Groundwater was not observed in the explorations that extended to a maximum depth of 8 feet below existing grades. The State Water Resources Control Board website (GeoTracker, 2017), indicates groundwater elevations at the United States Border Patrol Station located at 225 Kenney Street in El Cajon (about 2,000 feet southwest of the site) ranged from approximately 360 to 384 feet above MSL from 2007 to 2016, which is more than 100 feet below existing grades at the site.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p> | | | |
| 4 | <p>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.</p> | | X |
| <p>Provide basis:</p> <p>As discussed in Part 1, Criteria 1 above, the average design infiltration rate based on borehole percolation testing at the site was 0.33 inches per hour, which is less than 0.5 inches per hour. The risk of potential water balance issues, such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters, associated with infiltration in any appreciate quantity is considered low.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p> | | | |
| Part 1 Result* | <p>If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration</p> <p>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</p> | | <p>Proceed to Part 2</p> |

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

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 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:

As discussed in Part 1, Criteria 1 above, the average design infiltration rate based on borehole percolation testing at the site was 0.33 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:

As discussed in Part 1, Criteria 1 above, the average design infiltration rate based on borehole percolation testing at the site was 0.33 inches per hour. However, several geotechnical constraints to storm water infiltration are present at the site as summarized below:

Groundwater Mounding: Early Cretaceous-age granitic rock underlies the site. Granitic rock was encountered in all explorations at the ground surface or at depths ranging from about one to four feet. The granitic rock is dense to very dense with very low permeability. The granitic rock poses a significant risk for groundwater mounding at the site due to infiltration in any appreciable quantity. Consequently, we do not recommend infiltration of storm water at the site in accordance with Section C.2.5 of the 2016 City of Santee BMP Design Manual.

Retaining Walls: Multiple single rows of retaining walls up to about 25 feet in height are required to raise grades at the site. The retaining walls are located primarily along the perimeter of the development. In addition, an existing 5 to 15-foot-high retaining wall provides grade separation between the proposed development and the adjacent lower property. The existing retaining wall is located about 25 feet immediately west of the property boundary and is downgradient from proposed infiltration BMPs at the site. Infiltration of any appreciable quantity at the site may lead to potential increases in lateral pressures and potential reductions in soil strength of the proposed and existing retaining walls. Consequently, we do not recommend infiltration of storm water at the site in accordance with Section C.2.6 of the 2016 City of Santee BMP Design Manual.

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.

Appendix C: Geotechnical and Groundwater Investigation Requirements

| Worksheet C.4-1 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 | |
| <p>Provide basis:</p> <p>As discussed in Part 1, Criteria 1 above, the average design infiltration rate based on borehole percolation testing at the site was 0.33 inches per hour. Infiltration in any appreciable quantity would not pose a significant risk for groundwater related concerns such as shallow water table, storm water pollutants, or other factors as discussed in Part 1, Criteria 3 above.</p> <p>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.</p> | | | |
| 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 | |
| <p>Provide basis:</p> <p>As discussed in Part 1, Criteria 1 above, the average design infiltration rate based on borehole percolation testing at the site was 0.33 inches per hour. Infiltration in any appreciable quantity should not pose a significant risk for violating downstream water rights.</p> <p>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.</p> | | | |
| Part 2 Result* | If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration . If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration . | | No Infiltration |

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

ATTACHMENT 1D CONTINUED
FACTOR OF SAFETY AND DESIGN INFILTRATION RATE WORKSHEET

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Appendix D: Approved Infiltration Rate Assessment Methods

D-20

November 2015

| Factor of Safety and Design Infiltration Rate Worksheet | | | Worksheet D.5-1 | | |
|---|------------------------|--|---------------------|------------------|---------------------------------|
| Factor Category | | Factor Description | Assigned Weight (w) | Factor Value (v) | Product (p) $p = w \times v$ |
| A | Suitability Assessment | Soil assessment methods | 0.25 | 1 | 0.25 |
| | | Predominant soil texture | 0.25 | 2 | 0.5 |
| | | Site soil variability | 0.25 | 1 | 0.25 |
| | | Depth to groundwater / impervious layer | 0.25 | 1 | 0.25 |
| | | Suitability Assessment Safety Factor, $S_A = \sum p$ | | | |
| B | Design | Level of pretreatment/ expected sediment loads | 0.5 | 3 | 1.5 |
| | | Redundancy/resiliency | 0.25 | 3 | 0.75 |
| | | Compaction during construction | 0.25 | 2 | 0.5 |
| | | Design Safety Factor, $S_B = \sum p$ | | | |
| Combined Safety Factor, $S_{total} = S_A \times S_B$ | | | | 3.4375 | |
| Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias) | | | | 0 | |
| Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$ | | | | 0.000 | |
| Supporting Data | | | | | |
| Briefly describe infiltration test and provide reference to test forms: Geotechnical Engineer recommends no infiltration. Pleas refer to project's soil report. | | | | | |
| | | | | | |

ATTACHMENT 1E
POLLUTANT CONTROL BMP DESIGN WORKSHEETS/CALCULATIONS

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Automated Worksheet B.3-1: Project-Scale BMP Feasibility Analysis (V1.3)

| Category | # | Description | Value | Units |
|----------------------|----|--|-------------|---------------|
| Capture & Use Inputs | 0 | Design Capture Volume for Entire Project Site | 2,133 | cubic-feet |
| | 1 | Proposed Development Type | Residential | unitless |
| | 2 | Number of Residents or Employees at Proposed Development | 200 | # |
| | 3 | Total Planted Area within Development | 12,214 | sq-ft |
| | 4 | Water Use Category for Proposed Planted Areas | Low | unitless |
| Infiltration Inputs | 5 | Is Average Site Design Infiltration Rate ≤ 0.500 Inches per Hour? | Yes | yes/no |
| | 6 | Is Average Site Design Infiltration Rate ≤ 0.010 Inches per Hour? | Yes | yes/no |
| | 7 | Is Infiltration of the Full DCV Anticipated to Produce Negative Impacts? | Yes | yes/no |
| | 8 | Is Infiltration of Any Volume Anticipated to Produce Negative Impacts? | No | yes/no |
| Calculations | 9 | 36-Hour Toilet Use Per Resident or Employee | 1.86 | cubic-feet |
| | 10 | Subtotal: Anticipated 36 Hour Toilet Use | 373 | cubic-feet |
| | 11 | Anticipated 1 Acre Landscape Use Over 36 Hours | 52.14 | cubic-feet |
| | 12 | Subtotal: Anticipated Landscape Use Over 36 Hours | 15 | cubic-feet |
| | 13 | Total Anticipated Use Over 36 Hours | 388 | cubic-feet |
| | 14 | Total Anticipated Use / Design Capture Volume | 0.18 | cubic-feet |
| | 15 | Are Full Capture and Use Techniques Feasible for this Project? | No | unitless |
| | 16 | Is Full Retention Feasible for this Project? | No | yes/no |
| | 17 | Is Partial Retention Feasible for this Project? | No | yes/no |
| Result | 18 | Feasibility Category | 5 | 1, 2, 3, 4, 5 |

Worksheet B.3-1 General Notes:

A. Applicants may use this worksheet to determine the types of structural BMPs that are acceptable for implementation at their project site (as required in Section 5 of the BMPDM). User input should be provided for yellow shaded cells, values for all other cells will be automatically generated. Projects demonstrating feasibility or potential feasibility via this worksheet are encouraged to incorporate capture and use features in their project.

B. Negative impacts associated with retention may include geotechnical, groundwater, water balance, or other issues identified by a geotechnical engineer and substantiated through completion of Form I-8.

C. Feasibility Category 1: Applicant must implement capture & use, retention, and/or infiltration elements for the entire DCV.

D. Feasibility Category 2: Applicant must implement capture & use elements for the entire DCV.

E. Feasibility Category 3: Applicant must implement retention and/or infiltration elements for all DMAs with Design Infiltration Rates greater than 0.50 in/hr.

F. Feasibility Category 4: Applicant must implement standard unlined biofiltration BMPs sized at $\geq 3\%$ of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.011 to 0.50 in/hr. Applicants may be permitted to implement lined BMPs, reduced size BMPs, and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.

G. Feasibility Category 5: Applicant must implement standard lined biofiltration BMPs sized at $\geq 3\%$ of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.010 in/hr or less. Applicants may also be permitted to implement reduced size and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.

H. PDPs participating in an offsite alternative compliance program are not held to the feasibility categories presented herein.

| Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.3) | | | | | | | | | | | | | |
|--|----|---|----------|-----------|---------------|---------------|---------------|-----------|------------|-------------|-----------|----------|------------|
| Category | # | Description | <i>i</i> | <i>ii</i> | <i>iii</i> | <i>iv</i> | <i>v</i> | <i>vi</i> | <i>vii</i> | <i>viii</i> | <i>ix</i> | <i>x</i> | Units |
| Standard Drainage Basin Inputs | 0 | Drainage Basin ID or Name | DMA-1 | DMA-2 | DMA-3 | DMA-4 | DMA-5 | | | | | | unitless |
| | 1 | Basin Drains to the Following BMP Type | n/a | n/a | Biofiltration | Biofiltration | Biofiltration | | | | | | unitless |
| | 2 | 85th Percentile 24-hr Storm Depth | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | | | | | | inches |
| | 3 | Design Infiltration Rate Recommended by Geotechnical Engineer | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | in/hr |
| | 4 | Impervious Surfaces <u>Not Directed to Dispersion Area</u> (C=0.90) | 5,156 | 8,048 | 26,047 | 3,883 | 12,109 | | | | | | sq-ft |
| | 5 | Semi-Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.30) | | | | | | | | | | | sq-ft |
| | 6 | Engineered Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.10) | | | | | | | | | | | sq-ft |
| | 7 | Natural Type A Soil <u>Not Serving as Dispersion Area</u> (C=0.10) | | | | | | | | | | | sq-ft |
| | 8 | Natural Type B Soil <u>Not Serving as Dispersion Area</u> (C=0.14) | | | | | | | | | | | sq-ft |
| | 9 | Natural Type C Soil <u>Not Serving as Dispersion Area</u> (C=0.23) | | | | | | | | | | | sq-ft |
| | 10 | Natural Type D Soil <u>Not Serving as Dispersion Area</u> (C=0.30) | 1,225 | 1,572 | 5,916 | 1,170 | 2,331 | | | | | | sq-ft |
| Dispersion Area, Tree Well & Rain Barrel Inputs (Optional) | 11 | Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels? | Yes | Yes | No | No | No | No | No | No | No | No | yes/no |
| | 12 | Impervious Surfaces Directed to Dispersion Area per SD-B (Ci=0.90) | | | | | | | | | | | sq-ft |
| | 13 | Semi-Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.30) | | | | | | | | | | | sq-ft |
| | 14 | Engineered Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.10) | | | | | | | | | | | sq-ft |
| | 15 | Natural Type A Soil Serving as Dispersion Area per SD-B (Ci=0.10) | | | | | | | | | | | sq-ft |
| | 16 | Natural Type B Soil Serving as Dispersion Area per SD-B (Ci=0.14) | | | | | | | | | | | sq-ft |
| | 17 | Natural Type C Soil Serving as Dispersion Area per SD-B (Ci=0.23) | | | | | | | | | | | sq-ft |
| | 18 | Natural Type D Soil Serving as Dispersion Area per SD-B (Ci=0.30) | | | | | | | | | | | sq-ft |
| | 19 | Number of Tree Wells Proposed per SD-A | 5 | 8 | | | | | | | | | # |
| | 20 | Average Mature Tree Canopy Diameter | 10 | 10 | | | | | | | | | ft |
| | 21 | Number of Rain Barrels Proposed per SD-E | | | | | | | | | | | # |
| | 22 | Average Rain Barrel Size | | | | | | | | | | | gal |
| Treatment Train Inputs & Calculations | 23 | Does BMP Overflow to Stormwater Features in <u>Downstream</u> Drainage? | No | No | No | No | No | No | No | No | No | No | unitless |
| | 24 | Identify Downstream Drainage Basin Providing Treatment in Series | | | | | | | | | | | unitless |
| | 25 | Percent of Upstream Flows Directed to Downstream Dispersion Areas | | | | | | | | | | | percent |
| | 26 | Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 27 | Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| Initial Runoff Factor Calculation | 28 | Total Tributary Area | 6,381 | 9,620 | 31,963 | 5,053 | 14,440 | 0 | 0 | 0 | 0 | 0 | sq-ft |
| | 29 | Initial Runoff Factor for Standard Drainage Areas | 0.78 | 0.80 | 0.79 | 0.76 | 0.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | unitless |
| | 30 | Initial Runoff Factor for Dispersed & Dispersion Areas | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | unitless |
| | 31 | Initial Weighted Runoff Factor | 0.78 | 0.80 | 0.79 | 0.76 | 0.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | unitless |
| | 32 | Initial Design Capture Volume | 199 | 308 | 1,010 | 154 | 462 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| Dispersion Area Adjustments | 33 | Total Impervious Area Dispersed to Pervious Surface | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | sq-ft |
| | 34 | Total Pervious Dispersion Area | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | sq-ft |
| | 35 | Ratio of Dispersed Impervious Area to Pervious Dispersion Area | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | ratio |
| | 36 | Adjustment Factor for Dispersed & Dispersion Areas | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | ratio |
| | 37 | Runoff Factor After Dispersion Techniques | 0.78 | 0.80 | 0.79 | 0.76 | 0.80 | n/a | n/a | n/a | n/a | n/a | unitless |
| Tree & Barrel Adjustments | 38 | Design Capture Volume After Dispersion Techniques | 199 | 308 | 1,010 | 154 | 462 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 39 | Total Tree Well Volume Reduction | 200 | 320 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 40 | Total Rain Barrel Volume Reduction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| Results | 41 | Final Adjusted Runoff Factor | 0.00 | 0.00 | 0.79 | 0.76 | 0.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | unitless |
| | 42 | Final Effective Tributary Area | 0 | 0 | 25,251 | 3,840 | 11,552 | 0 | 0 | 0 | 0 | 0 | sq-ft |
| | 43 | Initial Design Capture Volume Retained by Site Design Elements | 200 | 320 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 44 | Final Design Capture Volume Tributary to BMP | 0 | 0 | 1,010 | 154 | 462 | 0 | 0 | 0 | 0 | 0 | cubic-feet |

Worksheet B.1-1 General Notes:

A. Applicants may use this worksheet to calculate design capture volumes for up to 10 drainage areas User input must be provided for yellow shaded cells, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Upon completion of this worksheet, proceed to the appropriate BMP Sizing worksheet(s).

| Automated Worksheet B.5-1: Sizing Lined or Unlined Biofiltration BMPs (V1.3) | | | | | | | | | | | | | |
|--|----|---|----------|-----------|------------|-----------|----------|-----------|------------|-------------|-----------|----------|------------|
| Category | # | Description | <i>i</i> | <i>ii</i> | <i>iii</i> | <i>iv</i> | <i>v</i> | <i>vi</i> | <i>vii</i> | <i>viii</i> | <i>ix</i> | <i>x</i> | Units |
| BMP Inputs | 0 | Drainage Basin ID or Name | - | - | DMA-3 | DMA-4 | DMA-5 | - | - | - | - | - | sq-ft |
| | 1 | Design Infiltration Rate Recommended by Geotechnical Engineer | - | - | 0.000 | 0.000 | 0.000 | - | - | - | - | - | in/hr |
| | 2 | Effective Tributary Area | - | - | 25,251 | 3,840 | 11,552 | - | - | - | - | - | sq-ft |
| | 3 | Minimum Biofiltration Footprint Sizing Factor | - | - | 0.030 | 0.030 | 0.030 | - | - | - | - | - | ratio |
| | 4 | Design Capture Volume Tributary to BMP | - | - | 1,010 | 154 | 462 | - | - | - | - | - | cubic-feet |
| | 5 | Is Biofiltration Basin Impermeably Lined or Unlined? | | | Lined | Lined | Lined | | | | | | unitless |
| | 6 | Provided Biofiltration BMP Surface Area | | | 940 | 845 | 580 | | | | | | sq-ft |
| | 7 | Provided Surface Ponding Depth | | | 9 | 9 | 9 | | | | | | inches |
| | 8 | Provided Soil Media Thickness | | | 18 | 18 | 18 | | | | | | inches |
| | 9 | Provided Depth of Gravel Above Underdrain Invert | | | 12 | 12 | 12 | | | | | | inches |
| | 10 | Diameter of Underdrain or Hydromod Orifice (Select Smallest) | | | 6.00 | 6.00 | 6.00 | | | | | | inches |
| | 11 | Provided Depth of Gravel Below the Underdrain | | | 3 | 3 | 3 | | | | | | inches |
| Retention Calculations | 12 | Volume Infiltrated Over 6 Hour Storm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 13 | Soil Media Pore Space Available for Retention | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | unitless |
| | 14 | Gravel Pore Space Available for Retention | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | unitless |
| | 15 | Effective Retention Depth | 0.00 | 0.00 | 0.90 | 0.90 | 0.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | inches |
| | 16 | Calculated Retention Storage Drawdown (Including 6 Hr Storm) | 0 | 0 | 120 | 120 | 120 | 0 | 0 | 0 | 0 | 0 | hours |
| | 17 | Volume Retained by BMP | 0 | 0 | 71 | 63 | 44 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 18 | Fraction of DCV Retained | 0.00 | 0.00 | 0.07 | 0.41 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | ratio |
| | 19 | Portion of Retention Performance Standard Satisfied | 0.00 | 0.00 | 0.08 | 0.40 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | ratio |
| | 20 | Fraction of DCV Retained (normalized to 36-hr drawdown) | 0.00 | 0.00 | 0.04 | 0.24 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | ratio |
| | 21 | Design Capture Volume Remaining for Biofiltration | 0 | 0 | 970 | 117 | 439 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 22 | Max Hydromod Flow Rate through Underdrain | n/a | n/a | 1.6375 | 1.6375 | 1.6375 | n/a | n/a | n/a | n/a | n/a | CFS |
| Biofiltration Calculations | 23 | Max Soil Filtration Rate Allowed by Underdrain Orifice | n/a | n/a | 75.26 | 83.72 | 121.97 | n/a | n/a | n/a | n/a | n/a | in/hr |
| | 24 | Soil Media Filtration Rate per Specifications | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | in/hr |
| | 25 | Soil Media Filtration Rate to be used for Sizing | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | in/hr |
| | 26 | Depth Biofiltered Over 6 Hour Storm | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | inches |
| | 27 | Soil Media Pore Space Available for Biofiltration | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | unitless |
| | 28 | Effective Depth of Biofiltration Storage | 0.00 | 0.00 | 17.40 | 17.40 | 17.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | inches |
| | 29 | Drawdown Time for Surface Ponding | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | hours |
| | 30 | Drawdown Time for Effective Biofiltration Depth | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | hours |
| | 31 | Total Depth Biofiltered | 30.00 | 30.00 | 47.40 | 47.40 | 47.40 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | inches |
| | 32 | Option 1 - Biofilter 1.50 DCV: Target Volume | 0 | 0 | 1,455 | 176 | 659 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 33 | Option 1 - Provided Biofiltration Volume | 0 | 0 | 1,455 | 176 | 659 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 34 | Option 2 - Store 0.75 DCV: Target Volume | 0 | 0 | 728 | 88 | 329 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 35 | Option 2 - Provided Storage Volume | 0 | 0 | 728 | 88 | 329 | 0 | 0 | 0 | 0 | 0 | cubic-feet |
| | 36 | Portion of Biofiltration Performance Standard Satisfied | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | ratio |
| Result | 37 | Do Site Design Elements and BMPs Satisfy Annual Retention Requirements? | - | - | Yes | Yes | Yes | - | - | - | - | - | yes/no |
| | 38 | Overall Portion of Performance Standard Satisfied | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | ratio |
| | 39 | This BMP Overflows to the Following Drainage Basin | - | - | - | - | - | - | - | - | - | - | unitless |
| | 40 | Deficit of Effectively Treated Stormwater | n/a | n/a | 0 | 0 | 0 | n/a | n/a | n/a | n/a | n/a | cubic-feet |

Worksheet B.5-1 General Notes:

A. Applicants may use this worksheet to size Lined or Unlined Biofiltration BMPs (BF-1, PR-1) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red/orange and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

| Summary of Stormwater Pollutant Control Calculations (V1.3) | | | | | | | | | | | | | |
|---|----|--|----------|-----------|---------------|---------------|---------------|-----------|------------|-------------|-----------|----------|-------------|
| Category | # | Description | <i>i</i> | <i>ii</i> | <i>iii</i> | <i>iv</i> | <i>v</i> | <i>vi</i> | <i>vii</i> | <i>viii</i> | <i>ix</i> | <i>x</i> | Units |
| General Info | 0 | Drainage Basin ID or Name | DMA-1 | DMA-2 | DMA-3 | DMA-4 | DMA-5 | - | - | - | - | - | unitless |
| | 1 | 85th Percentile Storm Depth | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | - | - | - | - | - | inches |
| | 2 | Design Infiltration Rate Recommended by Geotechnical Engineer | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | - | - | - | in/hr |
| | 3 | Total Tributary Area | 6,381 | 9,620 | 31,963 | 5,053 | 14,440 | - | - | - | - | - | sq-ft |
| | 4 | 85th Percentile Storm Volume (Rainfall Volume) | 255 | 385 | 1,279 | 202 | 578 | - | - | - | - | - | cubic-feet |
| Initial DCV | 5 | Initial Weighted Runoff Factor | 0.78 | 0.80 | 0.79 | 0.76 | 0.80 | - | - | - | - | - | unitless |
| | 6 | Initial Design Capture Volume | 199 | 308 | 1,010 | 154 | 462 | - | - | - | - | - | cubic-feet |
| Site Design Volume Reductions | 7 | Dispersion Area Reductions | 0 | 0 | 0 | 0 | 0 | - | - | - | - | - | cubic-feet |
| | 8 | Tree Well and Rain Barrel Reductions | 200 | 320 | 0 | 0 | 0 | - | - | - | - | - | cubic-feet |
| BMP Volume Reductions | 9 | Effective Area Tributary to BMP | 0 | 0 | 25,251 | 3,840 | 11,552 | - | - | - | - | - | square feet |
| | 10 | Final Design Capture Volume Tributary to BMP | 0 | 0 | 1,010 | 154 | 462 | - | - | - | - | - | cubic-feet |
| | 11 | Basin Drains to the Following BMP Type | n/a | n/a | Biofiltration | Biofiltration | Biofiltration | - | - | - | - | - | unitless |
| | 12 | Volume Retained by BMP (normalized to 36 hour drawdown) | 0 | 0 | 40 | 37 | 23 | - | - | - | - | - | cubic-feet |
| Total Volume Reductions | 13 | Total Fraction of Initial DCV Retained within DMA | 1.01 | 1.04 | 0.04 | 0.24 | 0.05 | - | - | - | - | - | fraction |
| | 14 | Percent of Average Annual Runoff Retention Provided | 80.7% | 81.5% | 6.1% | 31.4% | 7.6% | - | - | - | - | - | % |
| | 15 | Percent of Average Annual Runoff Retention Required | 4.5% | 4.5% | 4.5% | 4.5% | 4.5% | - | - | - | - | - | % |
| Performance Standard | 16 | Percent of Pollution Control Standard Satisfied | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | - | - | - | - | - | % |
| Treatment Train | 17 | Discharges to Secondary Treatment in Drainage Basin | - | - | - | - | - | - | - | - | - | - | unitless |
| | 18 | Impervious Surface Area Still Requiring Treatment | 0 | 0 | 0 | 0 | 0 | - | - | - | - | - | square feet |
| | 19 | Impervious Surfaces Directed to Downstream Dispersion Area | - | - | - | - | - | - | - | - | - | - | square feet |
| | 20 | Impervious Surfaces Not Directed to Downstream Dispersion Area | - | - | - | - | - | - | - | - | - | - | square feet |
| Result | 21 | Deficit of Effectively Treated Stormwater | 0 | 0 | 0 | 0 | 0 | - | - | - | - | - | cubic-feet |

Summary Notes:

All fields in this summary worksheet are populated based on previous user inputs. If applicable, drainage basin elements that require revisions and/or supplemental information outside the scope of these worksheets are highlighted in orange and summarized in the red text below. If all drainage basins achieve full compliance without a need for supplemental information, a green message will appear below.

-Congratulations, all specified drainage basins and BMPs are in compliance with stormwater pollutant control requirements. Include 11x17 color prints of this summary sheet and supporting worksheet calculations as part of the SWQMP submittal package.

False

Tree Well Determination for DMA-1

| Design Capture Volume for DMA-2 | | Worksheet B.2-1 | | |
|---------------------------------|---|-----------------|------|----------|
| 1 | 85th percentile 24-hr storm depth from Figure B.1-1 | d= | 0.48 | inches |
| 2 | Area tributary to BMP(s) | A= | 0.15 | acres |
| 3 | Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) | C= | 0.78 | unitless |
| 6 | Calculate DCV=(3630xCxdxA) - TCV - RCV) | DCV= | 199 | cu-ft |

| Weighted Runoff Factor | | | | | |
|------------------------|-------------------------|--------------|---------------|-------|------------|
| DMA | Type of Surface | Area (acres) | Runoff Factor | C x A | Weighted C |
| 1 | Roof, Concrete, Asphalt | 0.12 | 0.9 | 0.11 | 0.78 |
| | Landscape | 0.03 | 0.3 | 0.008 | |

| DCV to be treated for Hydromodification Requirements | | | |
|--|-----------------|------------------------------|---------------------------|
| DMA | DMA DCV (cu-ft) | Hydromodification Multiplier | DCV to be Treated (cu-ft) |
| 1 | 199 | N/A | 199 |

| STREET TREE DETERMINATION | | | | | | | | | | |
|---------------------------|-----------------|-------------------------|-----------------|-----------------------------------|----------------------|--|--------------------------------|----------------------------------|------------------------------|---------------------------|
| DMA | DMA DCV (cu-ft) | DIAMETER OF CANOPY (FT) | Number of Trees | TOTAL AREA OF TREE CANOPY (SQ-FT) | TCV PER TREE (CU-FT) | AREA OF CANOPY OVER IMPERVIOUS SURFACE (SQ-FT) | APPLICABLE CANOPY AREA (SQ-FT) | PERCENTAGE OF APPLICABLE TCV (%) | ADJUSTED TCV PER DMA (CU-FT) | FINAL DCV PER DMA (CU-FT) |
| 1 | 199 | 10 | 5 | 393 | 40 | 0 | 393 | 100 | 200 | -1 |

| STREET TREE STRUCTURAL SOIL REQUIREMENTS | | | | | | | | | |
|--|---------------------------|-----------------|-------------------------|--------------------------|----------------------------|--------------------------|---------------------------|----------------------------|------------------------------|
| DMA | TREE CANOPY DIAMETER (FT) | Number of Trees | REQUIRED VOLUME (CU-FT) | PROPOSED SOIL DEPTH (FT) | REQUIRED SOIL AREA (SQ-FT) | PROPOSED SOIL WIDTH (FT) | PROPOSED SOIL LENGTH (FT) | PROPOSED SOIL AREA (SQ-FT) | PROVIDED SOIL VOLUME (CU-FT) |
| 1 | 10 | 5 | 785 | 3 | 262 | 11 | 24 | 264 | 792 |

Tree Well Determination for DMA-2

| Design Capture Volume for DMA-2 | | Worksheet B.2-1 | | |
|---------------------------------|---|-----------------|------|----------|
| 1 | 85th percentile 24-hr storm depth from Figure B.1-1 | d= | 0.48 | inches |
| 2 | Area tributary to BMP(s) | A= | 0.21 | acres |
| 3 | Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) | C= | 0.79 | unitless |
| 6 | Calculate DCV=(3630xCxdxA) - TCV - RCV) | DCV= | 308 | cu-ft |

| Weighted Runoff Factor | | | | | |
|------------------------|-------------------------|--------------|---------------|-------|------------|
| DMA | Type of Surface | Area (acres) | Runoff Factor | C x A | Weighted C |
| 2 | Roof, Concrete, Asphalt | 0.17 | 0.9 | 0.15 | 0.79 |
| | Landscape | 0.04 | 0.3 | 0.012 | |

| DCV to be treated for Hydromodification Requirements | | | |
|--|-----------------|------------------------------|---------------------------|
| DMA | DMA DCV (cu-ft) | Hydromodification Multiplier | DCV to be Treated (cu-ft) |
| 2 | 308 | N/A | 308 |

| STREET TREE DETERMINATION | | | | | | | | | | |
|---------------------------|-----------------|-------------------------|-----------------|-----------------------------------|----------------------|--|--------------------------------|----------------------------------|------------------------------|---------------------------|
| DMA | DMA DCV (cu-ft) | DIAMETER OF CANOPY (FT) | Number of Trees | TOTAL AREA OF TREE CANOPY (SQ-FT) | TCV PER TREE (CU-FT) | AREA OF CANOPY OVER IMPERVIOUS SURFACE (SQ-FT) | APPLICABLE CANOPY AREA (SQ-FT) | PERCENTAGE OF APPLICABLE TCV (%) | ADJUSTED TCV PER DMA (CU-FT) | FINAL DCV PER DMA (CU-FT) |
| 2 | 308 | 10 | 8 | 628 | 40 | 0 | 628 | 100 | 320 | -12 |

| STREET TREE STRUCTURAL SOIL REQUIREMENTS | | | | | | | | | |
|--|---------------------------|-----------------|-------------------------|--------------------------|----------------------------|--------------------------|---------------------------|----------------------------|------------------------------|
| DMA | TREE CANOPY DIAMETER (FT) | Number of Trees | REQUIRED VOLUME (CU-FT) | PROPOSED SOIL DEPTH (FT) | REQUIRED SOIL AREA (SQ-FT) | PROPOSED SOIL WIDTH (FT) | PROPOSED SOIL LENGTH (FT) | PROPOSED SOIL AREA (SQ-FT) | PROVIDED SOIL VOLUME (CU-FT) |
| 2 | 10 | 8 | 1257 | 3 | 419 | 14 | 30 | 420 | 1260 |

B.1 DCV

DCV is defined as the volume of storm water runoff resulting from the 85th percentile, 24-hr storm event. The following hydrologic method shall be used to calculate the DCV:

$$DCV = C \times d \times A \times 43,560 \text{ sf/ac} \times 1/12 \text{ in/ft}$$

$$DCV = 3,630 \times C \times d \times A$$

Where:

DCV = Design Capture Volume in cubic feet

C = Runoff factor (unitless); refer to section B.1.1

d = 85th percentile, 24-hr storm event rainfall depth (inches), refer to section B.1.3

A = Tributary area (acres) which includes the total area draining to the BMP, including any offsite or onsite areas that comingles with project runoff and drains to the BMP. Refer to Chapter 3, Section 3.3.3 for additional guidance. Street redevelopment projects consult section 1.4.3.

B.1.1 Runoff Factor

Estimate the area weighted runoff factor for the tributary area to the BMP using runoff factor (from Table B.1-1) and area of each surface type in the tributary area and the following equation:

$$C = \frac{\sum C_x A_x}{\sum A_x}$$

Where:

C_x = Runoff factor for area X

A_x = Tributary area X (acres)

These runoff factors apply to areas receiving direct rainfall only. For conditions in which runoff is routed onto a surface from an adjacent surface, see Section B.2 for determining composite runoff factors for these areas.

Table 0-1: Runoff factors for surfaces draining to BMPs – Pollutant Control BMPs

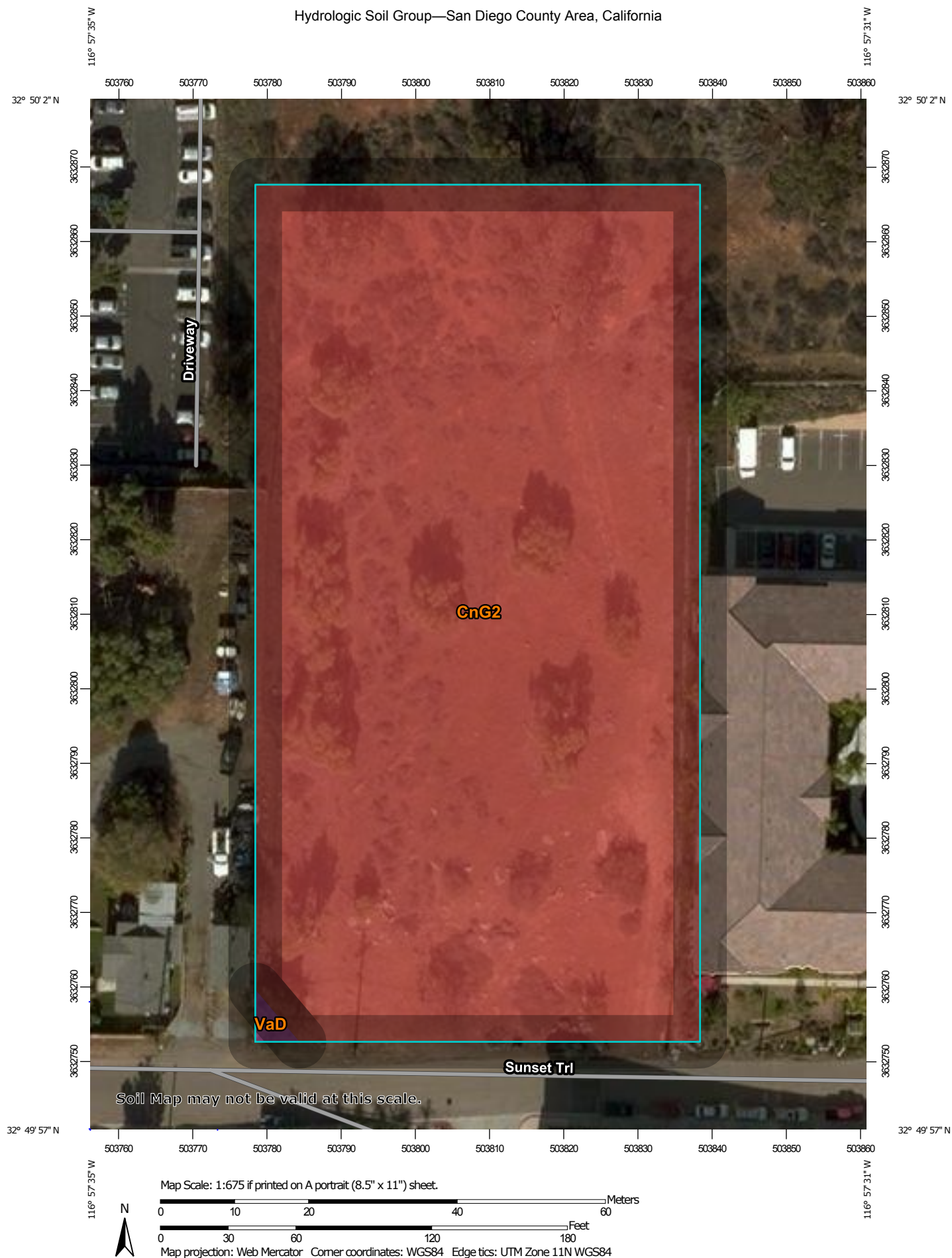
| Surface | Runoff Factor |
|--|---------------|
| Roofs ¹ | 0.90 |
| Concrete or Asphalt ¹ | 0.90 |
| Unit Pavers (grouted) ¹ | 0.90 |
| Decomposed Granite | 0.30 |
| Cobbles or Crushed Aggregate | 0.30 |
| Amended, Mulched Soils or Landscape | 0.10 |
| Compacted Soil (e.g., unpaved parking) | 0.30 |

1. Surface is considered impervious and could benefit from use of Site Design BMPs and adjustment of the runoff factor per Section B.2.1.

ATTACHMENT 1E CONTINUED
WEB SOIL SURVEY – HYDROLOGIC SOIL GROUP RESULTS

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Hydrologic Soil Group—San Diego County Area, California



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 12, Sep 13, 2017

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

Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

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

Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|------------------------------------|--|--------|--------------|----------------|
| CnG2 | Cieneba-Fallbrook rocky sandy loams, 30 to 65 percent slopes, eroded | D | 1.7 | 99.7% |
| VaD | Visalia sandy loam, 9 to 15 percent slopes | A | 0.0 | 0.3% |
| Totals for Area of Interest | | | 1.7 | 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

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ATTACHMENT 1E CONTINUED
85TH PERCENTILE 24-HR ISOPLUVIAL MAP

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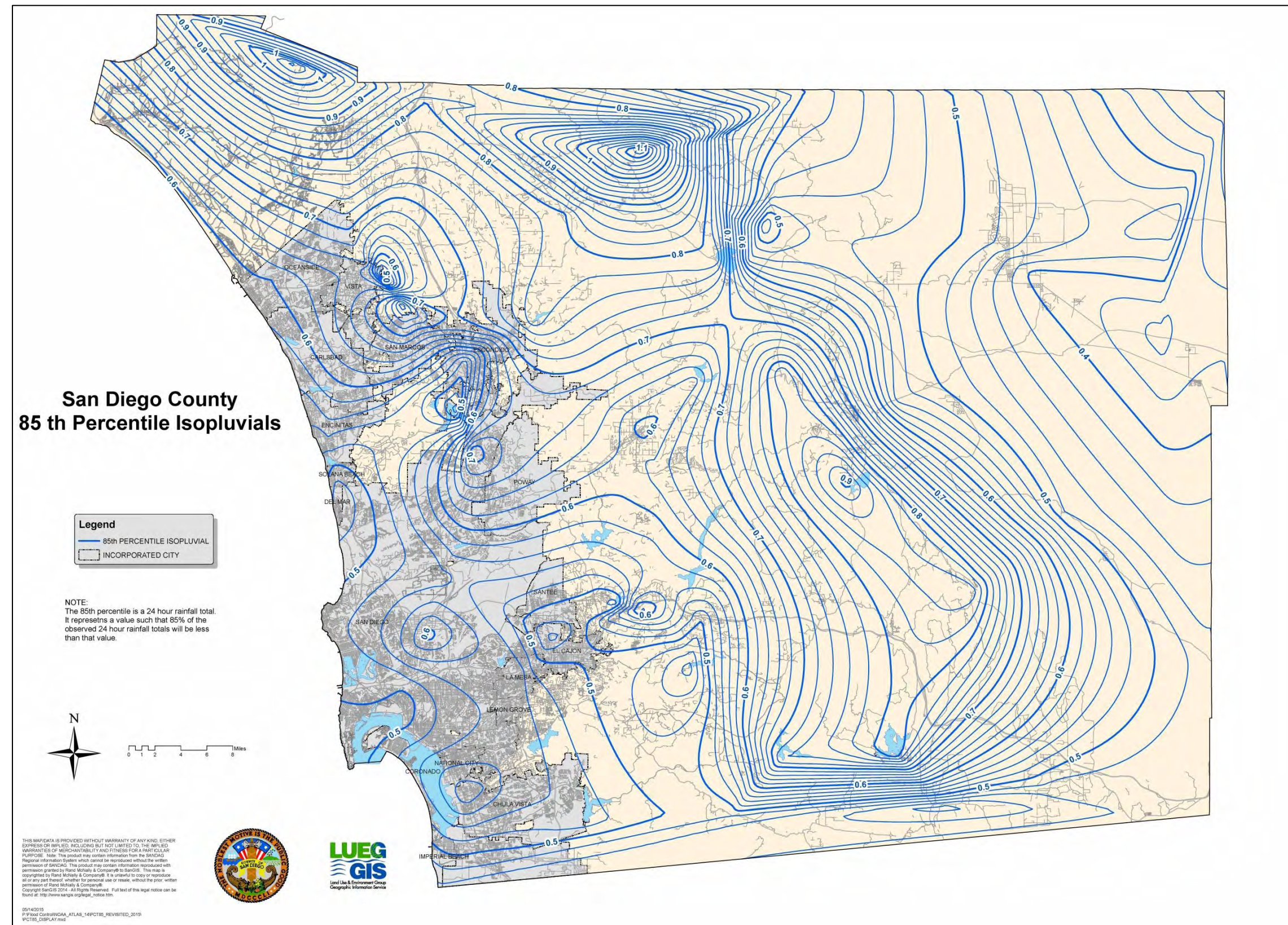


Figure 0-1: 85th Percentile 24-hour Isopluvial Map

ATTACHMENT 2

BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

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

Indicate which Items are Included behind this cover sheet:

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

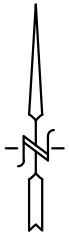
Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

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

LEGEND

OFFSITE FLOW PATH



NOT TO SCALE

HMP EXEMPT EXHIBIT

LANTERN CREST RIDGE II
SUNSET TRAILS
SANTEE, CA 92071

SHEET TITLE

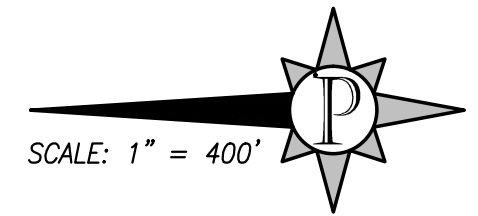
PROJECT

SHEET

1

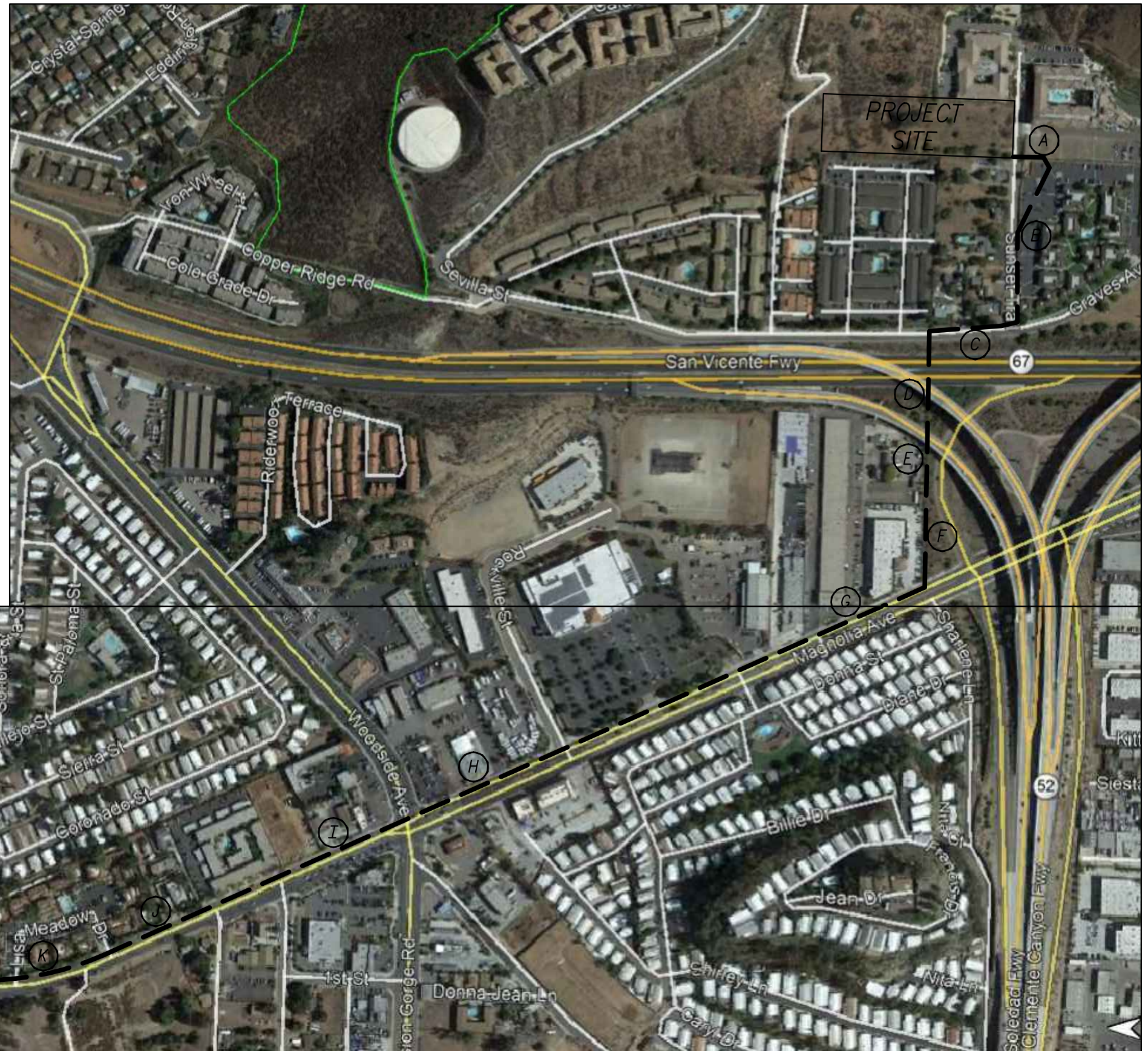
OF 1 SHEETS

LANTERN CREST RIDGE ADDITION HYDROMODIFICATION EXHIBIT



STORM DRAIN FACILITY LEGEND

- (A) EX. 24" HDPE STORM DRAIN PER DWG. 2011-046.
- (B) EX. 36" RCP STORM DRAIN PER DWG. 2011-046.
- (C) EX. 43" x 27" CMPA STORM DRAIN.
- (D) EX. 5' x 4' RCB PER CALTRANS DWG.
- (E) EX. CONCRETE CHANNEL.
- (F) EX. 30" x 120" BOX CHANNEL PER DWG. 2007-094.
- (G) EX. 42" RCP STORM DRAIN PER DWG. 87-091.
- (H) EX. 48" RCP STORM DRAIN PER DWG. 87-090.
- (I) EX. 54" RCP STORM DRAIN PER R.S. 627-5.
- (J) EX. 57" x 38" RCB PER R.S. 627-5.
- (K) EX. DOUBLE 57" x 38" RCB PER R.S. 627-5.
- (L) EX. 84" C.S.P. PER DWG. C.G. 1003.
- (M) EX. PCC CHANNEL PER DWG. C.G. 1003.
- (N) OUTLET TO SAN DIEGO RIVER.



ATTACHMENT 3

Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

| Attachment Sequence | Contents | Checklist |
|----------------------------|--|--|
| Attachment 3a | Structural BMP Maintenance Thresholds and Actions (Required) | <input checked="" type="checkbox"/> Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet. |
| Attachment 3b | Draft Maintenance Agreement (when applicable) | <input checked="" type="checkbox"/> Included <input type="checkbox"/> Not Applicable |

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

☒ **Preliminary Design / Planning / CEQA level submittal:**

Attachment 3a must identify:

- ☒ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

☐ **Final Design level submittal:**

Attachment 3a must identify:

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

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

ATTACHMENT 3A
STRUCTURAL BMP MAINTENANCE THRESHOLDS AND ACTIONS

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| BMP 1-1 THRU 1-3: BIOFILTRATION BASIN MAINTENANCE ACTIVITIES | | | | | |
|--|--|---|---|--|----------------------|
| ROUTINE ACTION | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | Frequency (times/yr) |
| Vegetation Management | Average vegetation height greater than 12-inches, emergence of trees or woody vegetation | Visual observation and random measurements throughout the side slope area | Monthly and prior to start of wet season, and after wet season | Cut vegetation to an average height of 12 inches, but not less than 6 inches and remove trimmings. Remove any trees, or woody vegetation. (California gray rush is recommended by landscape plans) | 12 |
| Poor vegetation establishment | Presence of barren spots | Visual observation of bare spots or areas. | Monthly, especially prior to start of wet season, and after wet season | Re-seed, replant or re-establish vegetation per original plans without the use of chemical applications. | 12 |
| Soil Repair | Evidence of erosion in slopes and especially in barren spots | Visual observation | Monthly, especially prior to start of wet season, and after wet season or as needed | Reseed/revegetate barren spots prior to wet season. Fill In holes and/or rills; revegetate as well. Amend soil media. Add mulch to bare soils. Adjust irrigation system. | 12 |
| Standing Water | Standing water for more than 96 hours | Visual observation | Quarterly, and 96 hours after each target storm (0.60 in) event | Drain facility. Corrective action prior to wet season, such as adjust irrigation system, remove obstructions of debris and invasive vegetation, loosen top soil. Clear underdrain. Consult engineers if immediate solution is not evident. | 4 |
| Trash and Debris | Trash and Debris present | Visual observation | Weekly, especially prior to start of wet season | Remove and dispose of trash and debris | 52 |
| Sediment Management | Silt level post. Visual observation of an accumulation of sediment at or near vegetation height, | Measure depth at apparent max. and min. accumulation of sediment with any type measuring device. Calculate avg. depth. Use silt level post as reference to bottom of and sediment height. | Quarterly, especially prior to start of wet season, and at the end of wet season | Remove and properly dispose of accumulated material, without damage to vegetation. Regrade if necessary. (expected every 2 years) | 4 |
| Underdrains | Evidence of clogging by ponding water | Visual observation | Twice a year, prior to start of wet season, and after end of wet season | Corrective action prior to wet season. Consult engineers if immediate solution not evident | 2 |
| General Maintenance Inspection | Debris in inlet structures, outlet structures, side slopes or other features damaged, significant erosion, burrows, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, structural component damage. etc. | Visual observation | Monthly, especially prior to start of wet season | Clear, clean storm inlets regularly. Repair damaged components. Corrective action prior to wet season. Consult engineers if immediate solution is not evident. | 12 |
| Storm Drain Signage | Evidence of deterioration | Visual observation | Twice a year, prior and post wet season | Re-apply stencil if required. Recondition signage if needed | 2 |
| Irrigation | N/A | N/A | Approximately every 10 days. Cease activity during storm events and up to 96 hours after each event | Irrigate vegetation on a regular basis with automated irrigation (sprinkler system). Ponding of water shall be avoided. | Continuous |
| Reporting | N/A | N/A | Due to City by September 15 th of each year | Property owner is required to complete and return annual certification form, verifying performance of all routine maintenance activities of treatment control BMPs on their property. See page 15 of Operation and Maintenance Plan. | 1 |

| SOURCE CONTROL PRACTICES | | | |
|--------------------------|--|---|-----------|
| DESIGNATION | BMP TYPE | MAINTENANCE ACTIVITY/PRACTICE | FREQUENCY |
| SC-1 | Prevent illegal discharges into the storm water conveyance system | Discharge of anything other than rain water to the storm water conveyance system is illegal. The developer shall provide owner with a copy of the City of Santee Residential Activities & Improvements Storm Water Fact Sheet (available under O&M Attachment 2 and on the City's website at: http://www.ci.santee.ca.us/Index.aspx?page=583). The only exception to this prohibition includes individually permitted discharges, pursuant to a National Pollutant Discharge Elimination System (such as Padre Dam Municipal Water District) and discharges resulting from emergency firefighting activities. All projects must effectively eliminate discharges of non-storm water into the storm water conveyance system. This may involve a suite of housekeeping BMPs which could include effective irrigation, dispersion of non-storm water discharges into landscaping for infiltration, and containing wash water from vehicle washing. | ONGOING |
| SC-2 | Storm drain stenciling or signage | Labeling shall be provided for all storm water conveyance system inlets and catch basins within the project area. Inlet stenciling may include concrete stamping, concrete painting, placards, or other methods as approved by the City. In addition to storm drain stenciling, projects are encouraged to post interpretive signage and prohibitive language (with graphical icons) which prohibit littering or dumping at trailheads, parks, building entrances and public access points within the project area. Replacement or repainting of signage to be performed as deemed necessary through annual inspection. | ONGOING |
| SC-5 | Protect trash storage areas from rainfall, runoff, and wind dispersal. | <p>Storm water runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water, wind, or vermin into nearby storm drain inlets, channels, and/or creeks. All development projects shall include the following structural BMPs:</p> <ul style="list-style-type: none"> • Ensure trash enclosure areas are fully contained (three walls, door, and roof). • Provide attached lids on all trash containers to prevent wind or vermin dispersal. Locate storm drains away from immediate vicinity of the trash storage area and vice versa. • Post signs on all enclosures and/or dumpsters informing users to keep lids closed and not to dispose of liquids or hazardous materials. • Trash bins are to be covered. • Replace leaking bins • Clean trash storage area. | REGULARLY |

| DESIGNATION | BMP TYPE | MAINTENANCE ACTIVITY/PRACTICE | FREQUENCY |
|-------------|---|---|--------------------------------------|
| SC-6 | Use any additional BMPs determined to be necessary by the Coppermittee to minimize pollutant generation at each project site. | <p><u>On-site Storm Drain Inlets</u></p> <ul style="list-style-type: none"> • Mark all inlets with the words “No dumping! Flows to river” or similar • Maintain and periodically repaint or replace inlet markings • Provide storm water pollution prevention information to new site owners, lessees, or operators. • Maintain stormwater inlets on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush storms, prevent clogging of the downstream conveyance system, and ensure that the stormwater conveyance system functions properly hydraulically to prevent flooding. • Clean storm drain inlets before the wet season to remove sediments and debris accumulated during the summer. Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. • Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain. • Train crews in proper maintenance activities, including record keeping and disposal <p><u>Interior Floor Drains and elevator shaft sump pumps</u></p> <ul style="list-style-type: none"> • Interior floor drains and elevator sump pumps will be plumbed to sanitary sewer. • Inspect and maintain drains regularly to prevent blockages and overflow. <p><u>Landscape/ Outdoor Pesticide Use</u></p> <ul style="list-style-type: none"> • Owners shall maintain landscaping using minimum or no pesticides • See applicable operational BMPs in Fact Sheet SC-41 “Building and Grounds Maintenance” in the CASQA Storm water Quality Handbook (See Attachments in Operations and Maintenance Plan) • Provide maintenance information to new owners, lessees, and operators. <p><u>Food service</u></p> <ul style="list-style-type: none"> • Food service area will be located indoors. • Cleaning area will include sink or other area for cleaning floor mats, containers, and equipment, this area will be located indoors. • Drain from food service area will be connected to a grease interceptor before discharging to sanitary sewer. <p><u>Fire sprinkler Test Water</u></p> <ul style="list-style-type: none"> • Fire sprinkler test water shall be drained to sanitary sewer system • During a fire sprinkler test, the fire riser discharge shall be connected by a hose to the sewer cleanout. | REGULARLY OR AS DETERMINED NECESSARY |

| DESIGNATION | BMP TYPE | MAINTENANCE ACTIVITY/PRACTICE | FREQUENCY |
|-------------|---|---|--------------------------------------|
| SC-6 | Use any additional BMPs determined to be necessary by the Coppermittee to minimize pollutant generation at each project site. | <p><u>Miscellaneous Drain or Wash Water</u></p> <ul style="list-style-type: none"> Boiler drains will be connected to sanitary sewer system; it may not and will not discharge to the storm drain system. Roofing gutters and trim will not be made of copper or other unprotected metals that may leach into runoff. <p><u>Plazas, Sidewalks, and Parking Lots</u></p> <ul style="list-style-type: none"> Plazas, sidewalks, and parking lots must be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing must be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser must be collected and discharged to the sanitary sewer and not discharged to a storm drain. <p><u>Irrigation</u></p> <ul style="list-style-type: none"> Irrigate landscape areas on a regular basis as needed, prevent over-spraying, adjust irrigation schedule according to wet/dry season. Prevent overwatering and runoff. Inspect and maintain irrigation system on a regular basis. Repair and/or replace malfunctioning components/equipment. | REGULARLY OR AS DETERMINED NECESSARY |

| DMA-1 AND 2: STREET TREE MAINTENANCE ACTIVITIES | | | | | |
|---|--|--|---|--|---------------------------|
| ROUTINE ACTION | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | Frequency (# times/yr) |
| Vegetation Management for Aesthetics (optional) | Emergence woody vegetation/weeds | Visual observation | Weekly | Remove any weeds or woody vegetation | 52 |
| Tree Replacement | Health of Tree | Visual observation by landscape professional | Inspect monthly, especially prior to start of wet season. Replace when needed. | Inspect health of tree, replace if necessary prior to start of wet season (Estimated every 5 years). Tree must have a 15' canopy and the required species is: Agonis Fluxuosa (Peppermint Willow) | 1 |
| Standing Water | Standing water for more than 96 hours | Visual observation | Inspect monthly and after 0.5-inch or larger storm event. Is standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. Maintenance when needed. | Loosen or replace soils surrounding the tree to restore drainage. | 1 |
| Trash and Debris | Trash and Debris present | Visual observation | Weekly | Remove and dispose of trash and debris | 52 |
| Sediment Management | Silt level post. Visual observation of an accumulation of excessive silt | Measure depth at apparent maximum and minimum accumulation of sediment with any type of measuring device. Calculate average depth. Use silt level post as reference to bottom of tree well and sediment accumulation height. | Quarterly, especially prior to start of wet season (Sept. 1), and at the end of wet season | Remove and properly dispose of sediment | 4 |
| Presence of mosquitos/larvae | Standing water for more than 96 hours and presence of mosquitos | Visual observation | Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1inch or larger storm event. Maintenance when needed. | Disperse any standing water from the tree well to nearby landscaping. Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water). | 12 |
| Entrance/opening of the tree well is blocked such that storm water will not drain to tree | Inlet opening is blocked by debris causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well. | Visual observation | Inspect monthly. Maintenance when needed. | Make repairs as appropriate to restore drainage into the tree well. | 2 |
| Reporting | N/A | N/A | Due to City by September 15 th of each year | Property owner is required to complete and return annual certification form, verifying performance of all routine maintenance activities of treatment control BMPs on their property. See page 15 of Operation and Maintenance Plan. | 1 |

ATTACHMENT 3B
DRAFT MAINTENANCE AGREEMENT

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Operations and Maintenance Plan

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Introduction

This site specific O&M Plan shall outline the maintenance responsibilities required in order to keep an effective long-term operation of the site specific TCBMP (Treatment Control Best Management Practice) and source control measures.

Property owner shall have ownership and maintenance responsibility for all structural permanent BMPs and provide annual certification to the City of Santee demonstrating that the BMPs have been properly maintained and that they are functioning as intended (see “Long Term Maintenance Documentation” section). When property ownership changes maintenance responsibility also transfers to the new owner (see Attachment 1).

Source Control

SC-1: Prevent illegal discharges into the storm water conveyance system

Discharges of anything other than rain water to the storm water conveyance system are illegal. The only exception to this prohibition includes individually permitted discharges, pursuant to a National Pollutant Discharge Elimination System (such as Padre Dam Municipal Water District) and discharges resulting from emergency firefighting activities. All projects must effectively eliminate discharges of non-storm water into the storm water conveyance system. This may involve a suite of housekeeping BMPs which could include effective irrigation, dispersion of non-storm water discharges into landscaping for infiltration, and containing wash water from vehicle washing.

SC-2: Identify the storm drain system using stenciling or signage

Storm drain signs and stencils are visual reminders which are typically placed adjacent to the inlets. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping, and bring awareness to the community that storm drains are connected to the river system, not a sewer system. Labeling shall be provided for all storm water conveyance system inlets and catch basins within the project area. Inlet stenciling may include concrete stamping, concrete painting, placards, or other methods as approved by the City. In addition to storm drain stenciling, projects are encouraged to post interpretive signage and prohibitive language (with graphical icons) which prohibit littering or dumping at trailheads, parks, building entrances and public access points within the project area.

SC-5: Protect trash storage areas from rainfall, run-on, runoff, and wind dispersal

Storm water runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water, wind, or vermin into nearby storm drain inlets, channels, and/or creeks. All development projects shall include the following structural BMPs:

- Ensure trash enclosure areas are fully contained (three walls, door, and roof).
- Provide attached lids on all trash containers to prevent wind or vermin dispersal.
- Locate storm drains away from immediate vicinity of the trash storage area and vice versa.
- Post signs on all enclosures and/or dumpsters informing users to keep lids closed and not to dispose of liquids or hazardous materials.

SC-6: Use any additional BMPs determined to be necessary by the Copermittee to minimize pollutant generation at each project site

On-site Storm Drain Inlets

- Mark all inlets with the words “No dumping! Flows to River”
- Maintain and periodically repaint or replace inlet markings.
- Provide and periodically repaint or replace inlet markings.
- See applicable operational BMPs in Fact Sheet SC-44 “Drainage System Maintenance”, in the CASQA Storm Water Quality Handbooks.
- Include the following in lease agreements: “Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains”.

Interior Floor Drains and Elevator Shaft Sump Pumps

- Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.
- Inspect and maintain drain regularly to prevent blockages and overflow.

Landscape/ Outdoor Pesticide Use

- Owner shall maintain landscaping using minimum or no pesticides
- See applicable operational BMPs in Fact Sheet SC-41 “Building and Grounds Maintenance,” in the CASQA Stormwater Quality Handbooks
- Provide maintenance information to new owners, lessees and operators.

Food Service

- Food service area will be located indoors.
- Cleaning area will include sink or other area for cleaning floor mats, containers, and equipment, this area will be located indoors.
- Drain from food service area will be connected to a grease interceptor before discharging to sanitary sewer.

Fire Suppression Systems

- Fire sprinkler test water shall be drained to sanitary sewer system. During a fire sprinkler test, the fire riser discharge shall be connected by a hose to the sewer cleanout.

Miscellaneous Drain or Wash Water

- Boiler drains will be connected to sanitary sewer system; it may not and will not discharge to the storm drain system.
- Roofing gutters and trim will not be made of copper or other unprotected metals that may leach into runoff.

Plazas, sidewalks, and parking lots

- Plazas, sidewalks, and parking lots shall be swept regularly and removed of any oil, grease and spills to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Wash water shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

Permanent TCBMP

Biofiltration, & Bioretention Basin

Biofiltration (Bioretention with underdrain) facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to discharge via underdrain or overflow to the downstream conveyance system. Bioretention with underdrain facilities are commonly incorporated into the site within parking lot landscaping, along roadsides, and in open spaces. Because these types of facilities have limited or no infiltration, they are typically designed to provide enough hydraulic head to move flows through the underdrain connection to the storm drain system. Treatment is achieved through filtration, sedimentation, sorption, biochemical processes and plant uptake.

Three biofiltration basins located within the project site is responsible for handling SWQMP and flood control requirements for most of the project. In developed conditions, the basin will have a surface depth and a riser spillway structure. Flows will then discharge from the basins via the outlet structure or infiltrate through the base of the facilities to the receiving amended soil and low flow orifice. The riser structure will act as a spillway such that peak flows can be safely discharged to the receiving storm drain system.

Beneath the basins' invert lies the proposed LID biofiltration portion of the drainage facility. This portion of the basin is comprised of a 3-inch layer of mulch, a layer of amended soil (a highly sandy, organic rich composite with an infiltration capacity of at least 5 inches/hr) and a layer of gravel. All basins will be designed per BMP Design Manual Specifications in Chapter 5. All basins will be unlined.

For more detailed information regarding basin details please refer to BMP Plan Sheet 5 of Attachment 4 of SWQMP report. For further information regarding underdrain components, Design Criteria and Considerations refer to (Attachment 3). For TCBMP maintenance responsibility into perpetuity refer to "Facility Maintenance Agreement" (Attachment 1). Refer to "Inspection & Maintenance and Action Schedule" (Attachment 2) for maintenance responsibilities and Attachment 3-4 for further basin supplemental information.

Street Tree

Trees planted in the right-of-way can be used as storm water management tools in addition to other typical benefits associated with trees, including energy conservation, air quality improvement, and aesthetic enhancement. The Street Tree (BMP 1) is located at the western boundary of the site and would include a 30-foot tree canopy. The Street Tree would be installed with cinch ties, lodgepoles and brace in order to prevent slipping. Amended soil with a minimum depth of three feet and one foot in all directions of the root ball would be used per the City's BMP Manual Appendix E-18, SD-1 Street Trees.

Documentation and Records

Maintenance Responsibility

The property owner is responsible to ensure inspection, O&M of BMPs on their property (unless responsibility has been formally transferred to community facilities district or other special district), and to provide annual certification to the City demonstrating that the BMPs have been properly maintained and that they are functioning as intended. When property ownership changes (i.e. the property is sold or otherwise transferred to a new owner), maintenance responsibility also transfers to the new owner, typically by transfer of a maintenance agreement recorded against the property by the County Assessor. For structural BMPs that will be transferred to an agency, community facilities district, homeowners association, property owners association, or other special district, there may be an interim period during which the property owner is responsible until maintenance responsibility is formally transferred.

From the time that the structural BMP is constructed and activated (i.e. it is operating and processing storm water from storm events), it requires inspection and maintenance to ensure it continues to function as designed. Because of this, the Permit requires that each jurisdiction must "require the project applicant to submit proof of the mechanism under which ongoing long-term maintenance of all structural BMPs will be conducted." Requirements for proof of the maintenance mechanism may also differ depending on whether the long term O&M will be provided by a public or private party.

Long-Term Maintenance Documentation

Each Copermittee is required to verify that structural BMPs on each PDP "are adequately maintained, and continue to operate effectively to remove pollutants in storm water to the MEP through inspections, self-certifications, surveys, or other equally effective approaches." Each Copermittee must also maintain an inventory of all developments which have water quality features within its jurisdiction, identifies the party responsible for BMP maintenance at each property, includes the dates and findings of BMP inspections, and states any corrective actions and/or resolutions when applicable. The inventory and findings of maintenance verifications must be reported to the SDRWQCB annually.

To ensure compliance with these requirements, the City of Santee requires property owners to provide a signed Annual Self-certification Form which demonstrates that the O&M, as outlined within the property's SWQMP, has been performed. Self-certification Forms are due to the City of Santee by September 15 of each year. This ensures that there is time to complete any corrective actions which may be necessary prior to the start of the rainy season. Information which must be provided within the Self-Certification Form includes: details of the inspection dates, results, and maintenance activities, back up documentation (evidence) that the maintenance activities were properly conducted must also be provided and may come in the form of photographs, invoices, and/or other detailed descriptions of materials removed, and documentation of proper disposal. The responsible party must also confirm or update the contact information for the property to ensure inspection and maintenance is performed.

An example Self-Certification Form is included in Attachment 9. Each property must maintain O&M records for a minimum of five years.

Inspection and Maintenance Frequency

The minimum inspection and maintenance frequency depends on the type of BMP, the property use, and the project's proximity to a waterway. The frequency for maintenance is determined based on CASQA specifications and the amount and quality of runoff delivered to the BMP.

Maintenance must be performed whenever needed, based on the maintenance indicators that are presented in Attachment 2 of this Operation and Maintenance Plan. The optimum maintenance frequency is each time the maintenance threshold for removal of materials (sediment, trash, debris or overgrown vegetation) is met. If this maintenance threshold has been exceeded by the time the structural BMP is inspected, the BMP has been operating at reduced capacity. This would mean that the inspection and maintenance frequency needs to be revised, and that it is necessary to inspect and maintain the structural BMP more frequently. Routine maintenance will also help avoid more costly rehabilitative maintenance to repair damages that may occur when BMPs have not been adequately maintained on a routine basis.

During the first year of normal operation of a structural BMP (i.e. when the project is fully built out and occupied), inspection by the property owner's representative is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. It is during and after a rain event when one can determine if the components of the BMP are functioning properly. 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. Modifications that are made to the O&M schedule must be documented and justified within the SWQMP.

City staff also inspects properties with water quality features. City inspection frequencies are primarily determined by whether the facility will, or will likely be a source of bacteria. Bacteria are the Highest Priority Water Quality Condition for the San Diego River Watershed. Projects with the potential of contributing bacteria to the watershed will receive a "high" priority, while all others will be "standard" priority. In general, the City inspects all high priority municipal facilities annually. Standard priority facilities are inspected at least once within the Permit term, which is expected to be a five-year period. These inspections may be either onsite or drive-by inspections. At minimum, 20 percent of the City's existing development inventory receives onsite inspections every year. Drive-by inspections may be conducted where appropriate.

Measures to Control Maintenance Costs

The most effective way to reduce maintenance of BMPs is to prevent or reduce pollutants from being generated in the first place. Second, through the implementation of source control and site design

BMPs. The specific project biofiltration basins are readily accessible through the driveway. Area around biofiltration shall be easily accessible by any equipment that may be needed. Refer to Exhibit A for Biofiltration estimated cost estimate for maintenance.

Measures to Facilitate Inspection of the Structural BMP

Structural BMPs shall include inspection ports for observing all underground components that require inspection and maintenance.

Silt level posts or other markings shall be included in all BMP components that will trap and store sediment, trash, and/or debris, so that the inspector may determine how full the BMP is, and the maintenance personnel may determine where the bottom of the BMP is. Posts or other markings shall be indicated and described on structural BMP plans.

Vegetation requirements including plant type, percent of vegetation coverage, and minimum height (as applicable) shall be provided within the O&M plan and be indicated on any structural BMP and/or landscaping plans as appropriate or as required by the City Engineer. Refer to landscape plans for vegetation requirements. Plant list per landscape plan is provided in attachment 5.

Signage or other demarcation indicating the location and boundary of the structural BMP is recommended, and may be required by the City Engineer. Signage indicating “no dumping” inlet marking shall be installed. Refer to Single Sheet BMP Plan for locations

Attachments

1. Facility Maintenance Agreement and Exhibit A

RECORDING REQUESTED BY:

City of Santee, CA

AFTER RECORDING MAIL TO:

City Clerk
City of Santee
10601 Magnolia Avenue
Santee, CA 92071-1266

ABOVE SPACE FOR RECORDER'S USE

**AGREEMENT TO PERFORM STORM WATER
FACILITIES MAINTENANCE**

NO RECORDATION FEE REQUIRED; THIS DOCUMENT IS
EXEMPT FROM RECORDING FEES PURSUANT
TO CALIFORNIA GOVERNMENT CODE SECTIONS 27383

DOCUMENTARY TRANSFER TAX DUE \$ 0

Assessor's Parcel No. 384-142-04-00

Project No. _____

This AGREEMENT for the maintenance and repair of certain Storm Water Management Facilities is entered into between Lantern Crest (hereinafter referred to as "Owner") and the City of Santee (hereinafter referred to as "City") for the benefit of the City, the successors in interest to the City, and the public generally.

RECITALS

A. Owner is the owner of certain real property located in the City of Santee, California, more particularly described in Exhibit "A" hereto (hereinafter referred to as the "Property"), and has proposed that the Property be developed as (insert brief description of type of project, e.g., "a 100 unit residential subdivision") in accordance with applications for Tentative Map No. ____

_____, Development Review No. _____, Conditional Use Permit No. _____, Grading Permit No. _____ which are on file with the City. This Agreement is required as a condition of approval for such development as set forth in Resolution Nos. _____.

B. In accordance with the City of Santee's Storm Water Management and Discharge Control Ordinance, (Santee Municipal Code, Chapter 13.42), the City of Santee Subdivision Ordinance, the City of Santee Zoning Ordinance, the City of Santee Grading Ordinance and/or other ordinances or regulations of the City which regulate land development and urban runoff, Owner has prepared and submitted to the City, a site specific Storm Water Quality Management Plan (hereinafter the SWQMP), prepared by REC Consultants, Inc. and dated 04/20/2018 as it currently exists or may hereafter be amended and which is on file with the City's Department of Development Services. The SWQMP proposes that storm water runoff from the Property be treated by the use of various storm water management facilities which are identified in the SWQMP as "Best Management Practices" or "BMP's":

The precise location and extent of the BMP's are described and shown in the SWQMP. The SWQMP specifies the frequency, manner, and standards by which the BMP's must be repaired and maintained in order to retain their effectiveness, as set forth in the Operation and Maintenance Section included in the SWMP.

C. The information contained in the SWQMP and the Owner's representation that the BMP's will be maintained pursuant to the SWQMP have been relied upon by City in approving Owner's development applications. It is the purpose of this Agreement to assure that the BMP's are maintained in perpetuity, by creating obligations which are enforceable against the Owner and the Owner's successors in interest in the Property. It is intended that these obligations be enforceable notwithstanding other provisions related to BMP maintenance which are provided by law.

AGREEMENT

NOW, THEREFORE, for consideration of City's approval of the above development applications and the mutual covenants set forth herein, IT IS HEREBY AGREED AS FOLLOWS:

1. **Maintenance of Storm Water Management Facilities.** Owner agrees, for itself and its successors in interest, to all or any portion of the Property, to comply in all respects with the requirements of the Storm Water Management and Discharge Control Ordinance and the SWQMP with regard to the maintenance

of all BMP's as designated in the SWQMP, and in particular agrees to perform, at its sole cost, expense and liability, the following "Maintenance Activities": all inspections, cleaning, repairs, servicing, maintenance and other actions specified in the SWQMP, with respect to all of the BMP's listed at Recital "B" above, at the times and in the manner specified in the SWQMP as it currently exists or may be amended or modified as provided herein. Owner shall initiate, perform and complete all Maintenance Activities at the required time, without request or demand from City or any other agency. Owner further agrees that "Maintenance Activities" shall include replacement or modification of the BMP's in the event that the BMP fails to provide the necessary water quality treatment, it is found that the BMP was not installed correctly, or in the event that the BMP is not functioning as intended. Replacement shall be with an identical type, size and model of BMP, except that:

(a) The City Engineer may authorize substitution of an alternative BMP if he or she determines that it will function as good or better than the failed BMP. The City requires that proposed modifications be submitted for review and approval prior to making any changes in the field, and that the Storm Water Quality Management Plan be revised or amended and resubmitted for approval; and

(b) Pursuant to Section 13.42.070 of the Storm Water Management and Discharge Control Ordinance, any discharge that would result in or contribute to a violation of the City's NPDES Permit and any amendment, revision or re-issuance thereof, either separately considered or when combined with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the owner(s) causing or responsible for the discharge. Owner agrees that if the BMP, in the judgment of the Director of Development Services, is inappropriate or inadequate to the circumstances and has or may result in a violation of water quality standards, the BMP must be modified or replaced with an upgraded BMP to prevent any actual or potential violation.

2. Annual Inspection and Certification by Owner

Owner agrees to provide documentation of BMP maintenance as required for the City to ensure that all storm water BMPs are properly maintained and are functioning as intended, in compliance with the site specific Storm Water Quality Management Plan. Owner shall provide annual certification that BMPs have been properly maintained for the time period of *September 1 to August 31, each year. This documentation is due to the City prior to September 15th of each year.* Structural BMPs for which annual certification is required includes, but is not limited to: drainage inserts; detention basins; hydrodynamic separators; swales; filters;

bioretention facilities; and Low Impact Development Integrated Management Practices (LID IMPs).

3. **Notices.** Owner further agrees that it shall, prior to transferring ownership of any land on which any of the above BMP's are located, and also prior to transferring ownership of any such BMP, provide clear written notice of the above maintenance obligations associated with that BMP to the transferee. The Storm Water Quality Management Plan and all associated records must also be provided to all subsequent owners upon transfer of property title.

4. **City's Right to Perform Maintenance.** It is agreed that City shall have the right, but not the obligation, to elect to perform any or all of the Maintenance Activities if, in the City's sole judgment, Owner has failed to perform the same. It is recognized and understood that the City makes no representation that it intends to or will perform any of the Maintenance Activities, and any election by the City to perform any of the Maintenance Activities, shall in no way relieve Owner of its continuing maintenance obligations under this agreement. If the City elects to perform any of the Maintenance Activities, it is understood that the City shall be deemed to be acting as the agent of the Owner and said work shall be without warranty or representation by City as to safety or effectiveness, shall be deemed to be accepted by Owner "as is", and shall be covered by Owner's indemnity provisions below.

If the City performs any of the Maintenance Activities, after City has served written notice to the Owner to perform the same, and the Owner has failed to do so within a reasonable time stated in the City's written notice, then Owner shall pay all of the City's costs incurred in performing the Maintenance Activities within sixty days of receipt of an invoice for those costs.

5. **Right of Entry and Inspection by City.** Owner hereby grants to City a perpetual right of entry over, under and across Owner's Property, for purposes of accessing the BMP's and performing inspection of the BMP's or any of the Maintenance Activities related to maintenance of the BMP's. City shall have the right, at any time and without prior notice to Owner, to enter upon any part of said area as may be necessary or convenient for such purposes. Owner shall at all times maintain the Property so as to make the City's access clear and unobstructed. City is required to perform periodic inspection of Structural BMPs. Owner agrees to pay reasonable fees levied by the City on Owners of BMPs for the costs of managing the BMP inspection and maintenance tracking program.

6. **Administration of Agreement for City.** City hereby designates its Department of Development Services with responsibility and authority to administer this Agreement on behalf of City. Any notice or communication related to the

implementation of this Agreement desired or required to be delivered to City shall be addressed to:

Director of Development Services
City of Santee
10601 Magnolia Avenue
Santee, CA 92071

The City Engineer is also granted authority to enter into appropriate amendments to this Agreement on behalf of City, provided that the amendment is consistent with the purposes of this Agreement as set forth above.

7. **Defense and Indemnity.** City shall not be liable for, and Owner and its successors in interest shall defend and indemnify City and the employees and agents of City, against any and all claims, demands, liability, judgments, awards, fines, mechanic's liens or other liens, labor disputes, losses, damages, expenses, charges or costs of any kind or character, including attorneys' fees and court costs (hereinafter collectively referred to as "CLAIMS"), related to this Agreement and arising either directly or indirectly from any act, error, omission or negligence of Owner, Owner's successors, or their contractors, licensees, agents, servants or employees, including, without limitation, claims caused by the concurrent negligent act, error or omission, whether active or passive of City. Owner shall have no obligation, however, to defend or indemnify City from a claim if it is determined by a court of competent jurisdiction that such claim was caused by the sole negligence or willful misconduct of City. Nothing in this Agreement, in the City's approval of the subdivision or other applications or plans and specifications, or inspection of the work, is intended to acknowledge responsibility for any such matter, and City shall have absolutely no responsibility or liability therefore unless otherwise provided by applicable law.

8. **Common Interest Developments.** If the Property is developed as a "Common Interest Development" as defined in Civil Code section 4100 which will include membership in or ownership of an "Association" as defined in Civil Code section 4080, then the following provisions of this Paragraph 7 shall apply during such time as the Property is encumbered by a "Declaration" as defined in Civil Code section 4135, and the Common Area, as "Common Area" is defined in Civil Code section 4095, of the Property is managed and controlled by the Association:

(a) The Association, through its Board of Directors, shall assume full responsibility to perform the MAINTENANCE ACTIVITIES pursuant to this Agreement, and shall undertake all actions and efforts necessary to accomplish the MAINTENANCE ACTIVITIES, including but not limited to, levying regular or special assessments against each member of the

Association sufficient to provide funding for the MAINTENANCE ACTIVITIES, conducting a vote of the membership related to such assessments if required by law. In the event insufficient votes have been obtained to authorize an assessment, the Association shall seek authority from a court of competent jurisdiction for a reduced percentage of affirmative votes necessary to authorize the assessment, re-conducting the vote of the membership in order to obtain the votes necessary to authorize an assessment, and the Association shall take all action authorized by the Declaration or California law to collect delinquent assessments, including but not limited to, the recording and foreclosure of assessment liens.

(b) No provision of the Declaration, nor any other governing document of the Association or grant of authority to its members, shall grant or recognize a right of any member or other person to alter, improve, maintain or repair any of the Property in any manner which would impair the functioning of the BMP's to manage drainage or storm water runoff as described in the SWQMP. In the event of any conflict between the terms of this Agreement and the Declaration or other Association governing documents, the provisions of this Agreement shall prevail.

9. **Agreement Binds Successors and Runs With the Property.** It is understood and agreed that the terms, covenants and conditions herein contained shall constitute covenants running with the land and shall be binding upon the heirs, executors, administrators, successors and assigns of Owner and City, shall be deemed to be for the benefit of all persons owning any interest in the Property (including the interest of City or its successors in the easement granted herein). It is the intent of the parties hereto that this Agreement shall be recorded and shall be binding upon all persons purchasing or otherwise acquiring all or any lot, unit or other portion of the Property, who shall be deemed to have consented to and become bound by all the provisions hereof.

10. **Owner's Continuing Responsibilities Where Work Commenced or Permit Obtained.** Notwithstanding any other provision of this Agreement, no transfer or conveyance of the Property or any portion thereof shall in any way relieve Owner of or otherwise affect Owner's responsibilities for installation or maintenance of BMP's which may have arisen under the ordinances or regulations of City referred to in Recital B above, or other federal, state or local laws, on account of Owner having obtained a permit which creates such obligations or having commenced grading, construction or other land disturbance work.

11. **Amendment and Release.** The terms of this Agreement may be modified only by a written amendment approved and signed by the Director of Development Services and by the Owner or Owner's successor(s) in interest. This

Agreement may be terminated and Owner and the Property released from the covenants set forth herein, by a Release which City may execute if it determines that another mechanism will assure the ongoing maintenance of the BMP's or that it is no longer necessary to assure such maintenance.

12. **Agreement is Intended to Supplement Not Supersede.** This Agreement is intended to supplement and not supersede the requirements of the Chapter 13.42 of the Santee Municipal Code – Storm Water Management and Discharge Control. The requirements listed herein are in addition to the requirements set forth in the Code including Civil Actions and Enforcement Powers established under the Code.

13. **Governing Law and Severability.** This Agreement shall be governed by the laws of the State of California. Venue in any action related to this Agreement shall be in the Superior Court of the State of California, County of San Diego, East County Division. In the event that any of the provisions of this Agreement are held to be unenforceable or invalid by any court of competent jurisdiction, the validity, and enforceability of the remaining provisions shall not be affected thereby.

IN WITNESS WHEREOF, the parties have executed this Agreement on the _____ day of _____, 201__.

CITY OF SANTEE:

By: _____
Melanie Kush
Director of Development Services

OWNERS: _____

By: _____
(sign here)

(print name here)

(title of signatory)

By: _____
(sign here)

(print name here)

(title of signatory)

(All OWNERS must sign)

(Proper notary acknowledgment of execution by OWNER must be attached.)

(President or vice-president **and** secretary or assistant secretary must sign for corporations. If only one officer signs, the corporation must attach a resolution certified by the secretary or assistant secretary under corporate seal empowering that officer to bind the corporation.)

**CITY OF SANTEE
CERTIFICATE OF ACCEPTANCE
FOR
AGREEMENT TO PERFORM STORM WATER FACILITIES MAINTENANCE**

This AGREEMENT by and between the City of Santee, a municipal corporation, and Lantern Crest is accepted for recording by the undersigned officers on behalf of the City of Santee pursuant to authority granted by Resolution No. 148-89 of the Santee City Council adopted on August 9, 1989.

Date: _____

By: _____
Melanie Kush
Director of Development Services

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }
County of San Diego }

On _____
(date), before me, Patsy Bell, Santee City Clerk (name and title of the officer), personally appeared _____

(Name(s) of Signer(s)), who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

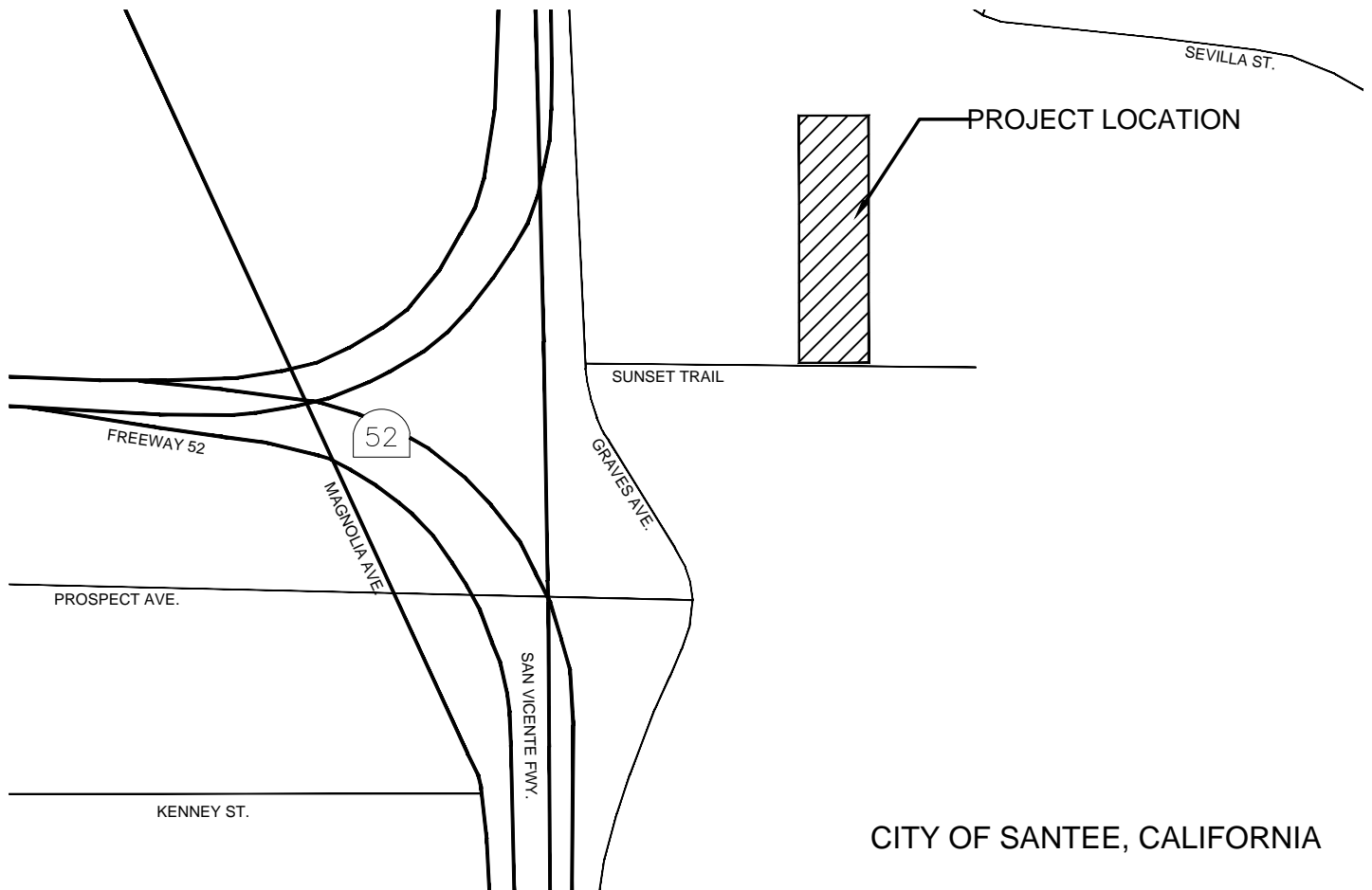
WITNESS my hand and official seal.

Patsy Bell, City Clerk

[Seal]

EXHIBIT 'A'

EXHIBIT "A"



CITY OF SANTEE, CALIFORNIA

STORM WATER MAINTENANCE EXHIBIT

APN: 384-142-04-00

PROJECT NAME: LANTERN CREST RIDGE II

LEGAL DESCRIPTION: THE WEST 185 FEET OF THE EAST 924.81 FEET OF LOT 8, IN BLOCK 7 OF THE SUBDIVISION OF LOTS 'H' AND 'O' OF THE RANCHO EL CAJON CITY OF SANTEE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO, 817, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, APRIL 2, 1896; EXCEPTING THEREFROM THE SOUTHERLY 15 FEET THEREOF.

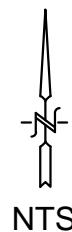


EXHIBIT "A"

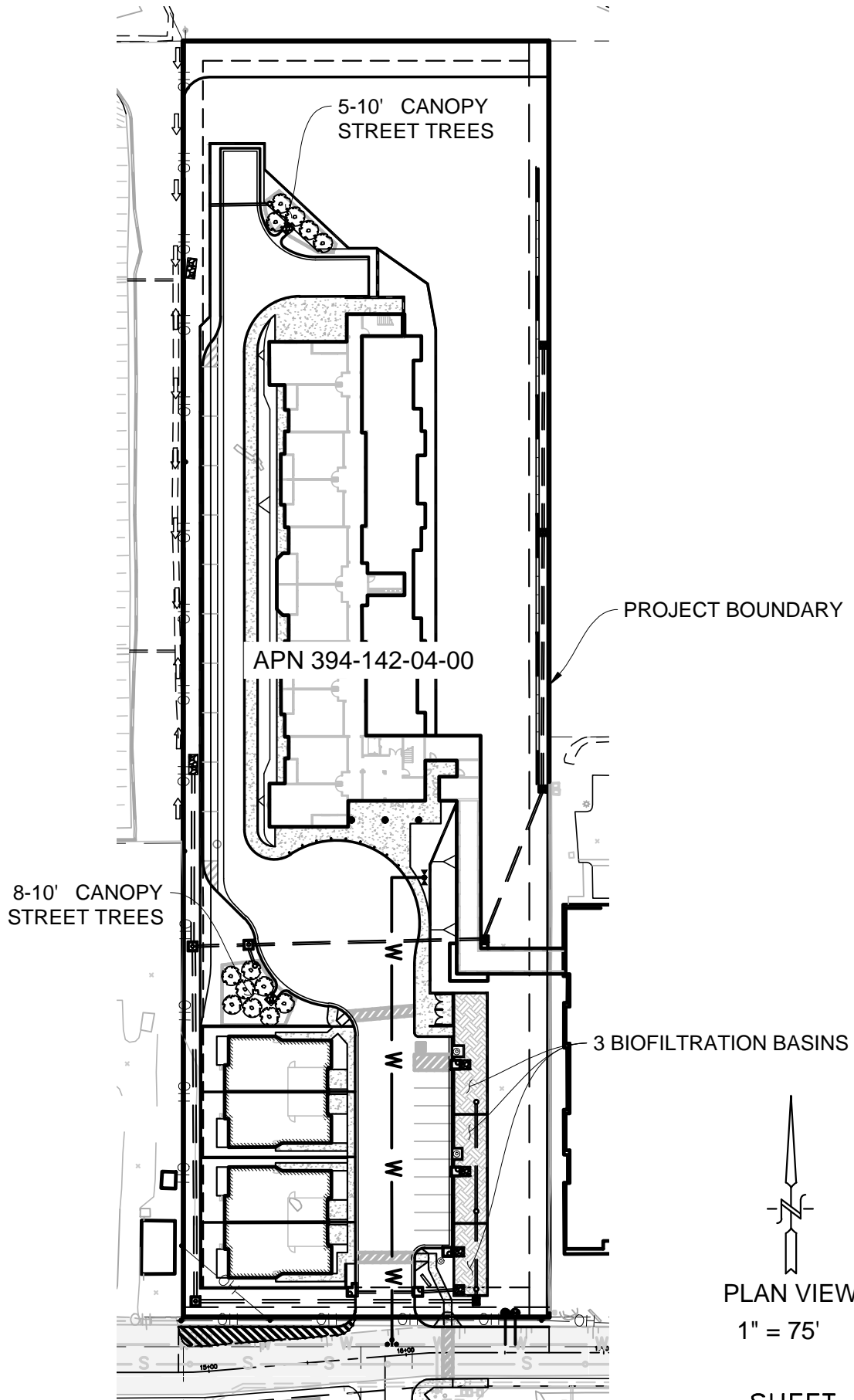
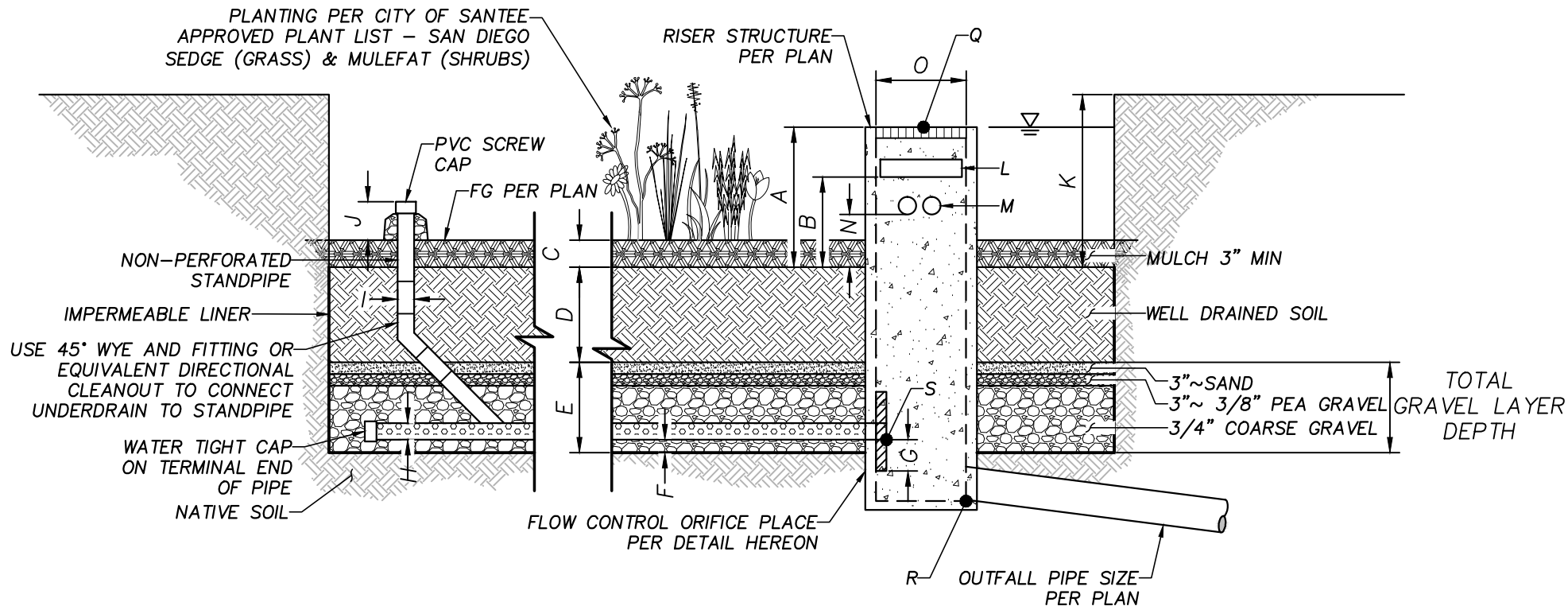


EXHIBIT "A"



NOTES

1. SEE SHEET 4 FOR TABULAR TABLE WITH BIOFILTRATION BASIN LAYER DEPTHS AND SPECS.
2. SEE SHEET 5 FOR BMP TABLE AND ORIFICE SPECS.
2. SOIL MIX PER CITY OF SANTEE LID MANUAL
3. "WELL DRAINED SOIL" SHALL BE "SANDY LOAM" SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50–60% SAND, 20–30% COMPOST OR HARDWOOD MULCH, AND 20–30% TOPSOIL.

EXHIBIT "A"

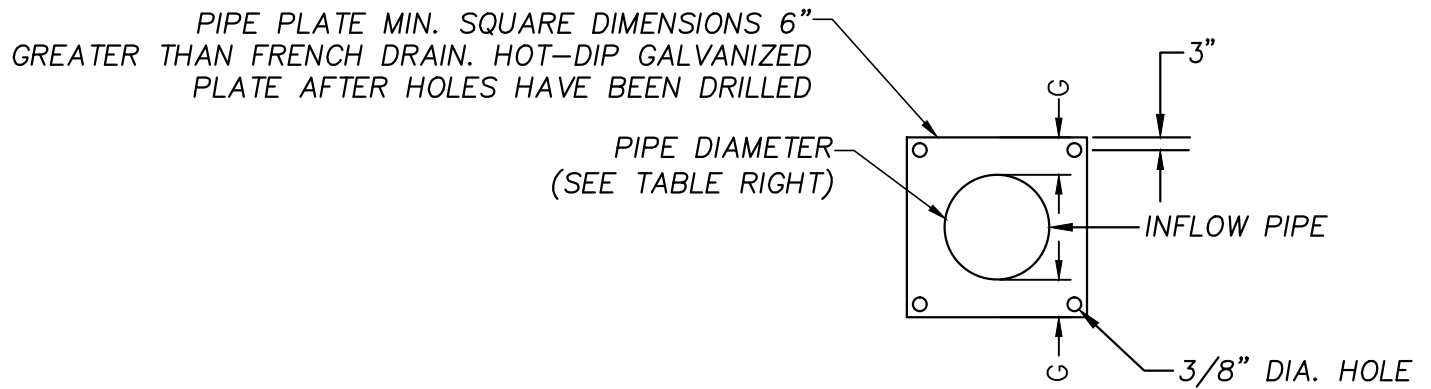
TABULATED DATA

| | BMP 1-1 | BMP 1-2 | BMP 1-3 |
|---|---------------------|----------------------|----------------------|
| A | 30" | 21" | 21" |
| B | N/A | N/A | N/A |
| C | 3" | 3" | 3" |
| D | 18" | 18" | 18" |
| E | 18" | 18" | 18" |
| F | 3" | 3" | 3" |
| G | 6" | 6" | 6" |
| H | 6" | 6" | 6" |
| I | 6" | 6" | 6" |
| J | 6' | 6" | 6" |
| K | 36" | 27" | 27" |
| L | N/A | N/A | N/A |
| M | 3 ~ 0.5" (ϕ) | 1 ~ 0.25" (ϕ) | 3 ~ 0.25" (ϕ) |
| N | 9" | 9" | 9" |
| O | 24" ϕ | 24" ϕ | 24" ϕ |
| Q = TOP OF GRATE ELEV. | 512.75 | 509.75 | 504.75 |
| R = FL OUT ELEV. (OUTFALL PIPE) | 510.25 | 508.00 | 503.00 |
| S = FL OUT ELEV. (PERFORATED UNDERDRAIN) | 507.75 | 505.50 | 500.50 |
| *T | 16.7' x 61.3' | 16.7' x 55' | 16.7' x 36.4' |

NOTE: (1) ROWS L AND M CORRESPOND TO UPPER & LOWER SLOT/ORIFICE WHERE W=WIDTH; H=HEIGHT; D-DIAMETER. FIRST NUMBER REPRESENTS THE NUMBER OF UNITS, IF MORE THAN 1 SLOT IS INDICATED THEN EACH SLOT SHOULD BE INSTALLED IN A DIFFERENT FACES OF OUTLET STRUCTURE.

*T = APPROX. LENGTH x WIDTH

EXHIBIT "A"

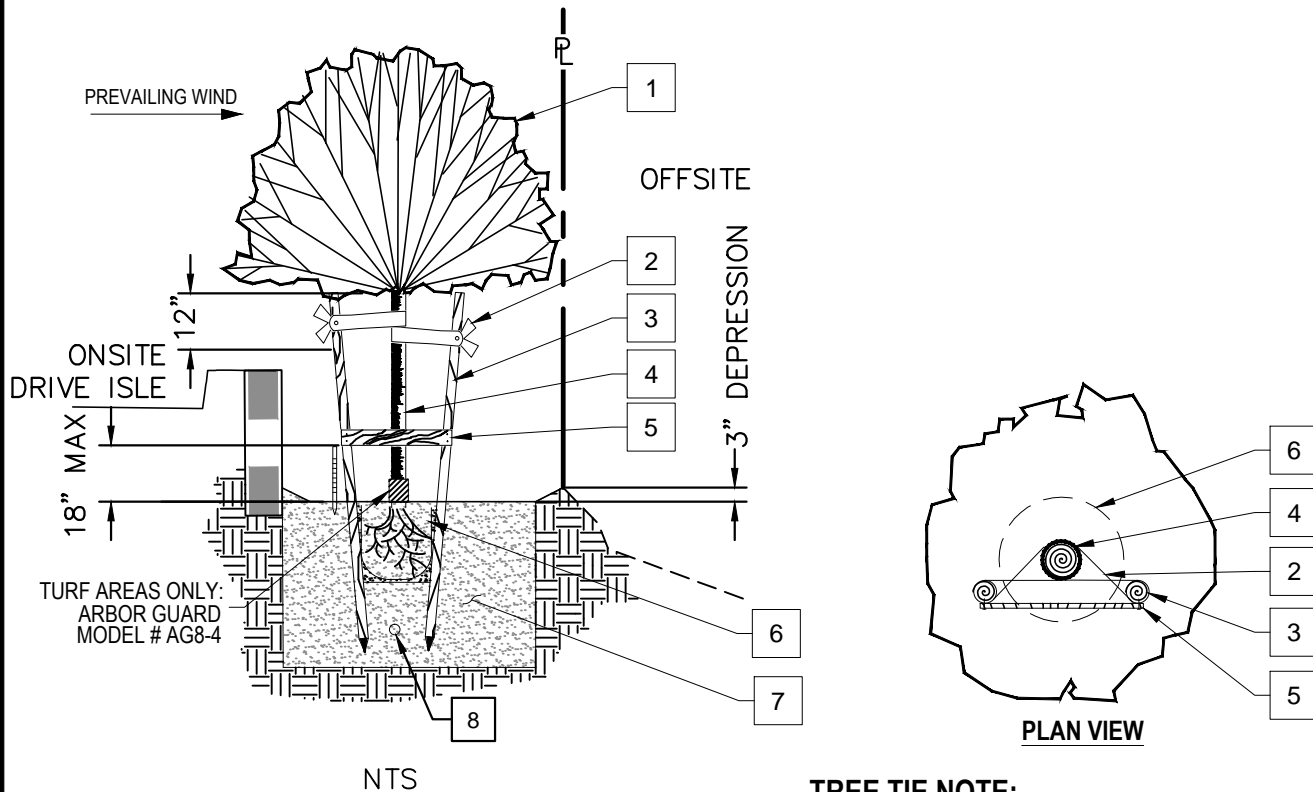


FLOW CONTROL PIPE PLATE

NTS

| BMP | REQUIRED AREA (sq-ft) | PROVIDED AREA (sq-ft) | REQUIRED VOLUME (cu-ft) | PROVIDED VOLUME (cu-ft) |
|-----|-----------------------------|-----------------------------|-------------------------------|-------------------------------|
| 1-1 | 761 | 940 | 1010 | 3384 |
| 1-2 | 175 | 845 | 154 | 2408 |
| 1-3 | 259 | 580 | 462 | 1653 |

EXHIBIT "A"



TREE TIE NOTE:

1. INSTALL TREE TIES AND STAKES ONLY TO PROPER LEVEL TO HOLD TREE UPRIGHT. PROPER HEIGHT IS 6" ABOVE POINT WHERE THE TREE WILL SNAP TO AN UPRIGHT POSITION BY ITSELF IF TOP IS PULLED TO ONE SIDE AS IF WIND LOADED AND THEN RELEASED. **DO NOT TOP TREES** IN ORDER TO REDUCE SIZE OR WEIGHT OF TREE CROWN, CONTACT LANDSCAPE ARCHITECT PRIOR TO ANY PRUNING OF TREES.

STREET TREES

- 1 10' TREE CANOPY
- 2 (2) CINCH TIES, TACK TO STAKE WITH GALVANIZED NAILS TO PREVENT SLIPPING
- 3 (2) 2" DIA. X 8' LONG UNTREATED LODGEPOLE PINE STAKES FOR 5 GAL. TREES,
OR
(2) 2" DIA. X 10' LONG UNTREATED LODGEPOLE PINE TAKES FOR 15 GAL. - 36" BOX TREES,
SET STAKES OUTSIDE ROOTBALL. ANGLE TOP OF STAKE AWAY FROM BRANCH STRUCTURE.
- 4 TREE TRUNK
- 5 1 X 4 DOUG. FIR BRACE, TACK TO LODGEPOLE STAKES WITH GALV. NAILS
- 6 ROOT BALL, DO NOT PENETRATE WITH STAKE.
- 7 USE AMENDED SOIL WITH MINIMUM DEPTH OF 3' PER CITY'S BMP MANUAL, SD-1 STREET TREES. MINIMUM SOIL VOLUME 1413.72 CU FT
- 8 6" MIN. PERFORATED PVC UNDERDRAIN

EXHIBIT "A"

Annual Estimate to Maintain Biofiltration Basins (BMPs 1-1 thru 1-3)

| Routine Actions | Frequency (times per year) | Hours per Event | Average Labor Crew Size | Average Labor rate/hr (\$) | Equipment | Equipment cost/hr (\$) | Materials and Incidentals Cost or Disposal Cost/event | Total Cost per year (\$) |
|--|-------------------------------|--------------------|----------------------------|-------------------------------|--|---------------------------|---|-----------------------------|
| Vegetation Management for Aesthetics | 1 | 2 | 2 | 74.97 | Utility Truck | 14.39 | 50.00 | 378.66 |
| Soil Repair | 1 | 4 | 2 | 74.97 | Utility Truck | 14.39 | 150.00 | 807.32 |
| Standing Water | 1 | 1 | 2 | 74.97 | Utility Truck | 14.39 | 150.00 | 314.33 |
| Trash and Debris | 12 | 1 | 2 | 74.97 | Utility Truck | 14.39 | | 1813.67 |
| Sediment management | 0.5 | 8 | 2 | 74.97 | Utility Truck | 14.39 | 400.00 | 914.88 |
| Underdrains | 1 | 0.5 | 2 | 74.97 | Utility Truck, 10-15 yd Truck Backhoe | 56.02 | | 102.98 |
| General Maintenance Inspection | 1 | 1 | 2 | 74.97 | Utility Truck | 14.39 | | 164.33 |
| Training | 1 | 2 | 2 | 74.97 | Utility Truck | 14.39 | | 328.66 |
| Storm Drain Signage (as needed every 2 years) | 0.5 | 2 | 2 | 74.97 | Utility Truck | 14.39 | | 178.72 |
| Trash Storage Areas Already included in property management responsibilities. Additional cost: | - | - | - | - | - | - | - | 50.00 |
| Reporting | 1 | 3 | 1 | 74.97 | Utility Truck | 14.39 | | 268.08 |
| Average Total Annual | | 58.0 | | | | | | 4942.97 |

| | | |
|---------------------------|-------|---------|
| Small Basin (500 sf) | 58.0 | 4942.97 |
| Medium Basin (2000 sq-ft) | 79.8 | 6079.85 |
| Large Basin (4000 sq-ft) | 123.6 | 8754.99 |

EXHIBIT "A"

| Annual Estimate to Maintain Street Tree | | | | | | | | |
|---|-------------------------------|--------------------|----------------------------|-------------------------------|---------------|---------------------------|---|-----------------------------|
| Routine Actions | Frequency (times per year) | Hours per Event | Average Labor Crew Size | Average Labor rate/hr (\$) | Equipment | Equipment cost/hr (\$) | Materials and Incidentals Cost or Disposal Cost/event | Total Cost per year (\$) |
| Vegetation Management for Aesthetics | 52 | 1 | 1 | 12.25 | Utility Truck | 14.93 | - | 1413.36 |
| Tree Replacement Inspection | 1 | 1 | 1 | 74.97 | - | - | - | 74.97 |
| Tree Replacement | 0.2 | 3 | 2 | 12.25 | Utility Truck | 14.93 | 290.00 | 117.49 |
| Trash and Debris | 52 | 0.5 | 1 | 12.25 | Utility Truck | 14.93 | - | 325.97 |
| Standing Water | 6 | 1 | 1 | 12.25 | Utility Truck | 14.93 | 150.00 | 988.43 |
| Sediment management | 4 | 1 | 1 | 12.25 | Utility Truck | 14.93 | 50.00 | 263.93 |
| Entrance/opening of tree well is blocked | 2 | 1 | 1 | 12.25 | Utility Truck | 14.93 | - | 39.43 |
| Inspect for Mosquitos/Larvae | 12 | 0.5 | 1 | 12.25 | - | - | - | 73.50 |
| Corrective action upon presence of Mosquitos/Larvae | 2 | 1 | 1 | 12.25 | Utility Truck | 14.93 | 150.00 | 339.43 |
| Reporting | 1 | 3 | 1 | 74.97 | Utility Truck | 14.93 | - | 269.70 |
| Average Total Annual | | 103.2 | | | | | | 3906.21 |

2. Inspection & Maintenance and Action Schedule

BMP-2-1 THRU 2-3: BIOFILTRATION BASIN MAINTENANCE ACTIVITIES

| ROUTINE ACTION | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | Frequency (times/yr) |
|--------------------------------|--|---|---|--|-----------------------------|
| Vegetation Management | Average vegetation height greater than 12-inches, emergence of trees or woody vegetation | Visual observation and random measurements throughout the side slope area | Monthly and prior to start of wet season, and after wet season | Cut vegetation to an average height of 12 inches, but not less than 6 inches and remove trimmings. Remove any trees, or woody vegetation. (California gray rush is recommended by landscape plans) | 12 |
| Poor vegetation establishment | Presence of barren spots | Visual observation of bare spots or areas. | Monthly, especially prior to start of wet season, and after wet season | Re-seed, replant or re-establish vegetation per original plans without the use of chemical applications. | 12 |
| Soil Repair | Evidence of erosion in slopes and especially in barren spots | Visual observation | Monthly, especially prior to start of wet season, and after wet season or as needed | Reseed/revegetate barren spots prior to wet season. Fill In holes and/or rills; revegetate as well. Amend soil media. Add mulch to bare soils. Adjust irrigation system. | 12 |
| Standing Water | Standing water for more than 96 hours | Visual observation | Quarterly, and 96 hours after each target storm (0.60 in) event | Drain facility. Corrective action prior to wet season, such as adjust irrigation system, remove obstructions of debris and invasive vegetation, loosen top soil. Clear underdrain. Consult engineers if immediate solution is not evident. | 4 |
| Trash and Debris | Trash and Debris present | Visual observation | Weekly, especially prior to start of wet season | Remove and dispose of trash and debris | 52 |
| Sediment Management | Silt level post. Visual observation of an accumulation of sediment at or near vegetation height, | Measure depth at apparent max. and min. accumulation of sediment with any type measuring device. Calculate avg. depth. Use silt level post as reference to bottom of and sediment height. | Quarterly, especially prior to start of wet season, and at the end of wet season | Remove and properly dispose of accumulated material, without damage to vegetation. Regrade if necessary. (expected every 2 years) | 4 |
| Underdrains | Evidence of clogging by ponding water | Visual observation | Twice a year, prior to start of wet season, and after end of wet season | Corrective action prior to wet season. Consult engineers if immediate solution not evident | 2 |
| General Maintenance Inspection | Debris in inlet structures, outlet structures, side slopes or other features damaged, significant erosion, burrows, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, structural component damage. etc. | Visual observation | Monthly, especially prior to start of wet season | Clear, clean storm inlets regularly. Repair damaged components. Corrective action prior to wet season. Consult engineers if immediate solution is not evident. | 12 |
| Storm Drain Signage | Evidence of deterioration | Visual observation | Twice a year, prior and post wet season | Re-apply stencil if required. Recondition signage if needed | 2 |
| Irrigation | N/A | N/A | Approximately every 10 days. Cease activity during storm events and up to 96 hours after each event | Irrigate vegetation on a regular basis with automated irrigation (sprinkler system). Ponding of water shall be avoided. | Continuous |
| Reporting | N/A | N/A | Due to City by September 15 th of each year | Property owner is required to complete and return annual certification form, verifying performance of all routine maintenance activities of treatment control BMPs on their property. See page 15 of Operation and Maintenance Plan. | 1 |

| SOURCE CONTROL PRACTICES | | | |
|--------------------------|--|---|-----------|
| DESIGNATION | BMP TYPE | MAINTENANCE ACTIVITY/PRACTICE | FREQUENCY |
| SC-1 | Prevent illegal discharges into the storm water conveyance system | Discharge of anything other than rain water to the storm water conveyance system is illegal. The developer shall provide owner with a copy of the City of Santee Residential Activities & Improvements Storm Water Fact Sheet (available under O&M Attachment 2 and on the City's website at: http://www.ci.santee.ca.us/Index.aspx?page=583). The only exception to this prohibition includes individually permitted discharges, pursuant to a National Pollutant Discharge Elimination System (such as Padre Dam Municipal Water District) and discharges resulting from emergency firefighting activities. All projects must effectively eliminate discharges of non-storm water into the storm water conveyance system. This may involve a suite of housekeeping BMPs which could include effective irrigation, dispersion of non-storm water discharges into landscaping for infiltration, and containing wash water from vehicle washing. | ONGOING |
| SC-2 | Storm drain stenciling or signage | Labeling shall be provided for all storm water conveyance system inlets and catch basins within the project area. Inlet stenciling may include concrete stamping, concrete painting, placards, or other methods as approved by the City. In addition to storm drain stenciling, projects are encouraged to post interpretive signage and prohibitive language (with graphical icons) which prohibit littering or dumping at trailheads, parks, building entrances and public access points within the project area. Replacement or repainting of signage to be performed as deemed necessary through annual inspection. | ONGOING |
| SC-5 | Protect trash storage areas from rainfall, runoff, and wind dispersal. | <p>Storm water runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water, wind, or vermin into nearby storm drain inlets, channels, and/or creeks. All development projects shall include the following structural BMPs:</p> <ul style="list-style-type: none"> • Ensure trash enclosure areas are fully contained (three walls, door, and roof). • Provide attached lids on all trash containers to prevent wind or vermin dispersal. Locate storm drains away from immediate vicinity of the trash storage area and vice versa. • Post signs on all enclosures and/or dumpsters informing users to keep lids closed and not to dispose of liquids or hazardous materials. • Trash bins are to be covered. • Replace leaking bins • Clean trash storage area. | REGULARLY |

| DESIGNATION | BMP TYPE | MAINTENANCE ACTIVITY/PRACTICE | FREQUENCY |
|-------------|---|---|--------------------------------------|
| SC-6 | Use any additional BMPs determined to be necessary by the Coppermittee to minimize pollutant generation at each project site. | <p><u>On-site Storm Drain Inlets</u></p> <ul style="list-style-type: none"> • Mark all inlets with the words “No dumping! Flows to river” or similar • Maintain and periodically repaint or replace inlet markings • Provide storm water pollution prevention information to new site owners, lessees, or operators. • Maintain stormwater inlets on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush storms, prevent clogging of the downstream conveyance system, and ensure that the stormwater conveyance system functions properly hydraulically to prevent flooding. • Clean storm drain inlets before the wet season to remove sediments and debris accumulated during the summer. Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. • Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain. • Train crews in proper maintenance activities, including record keeping and disposal <p><u>Interior Floor Drains and elevator shaft sump pumps</u></p> <ul style="list-style-type: none"> • Interior floor drains and elevator sump pumps will be plumbed to sanitary sewer. • Inspect and maintain drains regularly to prevent blockages and overflow. <p><u>Landscape/ Outdoor Pesticide Use</u></p> <ul style="list-style-type: none"> • Owners shall maintain landscaping using minimum or no pesticides • See applicable operational BMPs in Fact Sheet SC-41 “Building and Grounds Maintenance” in the CASQA Storm water Quality Handbook (See Attachments in Operations and Maintenance Plan) • Provide maintenance information to new owners, lessees, and operators. <p><u>Food service</u></p> <ul style="list-style-type: none"> • Food service area will be located indoors. • Cleaning area will include sink or other area for cleaning floor mats, containers, and equipment, this area will be located indoors. • Drain from food service area will be connected to a grease interceptor before discharging to sanitary sewer. <p><u>Fire sprinkler Test Water</u></p> <ul style="list-style-type: none"> • Fire sprinkler test water shall be drained to sanitary sewer system • During a fire sprinkler test, the fire riser discharge shall be connected by a hose to the sewer cleanout. | REGULARLY OR AS DETERMINED NECESSARY |

| DESIGNATION | BMP TYPE | MAINTENANCE ACTIVITY/PRACTICE | FREQUENCY |
|-------------|---|---|--------------------------------------|
| SC-6 | Use any additional BMPs determined to be necessary by the Coppermittee to minimize pollutant generation at each project site. | <p><u>Miscellaneous Drain or Wash Water</u></p> <ul style="list-style-type: none"> Boiler drains will be connected to sanitary sewer system; it may not and will not discharge to the storm drain system. Roofing gutters and trim will not be made of copper or other unprotected metals that may leach into runoff. <p><u>Plazas, Sidewalks, and Parking Lots</u></p> <ul style="list-style-type: none"> Plazas, sidewalks, and parking lots must be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing must be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser must be collected and discharged to the sanitary sewer and not discharged to a storm drain. <p><u>Irrigation</u></p> <ul style="list-style-type: none"> Irrigate landscape areas on a regular basis as needed, prevent over-spraying, adjust irrigation schedule according to wet/dry season. Prevent overwatering and runoff. Inspect and maintain irrigation system on a regular basis. Repair and/or replace malfunctioning components/equipment. | REGULARLY OR AS DETERMINED NECESSARY |

| DMA-1: STREET TREE MAINTENANCE ACTIVITIES | | | | | |
|---|--|--|---|--|---------------------------|
| ROUTINE ACTION | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | Frequency (# times/yr) |
| Vegetation Management for Aesthetics (optional) | Emergence woody vegetation/weeds | Visual observation | Weekly | Remove any weeds or woody vegetation | 52 |
| Tree Replacement | Health of Tree | Visual observation by landscape professional | Inspect monthly, especially prior to start of wet season. Replace when needed. | Inspect health of tree, replace if necessary prior to start of wet season (Estimated every 5 years). Tree must have a 15' canopy and the required species is: Agonis Fluxuosa (Peppermint Willow) | 1 |
| Standing Water | Standing water for more than 96 hours | Visual observation | Inspect monthly and after 0.5-inch or larger storm event. Is standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. Maintenance when needed. | Loosen or replace soils surrounding the tree to restore drainage. | 1 |
| Trash and Debris | Trash and Debris present | Visual observation | Weekly | Remove and dispose of trash and debris | 52 |
| Sediment Management | Silt level post. Visual observation of an accumulation of excessive silt | Measure depth at apparent maximum and minimum accumulation of sediment with any type of measuring device. Calculate average depth. Use silt level post as reference to bottom of tree well and sediment accumulation height. | Quarterly, especially prior to start of wet season (Sept. 1), and at the end of wet season | Remove and properly dispose of sediment | 4 |
| Presence of mosquitos/larvae | Standing water for more than 96 hours and presence of mosquitos | Visual observation | Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1inch or larger storm event. Maintenance when needed. | Disperse any standing water from the tree well to nearby landscaping. Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water). | 12 |
| Entrance/opening of the tree well is blocked such that storm water will not drain to tree | Inlet opening is blocked by debris causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well. | Visual observation | Inspect monthly. Maintenance when needed. | Make repairs as appropriate to restore drainage into the tree well. | 2 |
| Reporting | N/A | N/A | Due to City by September 15 th of each year | Property owner is required to complete and return annual certification form, verifying performance of all routine maintenance activities of treatment control BMPs on their property. See page 15 of Operation and Maintenance Plan. | 1 |

3. Biofiltration BMP Fact Sheet

E.12 BF-1 Biofiltration



Location: 43rd Street and Logan Avenue, San Diego, California

MS4 Permit Category

Biofiltration

Manual Category

Biofiltration

Applicable Performance Standard

Pollutant Control

Flow Control

Primary Benefits

Treatment

Volume Reduction (Incidental)

Peak Flow Attenuation (Optional)

Description

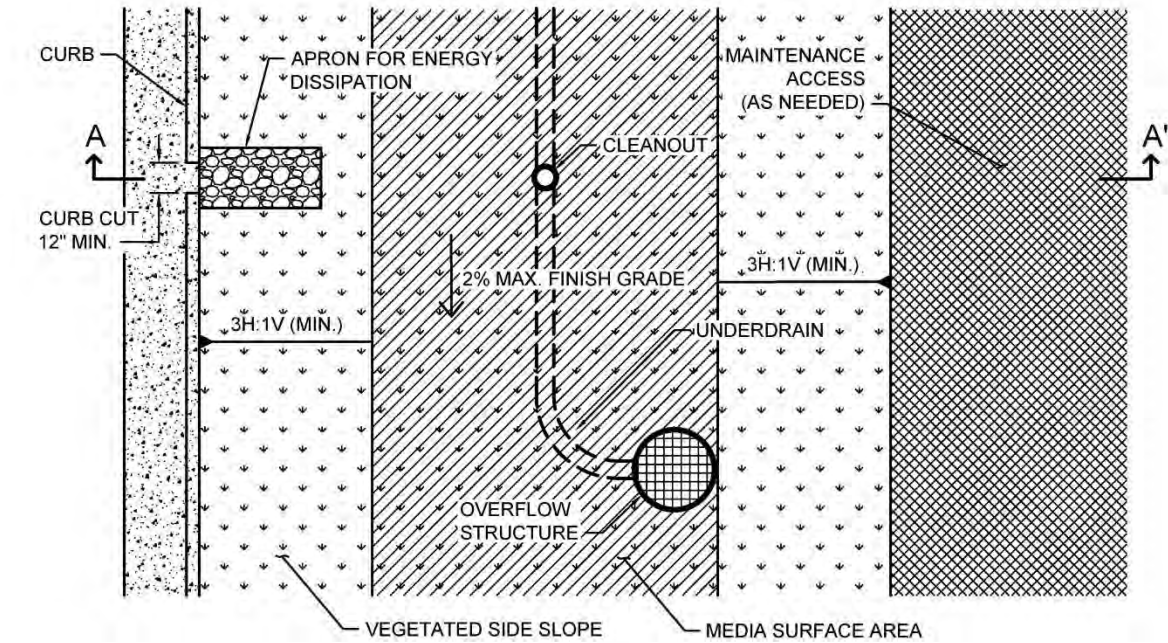
Biofiltration (Bioretention with underdrain) facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to discharge via underdrain or overflow to the downstream conveyance system. Bioretention with underdrain facilities are commonly incorporated into the site within parking lot landscaping, along roadsides, and in open spaces. Because these types of facilities have limited or no infiltration, they are typically designed to provide enough hydraulic head to move flows through the underdrain connection to the storm drain system. Treatment is achieved through filtration, sedimentation, sorption, biochemical processes and plant uptake.

Typical bioretention with underdrain components include:

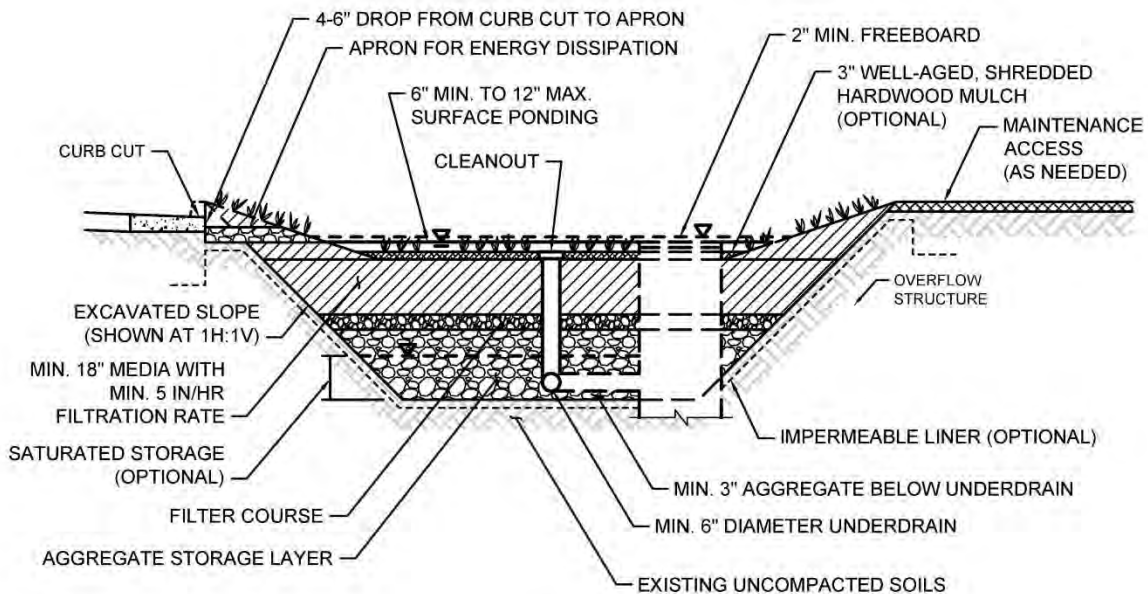
- Inflow distribution mechanisms (e.g, perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side slope and basin bottom vegetation selected based on expected climate and ponding 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 aggregate storage layer
- Aggregate storage layer with underdrain(s)

Appendix E: BMP Design Fact Sheets

- Impermeable liner or uncompacted native soils at the bottom of the facility
- Overflow structure



PLAN
NOT TO SCALE



SECTION A-A'
NOT TO SCALE

Typical plan and Section view of a Biofiltration BMP

Design Adaptations for Project Goals

Biofiltration Treatment BMP for storm water pollutant control. The system is lined or un-lined to provide incidental infiltration, and an underdrain is provided at the bottom to carry away filtered runoff. This configuration is considered to provide biofiltration treatment via flow through the media layer. Storage provided above the underdrain within surface ponding, media, and aggregate storage is considered included in the biofiltration treatment volume. Saturated storage within the aggregate storage layer can be added to this design by raising the underdrain above the bottom of the aggregate storage layer or via an internal weir structure designed to maintain a specific water level elevation.

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

Design Criteria and Considerations

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

| <i>Siting and Design</i> | <i>Intent/Rationale</i> |
|---|---|
| <input type="checkbox"/> 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. |
| <input type="checkbox"/> An impermeable liner or other hydraulic restriction layer is included if site constraints indicate that infiltration or lateral flows should not be allowed. | Lining prevents storm water from impacting groundwater and/or sensitive environmental or geotechnical features. Incidental infiltration, when allowable, can aid in pollutant removal and groundwater recharge. |

Appendix E: BMP Design Fact Sheets

| <i>Siting and Design</i> | <i>Intent/Rationale</i> |
|--|---|
| <input type="checkbox"/> Contributing tributary area shall be ≤ 5 acres (≤ 1 acre preferred). | <p>Bigger BMPs may require additional design features for proper performance.</p> <p>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.</p> |
| <input type="checkbox"/> Finish grade of the facility is $\leq 2\%$. | <p>Flatter surfaces reduce erosion and channelization within the facility.</p> |
| <i>Surface Ponding</i> | |
| <input type="checkbox"/> Surface ponding is limited to a 24-hour drawdown time. | <p>Surface ponding limited to 24 hour for plant health.</p> |
| <input type="checkbox"/> Surface ponding depth is ≥ 6 and ≤ 12 inches. | <p>Surface ponding capacity lowers subsurface storage requirements. Deep surface ponding raises safety concerns.</p> <p>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.</p> |
| <input type="checkbox"/> A minimum of 2 inches of freeboard is provided. | <p>Freeboard provides room for head over overflow structures and minimizes risk of uncontrolled surface discharge.</p> |

| <i>Siting and Design</i> | <i>Intent/Rationale</i> |
|--|---|
| <input type="checkbox"/> Side slopes are stabilized with vegetation and are = 3H:1V or shallower. | <p>Gentler side slopes are safer, less prone to erosion, able to establish vegetation more quickly and easier to maintain.</p> |
| <i>Vegetation</i> | |
| <input type="checkbox"/> Plantings are suitable for the climate and expected ponding depth. A plant list to aid in selection can be found in Appendix E.20. | <p>Plants suited to the climate and ponding depth are more likely to survive.</p> |
| <input type="checkbox"/> An irrigation system with a connection to water supply should be provided as needed. | <p>Seasonal irrigation might be needed to keep plants healthy.</p> |
| <i>Mulch (Mandatory)</i> | |
| <input type="checkbox"/> A minimum of 3 inches of well-aged, shredded hardwood mulch that has been stockpiled or stored for at least 12 months is provided. | <p>Mulch will suppress weeds and maintain moisture for plant growth. Aging mulch kills pathogens and weed seeds and allows the beneficial microbes to multiply.</p> |
| <i>Media Layer</i> | |
| <input type="checkbox"/> 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. | <p>A filtration rate of at least 5 inches per hour allows soil to drain between events. 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.</p> |

| <i>Siting and Design</i> | <i>Intent/Rationale</i> |
|--|--|
| <p>Media is a minimum 18 inches deep, meeting either of these two media specifications:</p> <p>City of San Diego Low Impact Development Design Manual (page B-18) (July 2011, unless superseded by more recent edition) or County of San Diego Low Impact Development Handbook: Appendix G -Bioretention Soil Specification (June 2014, unless superseded by more recent edition).</p> <p>Alternatively, for proprietary designs and custom media mixes not meeting the media specifications contained in the City or County LID Manual, the media meets the pollutant treatment performance criteria in Section F.1.</p> | <p>A deep media layer provides additional filtration and supports plants with deeper roots.</p> <p>Standard specifications shall be followed.</p> <p>For non-standard or proprietary designs, compliance with F.1 ensures that adequate treatment performance will be provided.</p> |
| <p>Media surface area is 3% of contributing area times adjusted runoff factor or greater.</p> | <p>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.</p> <p>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.</p> <p>Use Worksheet B.5-1 Line 26 to estimate the minimum surface area required per this criteria.</p> |
| <p>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).</p> | <p>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.</p> |
| <i>Filter Course Layer</i> | |
| <p>A filter course is used to prevent migration of fines through layers of the facility. Filter fabric is not used.</p> | <p>Migration of media can cause clogging of the aggregate storage layer void spaces or subgrade. Filter fabric is more likely to clog.</p> |

| <i>Siting and Design</i> | | <i>Intent/Rationale</i> |
|--|--|---|
| <input type="checkbox"/> | Filter course is washed and free of fines. | Washing aggregate will help eliminate fines that could clog the facility and impede infiltration. |
| <input type="checkbox"/> | 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. |
| <i>Aggregate Storage Layer</i> | | |
| <input type="checkbox"/> | 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. |
| <input type="checkbox"/> | The depth of aggregate provided (12-inch typical) and storage layer configuration is adequate for providing conveyance for underdrain flows to the outlet structure. | Proper storage layer configuration and underdrain placement will minimize facility drawdown time. |
| <i>Inflow, Underdrain, and Outflow Structures</i> | | |
| <input type="checkbox"/> | Inflow, underdrains and outflow structures are accessible for inspection and maintenance. | Maintenance will prevent clogging and ensure proper operation of the flow control structures. |
| <input type="checkbox"/> | 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. |
| <input type="checkbox"/> | 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. |
| <input type="checkbox"/> | 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. |
| <input type="checkbox"/> | Minimum underdrain diameter is 6 inches. | Smaller diameter underdrains are prone to clogging. |

| <i>Siting and Design</i> | <i>Intent/Rationale</i> |
|---|--|
| <input type="checkbox"/> 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. |
| <input type="checkbox"/> 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. |
| <input type="checkbox"/> Overflow is safely conveyed to a downstream storm drain system or discharge point. Size overflow structure to pass 100-year peak flow for on-line infiltration basins and water quality peak flow for off-line basins. | Planning for overflow lessens the risk of property damage due to flooding. |

Conceptual Design and Sizing Approach for Storm Water Pollutant Control Only

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

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Calculate the DCV per Appendix B based on expected site design runoff for tributary areas.
3. Use the sizing worksheet presented in Appendix B.5 to size biofiltration BMPs.

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

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

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.

Appendix E: BMP Design Fact Sheets

2. Iteratively determine the facility footprint area, surface ponding and/or aggregate storage layer depth required to provide detention storage to reduce flow rates and durations to allowable limits. Flow rates and durations can be controlled from detention storage by altering outlet structure orifice size(s) and/or water control levels. Multi-level orifices can be used within an outlet structure to control the full range of flows.
3. If bioretention with underdrain cannot fully provide the flow rate and duration control required by this manual, an upstream or downstream structure with significant storage volume such as an underground vault can be used to provide remaining controls.
4. After bioretention with underdrain has been designed to meet flow control requirements, calculations must be completed to verify if storm water pollutant control requirements to treat the DCV have been met.

E.13 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.14 BF-3 Proprietary Biofiltration Systems

The purpose of this fact sheet is to help explain the potential role of proprietary BMPs in meeting biofiltration requirements, when full retention of the DCV is not feasible. The fact sheet does not describe design criteria like the other fact sheets in this appendix because this information varies by BMP product model.

Criteria for Use of a Proprietary BMP as a Biofiltration BMP

A proprietary BMP may be acceptable as a “biofiltration BMP” under the following conditions:

- (1) The BMP meets the minimum design criteria listed in Appendix F, including the pollutant treatment performance standard in Appendix F.1;
- (2) The BMP is designed and maintained in a manner consistent with its performance certifications (See explanation in Appendix F.2); and
- (3) The BMP is acceptable at the discretion of the City Engineer. The City Engineer has no obligation to accept any proprietary biofiltration BMP.

Guidance for Sizing a Proprietary BMP as a Biofiltration BMP

Proprietary biofiltration BMPs must meet the same sizing guidance as non-proprietary BMPs. Sizing is typically based on capturing and treating 1.50 times the DCV not reliably retained. Guidance for sizing biofiltration BMPs to comply with requirements of this manual is provided in Appendix F.2.

4. Biofiltration - Plant List (E.20)

E.20 Plant List (PL)

| Plant Name | | Irrigation Requirements | | Preferred Location in Basin | | Applicable Bioretention Sections (Un-Lined Facilities) | | | | Applicability to Flow-Through Planter? (Lined Facility) | |
|------------------------------------|-------------------------|--|--|-----------------------------|-------------------|---|---|--|--|---|--|
| | | Temporary Irrigation during Plant Establishment Period | Permanent Irrigation (Drip / Spray) ⁽¹⁾ | | | Section A Treatment-Only Bioretention in Hydrologic Soil Group A or B Soils | Section B Treatment-Only Bioretention in Hydrologic Soil Group C or D soils | Section C Treatment Plus Flow Control Bioretention in Hydrologic Soil Group A or B Soils | Section D Treatment Plus Flow Control Bioretention in Hydrologic Soil Group C or D Soils | NO Applicable to Un-lined Facilities Only (Bioretention Only) | YES Can Use in Lined or Un-Lined Facility (Flow-Through Planter OR Bioretention) |
| Latin Name | Common Name | | | Basin Bottom | Basin Side Slopes | | | | | | |
| TREES⁽²⁾ | | | | | | | | | | | |
| Alnus rhombifolia | White Alder | X | | X | X | X | X | X | X | X | |
| Platanus racemosa | California Sycamore | X | | X | X | X | X | X | X | X | |
| Salix lasiolepis | Arroyo Willow | X | | | X | X | X | X | X | X | |
| Salix lucida | Lance-Leaf Willow | X | | | X | X | X | X | X | X | |
| Sambucus mexicana | Blue Elderberry | X | | | X | X | X | X | X | X | |
| SHRUBS / GROUNDCOVER | | | | | | | | | | | |
| Achillea millefolium | Yarrow | X | | | X | X | X | | | | X |
| Agrostis palens | Thingrass | X | | | X | X | X | X | X | | X |
| Anemopsis californica | Yerba Manza | X | | | X | X | X | X | X | | X |
| Baccharis douglasii | Marsh Baccahris | X | X | X | | X | X | X | X | | X |
| Carex praegracillis | California Field Sedge | X | X | X | | X | X | X | X | | X |
| Carex spissa | San Diego Sedge | X | X | X | | X | X | X | X | | X |
| Carex subfusca | Rusty Sedge | X | X | X | X | X | X | X | X | | X |
| Distichlis spicata | Salt Grass | X | X | X | | X | X | X | X | | X |
| Eleocharis macrostachya | Pale Spike Rush | X | X | X | | X | X | X | X | | X |
| Festuca rubra | Red Fescue | X | X | X | X | X | X | | | | X |
| Festuca californica | California Fescue | X | X | | X | X | X | | | | X |
| Iva hayesiana | Hayes Iva | X | | | X | X | X | | | | X |
| Juncus Mexicana | Mexican Rush | X | X | X | X | X | X | X | X | | X |
| Jucus patens | California Gray Rush | X | X | X | X | X | X | X | X | | X |
| Leymus condensatus ‘Canyon Prince’ | Canyon Prince Wild Rye | X | X | X | X | X | X | X | X | | X |
| Mahonia nevinii | Nevin’s Barberry | X | | | X | X | X | X | X | | X |
| Muhlenburgia rigens | Deergrass | X | X | X | X | X | X | X | X | | X |
| Mimulus cardinalis | Scarlet Monkeyflower | X | | X | X | X | X | | | | X |
| Ribes speciosum | Fushia Flowering Goose. | X | | | X | X | X | | | | X |
| Rosa californica | California Wild Rose | X | X | | X | X | X | | | | X |
| Scirpus cenuus | Low Bullrush | X | X | X | | X | X | X | X | | X |
| Sisyrinchium bellum | Blue-eyed Grass | X | | | X | X | X | | | | X |
| | | | | | | | | | | | |

1. All plants will benefit from some supplemental irrigation during hot dry summer months, particularly those on basin side slopes and further inland.
2. All trees should be planted a min. of 10’ away from any drain pipes or structures.

5. Fact Sheet SC-41

Building & Grounds Maintenance SC-41

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- ☐ Switch to non-toxic chemicals for maintenance to the maximum extent possible.
- ☐ Choose cleaning agents that can be recycled.
- ☐ Encourage proper lawn management and landscaping, including use of native vegetation.
- ☐ Encourage use of Integrated Pest Management techniques for pest control.
- ☐ Encourage proper onsite recycling of yard trimmings.
- ☐ Recycle residual paints, solvents, lumber, and other material as much as possible.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

| | |
|----------------|---|
| Sediment | ✓ |
| Nutrients | ✓ |
| Trash | |
| Metals | ✓ |
| Bacteria | ✓ |
| Oil and Grease | |
| Organics | |

Minimum BMPs Covered

| | | |
|---|--|---|
|  | Good Housekeeping | ✓ |
|  | Preventative Maintenance | |
|  | Spill and Leak Prevention and Response | ✓ |
|  | Material Handling & Waste Management | ✓ |
|  | Erosion and Sediment Controls | |
|  | Employee Training Program | ✓ |
|  | Quality Assurance Record Keeping | ✓ |



Building & Grounds Maintenance SC-41

- Clean work areas at the end of each work shift using dry cleaning methods such as sweeping and vacuuming.



Good Housekeeping

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils. See also SC-40, Contaminated and Erodible Areas, for more information.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.
- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and

Building & Grounds Maintenance SC-41

solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- ❑ If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- ❑ Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- ❑ Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- ❑ Use mulch or other erosion control measures when soils are exposed.
- ❑ Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- ❑ Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- ❑ Use hand weeding where practical.

Fertilizer and Pesticide Management

- ❑ Do not use pesticides if rain is expected.
- ❑ Do not mix or prepare pesticides for application near storm drains.
- ❑ Use the minimum amount needed for the job.
- ❑ Calibrate fertilizer distributors to avoid excessive application.
- ❑ Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- ❑ Apply pesticides only when wind speeds are low.
- ❑ Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- ❑ Irrigate slowly to prevent runoff and then only as much as is needed.
- ❑ Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.

Inspection

- ❑ Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

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Spill Response and Prevention Procedures

- ☐ Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- ☐ Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- ☐ Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- ☐ Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- ☐ Clean up spills immediately.



Material Handling and Waste Management

- ☐ Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- ☐ Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- ☐ Dispose of empty pesticide containers according to the instructions on the container label.
- ☐ Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- ☐ Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.



Employee Training Program

- ☐ Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- ☐ Train employees and contractors in proper techniques for spill containment and cleanup.
- ☐ Be sure the frequency of training takes into account the complexity of the operations and the needs of individual staff.



Quality Assurance and Record Keeping

- ☐ Keep accurate logs that document maintenance activities performed and minimum BMP measures implemented.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- ☐ Establish procedures to complete logs and file them in the central office.

Building & Grounds Maintenance SC-41

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Additional capital costs are not anticipated for building and grounds maintenance. Implementation of the minimum BMPs described above should be conducted as part of regular site operations.

Maintenance

- Maintenance activities for the BMPs described above will be minimal, and no additional cost is anticipated.

Supplemental Information

Fire Sprinkler Line Flushing

Site fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

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6. Fact Sheet SC-34

Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- Accomplish reduction in the amount of waste generated using the following source controls:
 - ✓ Production planning and sequencing;
 - ✓ Process or equipment modification;
 - ✓ Raw material substitution or elimination;
 - ✓ Loss prevention and housekeeping;
 - ✓ Waste segregation and separation; and
 - ✓ Close loop recycling.
- Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- Recycle materials whenever possible.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment

Nutrients

Trash

Metals ✓

Bacteria ✓

Oil and Grease ✓

Organics ✓

Minimum BMPs Covered

- | | | |
|---|---|---|
|  | <i>Good Housekeeping</i> | ✓ |
|  | <i>Preventative Maintenance</i> | ✓ |
|  | <i>Spill and Leak Prevention and Response</i> | ✓ |
|  | <i>Material Handling & Waste Management</i> | ✓ |
|  | <i>Erosion and Sediment Controls</i> | |
|  | <i>Employee Training Program</i> | ✓ |
|  | <i>Quality Assurance Record Keeping</i> | ✓ |



- ❑ Use the entire product before disposing of the container.
- ❑ To the extent possible, store wastes under cover or indoors after ensuring all safety concerns such as fire hazard and ventilation are addressed.
- ❑ Provide containers for each waste stream at each work station. Allow time after shift to clean area.



Good Housekeeping

- ❑ Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater run-on and runoff with a berm. The waste containers or piles must be covered except when in use.
- ❑ Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- ❑ Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain. Clean in a designated wash area that drains to a clarifier.
- ❑ Transfer waste from damaged containers into safe containers.
- ❑ Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.
- ❑ Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- ❑ Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- ❑ Stencil or demarcate storm drains on the facility's property with prohibitive message regarding waste disposal.
- ❑ Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.
- ❑ If possible, move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.



Preventative Maintenance

- ❑ Prevent stormwater run-on from entering the waste management area by enclosing the area or building a berm around the area.
- ❑ Prevent waste materials from directly contacting rain.

- ☐ Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.
- ☐ Cover the area with a permanent roof if feasible.
- ☐ Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- ☐ Check waste containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- ☐ Sweep and clean the waste management area regularly. Use dry methods when possible (e.g., sweeping, vacuuming, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- ☐ Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- ☐ Repair leaking equipment including valves, lines, seals, or pumps promptly.



Spill Response and Prevention Procedures

- ☐ Keep your spill prevention and plan up-to-date.
- ☐ Have an emergency plan, equipment and trained personnel ready at all times to deal immediately with major spills.
- ☐ Collect all spilled liquids and properly dispose of them.
- ☐ Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.
- ☐ Ensure that vehicles transporting waste have spill prevention equipment that can prevent spills during transport. Spill prevention equipment includes:
 - ✓ Vehicles equipped with baffles for liquid waste; and
 - ✓ Trucks with sealed gates and spill guards for solid waste.



Material Handling and Waste Management

Litter Control

- ☐ Post “No Littering” signs and enforce anti-litter laws.
- ☐ Provide a sufficient number of litter receptacles for the facility.
- ☐ Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- ☐ Keep waste collection areas clean.

- ☐ Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- ☐ Secure solid waste containers; containers must be closed tightly when not in use.
- ☐ Do not fill waste containers with washout water or any other liquid.
- ☐ Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/ hazardous waste collection section below).
- ☐ Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal. Affix labels to all waste containers.

Chemical/Hazardous Wastes

- ☐ Select designated hazardous waste collection areas on-site.
- ☐ Store hazardous materials and wastes in covered containers and protect them from vandalism.
- ☐ Place hazardous waste containers in secondary containment.
- ☐ Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- ☐ Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.



Employee Training Program

- ☐ Educate employees about pollution prevention measures and goals.
- ☐ Train employees how to properly handle and dispose of waste using the source control BMPs described above.
- ☐ Train employees and subcontractors in proper hazardous waste management.
- ☐ Use a training log or similar method to document training.
- ☐ Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.



Quality Assurance and Record Keeping

- ☐ Keep accurate maintenance logs that document minimum BMP activities performed for waste handling and disposal, types and quantities of waste disposed of, and any improvement actions.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.

- Establish procedures to complete logs and file them in the central office.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Capital costs will vary substantially depending on the size of the facility and the types of waste handled. Significant capital costs may be associated with reducing wastes by modifying processes or implementing closed-loop recycling.
- Many facilities will already have indoor covered areas where waste materials will be stored and will require no additional capital expenditures for providing cover.
- If outdoor storage of wastes is required, construction of berms or other means to prevent stormwater run-on and runoff may require appropriate constructed systems for containment.
- Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

Maintenance

- Check waste containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the waste management area regularly. Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Repair leaking equipment including valves, lines, seals, or pumps promptly.

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7. Fact Sheet SC-10

Description

Non-stormwater discharges (NSWDs) are flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain if local regulations allow. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include: potable water sources, fire hydrant flushing, air conditioner condensate, landscape irrigation drainage and landscape watering, emergency firefighting, etc. as discussed in Section 2.

However there are certain non-stormwater discharges that pose an environmental concern. These discharges may originate from illegal dumping of industrial material or wastes and illegal connections such as internal floor drains, appliances, industrial processes, sinks, and toilets that are illegally connected to the nearby storm drainage system through on-site drainage and piping. These unauthorized discharges (examples of which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains.

Non-stormwater discharges will need to be addressed through a combination of detection and elimination. The ultimate goal is to effectively eliminate unauthorized non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of

Objectives

- *Cover*
- *Contain*
- *Educate*
- *Reduce/Minimize*
- *Product Substitution*

Targeted Constituents

| | |
|-----------------------|---|
| <i>Sediment</i> | |
| <i>Nutrients</i> | ✓ |
| <i>Trash</i> | |
| <i>Metals</i> | ✓ |
| <i>Bacteria</i> | ✓ |
| <i>Oil and Grease</i> | ✓ |
| <i>Organics</i> | ✓ |

Minimum BMPs Covered

| | | |
|---|---|---|
|  | <i>Good Housekeeping</i> | ✓ |
|  | <i>Preventative Maintenance</i> | |
|  | <i>Spill and Leak Prevention and Response</i> | ✓ |
|  | <i>Material Handling & Waste Management</i> | |
|  | <i>Erosion and Sediment Controls</i> | |
|  | <i>Employee Training Program</i> | ✓ |
|  | <i>Quality Assurance Record Keeping</i> | ✓ |



pollutants on streets and into the storm drain system and downstream water bodies.

Approach

Initially the Discharger must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is the elimination of unauthorized non-stormwater discharges. See other BMP Fact Sheets for activity-specific pollution prevention procedures.

General Pollution Prevention Protocols

- ❑ Implement waste management controls described in SC-34 Waste Handling and Disposal.
- ❑ Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- ❑ Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” or similar stenciled or demarcated next to them to warn against ignorant or unintentional dumping of pollutants into the storm drainage system.
- ❑ Manage and control sources of water such as hose bibs, faucets, wash racks, irrigation heads, etc. Identify hoses and faucets in the SWPPP, and post signage for appropriate use.

Non-Stormwater Discharge Investigation Protocols

Identifying the sources of non-stormwater discharges requires the Discharger to conduct an investigation of the facility at regular intervals. There are several categories of non-stormwater discharges:

- ❑ Visible, easily identifiable discharges, typically generated as surface runoff, such as uncontained surface runoff from vehicle or equipment washing; and
- ❑ Non-visible, (e.g., subsurface) discharges into the site drainage system through a variety of pathways that are not obvious.

The approach to detecting and eliminating non-stormwater discharges will vary considerably, as discussed below:

Visible and identifiable discharges

- ❑ Conduct routine inspections of the facilities and of each major activity area and identify visible evidence of unauthorized non-stormwater discharges. This may include:
 - ✓ Visual observations of actual discharges occurring;

- ✓ Evidence of surface staining, discoloring etc. that indicates that discharges have occurred;
 - ✓ Pools of water in low lying areas when a rain event has not occurred; and
 - ✓ Discussions with operations personnel to understand practices that may lead to unauthorized discharges.
- If evidence of non-stormwater discharges is discovered:
- ✓ Document the location and circumstances using Worksheets 5 and 6 (Section 2 of the manual), including digital photos;
 - ✓ Identify and implement any quick remedy or corrective action (e.g., moving uncovered containers inside or to a proper location); and
 - ✓ Develop a plan to eliminate the discharge. Consult the appropriate activity-specific BMP Fact Sheet for alternative approaches to manage and eliminate the discharge.
- Consult the appropriate activity-specific BMP Fact Sheet for alternative approaches to manage and eliminate the discharge. Make sure the facility SWPPP is up-to-date and includes applicable BMPs to address the non-stormwater discharge.

Other Illegal Discharges (Non visible)

Illicit Connections

- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of “as-built” piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate discharges to the storm drain system.
- Visual Inspection and Inventory:
 - ✓ Inventory and inspect each discharge point during dry weather.
 - ✓ Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system.
 - ✓ Non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- A review of the “as-built” piping schematic is a way to determine if there are any connections to the stormwater collection system.

- ❑ Inspect the path of loading/unloading area drain inlets and floor drains in older buildings.
- ❑ Never assume storm drains are connected to the sanitary sewer system.

Monitoring for investigation/detection of illegal discharges

- ❑ If a suspected illegal or unknown discharge is detected, monitoring of the discharge may help identify the content and/or suggest the source. This may be done with a field screening analysis, flow meter measurements, or by collecting a sample for laboratory analysis. Section 5 and Appendix D describe the necessary field equipment and procedures for field investigations.
- ❑ Investigative monitoring may be conducted over time. For example if, a discharge is intermittent, then monitoring might be conducted to determine the timing of the discharge to determine the source.
- ❑ Investigative monitoring may be conducted over a spatial area. For example, if a discharge is observed in a pipe, then monitoring might be conducted at accessible upstream locations in order to pinpoint the source of the discharge.
- ❑ Generally, investigative monitoring requiring collection of samples and submittal for lab analysis requires proper planning and specially trained staff.

Smoke Testing

Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two piping systems. Smoke testing is generally performed at a downstream location and the smoke is forced upstream using blowers to create positive pressure. The advantage to smoke testing is that it can potentially identify multiple potential discharge sources at once.

- ❑ Smoke testing uses a harmless, non-toxic smoke cartridges developed specifically for this purpose.
- ❑ Smoke testing requires specialized equipment (e.g., cartridges, blowers) and is generally only appropriate for specially trained staff.
- ❑ A Standard Operating Procedure (SOP) for smoke testing is highly desirable. The SOP should address the following elements:
 - ✓ Proper planning and notification of nearby residents and emergency services is necessary since introducing smoke into the system may result in false alarms;
 - ✓ During dry weather, the stormwater collection system is filled with smoke and then traced back to sources;

- ✓ Temporary isolation of segments of pipe using sand bags is often needed to force the smoke into leaking pipes; and
- ✓ The appearance of smoke in a waste vent pipe, at a sewer manhole, or even the base of a toilet indicates that there may be a connection between the sanitary and storm water systems.
- Most municipal wastewater agencies will have necessary staff and equipment to conduct smoke testing and they should be contacted if cross connections with the sanitary sewer are suspected. See SC-44 Drainage System Maintenance for more information.

Dye Testing

- Dye testing is typically performed when there is a suspected specific pollutant source and location (i.e., leaking sanitary sewer) and there is evidence of dry weather flows in the stormwater collection system.
- Dye is released at a probable upstream source location, either the facility's sanitary or process wastewater system. The dye must be released with a sufficient volume of water to flush the system.
- Operators then visually examine the downstream discharge points from the stormwater collection system for the presence of the dye.
- Dye testing can be performed informally using commercially available products in order to conduct an initial investigation for fairly obvious cross-connections.
- More detailed dye testing should be performed by properly trained staff and follow SOPs. Specialized equipment such as fluorometers may be necessary to detect low concentrations of dye.
- Most municipal wastewater agencies will have necessary staff and equipment to conduct dye testing and they should be contacted if cross connections with the sanitary sewer are suspected.

TV Inspection of Drainage System

- Closed Circuit Television (CCTV) can be employed to visually identify illicit connections to the industrial storm drainage system. Two types of CCTV systems are available: (1) a small specially designed camera that can be manually pushed on a stiff cable through storm drains to observe the interior of the piping, or (2) a larger remote operated video camera on treads or wheels that can be guided through storm drains to view the interior of the pipe.
- CCTV systems often include a high-pressure water jet and camera on a flexible cable. The water jet cleans debris and biofilm off the inside of pipes so the camera can take video images of the pipe condition.

- ❑ CCTV units can detect large cracks and other defects such as offsets in pipe ends caused by root intrusions or shifting substrate.
- ❑ CCTV can also be used to detect dye introduced into the sanitary sewer.
- ❑ CCTV inspections require specialized equipment and properly trained staff and are generally best left to specialized contractors or municipal public works staff.

Illegal Dumping

- ❑ Substances illegally dumped on streets and into the storm drain systems and creeks may include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. These wastes can cause stormwater and receiving water quality problems as well as clog the storm drain system itself.
- ❑ Establish a system for tracking incidents. The system should be designed to identify the following:
 - ✓ Illegal dumping hot spots;
 - ✓ Types and quantities (in some cases) of wastes;
 - ✓ Patterns in time of occurrence (time of day/night, month, or year);
 - ✓ Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills);
 - ✓ An anonymous tip/reporting mechanism; and
 - ✓ Evidence of responsible parties (e.g., tagging, encampments, etc.).
- ❑ One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

Once a site has been cleaned:

- ❑ Post “No Dumping” signs with a phone number for reporting dumping and disposal.
- ❑ Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- ❑ Lighting or barriers may also be needed to discourage future dumping.
- ❑ See fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Inspection

- ❑ Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- ❑ Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- ❑ Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.



Spill and Leak Prevention and Response

- ❑ On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- ❑ Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- ❑ Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- ❑ For larger spills, a private spill cleanup company or Hazmat team may be necessary.
- ❑ See SC-11 Spill Prevention Control and Cleanup.



Employee Training Program

- ❑ Training of technical staff in identifying and documenting illegal dumping incidents is required. The frequency of training must be presented in the SWPPP, and depends on site-specific industrial materials and activities.
- ❑ Consider posting a quick reference table near storm drains to reinforce training.
- ❑ Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.
- ❑ Educate employees about spill prevention and cleanup.
- ❑ Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan. Employees should be able to identify work/jobs with high potential for spills and suggest methods to reduce possibility.
- ❑ Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.

- ☐ Conduct spill response drills annually (if no events occurred) in order to evaluate the effectiveness of the plan.
- ☐ When a responsible party is identified, educate the party on the impacts of his or her actions.



Quality Assurance and Record Keeping

Performance Evaluation

- ☐ Annually review internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- ☐ Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.
- ☐ Develop document and data management procedures.
- ☐ A database is useful for defining and tracking the magnitude and location of the problem.
- ☐ Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- ☐ Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- ☐ Annually document and report the results of the program.
- ☐ Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.
- ☐ Document training activities.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended “work-arounds.”

- ☐ Many facilities do not have accurate, up-to-date ‘as-built’ plans or drawings which may be necessary in order to conduct non-stormwater discharge assessments.
 - ✓ Online tools such as Google Earth™ can provide an aerial view of the facility and may be useful in understanding drainage patterns and potential sources of non-stormwater discharges
 - ✓ Local municipal jurisdictions may have useful drainage systems maps.

- ❑ Video surveillance cameras are commonly used to secure the perimeter of industrial facilities against break-ins and theft. These surveillance systems may also be useful for capturing illegal dumping activities. Minor, temporary adjustments to the field of view of existing surveillance camera systems to target known or suspected problem areas may be a cost-effective way of capturing illegal dumping activities and identifying the perpetrators.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- ❑ Capital facility cost requirements may be minimal unless cross-connections to storm drains are detected.
- ❑ Indoor floor drains may require re-plumbing if cross-connections are detected.
- ❑ Leaky sanitary sewers will require repair or replacement which can have significant costs depending on the size and industrial activity at the facility.

Maintenance (including administrative and staffing)

- ❑ The primary effort is for staff time and depends on how aggressively a program is implemented.
- ❑ Costs for containment, and disposal of any leak or discharge is borne by the Discharger.
- ❑ Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- ❑ Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Permit Requirements

The IGP authorizes certain Non-Storm Water Discharges (NSWDs) provided BMPs are included in the SWPPP and implemented to:

- ❑ Reduce or prevent the contact of authorized NSWDs with materials or equipment that are potential sources of pollutants;
- ❑ Reduce, to the extent practicable, the flow or volume of authorized NSWDs;
- ❑ Ensure that authorized NSWDs do not contain quantities of pollutants that cause or contribute to an exceedance of a water quality standards (WQS); and,

- Reduce or prevent discharges of pollutants in authorized NSWs in a manner that reflects best industry practice considering technological availability and economic practicability and achievability.”

References and Resources

Center for Watershed Protection, 2004. *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, EPA Cooperative Agreement X-82907801-0.

Dublin San Ramon Sanitation District. <http://www.dsrsd.com/www/smoketest.html>.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: <http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessactivities>.

Sacramento Stormwater Management Program, *Best Management Practices for Industrial Storm Water Pollution Control*, Available online at: <http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf>.

Santa Clara Valley Urban Runoff Pollution Prevention Program. <http://www.scvurppp.org>.

Southern California Coastal Water Research Project, 2013. *The California Microbial Source Identification Manual: A Tiered Approach to Identifying Fecal Pollution Sources to Beaches*, Technical Report 804.

The Storm Water Managers Resource Center, <http://www.stormwatercenter.net/>.

US EPA. National Pollutant Discharge Elimination System. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=111.

WEF Press Alexandria, Virginia, 2009. Existing Sewer Evaluation and Rehabilitation: *WEF Manual of Practice No. FD-6 ASCE/EWRI Manuals and Reports on Engineering Practice No. 62, Third Edition*.

8. Street Trees Fact Sheet

E.2 SD-1 Street Trees



MS4 Permit Category

Site Design

Manual Category

Site Design

Applicable Performance Standard

Site Design

Primary Benefits

Volume Reduction

Street Trees (Source: County of San Diego LID Manual – EOA, Inc.)

Description

Trees planted in the right-of-way can be used as storm water management tools in addition to other typical benefits associated with trees, including energy conservation, air quality improvement, and aesthetic enhancement. Typical storm water management benefits associated with trees include:

- **Interception of rainfall** – tree surfaces (roots, foliage, bark, and branches) intercept, evaporate, store, or convey precipitation to the soil before it reaches surrounding impervious surfaces
- **Reduced erosion** – trees protect denuded area by intercepting or reducing the velocity of rain drops as they fall through the tree canopy
- **Increased infiltration** – soil conditions created by roots and fallen leaves promote infiltration
- **Treatment of storm water** – trees provide treatment through uptake of nutrients and other storm water pollutants (phytoremediation) and support of other biological processes that break down pollutants

Typical street tree system components include:

- Trees of the appropriate species for site conditions and constraints
- Available growing space based on tree species, soil type, water availability, surrounding land uses, and project goals

Appendix E: BMP Design Fact Sheets

- Optional suspended pavement design to provide structural support for adjacent pavement without requiring compaction of underlying layers
- Optional root barrier devices as needed; a root barrier is a device installed in the ground, between a tree and the sidewalk, intended to guide roots down and away from the sidewalk in order to prevent sidewalk lifting from tree roots.
- Optional tree grates; to be considered to maximize available space for pedestrian circulation and to protect tree roots from compaction related to pedestrian circulation; tree grates are typically made up of porous material that will allow the runoff to soak through.
- Optional shallow surface depression for ponding of excess runoff
- Optional planter box drain

Design Adaptations for Project Goals

Site design BMP to provide incidental treatment. Street trees primarily functions as site design BMPs for incidental treatment. Benefits from street trees are accounted for by adjustment factors presented in Appendix B.2. This credit can apply to non-street trees as well (that meet the same criteria).

Design Criteria and Considerations

Street Trees 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:

| <i>Siting and Design</i> | <i>Intent/Rationale</i> |
|--|--|
| <input type="checkbox"/> Tree species is appropriately chosen for the development (private or public). For public rights-of-ways, local planning guidelines and zoning provisions for the permissible species and placement of trees are consulted. A list of trees appropriate for site design that can be used by all county municipalities are provided in Appendix E.20 | Proper tree placement and species selection minimizes problems such as pavement damage by surface roots and poor growth. |

| <i>Siting and Design</i> | <i>Intent/Rationale</i> | | | | | | | | | | | | | | |
|--|---|---------------------------------|---------------------------|---------|--|--------|-------------|---------|---|---------|-----------|---------|--|---------|--|
| <p>Location of trees planted along public streets follows local requirements and guidelines. Vehicle and pedestrian line of sight are considered in tree selection and placement.</p> <p>Unless exemption is granted by the City Engineer the following minimum tree separation distance is followed</p> <table border="1" data-bbox="282 569 846 1178"> <thead> <tr> <th>Improvement</th><th>Minimum distance to Street Tree</th></tr> </thead> <tbody> <tr> <td>Traffic Signal, Stop sign</td><td>20 feet</td></tr> <tr> <td>Underground Utility lines (except sewer)</td><td>5 feet</td></tr> <tr> <td>Sewer Lines</td><td>10 feet</td></tr> <tr> <td>Above ground utility structures (Transformers, Hydrants, Utility poles, etc.)</td><td>10 feet</td></tr> <tr> <td>Driveways</td><td>10 feet</td></tr> <tr> <td>Intersections (intersecting curb lines of two streets)</td><td>25 feet</td></tr> </tbody> </table> | Improvement | Minimum distance to Street Tree | Traffic Signal, Stop sign | 20 feet | Underground Utility lines (except sewer) | 5 feet | Sewer Lines | 10 feet | Above ground utility structures (Transformers, Hydrants, Utility poles, etc.) | 10 feet | Driveways | 10 feet | Intersections (intersecting curb lines of two streets) | 25 feet | <p>Roadway safety for both vehicular and pedestrian traffic is a key consideration for placement along public streets.</p> |
| Improvement | Minimum distance to Street Tree | | | | | | | | | | | | | | |
| Traffic Signal, Stop sign | 20 feet | | | | | | | | | | | | | | |
| Underground Utility lines (except sewer) | 5 feet | | | | | | | | | | | | | | |
| Sewer Lines | 10 feet | | | | | | | | | | | | | | |
| Above ground utility structures (Transformers, Hydrants, Utility poles, etc.) | 10 feet | | | | | | | | | | | | | | |
| Driveways | 10 feet | | | | | | | | | | | | | | |
| Intersections (intersecting curb lines of two streets) | 25 feet | | | | | | | | | | | | | | |
| <p>Underground utilities and overhead wires are considered in the design and avoided or circumvented. Underground utilities are routed around or through the planter in suspended pavement applications. All underground utilities are protected from water and root penetration.</p> | <p>Tree growth can damage utilities and overhead wires resulting in service interruptions. Protecting utilities routed through the planter prevents damage and service interruptions.</p> | | | | | | | | | | | | | | |
| <p>Suspended pavement design was developed where appropriate to minimize soil compaction and improve infiltration and filtration capabilities.</p> <p>Suspended pavement was constructed with an approved structural cell.</p> | <p>Suspended pavement designs provide structural support without compaction of the underlying layers, thereby promoting tree growth.</p> <p>Recommended structural cells include poured in place concrete columns, Silva Cells manufactured by Deeproot Green Infrastructures and Stratacell and Stratavault systems manufactured by Citygreen Systems.</p> | | | | | | | | | | | | | | |

| <i>Siting and Design</i> | <i>Intent/Rationale</i> |
|--|---|
| <input type="checkbox"/> A minimum soil volume of 2 cubic feet per square foot of canopy projection volume is provided for each tree. Canopy projection area is the ground area beneath the tree, measured at the drip line. | The minimum soil volume ensures that there is adequate storage volume to allow for unrestricted evapotranspiration. |

Conceptual Design and Sizing Approach for Site Design

1. Determine the areas where street trees can be used in the site design to achieve incidental treatment. Street trees reduce runoff volumes from the site. Refer to Appendix B.2.

9. Maintenance Costs Table

| Annual Estimate to Maintain Biofiltration Basins (BMPs 1-1 thru 1-3) | | | | | | | | |
|--|----------------------------|-----------------|-------------------------|----------------------------|---------------------------------------|------------------------|---|--------------------------|
| Routine Actions | Frequency (times per year) | Hours per Event | Average Labor Crew Size | Average Labor rate/hr (\$) | Equipment | Equipment cost/hr (\$) | Materials and Incidentals Cost or Disposal Cost/event | Total Cost per year (\$) |
| Vegetation Management for Aesthetics | 1 | 2 | 2 | 74.97 | Utility Truck | 14.39 | 50.00 | 378.66 |
| Soil Repair | 1 | 4 | 2 | 74.97 | Utility Truck | 14.39 | 150.00 | 807.32 |
| Standing Water | 1 | 1 | 2 | 74.97 | Utility Truck | 14.39 | 150.00 | 314.33 |
| Trash and Debris | 12 | 1 | 2 | 74.97 | Utility Truck | 14.39 | | 1813.67 |
| Sediment management | 0.5 | 8 | 2 | 74.97 | Utility Truck | 14.39 | 400.00 | 914.88 |
| Underdrains | 1 | 0.5 | 2 | 74.97 | Utility Truck, 10-15 yd Truck Backhoe | 56.02 | | 102.98 |
| General Maintenance Inspection | 1 | 1 | 2 | 74.97 | Utility Truck | 14.39 | | 164.33 |
| Training | 1 | 2 | 2 | 74.97 | Utility Truck | 14.39 | | 328.66 |
| Storm Drain Signage (as needed every 2 years) | 0.5 | 2 | 2 | 74.97 | Utility Truck | 14.39 | | 178.72 |
| Trash Storage Areas Already included in property management responsibilities. Additional cost: | - | - | - | - | - | - | - | 50.00 |
| Reporting | 1 | 3 | 1 | 74.97 | Utility Truck | 14.39 | | 268.08 |
| Average Total Annual | | 58.0 | | | | | | 4942.97 |

| | | |
|---------------------------|-------|---------|
| Small Basin (500 sf) | 58.0 | 4942.97 |
| Medium Basin (2000 sq-ft) | 79.8 | 6079.85 |
| Large Basin (4000 sq-ft) | 123.6 | 8754.99 |

| Annual Estimate to Maintain Tree Well | | | | | | | | |
|---|----------------------------|-----------------|-------------------------|----------------------------|---------------|------------------------|---|--------------------------|
| Routine Actions | Frequency (times per year) | Hours per Event | Average Labor Crew Size | Average Labor rate/hr (\$) | Equipment | Equipment cost/hr (\$) | Materials and Incidentals Cost or Disposal Cost/event | Total Cost per year (\$) |
| Vegetation Management for Aesthetics | 52 | 1 | 1 | 12.25 | Utility Truck | 14.93 | - | 1413.36 |
| Tree Replacement Inspection | 1 | 1 | 1 | 74.97 | - | - | - | 74.97 |
| Tree Replacement | 0.2 | 3 | 2 | 12.25 | Utility Truck | 14.93 | 290.00 | 117.49 |
| Trash and Debris | 52 | 0.5 | 1 | 12.25 | Utility Truck | 14.93 | - | 325.97 |
| Standing Water | 6 | 1 | 1 | 12.25 | Utility Truck | 14.93 | 150.00 | 988.43 |
| Sediment management | 4 | 1 | 1 | 12.25 | Utility Truck | 14.93 | 50.00 | 263.93 |
| Entrance/opening of tree well is blocked | 2 | 1 | 1 | 12.25 | Utility Truck | 14.93 | - | 39.43 |
| Inspect for Mosquitos/Larvae | 12 | 0.5 | 1 | 12.25 | - | - | - | 73.50 |
| Corrective action upon presence of Mosquitos/Larvae | 2 | 1 | 1 | 12.25 | Utility Truck | 14.93 | 150.00 | 339.43 |
| Reporting | 1 | 3 | 1 | 74.97 | Utility Truck | 14.93 | - | 269.70 |
| Average Total Annual | | 103.2 | | | | | | 3906.21 |

10. Example Self-Certification Form



City of Santee – Storm Water Program

Annual Certification of Storm Water Best Management Practice(s)

Date: 07/22/2019

Name of Development: Lantern Crest Ridge II (Addition)

Responsible Party: (Owner/HOA)

Lantern Crest

Address:

11010 Sunset Trail, Santee, CA 92071

I Understand That:

Initial:_____ This document and all supporting documents are due to the City of Santee, by September 15th of each year.

Initial:_____ This Document has been prepared to provide verification that all storm water best management practices and treatment control devices (BMPs) located at the above referenced property have been operated and maintained in accordance with the property's Storm Water Management Plan (SWMP) for the period of **September 1st, 20** 19 __, **to August 31st, 20** 20 __.

Initial:_____ By submission of this letter, I am certifying that the BMPs at this property were inspected and serviced as summarized in the tables below. In addition, I certify that all BMPs located on this property are currently functioning and operating as intended, and that these facilities will continue to be properly maintained as described within the property's Storm Water Management Plan.

Initial:_____ I am the Responsible Party, and understand that I must provide the City with updated contact information for the new Responsible Party, should the property be transferred or sold.

| | |
|----------------------------------|-------------------|
| Print Name: | Signature: |
| Relationship to Property: | Phone: |
| Email: | |

BMPs Include – (Check If Present On Property, & Provide Quantity Of Each BMP On Property):

| | | |
|---|---|---|
| <input checked="" type="checkbox"/> Bioswales #: _____ | <input type="checkbox"/> Storm Drain Filters #: _____ | <input type="checkbox"/> Detention Basins #: _____ |
| <input type="checkbox"/> CDS Unit #: _____ | <input checked="" type="checkbox"/> Parking-Lot Maintenance #: _____ | <input checked="" type="checkbox"/> Landscape Maintenance #: _____ |
| <input type="checkbox"/> Private Streets #: _____ | <input type="checkbox"/> Private Storm Drain System #: _____ | <input type="checkbox"/> Dog Stations #: _____ |
| <input type="checkbox"/> Other: _____ #: _____ | <input type="checkbox"/> Other: _____ #: _____ | <input type="checkbox"/> Other: _____ #: _____ |

Attachments – (Check All That Apply):

| | |
|--|-------------------------------------|
| | Maintenance Records |
| | Reports |
| | Photos |
| | Receipts |
| | Other – <i>Please Specify Here:</i> |
| | Other – <i>Please Specify Here:</i> |
| | Other – <i>Please Specify Here:</i> |

Summary of Inspections –

If Additional Space is Needed – Use “Annual Certification Form: Part 2”

| Inspection Date(s) | BMP Type (<i>list each individually</i>) | Location of BMP (refer to SWMP) | Describe Observations/ Condition of BMP | Describe Maintenance Completed and/or Repairs Made |
|--------------------|--|---------------------------------|---|--|
| | Biofiltration Basin | SE corner of project site | | |
| | | | | |
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If Additional Space is Needed – Use Annual Certification Form: Part 2

For Additional Information Visit Our Website: www.SanteeH2o.org

ATTACHMENT 4

Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

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

The plans must identify:

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

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SITE DESIGN REQUIREMENTS

- SD-1: MAINTAIN NATURAL DRAINAGE PATHWAYS AND HYDROLOGIC FEATURES
SD-2: CONSERVE NATURAL AREAS, SOILS AND VEGETATION
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

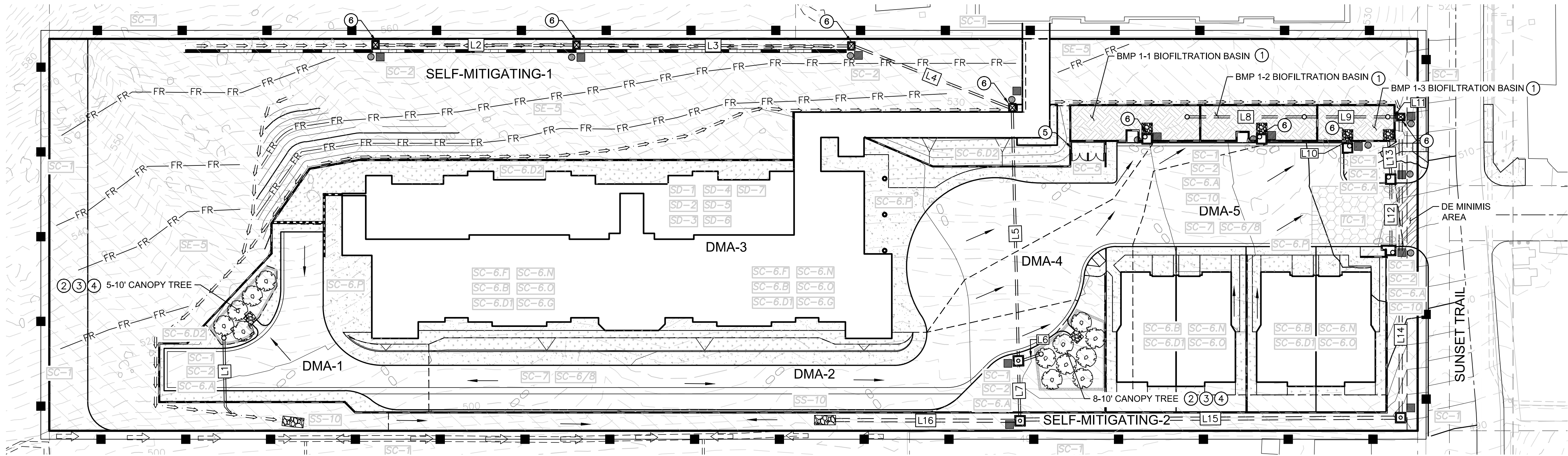
SELF MITIGATING AREAS REQUIREMENTS

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

NOTES

- * APPROXIMATE DEPTH TO GROUNDWATER > 20 FT
* UNDERLYING SOIL TYPE D

BMP PLAN SHEET
LANTERN CREST RIDGE II



| BMP TABLE | | | | | | | | |
|--------------------------------|---------------------------------------|--------|-----------|----------------------------|----------|--------------|-----------------------|--------------------------|
| TREATMENT AND DRAINAGE CONTROL | | | | | | | | |
| BMP ID # | BMP TYPE | SYMBOL | CASQA NO. | AREA | DWG. NO. | SHEET NO.(S) | *INSPECTION FREQUENCY | *MAINTENANCE FREQUENCY |
| 1 | BMP 1-1 THRU 1-3; BIOFILTRATION BASIN | | TC-32 | 7445 SF TOTAL | TBD | THIS SHEET | WEEKLY | ANNUALLY OR AS NECESSARY |
| 2 | SILT LEVEL POSTS | - | N/A | 2 EACH PER BASIN | TBD | THIS SHEET | MONTHLY | AS NEEDED |
| 3 | QTY. 13 - 10' CANOPY STREET TREES | | N/A | 5 FOR DMA-1 8 FOR DMA-2 | TBD | THIS SHEET | WEEKLY | AS NEEDED |
| 4 | SILT LEVEL POSTS FOR STREET TREE | - | N/A | 2 EACH PER TREE | TBD | THIS SHEET | MONTHLY | AS NEEDED |

MATERIALS & WASTE MANAGEMENT CONTROL BMPS:

- WM-4 SPILL PREVENTION AND CONTROL
WM-8 CONCRETE WASTE MANAGEMENT
WM-5 SOLID WASTE MANAGEMENT
WM-9 SANITARY WASTE MANAGEMENT
WM-6 HAZARDOUS WASTE MANAGEMENT

TEMPORARY RUNOFF CONTROL BMPS:

- SC-1 SILT FENCE
SC-6/B GRAVEL OR SAND BAGS
SC-7 STREET SWEEPING AND VACUUMING
SC-10 STORM DRAIN INLET PROTECTION
SC-9 FIBER ROLL
SS-10 RIPRAP ENERGY DISSIPATOR
TC-1 STABILIZED CONSTRUCTION ENTRANCE

| STORM DRAIN LATERAL DATA TABLE | | | |
|--------------------------------|---------------|---------|---------|
| # | BEARING | LENGTH | NOTES |
| L1 | N 89°20'58" W | 29.59' | 6" PVC |
| L2 | S 01°47'13" W | 92.27' | 12" PVC |
| L3 | S 01°56'26" W | 127.85' | 12" PVC |
| L4 | S 23°23'42" W | 79.02' | 12" PVC |
| L5 | S 89°38'43" E | 116.00' | 12" PVC |
| L6 | N 17°08'36" W | 8.25' | 6" PVC |
| L7 | S 89°38'43" E | 24.32' | 12" PVC |
| L8 | S 01°44'46" W | 53.21' | 6" PVC |
| L9 | S 01°44'46" W | 37.41' | 6" PVC |
| L10 | S 88°15'08" E | 1.70' | 8" PVC |
| L11 | S 01°44'46" W | 3.54' | 6" PVC |
| L12 | S 88°30'26" E | 29.67' | 8" PVC |
| L13 | N 88°07'11" E | 16.40' | 12" PVC |
| L14 | S 88°15'15" E | 138.72' | 12" PVC |
| L15 | N 01°28'15" E | 175.53' | 12" PVC |
| L16 | N 02°00'32" E | 85.02' | 18" PVC |

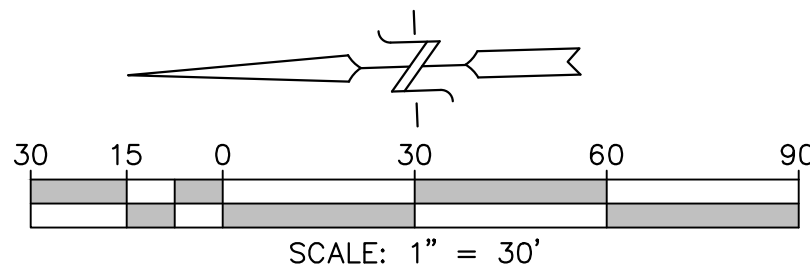
| SOURCE CONTROL | | | | | | | | | |
|----------------|---|------------|--------------|--------------------------------------|--------------------------------------|--|-----------------------|------------------------|---|
| BMP ID # | BMP TYPE | SYMBOL | CASQA NO. | AREA | DWG. NO. | SHEET NO.(S) | *INSPECTION FREQUENCY | *MAINTENANCE FREQUENCY | MAINTENANCE ACTIVITY |
| 5 | TRASH ENCLOSURE | | SD-32 | 1 EA | TBD | 2 | MONTHLY | AS NEEDED | INSPECT REGULARLY. CLEAR TRASH & DEBRIS. REPLACE LEAKING BINS. CLEAN STORAGE AREAS REGULARLY. POST SIGNS INFORMING TO NOT DISPOSE OF LIQUIDS & TO KEEP BIN LIDS CLOSED. |
| 6 | STENCILS | NO DUMPING | SD-13, SC-2 | 3 EACH | TBD | THIS SHEET | MONTHLY | AS NEEDED | INSPECT AND MAINTAIN/REPLACE AS NEEDED. |
| BMP ID # | BMP TYPE | DWG. NO. | SHEET NO.(S) | *INSPECTION FREQUENCY | *MAINTENANCE FREQUENCY | MAINTENANCE ACTIVITY | | | |
| SC-1 | PREVENTION OF ILLICIT DISCHARGES INTO MS4 | TBD | THIS SHEET | CONTINUOUS | - | ALL PROJECTS MUST EFFECTIVELY ELIMINATE DISCHARGES OF NON-STORM WATER INTO THE STORM WATER CONVEYANCE SYSTEM. | | | |
| SC-2 | STORM DRAIN STENCILING OR SIGNAGE | TBD | THIS SHEET | CONTINUOUS | REGULARLY | LABELING SHALL BE PROVIDED FOR ALL STORM WATER CONVEYANCE SYSTEM INLETS AND CATCH BASINS WITHIN THE PROJECT AREA. INLET STENCILING MAY INCLUDE CONCRETE STAMPING, CONCRETE PAINTING. INSPECT AND MAINTAIN MARKINGS AS NEEDED. | | | |
| SC-3 | PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, RUNOFF, AND WIND DISPERSAL | TBD | THIS SHEET | REGULARLY | REGULARLY | <ul style="list-style-type: none">ENSURE TRASH ENCLOSURE AREAS ARE FULLY CONTAINED (THREE WALLS, DOOR, ROOF)PROVIDE ATTACHED LIDS ON ALL TRASH CONTAINERS. KEEP CONTAINERS AWAY FROM STORM DRAIN VICINITY.POST SIGNS ON ALL ENCLOSURES AND/OR DUMPSTERS INFORMING USERS TO KEEP LID CLOSED AND NOT TO DISPOSE OF LIQUIDS OR HAZARDOUS MATERIALS.INSPECT TRASH STORAGE AREAS TO ENSURE INTEGRITY OF CONTAINERS AND THAT AREA IS KEPT CLEANREPLACE LEAKING BINSCLEAN TRASH STORAGE AREAS REGULARLY | | | |
| SC-6 | ADDITIONAL BMPS BASED ON POTENTIAL SOURCES OF RUNOFF POLLUTANTS | TBD | THIS SHEET | REGULARLY OR AS DETERMINED NECESSARY | REGULARLY OR AS DETERMINED NECESSARY | <p>SC-6.A: ON-SITE STORM DRAIN INLETS</p> <ul style="list-style-type: none">MAINTAIN AND PERIODICALLY REPAIR OR REPLACE INLET MARKINGSPROVIDE STORM WATER POLLUTION PREVENTION INFORMATION TO NEW SITE OWNERS, LESSEES, OR OPERATORS <p>SC-6.B: INTERIOR FLOOR DRAINS AND ELEVATOR SHAFT SUMP PUMPS</p> <ul style="list-style-type: none">INSPECT AND MAINTAIN DRAINS TO PREVENT BLOCKAGE AND OVERFLOW <p>SC-6.D1: NEED FOR FUTURE INDOOR AND STRUCTURAL PEST CONTROL</p> <ul style="list-style-type: none">PROVIDE INTEGRATED PEST MANAGEMENT INFORMATION TO OWNERS, LESSEES AND OPERATORS. <p>SC-6.D2: LANDSCAPE/OUTDOOR PESTICIDE USE</p> <ul style="list-style-type: none">OWNER SHALL MAINTAIN LANDSCAPING USING MINIMUM OR NO PESTICIDESPROVIDE IPM INFORMATION TO NEW OWNERS, LESSEES AND OPERATORS <p>SC-6.F: FOOD SERVICE</p> <p>SC-6.G: REFUSE AREAS</p> <p>SC-6.N: FIRE SPRINKLER TEST WATER</p> <ul style="list-style-type: none">FIRE SPRINKLER TEST WATER SHALL BE DRAINED TO SANITARY SEWER SYSTEM.DURING A FIRE SPRINKLER TEST, THE FIRE RISER DISCHARGE SHALL BE CONNECTED BY A HOSE TO THE SEWER CLEANOUT. <p>SC-6.O: MISCELLANEOUS DRAIN OR WASH WATER</p> <p>SC-6.P: PLAZAS, SIDEWALK AND PARKING LOTS</p> <ul style="list-style-type: none">SWEEP REGULARLY TO PREVENT ACCUMULATION OF LITTER AND DEBRIS.DEBRIS FROM PRESSURE WASHING MUST BE COLLECTED TO PREVENT ENTRY INTO STORM DRAIN SYSTEM. WASHWATER CONTAINING ANY CLEANING AGENT OR DEGREASER MUST BE COLLECTED AND DISCHARGED TO THE SANITARY SEWER AND NOT DISCHARGED TO A STORM DRAIN.CLEAN ALL PAVEMENT AT LEAST ONCE A YEAR. | | | |

LEGEND

- PROJECT BOUNDARY
DMA BOUNDARY
SELF-MITIGATING
DE-MINIMIS AREA
PERVIOUS AREA
BMP AREA
STORM DRAIN STENCILING
PROHIBITIVE SIGNAGE (SEE SAMPLE BELOW)
STREET TREE (DMA-1)
TREE WELL SOIL



SAMPLE PROHIBITIVE SIGNAGE
NTS



ENGINEER OF WORK

REC CONSULTANTS, INC.
2442 SECOND AVENUE
SAN DIEGO, CA 92101
(619)232-9200 (619)232-9210 FAX

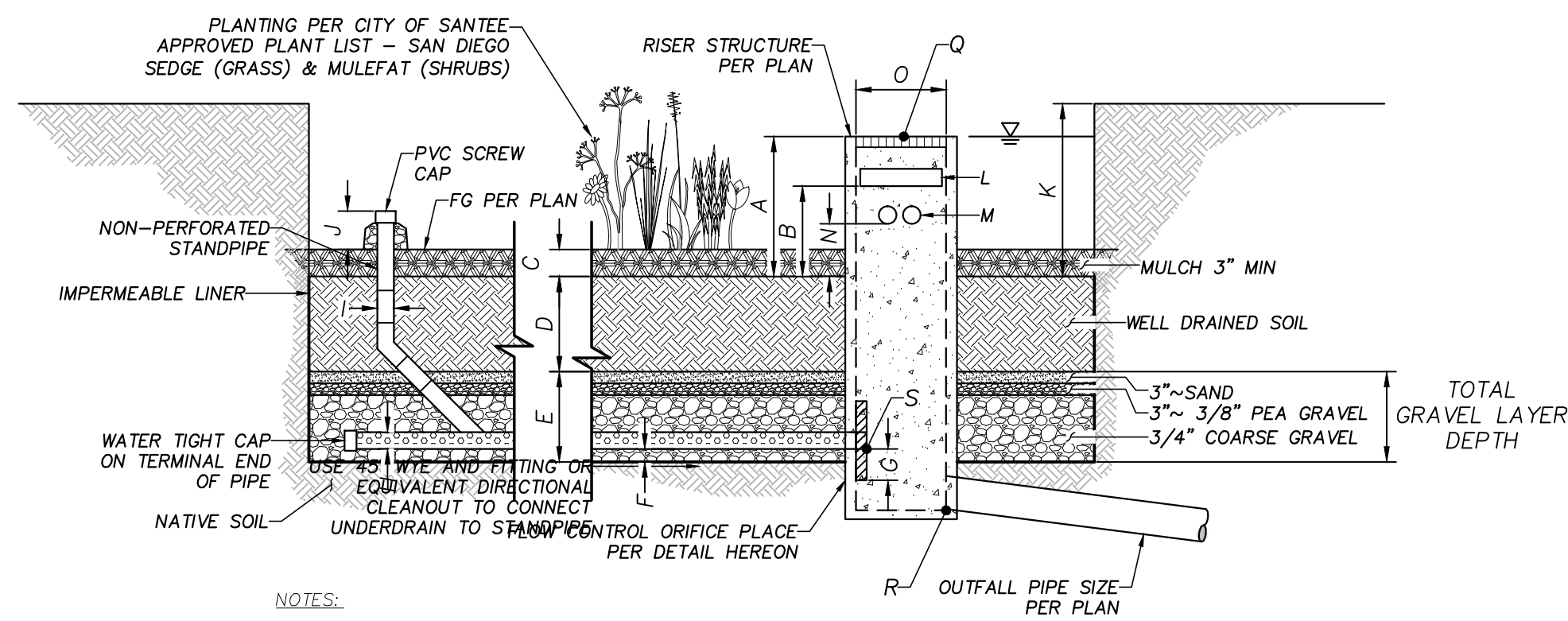


JONATHAN RAAB RYDEEN
R.C.E. 64811
DATE
EXP. 6-30-21

SHEET 5 CITY OF SANTEE OF 6 SHEETS

D.R. SITE PLAN &
PRELIMINARY GRADING PLAN
LANTERN CREST RIDGE II

BMP DETAILS SHEET
LANTERN CREST RIDGE II



NOTES:

- SEE TABULATED DATA BELOW FOR BILOFILTRATION BASIN LAYER DEPTHS AND SPECS.
- SEE DETAIL BELOW FOR PIPE SPECS.
- SOIL MIX PER CITY OF SANTEE LID MANUAL
- "WELL DRAINED SOIL" SHALL BE "SANDY LOAM" SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50-60% SAND, 20-30% COMPOST OR HARDWOOD MULCH, AND 20-30% TOPSOIL.
- THE EMERGENCY OVERFLOWS FOR THE BASINS ARE THE CURB INLETS WHICH WILL CONVEY THE FLOWS TO THE CURB AND GUTTER PRIOR TO DISCHARGING TO GRAVES AVENUE.

TABULATED DATA

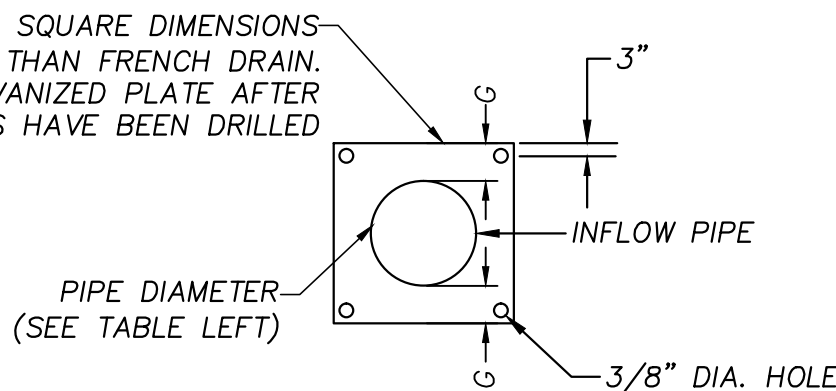
| | BMP 1-1 | BMP 1-2 | BMP 1-3 |
|--|---------------|---------------|---------------|
| A | 30" | 21" | 21" |
| B | N/A | N/A | N/A |
| C | 3" | 3" | 3" |
| D | 18" | 18" | 18" |
| E | 18" | 18" | 18" |
| F | 3" | 3" | 3" |
| G | 6" | 6" | 6" |
| H | 6" | 6" | 6" |
| I | 6" | 6" | 6" |
| J | 6' | 6" | 6" |
| K | 36" | 27" | 27" |
| L | N/A | N/A | N/A |
| M | 3 ~ 0.5" (Ø) | 1 ~ 0.25" (Ø) | 3 ~ 0.25" (Ø) |
| N | 9" | 9" | 9" |
| O | 24" Ø | 24" Ø | 24" Ø |
| Q = TOP OF GRATE ELEV. | 512.75 | 509.75 | 504.75 |
| R = FL OUT ELEV. (OUTFALL PIPE) | 510.25 | 508.00 | 503.00 |
| S = FL OUT ELEV. (PERFORATED UNDERDRAIN) | 507.75 | 505.50 | 500.50 |
| *T | 16.7' x 61.3' | 16.7' x 55' | 16.7' x 36.4' |

NOTE: (1) ROWS L AND M CORRESPOND TO UPPER & LOWER SLOT/ORIFICE WHERE W=WIDTH; H=HEIGHT; D=DIAMETER. FIRST NUMBER REPRESENTS THE NUMBER OF UNITS, IF MORE THAN 1 SLOT IS INDICATED THEN EACH SLOT SHOULD BE INSTALLED IN A DIFFERENT FACES OF OUTLET STRUCTURE.

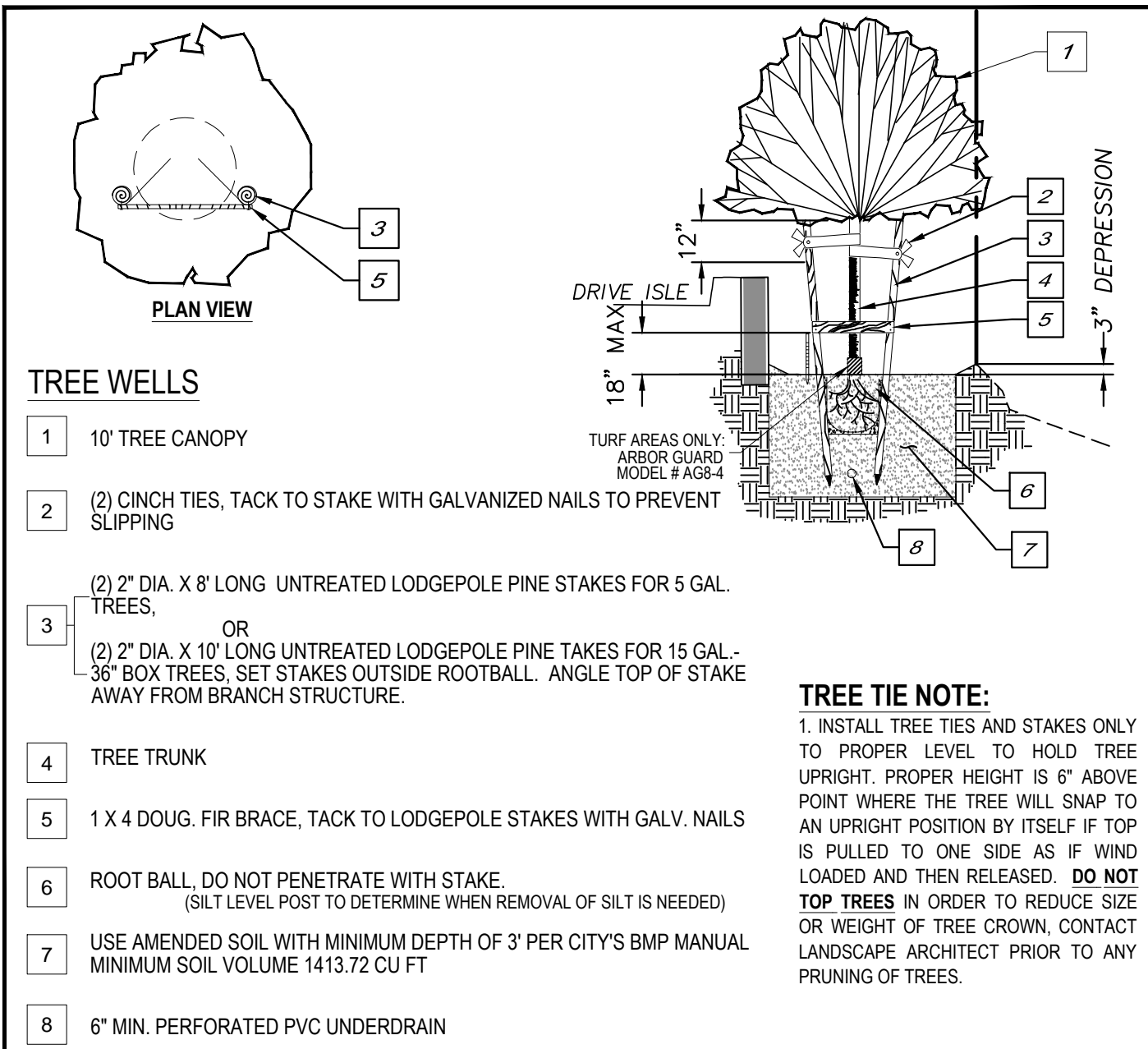
*T = APPROX. LENGTH x WIDTH

| BMP | REQUIRED AREA (sq-ft) | PROVIDED AREA (sq-ft) | REQUIRED VOLUME (cu-ft) | PROVIDED VOLUME (cu-ft) |
|-----|-----------------------|-----------------------|-------------------------|-------------------------|
| 1-1 | 761 | 940 | 1010 | 3384 |
| 1-2 | 175 | 845 | 154 | 2408 |
| 1-3 | 259 | 580 | 462 | 1653 |

| DMA DATA SUMMARY | | | | | | |
|-------------------|-----------|-----------------|---------------|-----------------|----------------|-------|
| AREA | SOIL TYPE | IMPERVIOUS (AC) | PERVIOUS (AC) | TOTAL AREA (AC) | TREATMENT TYPE | POC |
| DMA-1 | D | 0.12 | 0.03 | 0.15 | TREE WELL | POC-1 |
| DMA-2 | D | 0.17 | 0.04 | 0.21 | TREE WELL | |
| DMA-3 | D | 0.60 | 0.14 | 0.74 | BMP 1-1 | |
| DMA-4 | D | 0.09 | 0.03 | 0.12 | BMP 1-2 | |
| DMA-5 | D | 0.28 | 0.05 | 0.33 | BMP 1-3 | |
| SELF-MITIGATING-1 | D | 0.00 | 0.84 | 0.84 | BYPASS | POC-2 |
| SELF-MITIGATING-2 | D | 0.00 | 0.34 | 0.34 | BYPASS | |
| DE MINIMIS | D | 0.01 | 0.00 | 0.01 | - | |
| TOTAL | - | 1.27 | 1.47 | 2.74 | - | - |



FLOW CONTROL PIPE PLATE
NTS



| STREET TREE DETERMINATION | | | | | | | | | | |
|---------------------------|---------------|----------------------|------------------------|-------------------------|--------------------|------------------------------------|------------------------------|---------------------------|----------------------------|-------------------------|
| DMA | DMA DCV (FT³) | CANOPY DIAMETER (FT) | NUMBER OF STREET TREES | TOTAL CANOPY AREA (FT²) | TCV PER TREE (FT³) | CANOPY AREA OVER IMP SURFACE (FT²) | APPLICABLE CANOPY AREA (FT²) | APPLICABLE PERCENTAGE (%) | ADJUSTED TCV PER DMA (FT³) | FINAL DCV PER DMA (FT³) |
| 1 | 199 | 10 | 5 | 393 | 40 | 0 | 393 | 100 | 200 | -1 |
| 2 | 308 | 10 | 8 | 628 | 40 | 0 | 628 | 100 | 320 | -12 |

| STREET TREE STRUCTURAL SOIL REQUIREMENTS | | | | | | | | | |
|--|----------------------|------------------------|-----------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|----------------------------|
| DMA | CANOPY DIAMETER (FT) | NUMBER OF STREET TREES | REQUIRED VOLUME (FT³) | PROPOSED SOIL DEPTH (FT) | REQUIRED SOIL AREA (FT²) | PROPOSED SOIL WIDTH (FT) | PROPOSED SOIL LENGTH (FT) | PROPOSED SOIL AREA (FT²) | PROVIDED SOIL VOLUME (FT³) |
| 1 | 10 | 5 | 785 | 3 | 262 | 11 | 24 | 264 | 792 |
| 2 | 10 | 8 | 1257 | 3 | 419 | 14 | 30 | 420 | 1260 |

NOTES

- * APPROXIMATE DEPTH TO GROUNDWATER > 20 FT
- * UNDERLYING SOIL TYPE D



Civil Engineering-Environmental
Land Surveying

2442 Second Avenue
San Diego, CA 92101

Consultants, Inc. (619)232-9200 (619)232-9210 Fax

ENGINEER OF WORK

REC CONSULTANTS, INC.
2442 SECOND AVENUE
SAN DIEGO, CA 92101
(619)232-9200 (619)232-9210 FAX



JONATHAN RAAB RYDEEN
R.C.E. 64811

DATE
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July 26, 2019

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