County of San Diego
PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Marshall Road TM, PGP & Site Plan
PDS2017-TM-5621

1460 Marshall Road
Alpine, CA 91901

ASSESSOR'S PARCEL NUMBER(S):
403-271-20 & 21

ENGINEER OF WORK:

Lawrence W. Walsh **RCE 46316**

PREPARED FOR:

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PDP SWQMP PREPARED BY:

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DATE OF SWQMP:
September 5, 2018

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SWQMP APPROVED BY:

APPROVAL DATE:


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Table of Contents

Table of Contents iv
Attachments v
Acronyms v
PDP SWQMP Preparer's Certification Page vi
Submittal Record viii
Project Vicinity Map ix
Step 1: Project type determination (Standard or Priority Development Project) 1
Step 1.1: Storm Water Quality Management Plan requirements 3
Step 1.2: Exemption to PDP definitions 3
Step 2: Construction Storm Water BMP Checklist 4
Step 3: County of San Diego PDP SWQMP Site Information Checklist 7
Step 3.1: Description of Existing Site Condition 7
Step 3.2: Description of Existing Site Drainage Patterns 8
Step 3.3: Description of Proposed Site Development 9
Step 3.4: Description of Proposed Site Drainage Patterns 10
Step 3.5: Potential Pollutant Source Areas 11
Step 3.6: Identification and Narrative of Receiving Water and Pollutants of Concern 12
Step 3.7: Hydromodification Management Requirements 13
Step 3.7.1: Critical Coarse Sediment Yield Areas* 14
Step 3.7.2: Flow Control for Post-Project Runoff* 15
Step 3.8: Other Site Requirements and Constraints 16
Step 4: Source Control BMP Checklist 17
Step 5: Site Design BMP Checklist 19
Step 6: PDP Structural BMPs 21
Step 6.1: Description of structural BMP strategy 22
Step 6.2: Structural BMP Checklist 24
Step 6.3: Offsite Alternative Compliance Participation Form 25

Attachments

Attachment 1: Backup for PDP Pollutant Control BMPs
- Attachment 1a: Storm Water Pollutant Control Worksheet Calculations
- Attachment 1b: DMA Exhibit
- Attachment 1c: Individual Structural BMP DMA Mapbook

Attachment 2: Backup for PDP Hydromodification Control Measures
- Attachment 2a: Flow Control Facility Design
- Attachment 2b: Hydromodification Management Exhibit
- Attachment 2c: Management of Critical Coarse Sediment Yield Areas
- Attachment 2d: Geomorphic Assessment of Receiving Channels (optional)
- Attachment 2e: Vector Control Plan (if applicable)

Attachment 3: Structural BMP Maintenance Plan
- Attachment 3a: Structural BMP Maintenance Thresholds and Actions
- Attachment 3b: Draft Maintenance Agreements / Notifications(when applicable)

Attachment 4: County of San Diego PDP Structural BMP Verification for DPW Permitted Land Development Projects

Attachment 5: Copy of Plan Sheets Showing Permanent Storm Water BMPs

Attachment 6: Copy of Project's Drainage Report

Attachment 7: Copy of Project's Geotechnical and Groundwater Investigation Report

Acronyms

ACP	Alternative Compliance Project
APN	Assessor's Parcel Number
BMP	Best Management Practice
BMP DM	Best Management Practice Design Manual
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDCI	Private Development Construction Inspection Section
PDP	Priority Development Project
PDS	Planning and Development Services
PE	Professional Engineer
RPO	Resource Protection Ordinance
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan
WMAA	Watershed Management Area Analysis
WPO	Watershed Protection Ordinance
WQIP	Water Quality Improvement Plan

PDP SWQMP Preparer's Certification Page

Project Name: Marshall Road TM, PGP, & Site Plan
Permit Application Number: PDS2017-TM-5621

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 County of San Diego BMP Design Manual, which is a design manual for compliance with local County of San Diego Watershed Protection Ordinance (Sections 67.801 et seq.) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100) requirements for storm water management.

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

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

Larry Walsh
Print Name

Walsh Engineering & Surveying, Inc.
Company

_____
Date

Engineer's Seal:

Template Date: March 16, 2016 Preparation Date: September 5, 2018
LUEG:SW **PDP SWQMP**

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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.

Preliminary Design / Planning / CEQA

Submittal Number	Date	Summary of Changes
1	10-4-17	Initial Submittal
2	3-6-18	Addressing comments per 12-7-17 County scoping letter
3	7-6-18	Addressing comments per 5-4-18 County scoping letter
4	9-5-18	Addressing comments per 7-30-18 County project checklist

Final Design

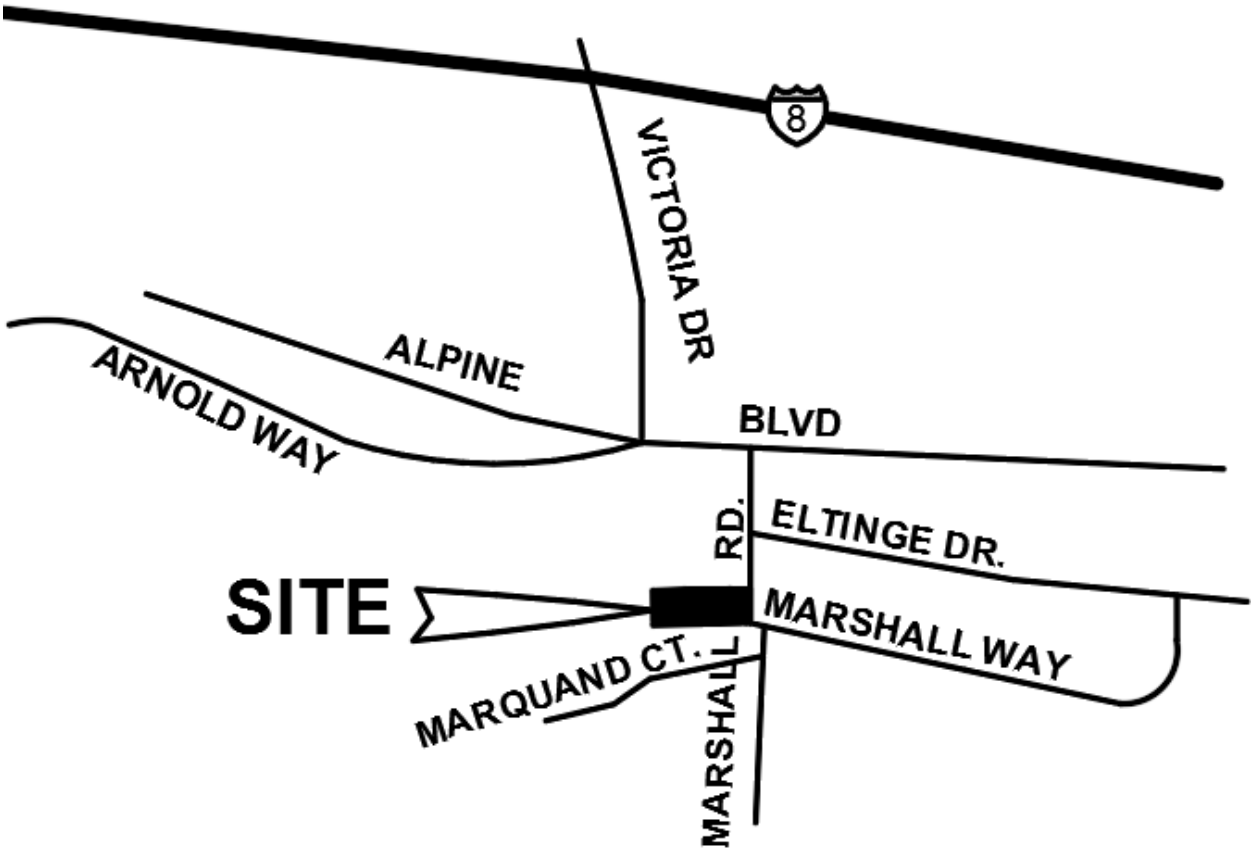
Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Plan Changes

Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Project Vicinity Map

Project Name: Marshall Road TM, PGP, and Site Plan
Record ID: PDS2017-TM-5621



VICINITY MAP
NO SCALE

Step 1: Project type determination (Standard or Priority Development Project)

Is the project part of another Priority Development Project (PDP)? (☐ Yes ☒ No If so, a PDP SWQMP is required. Go to Step 2.			
The project is (select one): ☐ New Development ☒ Redevelopment[1]			
The total proposed newly created or replaced impervious area is: 47,408 ft^2			
The total existing (pre-project) impervious area is: 5,516 ft^2			
The total area disturbed by the project is: 81,650 ft^2			
If the total area disturbed by the project is 1 acre (43,560 sq. ft.) or more OR the project is part of a larger common plan of development disturbing 1 acre or more, a Waste Discharger Identification (WDID) number must be obtained from the State Water Resources Control Board. WDID: _To be obtained during final engineering.			
Is the project in any of the following categories, (a) through (f)?[2]			
Yes ☐	No ☒	(a)	New development projects that create 10,000 square feet or more of impervious surfaces [3](collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☒	No ☐	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☒	No ☐	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (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.

[1] Redevelopment is defined as: The creation and/or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include routine maintenance activities, such as trenching and resurfacing associated with utility work; pavement grinding; resurfacing existing roadways; new sidewalks construction; pedestrian ramps; or bike lanes on existing roads; and routine replacement of damaged pavement, such as pothole repair.

[2] Applicants should note that any development project that will create and/or replace 10,000 square feet or more of impervious surface (collectively over the entire project site) is considered a new development.

[3] For solar energy farm projects, the area of the solar panels does not count toward the total impervious area of the site.

Project type determination (continued)

Yes ☐	No ☒	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and 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). *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.*
Yes ☐	No ☒	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (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. (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.
Yes ☒	No ☐	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*

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

☐ No – the project is not a Priority Development Project (Standard Project).

☒ Yes – the project is a Priority Development Project (PDP).

Further guidance may be found in Chapter 1 and Table 1-2 of the BMP Design Manual.

The following is for **redevelopment PDPs only**:

The area of existing (pre-project) impervious area at the project site is:	5,516 ft^2 (A)
The total proposed newly created or replaced impervious area is	47,408 ft^2 (B)
Percent impervious surface created or replaced (B/A)*100:	859 %

The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – **only newly created or replaced impervious areas are considered a PDP and subject to stormwater requirements**

OR

☒ greater than fifty percent (50%) – **the entire project site is considered a PDP and subject to stormwater requirements**

Step 1.1: Storm Water Quality Management Plan requirements

Step	Answer	Progression
Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, complete Step 1 Project Type Determination Checklist on Pages 1 and 2, and see PDP exemption information below. For further guidance, see Section 1.4 of the BMP Design Manual *in its entirety*.	☐ Standard Project	Standard Project requirements apply, including Standard Project SWQMP. **Complete Standard Project SWQMP.**
	☒ PDP	Standard and PDP requirements apply, including PDP SWQMP. **Complete PDP SWQMP.**
	☐ PDP with ACP	If participating in offsite alternative compliance, **complete Step 6.3 and an ACP SWQMP.**
	☐ PDP Exemption	**Go to Step 1.2 below.**

Step 1.2: Exemption to PDP definitions

Is the project exempt from PDP definitions based on either of the following:	If so:
☐ Projects that are only new or retrofit paved sidewalks, bicycle lanes, or trails that meet the following criteria: (i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR (ii) Designed and constructed to be hydraulically disconnected from paved streets or roads [i.e., runoff from the new improvement does not drain directly onto paved streets or roads]; OR (iii) Designed and constructed with permeable pavements or surfaces in accordance with County of San Diego Guidance on Green Infrastructure;	Standard Project requirements apply, AND any additional requirements specific to the type of project. County concurrence with the exemption is required. *Provide discussion and list any additional requirements below in this form.* **Complete Standard Project SWQMP**
☐ Projects that are only retrofitting or redeveloping existing paved alleys, streets or roads that are designed and constructed in accordance with the County of San Diego Guidance on Green Infrastructure.	**Complete Green Streets PDP Exempt SWQMP.**
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:	

Step 2: Construction Storm Water BMP Checklist

Minimum Required Standard Construction Storm Water BMPs		
If you answer "Yes" to any of the questions below, your project is subject to Table 1 on the following page (Minimum Required Standard Construction Stormwater BMPs). As noted in Table 1, please select at least the minimum number of required BMPs, or as many as are feasible for your project. If no BMP is selected, an explanation must be given in the box provided. The following questions are intended to aid in determining construction BMP requirements for your project. **Note: All selected BMPs below must be included on the BMP plan incorporated into the construction plan sets.**		
1. Will there be soil disturbing activities that will result in exposed soil areas? (This includes minor grading and trenching.) **Reference Table 1 Items A, B, D, and E** Note: Soil disturbances NOT considered significant include, but are not limited to, change in use, mechanical/electrical/plumbing activities, signs, temporary trailers, interior remodeling, and minor tenant improvement.	☒Yes	☐No
2. Will there be asphalt paving, including patching? **Reference Table 1 Items D and F**	☒Yes	☐No
3. Will there be slurries from mortar mixing, coring, or concrete saw cutting? **Reference Table 1 Items D and F**	☒Yes	☐No
4. Will there be solid wastes from concrete demolition and removal, wall construction, or form work? **Reference Table 1 Items D and F**	☒Yes	☐No
5. Will there be stockpiling (soil, compost, asphalt, concrete, solid waste) for over 24 hours? **Reference Table 1 Items D and F**	☒Yes	☐No
6. Will there be dewatering operations? **Reference Table 1 Items C and D**	☐Yes	☒No
7. Will there be temporary on-site storage of construction materials, including mortar mix, raw landscaping and soil stabilization materials, treated lumber, rebar, and plated metal fencing materials? **Reference Table 1 Items E and F**	☒Yes	☐No
8. Will trash or solid waste product be generated from this project? **Reference Table 1 Item F**	☒Yes	☐No
9. Will construction equipment be stored on site (e.g.: fuels, oils, trucks, etc.?) **Reference Table 1 Item F**	☒Yes	☐No
10. Will Portable Sanitary Services ("Porta-potty") be used on the site? **Reference Table 1 Item F**	☒Yes	☐No

Table 1. Construction Storm Water BMP Checklist

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook[4] Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
A. Select Erosion Control Method for Disturbed Slopes (choose at least one for the appropriate season)			
Vegetation Stabilization Planting[5] (Summer)	SS-2, SS-4	☐	
Hydraulic Stabilization Hydroseeding[2] (Summer)	SS-4	☒	
Bonded Fiber Matrix or Stabilized Fiber Matrix[6] (Winter)	SS-3	☒	
Physical Stabilization Erosion Control Blanket[3] (Winter)	SS-7	☐	
B. Select erosion control method for disturbed flat areas (slope < 5%) (choose at least one)			
County Standard Lot Perimeter Protection Detail	PDS 659[7], SC-2	☐	
Will use erosion control measures from Item A on flat areas also	SS-3, 4, 7	☐	
County Standard Desilting Basin (must treat all site runoff)	PDS 660[8], SC-2	☐	
Mulch, straw, wood chips, soil application	SS-6, SS-8	☒	

4 State of California Department of Transportation (Caltrans). 2003. Storm Water Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual. March. Available online at: http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm.

5 If Vegetation Stabilization (Planting or Hydroseeding) is proposed for erosion control it may be installed between May 1st and August 15th. Slope irrigation is in place and needs to be operable for slopes >3 feet. Vegetation must be watered and established prior to October 1st. The owner must implement a contingency physical BMP by August 15th if vegetation establishment does not occur by that date. If landscaping is proposed, erosion control measures must also be used while landscaping is being established. Established vegetation must have a subsurface mat of intertwined mature roots with a uniform vegetative coverage of 70 percent of the natural vegetative coverage or more on all disturbed areas.

6 All slopes over three feet must have established vegetative cover prior to final permit approval.

7 County of San Diego, Planning & Development Services. 2012. Standard Lot Perimeter Protection Design System. Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds659.pdf.

8 County of San Diego, Planning & Development Services. 2012. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds660.pdf.

Table 1. Construction Storm Water BMP Checklist (continued)

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
C. If runoff or dewatering operation is concentrated, velocity must be controlled using an energy dissipater			
Energy Dissipater Outlet Protection[9]	SS-10	☒	
D. Select sediment control method for all disturbed areas (choose at least one)			
Silt Fence	SC-1	☒	
Fiber Rolls (Straw Wattles)	SC-5	☒	
Gravel & Sand Bags	SC-6 & 8	☒	
Dewatering Filtration	NS-2	☐	
Storm Drain Inlet Protection	SC-10	☒	
Engineered Desilting Basin (sized for 10-year flow)	SC-2	☐	
E. Select method for preventing offsite tracking of sediment (choose at least one)			
Stabilized Construction Entrance	TC-1	☒	
Construction Road Stabilization	TC-2	☒	
Entrance/Exit Tire Wash	TC-3	☐	
Entrance/Exit Inspection & Cleaning Facility	TC-1	☐	
Street Sweeping and Vacuuming	SC-7	☐	
F. Select the general site management BMPs			
F.1 Materials Management			
Material Delivery & Storage	WM-1	☒	
Spill Prevention and Control	WM-4	☐	
F.2 Waste Management[10]			
Waste Management Concrete Waste Management	WM-8	☒	
Solid Waste Management	WM-5	☒	
Sanitary Waste Management	WM-9	☒	
Hazardous Waste Management	WM-6	☒	

Note: The Construction General Permit (Order No. 2009-0009-DWQ) also requires all projects not subject to the BMP Design Manual to comply with runoff reduction requirements through the implementation of post-construction BMPs as described in Section XIII of the order.

[9] Regional Standard Drawing D-40 – Rip Rap Energy Dissipater is also acceptable for velocity reduction.

[10] Not all projects will have every waste identified. The applicant is responsible for identifying wastes that will be onsite and applying the appropriate BMP. For example, if concrete will be used, BMP WM-8 must be selected.

Step 3: County of San Diego PDP SWQMP Site Information Checklist

Step 3.1: Description of Existing Site Condition

Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	907.33 San Diego Hydrologic Unit, El Capitan HA, Alpine HSA

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:
There are five existing run-down structures on site all to be removed prior construction.

Existing Land Cover Includes (select all that apply and provide each area on site):

☒ Vegetative Cover 0.31 Acres (13,469 Square Feet)
☒ Non-Vegetated Pervious Areas 1.44 Acres (62,575 Square Feet)
☒ Impervious Areas 0.13 Acres (5,516 Square Feet)

Description / Additional Information:
Currently undeveloped land, with private road and one existing house to be removed. Terrain is dry weeds/dirt and the site slopes north to south with a general slope range of 5%-15%

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) (or N/A if no infiltration is used):

☐ 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
☐ Other

Description / Additional Information:

Step 3.2: 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 existing site drainage is natural and the site slopes generally 7%-20% from east to west. There are several structures on site to be removed. The majority of the site flows to a brow ditch located along the entire westerly property line. The small amount of runoff that does not flow to this westerly brow ditch, flows to brow ditches along the north and south property lines.

Step 3.3: Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:
The proposed project will consist of 23 single family units. A proposed private 24' wide AC paved road will be constructed to provide access to the units.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):
Proposed impervious features of the site will include the 24' wide AC paved road, as well as the 23 proposed single family units. There will also be proposed AC pavement at the intersection of Marshall Road and Marshall Way to provide a 20 foot radius modified street knuckle with proposed curb, gutter, and sidewalk.

List/describe proposed pervious features of the project (e.g., landscape areas):
Proposed pervious features of the site will include graded slopes, as well as the area around the 23 units.

Does the project include grading and changes to site topography?
☒Yes
☐No

Description / Additional Information:
The lot will be graded to construct private road as well as units. Areas on-site near the south and west property lines will remain natural/ungraded.

Insert acreage or square feet for the different land cover types in the table below:

Change in Land Cover Type Summary			
Land Cover Type	Existing (acres or ft^2)	Proposed (acres or ft^2)	Percent Change
Vegetation	0.31 Ac	0.31 Ac	0%
Pervious (non-vegetated)	1.44 Ac	0.48 Ac	51%
Impervious	0.13 Ac	1.09 Ac	51%

Step 3.4: 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:

The proposed project will create 24' wide AC paved road that will pick up runoff from the units south of the road. The 24' wide road is dipped in the middle to create a triangular type swale in which water will flow through. The runoff from the road will enter a 14' Type B-1 curb inlet near the road's end and enter a biofiltration basin with partial retention (PR-1) also known as Basin A. Runoff from the units north of the road will enter a catch basin and pipe system that ultimately will outlet at the proposed Basin A. There will be two proposed biofiltration basins (Basins A & B), 700 sf each. Runoff will be routed to the first biofiltration basin (Basin A) and will overflow to enter the standpipe and be delivered to the second basin (Basin B). There is also a smaller Type C curb inlet at the end of the private driveway that picks up remaining runoff not picked up by the Type B-1 curb inlet mentioned above. This small amount of runoff picked up in the Type C inlet will be directly routed to the second biofiltration basin (Basin B). Runoff leaving Basin B will leave through a 12" PVC outlet pipe and enter a Type B Concrete brow ditch. This runoff will flow southwest across the back of the project and enter a settling area where runoff is designed to sheet flow over rip rap and enter the existing concrete brow ditch located along the westerly property line.

The project also will create proposed street improvements at the intersection of Marshall Road and Marshall Way. These improvements include at 20 foot radius modified street knuckle, in which there will be proposed AC pavement, a proposed driveway entrance, and proposed, curb, gutter, and sidewalk. To treat this addition of new impervious area a 20' diameter street tree in a 19'x13.5' tree well will be proposed at the southeast corner of the site in which a modified curb outlet inlet will transport runoff from Marshall Way under the proposed sidewalk and into the tree well. Runoff leaving the tree well will enter the existing concrete brow ditch adjacent to the south edge of the tree well.

Step 3.5: Potential Pollutant Source Areas

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply). Select "Other" if the project is a phased development and provide a description:

- ☒ 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
- ☐ Other (provide description)

Description / Additional Information:

Step 3.6: Identification and Narrative of Receiving Water and Pollutants of Concern

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable):
Runoff will flow to POCs then make its way to El Capitan Lake then the San Diego River

List any 303(d) impaired water bodies[11] 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
Lower San Diego River	*Enterococcus, fecal coliform, dissolved oxygen manganese, nitrogen, phosphorus, TDS, aquatic toxicity*	
El Capitan Lake	*Color, Manganese, Phosphorus, Total Nitrogen as N, pH*	

Identification of Project Site Pollutants*

*Identification of project site pollutants below 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	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	☒	☐	☐
Nutrients	☒	☐	☐
Heavy Metals	☒	☐	☐
Organic Compounds	☒	☐	☐
Trash & Debris	☒	☐	☐
Oxygen Demanding Substances	☒	☐	☐
Oil & Grease	☒	☐	☐
Bacteria & Viruses	☒	☐	☐

[11] The current list of Section 303(d) impaired water bodies can be found at http://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired

Pesticides	☒	☐	☐

Step 3.7: Hydromodification Management Requirements

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

☒Yes, hydromodification management requirements for flow control and preservation of critical coarse sediment yield areas are applicable.

☐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[12] for the watershed in which the project resides.

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

[12] The Watershed Management Area Analysis (WMAA) is an optional element for inclusion in the Water Quality Improvement Plans (WQIPs) described in the 2013 MS4 Permit [Provision B.3.b.(4)]. It is available online at the Project Clean Water website: http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=248

Step 3.7.1: Critical Coarse Sediment Yield Areas*

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

Projects must satisfy critical coarse sediment yield area (CCSYA) requirements by characterizing the project as one of the scenario-types presented below and satisfying associated criteria. Projects must appropriately satisfy all requirements for identification, avoidance, and bypass, OR may alternatively elect to demonstrate no net impact.

☒ **Scenario 1**: Project is subject to and in compliance with RPO requirements *(without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3) that result in impacts to more than 15% of the project-scale CCSYAs)*.

- ☒ Identify: Project has identified both onsite and upstream CCSYAs as areas that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☒ Avoid: Project has avoided onsite CCSYAs per existing RPO steep slope encroachment criteria. AND,
- ☒ Bypass: Project has demonstrated that both onsite and upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☒ No Net Impact: Project does not satisfy all Scenario 1 criteria above and must alternatively demonstrate no net impact to the receiving water.

☐ **Scenario 2**: Project is entirely exempt/not subject to RPO requirements without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3).

- ☐ Identify: Project has identified upstream CCSYAs that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☐ Avoid: Project is not required to avoid onsite CCSYAs as none were identified in the previous step. AND,
- ☐ Bypass: Project has demonstrated that upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☐ No Net Impact: Project does not satisfy all Scenario 2 criteria above and must alternatively demonstrate no net impact to the receiving water. *(Skip to next row).*

☐ **Scenario 3**: Project utilizes exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3) and impacts more than 15% of the project-scale CCSYAs.

- ☐ No Net Impact: Project is not eligible for traditional methods of identification, avoidance, and bypass. Project must demonstrate no net impact to the receiving water.

Critical Coarse Sediment Yield Areas Continued
Demonstrate No Net Impact
If the project elects to satisfy CCSYA criteria through demonstration of no net impact to the receiving water. Applicants must identify the methods utilized from the list below and provide supporting documentation in Attachment 2c of the SWQMP. Check all that are applicable. ☒ N/A, the project appropriately identifies, avoids, and bypasses CCSYAs. ☐ Project has performed additional analysis to demonstrate that impacts to CCSYAs satisfy the no net impact standard of Ep/Sp≤1.1. ☐ Project has provided alternate mapping of CCSYAs. ☐ Project has implemented additional onsite hydromodification flow control measures. ☐ Project has implemented an offsite stream rehabilitation project to offset impacts. ☐ Project has implemented other applicant-proposed mitigation measures.

Step 3.7.2: 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. POC 1 (existing brow ditch near west property line which receives flows from DMA 1) and POC 2 (existing brow ditch at south property line near southeast property corner, which receives flows from DMA 3). See DMA and HMP map for POC locations and DMA boundaries.
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:* *N/A* *Discussion / Additional Information: (optional)*

Step 3.8: 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.

No site constraints.

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.

Step 4: Source Control BMP Checklist

Source Control BMPs			
All development projects must implement source control BMPs 4.2.1 through 4.2.6 where applicable and feasible. See Chapter 4.2 and Appendix E of the County BMP Design Manual for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the source control BMP as described in Chapter 4.2 and/or Appendix E of the County 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 must be provided.			
Source Control Requirement	**Applied?**		
4.2.1 Prevention of Illicit Discharges into the MS4	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.1 not implemented:			
4.2.2 Storm Drain Stenciling or Signage	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.2 not implemented:			
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.3 not implemented:			
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.4 not implemented:			

Source Control Requirement	Applied?		
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.5 not implemented:			
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below):			
☐ A. On-site storm drain inlets	☒Yes	☐No	☐N/A
☐ B. Interior floor drains and elevator shaft sump pumps	☐Yes	☐No	☒N/A
☐ C. Interior parking garages	☐Yes	☐No	☒N/A
☐ D. Need for future indoor & structural pest control	☐Yes	☐No	☒N/A
☐ E. Landscape/outdoor pesticide use	☒Yes	☐No	☐N/A
☐ F. Pools, spas, ponds, fountains, and other water features	☐Yes	☐No	☒N/A
☐ G. Food service	☐Yes	☐No	☒N/A
☐ H. Refuse areas	☐Yes	☐No	☒N/A
☐ I. Industrial processes	☐Yes	☐No	☒N/A
☐ J. Outdoor storage of equipment or materials	☐Yes	☐No	☒N/A
☐ K. Vehicle and equipment cleaning	☐Yes	☐No	☒N/A
☐ L. Vehicle/equipment repair and maintenance	☐Yes	☐No	☒N/A
☐ M. Fuel dispensing areas	☐Yes	☐No	☒N/A
☐ N. Loading docks	☐Yes	☐No	☒N/A
☐ O. Fire sprinkler test water	☐Yes	☐No	☒N/A
☐ P. Miscellaneous drain or wash water	☐Yes	☐No	☒N/A
☐ Q. Plazas, sidewalks, and parking lots	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above. Runoff pollutants are listed as N/A because interior floor drains and elevator shaft pumps, interior parking garages, indoor or structural pest control, pools, spas, ponds, fountains, water features, food service, refuse areas, industrial processes, outdoor storage of equipment or materials, vehicle and equipment cleaning, and vehicle repair, fuel dispensing areas, loading docks, fire sprinkler test water, miscellaneous drain or wash water are not present on site.			

Note: Show all source control measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 5: Site Design BMP Checklist

Site Design BMPs
All development projects must implement site design BMPs SD-A through SD-H where applicable and feasible. See Chapter 4.3 and Appendix E of the County BMP Design Manual for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the site design BMP as described in Chapter 4.3 and/or Appendix E of the County 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 must be provided.

Site Design Requirement	Applied?		
4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features	☐Yes	☐No	☒N/A
Discussion / justification if 4.3.1 not implemented: There are no drainage courses or natural drainage swales on site.			
4.3.2 Conserve Natural Areas, Soils, and Vegetation	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.2 not implemented:			
4.3.3 Minimize Impervious Area	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.3 not implemented:			
4.3.4 Minimize Soil Compaction	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.4 not implemented:			
4.3.5 Impervious Area Dispersion	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.5 not implemented:			

Site Design Requirement	Applied?		
4.3.6 Runoff Collection	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.6 not implemented:			
4.3.7 Landscaping with Native or Drought Tolerant Species	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.7 not implemented:			
4.3.8 Harvesting and Using Precipitation	☐Yes	☒No	☐N/A
Discussion / justification if 4.3.8 not implemented: Harvest and use is not feasible for the project.			

Note: Show all site design measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 6: PDP Structural BMPs

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

PDP structural BMPs must be verified by the County 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 County must confirm the maintenance (see Section 7 of the BMP Design Manual).

Use this section to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (Step 6.2) for each structural BMP within the project (copy the BMP summary information sheet [Step 6.2] as many times as needed to provide summary information for each individual structural BMP).

Step 6.1: Description of structural BMP strategy

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. At the end of this discussion provide a summary of all the structural BMPs within the project including the type and number.

There will be two biofiltration basins with partial retention placed near the end of the proposed private road. The biofiltration basins with retention (PR-1) will treat all the proposed impervious surface generated from the project. This type of structural BMP was selected due to the ability to allow for some infiltration and include and underdrain. There were infiltration rates of 1 inch per hour measured on-site per infiltration testing results, which is an acceptable rate to allow for infiltration. Infiltration testing results are provided in attachment 7 of this report. This type of structural BMP also has good ability to remove pollutants and is easy to maintain.

One 20’ diameter canopy street tree will also be used to treat the improvements at the intersection of Marshall Road and Marshall Way, however, street trees are not considered structural BMPs and is therefore not listed in the section below.

(Continue on following page as necessary.)

Description of structural BMP strategy continued (Page reserved for continuation of description of general strategy for structural BMP implementation at the site)
(Continued from previous page)

Step 6.2: Structural BMP Checklist

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. N/A TM Phase	
Construction Plan Sheet No. N/A TM Phase	
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 (See Section 1.12 of the BMP Design Manual)	The Owner, Rich Bonjorno
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	CAT 2
Discussion (as needed): *(Continue on subsequent pages as necessary)*	

Step 6.3: Offsite Alternative Compliance Participation Form

PDP INFORMATION	
Record ID:	N/A
Assessor's Parcel Number(s) [APN(s)]	
What are your PDP Pollutant Control Debits? *See Attachment 1 of the PDP SWQMP	
What are your PDP HMP Debits? (if applicable) *See Attachment 2 of the PDP SWQMP	
ACP Information	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
Project Owner/Address	
What are your ACP Pollutant Control Credits? *See Attachment 1 of the ACP SWQMP	
What are your ACP HMP Debits? (if applicable) *See Attachment 2 of the ACP SWQMP	
Is your ACP in the same watershed as your PDP? ☐ Yes ☐ No	Will your ACP project be completed prior to the completion of the PDP? ☐ Yes ☐ No
Does your ACP account for all Deficits generated by the PDP? ☐ Yes ☐ No (PDP and/or ACP must be redesigned to account for all deficits generated by the PDP.	What is the difference between your PDP debits and ACP Credits? *(ACP Credits -Total PDP Debits = Total Earned Credits)

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	Storm Water Pollutant Control Worksheet Calculations -Worksheet B.3-1 (Required) -Worksheet B.1-1 (Required) -Worksheet B.4-1 (if applicable) -Worksheet B.4-2 (if applicable) -Worksheet B.5-1 (if applicable) -Worksheet B.5-2 (if applicable) -Worksheet B.5-3 (if applicable) -Worksheet B.6-1 (if applicable) -Summary Worksheet (optional)	☒ Included
Attachment 1b	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	☒ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1c	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☒ Included
Attachment 1d	Individual Structural BMP DMA Mapbook (Required) -Place each map on 8.5”x11” paper. -Show at a minimum the DMA, Structural BMP, and any existing hydrologic features within the DMA.	☒ Included

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	1,931	cubic-feet
	1	Proposed Development Type	Residential	unitless
	2	Number of Residents or Employees at Proposed Development	23	#
	3	Total Planted Area within Development	10,000	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?	No	yes/no
	6	Is Average Site Design Infiltration Rate ≤0.010 Inches per Hour?	No	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	43	cubic-feet
	11	Anticipated 1 Acre Landscape Use Over 36 Hours	52.14	cubic-feet
	12	Subtotal: Anticipated Landscape Use Over 36 Hours	12	cubic-feet
	13	Total Anticipated Use Over 36 Hours	55	cubic-feet
	14	Total Anticipated Use / Design Capture Volume	0.03	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?	Yes	yes/no
Result	18	Feasibility Category	4	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 ≥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 ≥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*	*ii*	Units
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	DMA 1	DMA 3	unitless
	1	Basin Drains to the Following BMP Type	Biofiltration	Other	unitless
	2	85th Percentile 24-hr Storm Depth	0.52	0.52	inches
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	1.000		in/hr
	4	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	44,099	3,309	sq-ft
	5	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)			sq-ft
	6	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)			sq-ft
	7	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)			sq-ft
	8	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)			sq-ft
	9	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)	20,473	2,879	sq-ft
	10	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)			sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	Yes	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		1	#
	20	Average Mature Tree Canopy Diameter		20	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 Downstream Drainage?	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	cubic-feet
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	cubic-feet
Initial Runoff Factor Calculation	28	Total Tributary Area	64,572	6,188	sq-ft
	29	Initial Runoff Factor for Standard Drainage Areas	0.69	0.59	unitless
	30	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	unitless
	31	Initial Weighted Runoff Factor	0.69	0.59	unitless
	32	Initial Design Capture Volume	1,931	158	cubic-feet
Dispersion Area Adjustments	33	Total Impervious Area Dispersed to Pervious Surface	0	0	sq-ft
	34	Total Pervious Dispersion Area	0	0	sq-ft
	35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	ratio
	36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	ratio
	37	Runoff Factor After Dispersion Techniques	0.69	0.59	unitless
	38	Design Capture Volume After Dispersion Techniques	1,931	158	cubic-feet
Tree & Barrel Adjustments	39	Total Tree Well Volume Reduction	0	180	cubic-feet
	40	Total Rain Barrel Volume Reduction	0	0	cubic-feet
Results	41	Final Adjusted Runoff Factor	0.69	0.00	unitless
	42	Final Effective Tributary Area	44,555	0	sq-ft
	43	Initial Design Capture Volume Retained by Site Design Elements	0	180	cubic-feet
	44	Final Design Capture Volume Tributary to BMP	1,931	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*	Units
BMP Inputs	0	Drainage Basin ID or Name	DMA 1	sq-ft
	1	Design Infiltration Rate Recommended by Geotechnical Engineer	1.000	in/hr
	2	Effective Tributary Area	44,555	sq-ft
	3	Minimum Biofiltration Footprint Sizing Factor	0.030	ratio
	4	Design Capture Volume Tributary to BMP	1,931	cubic-feet
	5	Is Biofiltration Basin Impermeably Lined or Unlined?	Unlined	unitless
	6	Provided Biofiltration BMP Surface Area	1,340	sq-ft
	7	Provided Surface Ponding Depth	6	inches
	8	Provided Soil Media Thickness	18	inches
	9	Provided Depth of Gravel Above Underdrain Invert	45	inches
	10	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	0.70	inches
	11	Provided Depth of Gravel Below the Underdrain	3	inches
Retention Calculations	12	Volume Infiltrated Over 6 Hour Storm	670	cubic-feet
	13	Soil Media Pore Space Available for Retention	0.05	unitless
	14	Gravel Pore Space Available for Retention	0.40	unitless
	15	Effective Retention Depth	2.10	inches
	16	Calculated Retention Storage Drawdown (Including 6 Hr Storm)	7	hours
	17	Volume Retained by BMP	905	cubic-feet
	18	Fraction of DCV Retained	0.47	ratio
	19	Portion of Retention Performance Standard Satisfied	1.00	ratio
	20	Fraction of DCV Retained (normalized to 36-hr drawdown)	1.00	ratio
	21	Design Capture Volume Remaining for Biofiltration	0	cubic-feet
Biofiltration Calculations	22	Max Hydromod Flow Rate through Underdrain	0.0308	CFS
	23	Max Soil Filtration Rate Allowed by Underdrain Orifice	0.99	in/hr
	24	Soil Media Filtration Rate per Specifications	5.00	in/hr
	25	Soil Media Filtration Rate to be used for Sizing	0.99	in/hr
	26	Depth Biofiltered Over 6 Hour Storm	5.95	inches
	27	Soil Media Pore Space Available for Biofiltration	0.20	unitless
	28	Effective Depth of Biofiltration Storage	27.60	inches
	29	Drawdown Time for Surface Ponding	3	hours
	30	Drawdown Time for Effective Biofiltration Depth	14	hours
	31	Total Depth Biofiltered	33.55	inches
	32	Option 1 - Biofilter 1.50 DCV: Target Volume	0	cubic-feet
	33	Option 1 - Provided Biofiltration Volume	0	cubic-feet
	34	Option 2 - Store 0.75 DCV: Target Volume	0	cubic-feet
	35	Option 2 - Provided Storage Volume	0	cubic-feet
	36	Portion of Biofiltration Performance Standard Satisfied	#DIV/0!	ratio
Result	37	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	yes/no
	38	Overall Portion of Performance Standard Satisfied	#DIV/0!	ratio
	39	This BMP Overflows to the Following Drainage Basin	-	unitless
	40	**Deficit of Effectively Treated Stormwater**	**#DIV/0!**	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

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

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

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

Provide basis:

Type C soil is located on-site. Infiltration testing was performed on-site by Soil Testers and testing yielded and infiltration rate of 1 in/hr for the project.

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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

Due to the proximity of unit 14 as well as retaining wall to the basin, full infiltration could potentially create settlement problems.

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

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Type C soil is located on-site. Infiltration testing was performed on-site by Soil Testers and testing yielded and infiltration rate of 1 in/hr for the project. No shallow groundwater table, nor potential for groundwater contamination. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Type C soil is located on-site. Infiltration testing was performed on-site by Soil Testers and testing yielded and infiltration rate of 1 in/hr for the project. No potential for water balance issues. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** 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		No

*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 Agency/Jurisdictions to substantiate findings

Form I-8 Page 3 of 4

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

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

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

Provide basis:

Type C soil is located on-site. Infiltration testing was performed on-site by Soil Testers and testing yielded and infiltration rate of 1 in/hr for the project.

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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Provide basis:

Type C soil is located on-site. Infiltration testing was performed on-site by Soil Testers and testing yielded and infiltration rate of 1 in/hr for the project. Partial infiltration is acceptable and will not increase risk of geologic hazards.

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

Form I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Type C soil is located on-site. Infiltration testing was performed on-site by Soil Testers and testing yielded and infiltration rate of 1 in/hr for the project. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Type C soil is located on-site. Infiltration testing was performed on-site by Soil Testers and testing yielded and infiltration rate of 1 in/hr for the project. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 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.**	Partial Infiltration	

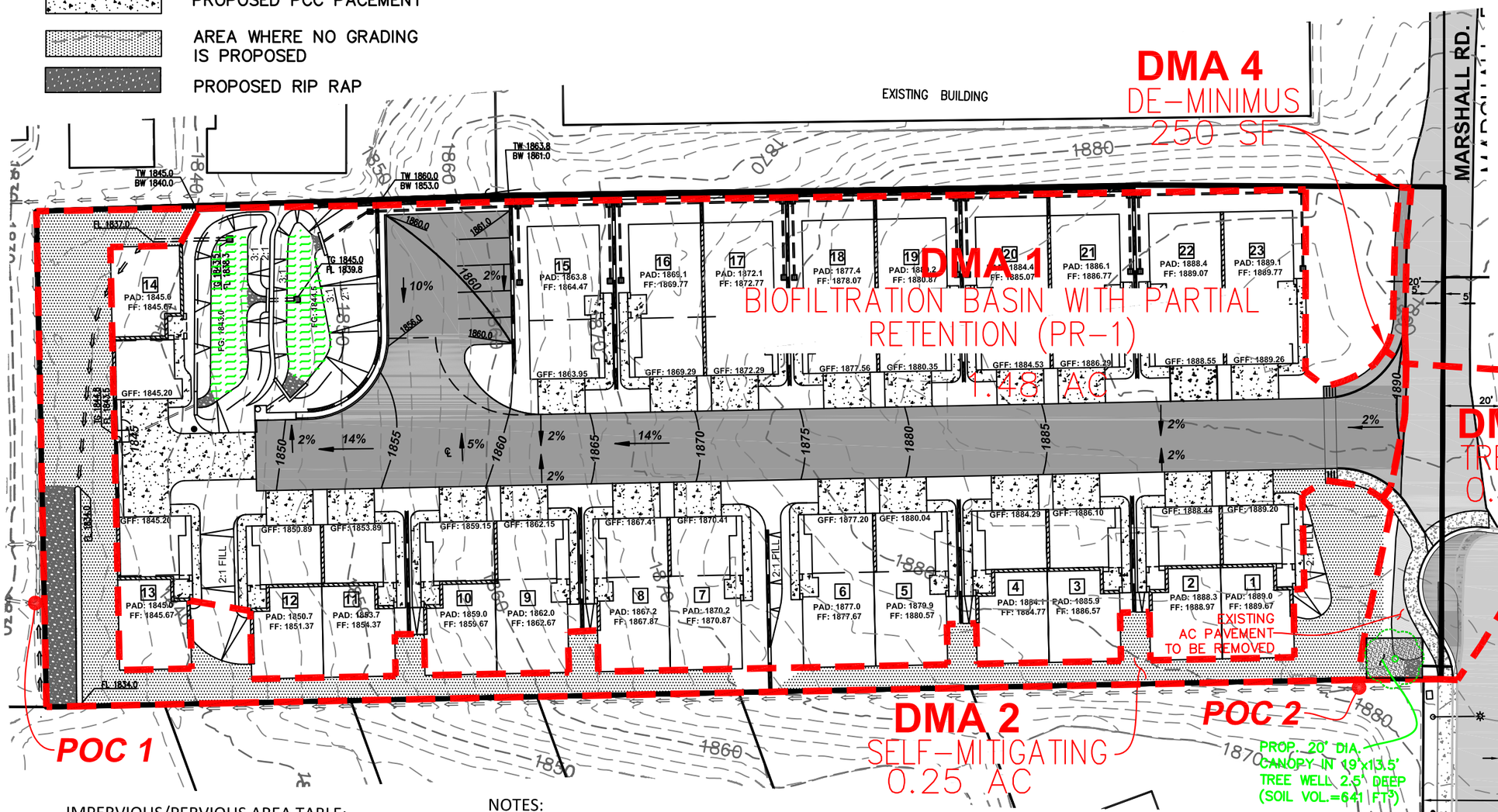
*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

DRAINAGE MANAGEMENT AREA EXHIBIT

1460 MARSHALL ROAD
ALPINE, CA. 91901

HATCH LEGEND:

SYMBOL	ITEM
	EXISTING AC PAVEMENT
	PROPOSED AC PAVEMENT
	PROPOSED PCC PACEMENT
	AREA WHERE NO GRADING IS PROPOSED
	PROPOSED RIP RAP



BMP LEGEND

SOURCE CONTROL BMPS:

PREVENTION OF ILLICIT DISCHARGES INTO THE MS4	4.2.1
STORM DRAIN STENCILING	4.2.2
PROTECTED OUTDOOR MATERIALS STORAGE AREAS	4.2.3
PROTECTED MATERIALS STORED IN OUTDOOR WORK AREAS	4.2.4
PROTECT TRASH STORAGE AREAS	4.2.5
ON-SITE STORM DRAIN INLETS	4.2.6.A
LANDSCAPE/OUTDOOR PEST. USE	4.2.6.E
PLAZAS, SIDEWALKS, AND PARKING LOT	4.2.6.Q

SITE DESIGN BMPS:

CONSERVE NATURAL AREAS, SOILS, AND VEGETATION	4.3.2
MINIMIZE IMPERVIOUS AREA	4.3.3
MINIMIZE SOIL COMPACTION	4.3.4
IMPERVIOUS AREA DISPERSION	4.3.5
RUNOFF COLLECTION	4.3.6
LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES	4.3.7

IMPERVIOUS/PERVIOUS AREA TABLE:

DMA	1	2	3
IMPERVIOUS (SF)	44,099	0	3,309
PERVIOUS (SF)	20,473	10,890	2,879
TOTAL (SF)	64,572	10,890	6,188
SELF-RETAINING	X	–	X
SELF-MITIGATING	–	X	–
BMP AREA (SF) (IF APPLICABLE)	1,340	N/A	N/A-TREE WELL

NOTES:
1. SOIL: TYPE C

2. CRITICAL SEDIMENT YIELD COARSE AREAS: NONE

3. DEPTH TO GROUNDWATER: UNKNOWN DEPTH - KNOWN TO BE DEEP (DEPTH> 10')

4. PROPOSED CURB INLETS TO HAVE PROHIBITIVE LANGUAGE/SIGNAGE STATING : "NO DUMPING"

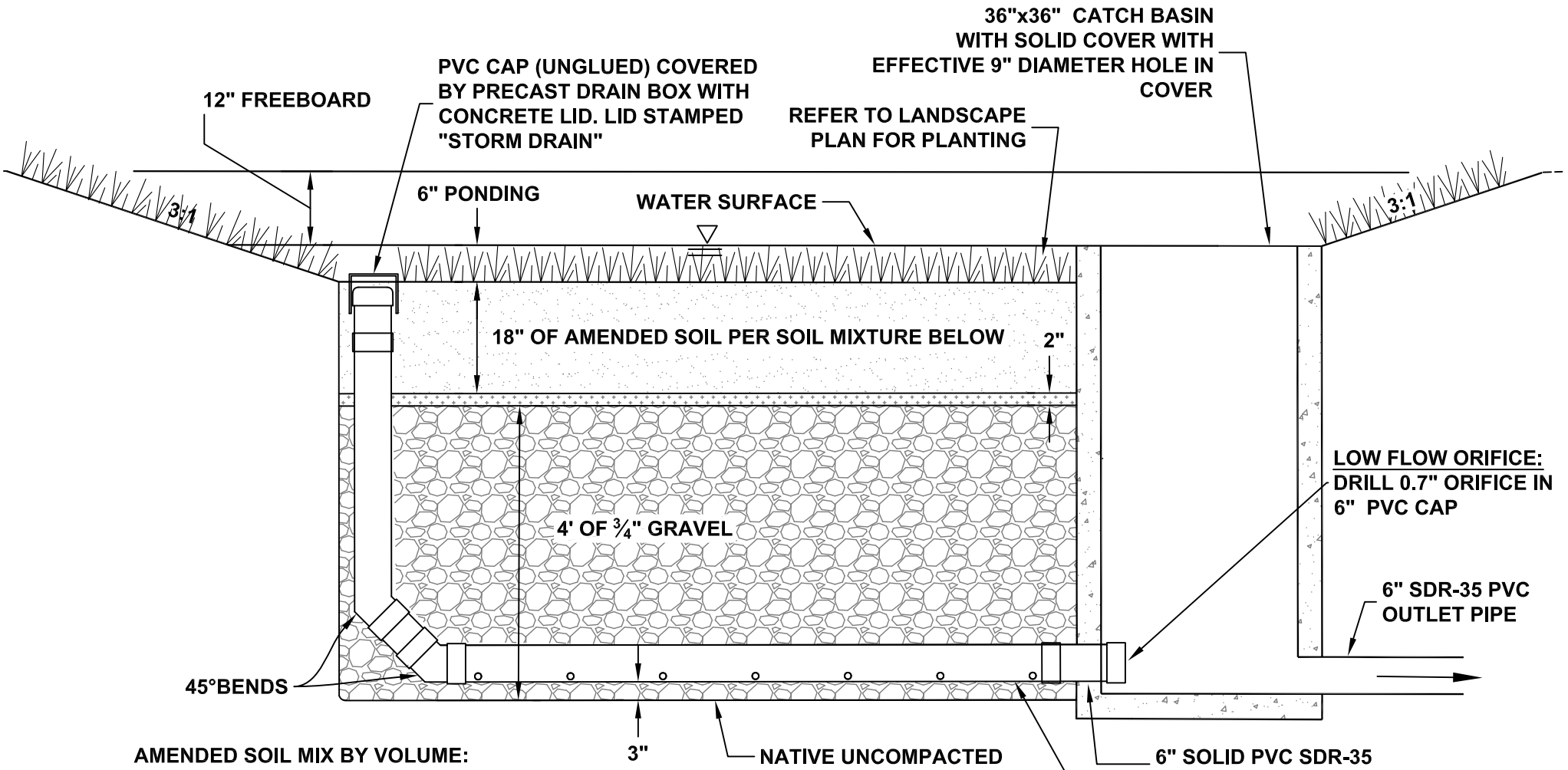
5. EACH UNIT IS 1,100 SF

BMP TREATMENT AREA:
COMBINE TREATMENT AREA OF BOTH BIOFILTRATION BASINS w/ PARTIAL RETENTION (PR-1): 1,340 SF

LEGEND:
DMA BOUNDARY
BIOFILTRATION BASIN WITH PARTIAL RETENTION (PR-1): 1,340 SF

40' 20' 0 40' 80' 120'
SCALE: 1"=40'

L:\PROJECTS 3D\16954-MARSHALL\PRODUCTION DRAWINGS\16954-SWQMP EXHIBITS.DWG July 09, 2018 - 11:50am

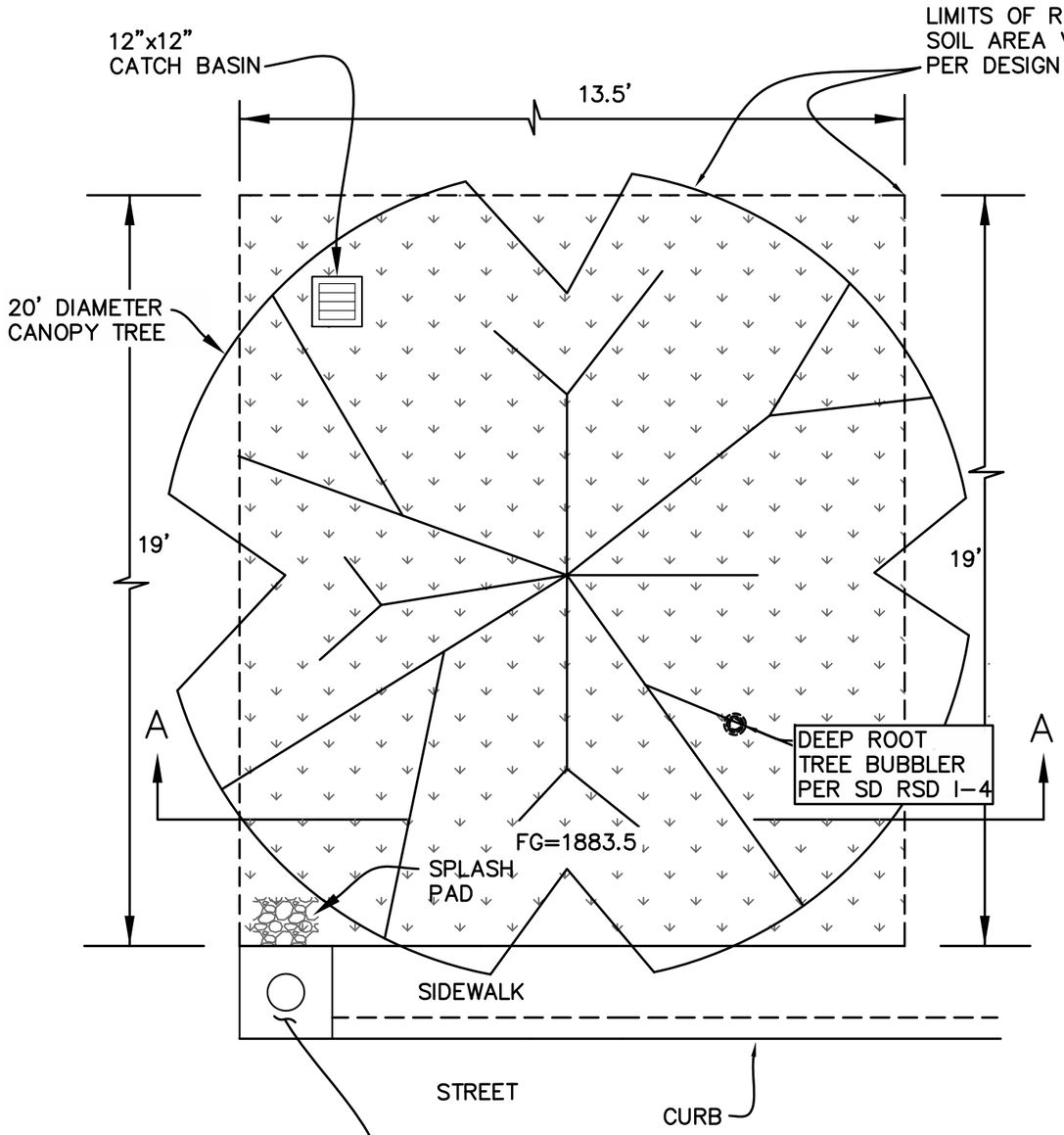


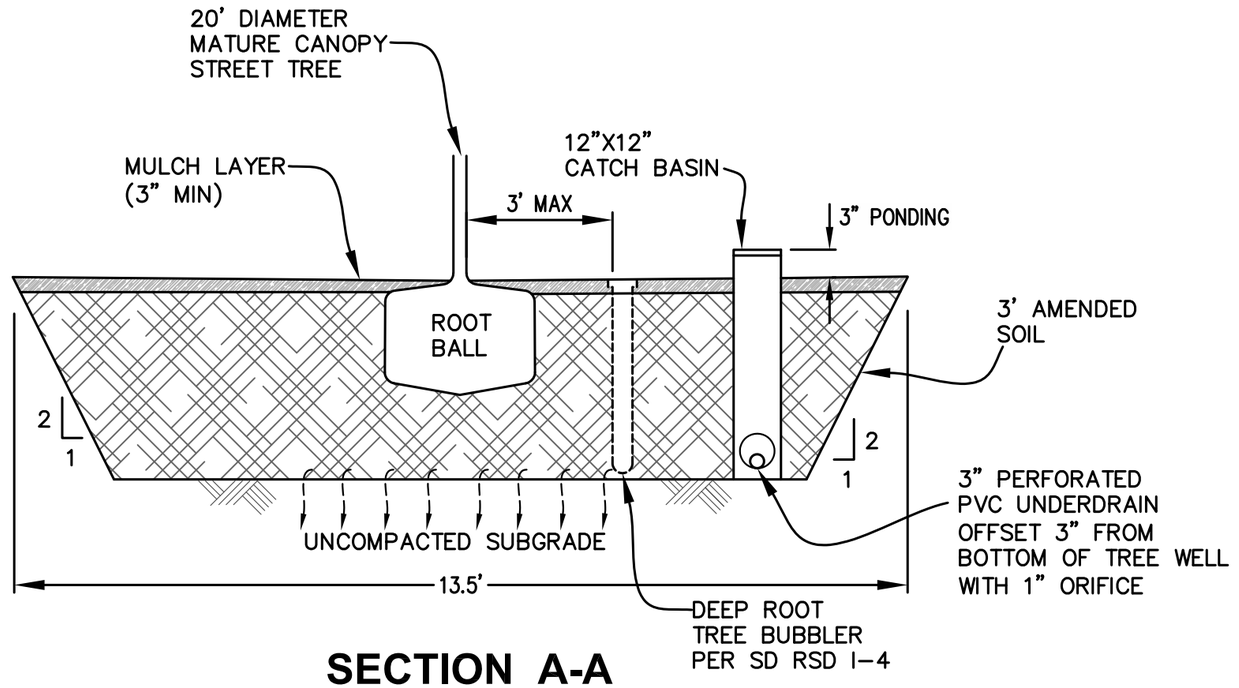
AMENDED SOIL MIX BY VOLUME:
- 65% SAND
- 20% SANDY LOAM
- 15% COMPOST

PERCOLATION RATE 5-10 IN/HR
MIN SUSTAINED

BIOFILTRATION BASIN DETAIL

1" = 2'





SECTION A-A

STREET TREE (TREE WELL) DETAIL

NO SCALE

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 Step 3.5)
☒ Structural BMPs (identify location, structural BMP ID#, type of BMP, and size/detail)

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	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	☒ Included ☐ Submitted as separate stand-alone document
Attachment 2b	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2c	Management of Critical Coarse Sediment Yield Areas See Section 6.2 and Appendix H of the BMP Design Manual.	☒ Exhibit depicting onsite and/or upstream sources of critical coarse sediment as mapped by Regional or Jurisdictional approaches outlined in Appendix H.1 AND, ☒ Demonstration that the project effectively avoids and bypasses sources of mapped critical coarse sediment per approaches outlined in Appendix H.2 and H.3. OR, ☐ Demonstration that project does not generate a net impact on the receiving water per approaches outlined in Appendix H.4.
Attachment 2d	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☒ Not performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☒ Not required because BMPs will drain in less than 96 hours

SDHM 3.1

PROJECT REPORT

General Model Information

Project Name:	Marshall Road
Site Name:	Marshall
Site Address:	1460 Marshall Rd
City:	
Report Date:	9/4/2018
Gage:	FLINN SP
Data Start:	10/01/1963
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.000
Version Date:	2018/01/19

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year
Low Flow Threshold for POC2:	10 Percent of the 2 Year
High Flow Threshold for POC2:	10 Year

Landuse Basin Data

Predeveloped Land Use

DMA 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C,Dirt,Moderate	0.982
C,Dirt,Steep	0.75
Pervious Total	1.732
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.732

Element Flows To:

Surface	Interflow	Groundwater

DMA 3

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C,Dirt,Moderate	0.14
Pervious Total	0.14
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.14

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

DMA 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C,Dirt,Moderate	0.38
C,Dirt,Steep	0.09
Pervious Total	0.47

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.612
IMPERVIOUS-MOD	0.4
Impervious Total	1.012
Basin Total	1.482

Element Flows To:

Surface	Interflow	Groundwater
Surface rtial Ret 1	Surface rtial Ret 1	

DMA 2

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C,Dirt,Moderate	0.17
C,Dirt,Steep	0.08
Pervious Total	0.25
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.25

Element Flows To:

Surface	Interflow	Groundwater

DMA 3

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C,Dirt,Moderate	0.065
Pervious Total	0.065

Impervious Land Use	acre
IMPERVIOUS-MOD	0.075
Impervious Total	0.075
Basin Total	0.14

Element Flows To:

Surface		Interflow		Groundwater
Surface	Street Tree	Surface	Street Tree	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bio Partial Ret 1

Bottom Length:	45.00 ft.
Bottom Width:	14.00 ft.
Material thickness of first layer:	0.25
Material type for first layer:	Mulch
Material thickness of second layer:	1.5
Material type for second layer:	ESM
Material thickness of third layer:	4
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	1
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	17.334
Total Volume Through Riser (ac-ft.):	11.799
Total Volume Through Facility (ac-ft.):	37.995
Percent Infiltrated:	45.62
Total Precip Applied to Facility:	0.475
Total Evap From Facility:	0.433
Underdrain used	
Underdrain Diameter (feet):	0.5
Orifice Diameter (in.):	0.7
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	8.862
Total Outflow (ac-ft.):	37.995
Percent Through Underdrain:	23.32
Discharge Structure	
Riser Height:	0.5 ft.
Riser Diameter:	9 in.
Element Flows To:	
Outlet 1	Outlet 2
Surface rtial Ret 2	

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0145	0.0000	0.0000	0.0000
0.0797	0.0145	0.0003	0.0000	0.0000
0.1593	0.0145	0.0007	0.0000	0.0000
0.2390	0.0145	0.0010	0.0001	0.0001
0.3187	0.0145	0.0014	0.0003	0.0003
0.3984	0.0145	0.0017	0.0005	0.0005
0.4780	0.0145	0.0021	0.0012	0.0012
0.5577	0.0145	0.0024	0.0016	0.0016
0.6374	0.0145	0.0028	0.0027	0.0027
0.7170	0.0145	0.0031	0.0035	0.0035
0.7967	0.0145	0.0035	0.0048	0.0048
0.8764	0.0145	0.0038	0.0146	0.0146
0.9560	0.0145	0.0041	0.0146	0.0146
1.0357	0.0145	0.0045	0.0146	0.0146
1.1154	0.0145	0.0048	0.0146	0.0146
1.1951	0.0145	0.0052	0.0146	0.0146
1.2747	0.0145	0.0055	0.0146	0.0146
1.3544	0.0145	0.0059	0.0146	0.0146
1.4341	0.0145	0.0062	0.0146	0.0146

1.5137	0.0145	0.0066	0.0146	0.0146
1.5934	0.0145	0.0069	0.0146	0.0146
1.6731	0.0145	0.0073	0.0146	0.0146
1.7527	0.0145	0.0077	0.0146	0.0146
1.8324	0.0145	0.0082	0.0146	0.0146
1.9121	0.0145	0.0087	0.0146	0.0146
1.9918	0.0145	0.0092	0.0146	0.0146
2.0714	0.0145	0.0097	0.0146	0.0146
2.1511	0.0145	0.0101	0.0146	0.0146
2.2308	0.0145	0.0106	0.0146	0.0146
2.3104	0.0145	0.0111	0.0146	0.0146
2.3901	0.0145	0.0116	0.0146	0.0146
2.4698	0.0145	0.0120	0.0146	0.0146
2.5495	0.0145	0.0125	0.0146	0.0146
2.6291	0.0145	0.0130	0.0146	0.0146
2.7088	0.0145	0.0135	0.0146	0.0146
2.7885	0.0145	0.0140	0.0146	0.0146
2.8681	0.0145	0.0144	0.0146	0.0146
2.9478	0.0145	0.0149	0.0146	0.0146
3.0275	0.0145	0.0154	0.0146	0.0146
3.1071	0.0145	0.0159	0.0146	0.0146
3.1868	0.0145	0.0163	0.0146	0.0146
3.2665	0.0145	0.0168	0.0146	0.0146
3.3462	0.0145	0.0173	0.0146	0.0146
3.4258	0.0145	0.0178	0.0146	0.0146
3.5055	0.0145	0.0183	0.0146	0.0146
3.5852	0.0145	0.0187	0.0146	0.0146
3.6648	0.0145	0.0192	0.0146	0.0146
3.7445	0.0145	0.0197	0.0146	0.0146
3.8242	0.0145	0.0202	0.0146	0.0146
3.9038	0.0145	0.0206	0.0146	0.0146
3.9835	0.0145	0.0211	0.0146	0.0146
4.0632	0.0145	0.0216	0.0146	0.0146
4.1429	0.0145	0.0221	0.0146	0.0146
4.2225	0.0145	0.0226	0.0146	0.0146
4.3022	0.0145	0.0230	0.0146	0.0146
4.3819	0.0145	0.0235	0.0146	0.0146
4.4615	0.0145	0.0240	0.0146	0.0146
4.5412	0.0145	0.0245	0.0146	0.0146
4.6209	0.0145	0.0250	0.0146	0.0146
4.7005	0.0145	0.0254	0.0146	0.0146
4.7802	0.0145	0.0259	0.0146	0.0146
4.8599	0.0145	0.0264	0.0146	0.0146
4.9396	0.0145	0.0269	0.0146	0.0146
5.0192	0.0145	0.0273	0.0146	0.0146
5.0989	0.0145	0.0278	0.0146	0.0146
5.1786	0.0145	0.0283	0.0146	0.0146
5.2582	0.0145	0.0288	0.0146	0.0146
5.3379	0.0145	0.0293	0.0146	0.0146
5.4176	0.0145	0.0297	0.0146	0.0146
5.4973	0.0145	0.0302	0.0146	0.0146
5.5769	0.0145	0.0307	0.0146	0.0146
5.6566	0.0145	0.0312	0.0146	0.0146
5.7363	0.0145	0.0316	0.0146	0.0146
5.7500	0.0145	0.0317	0.0146	0.0146

Biofilter Hydraulic Table

Stage(feet)Area(ac.)Volume(ac-ft.)Discharge(cfs)To Amended(cfs)Infilt(cfs)

5.7500	0.0145	0.0317	0.0000	0.0762	0.0007
5.8297	0.0151	0.0329	0.0000	0.0762	0.0013
5.9093	0.0158	0.0341	0.0000	0.0796	0.0020
5.9890	0.0165	0.0354	0.0000	0.0829	0.0027
6.0687	0.0171	0.0368	0.0000	0.0862	0.0034
6.1484	0.0178	0.0382	0.0000	0.0895	0.0041
6.2280	0.0185	0.0396	0.0000	0.0928	0.0048
6.3077	0.0193	0.0411	0.0000	0.0962	0.0056
6.3874	0.0200	0.0427	0.0000	0.0995	0.0063
6.4670	0.0207	0.0443	0.0000	0.1028	0.0071
6.5467	0.0215	0.0460	0.0000	0.1061	0.0078
6.6264	0.0222	0.0477	0.0000	0.1094	0.0086
6.7060	0.0230	0.0495	0.0000	0.1128	0.0094
6.7857	0.0238	0.0514	0.0000	0.1161	0.0102
6.8654	0.0246	0.0533	0.0011	0.1194	0.0110
6.9451	0.0254	0.0553	0.0015	0.1227	0.0118
7.0247	0.0262	0.0573	0.0017	0.1260	0.0126
7.1044	0.0270	0.0595	0.0025	0.1293	0.0135
7.1841	0.0278	0.0616	0.0033	0.1327	0.0142
7.2500	0.0285	0.0635	0.0041	0.1354	0.0144

Surface rtial Ret 1

Element Flows To:

Outlet 1	Outlet 2
Surface rtial Ret 2	Bio Partial Ret 1

Bio Partial Ret 2

Bottom Length:	54.60 ft.
Bottom Width:	13.00 ft.
Material thickness of first layer:	0.25
Material type for first layer:	Mulch
Material thickness of second layer:	1.5
Material type for second layer:	ESM
Material thickness of third layer:	4
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	1
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	11.662
Total Volume Through Riser (ac-ft.):	4.628
Total Volume Through Facility (ac-ft.):	20.735
Percent Infiltrated:	56.24
Total Precip Applied to Facility:	0.452
Total Evap From Facility:	0.377
Underdrain used	
Underdrain Diameter (feet):	0.5
Orifice Diameter (in.):	0.7
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	4.445
Total Outflow (ac-ft.):	20.735
Percent Through Underdrain:	21.44
Discharge Structure	
Riser Height:	0.5 ft.
Riser Diameter:	9 in.
Element Flows To:	
Outlet 1	Outlet 2

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0163	0.0000	0.0000	0.0000
0.0797	0.0163	0.0004	0.0000	0.0000
0.1593	0.0163	0.0008	0.0000	0.0000
0.2390	0.0163	0.0012	0.0001	0.0001
0.3187	0.0163	0.0016	0.0004	0.0004
0.3984	0.0163	0.0019	0.0006	0.0006
0.4780	0.0163	0.0023	0.0013	0.0013
0.5577	0.0163	0.0027	0.0018	0.0018
0.6374	0.0163	0.0031	0.0031	0.0031
0.7170	0.0163	0.0035	0.0039	0.0039
0.7967	0.0163	0.0039	0.0054	0.0054
0.8764	0.0163	0.0043	0.0164	0.0164
0.9560	0.0163	0.0047	0.0164	0.0164
1.0357	0.0163	0.0051	0.0164	0.0164
1.1154	0.0163	0.0055	0.0164	0.0164
1.1951	0.0163	0.0058	0.0164	0.0164
1.2747	0.0163	0.0062	0.0164	0.0164
1.3544	0.0163	0.0066	0.0164	0.0164
1.4341	0.0163	0.0070	0.0164	0.0164
1.5137	0.0163	0.0074	0.0164	0.0164
1.5934	0.0163	0.0078	0.0164	0.0164

1.6731	0.0163	0.0082	0.0164	0.0164
1.7527	0.0163	0.0087	0.0164	0.0164
1.8324	0.0163	0.0093	0.0164	0.0164
1.9121	0.0163	0.0098	0.0164	0.0164
1.9918	0.0163	0.0103	0.0164	0.0164
2.0714	0.0163	0.0109	0.0164	0.0164
2.1511	0.0163	0.0114	0.0164	0.0164
2.2308	0.0163	0.0120	0.0164	0.0164
2.3104	0.0163	0.0125	0.0164	0.0164
2.3901	0.0163	0.0130	0.0164	0.0164
2.4698	0.0163	0.0136	0.0164	0.0164
2.5495	0.0163	0.0141	0.0164	0.0164
2.6291	0.0163	0.0146	0.0164	0.0164
2.7088	0.0163	0.0152	0.0164	0.0164
2.7885	0.0163	0.0157	0.0164	0.0164
2.8681	0.0163	0.0163	0.0164	0.0164
2.9478	0.0163	0.0168	0.0164	0.0164
3.0275	0.0163	0.0173	0.0164	0.0164
3.1071	0.0163	0.0179	0.0164	0.0164
3.1868	0.0163	0.0184	0.0164	0.0164
3.2665	0.0163	0.0190	0.0164	0.0164
3.3462	0.0163	0.0195	0.0164	0.0164
3.4258	0.0163	0.0200	0.0164	0.0164
3.5055	0.0163	0.0206	0.0164	0.0164
3.5852	0.0163	0.0211	0.0164	0.0164
3.6648	0.0163	0.0216	0.0164	0.0164
3.7445	0.0163	0.0222	0.0164	0.0164
3.8242	0.0163	0.0227	0.0164	0.0164
3.9038	0.0163	0.0233	0.0164	0.0164
3.9835	0.0163	0.0238	0.0164	0.0164
4.0632	0.0163	0.0243	0.0164	0.0164
4.1429	0.0163	0.0249	0.0164	0.0164
4.2225	0.0163	0.0254	0.0164	0.0164
4.3022	0.0163	0.0260	0.0164	0.0164
4.3819	0.0163	0.0265	0.0164	0.0164
4.4615	0.0163	0.0270	0.0164	0.0164
4.5412	0.0163	0.0276	0.0164	0.0164
4.6209	0.0163	0.0281	0.0164	0.0164
4.7005	0.0163	0.0287	0.0164	0.0164
4.7802	0.0163	0.0292	0.0164	0.0164
4.8599	0.0163	0.0297	0.0164	0.0164
4.9396	0.0163	0.0303	0.0164	0.0164
5.0192	0.0163	0.0308	0.0164	0.0164
5.0989	0.0163	0.0313	0.0164	0.0164
5.1786	0.0163	0.0319	0.0164	0.0164
5.2582	0.0163	0.0324	0.0164	0.0164
5.3379	0.0163	0.0330	0.0164	0.0164
5.4176	0.0163	0.0335	0.0164	0.0164
5.4973	0.0163	0.0340	0.0164	0.0164
5.5769	0.0163	0.0346	0.0164	0.0164
5.6566	0.0163	0.0351	0.0164	0.0164
5.7363	0.0163	0.0357	0.0164	0.0164
5.7500	0.0163	0.0357	0.0164	0.0164

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
5.7500	0.0163	0.0357	0.0000	0.0859	0.0008
5.8297	0.0170	0.0371	0.0000	0.0859	0.0015

5.9093	0.0178	0.0385	0.0000	0.0896	0.0023
5.9890	0.0186	0.0399	0.0000	0.0934	0.0031
6.0687	0.0193	0.0414	0.0000	0.0971	0.0039
6.1484	0.0201	0.0430	0.0000	0.1009	0.0047
6.2280	0.0209	0.0446	0.0000	0.1046	0.0055
6.3077	0.0217	0.0463	0.0000	0.1083	0.0063
6.3874	0.0226	0.0481	0.0000	0.1121	0.0072
6.4670	0.0234	0.0499	0.0000	0.1158	0.0080
6.5467	0.0242	0.0518	0.0000	0.1196	0.0089
6.6264	0.0251	0.0538	0.0000	0.1233	0.0097
6.7060	0.0260	0.0558	0.0000	0.1270	0.0106
6.7857	0.0268	0.0579	0.0000	0.1308	0.0115
6.8654	0.0277	0.0601	0.0011	0.1345	0.0124
6.9451	0.0286	0.0623	0.0015	0.1383	0.0133
7.0247	0.0295	0.0647	0.0017	0.1420	0.0142
7.1044	0.0304	0.0670	0.0026	0.1457	0.0152
7.1841	0.0313	0.0695	0.0033	0.1495	0.0160
7.2500	0.0321	0.0716	0.0041	0.1526	0.0160

Surface rtial Ret 2

Element Flows To:

Outlet 1	Outlet 2
	Bio Partial Ret 2

20' Dia. Street Tree

Bottom Length:	13.50 ft.
Bottom Width:	19.00 ft.
Material thickness of first layer:	3
Material type for first layer:	ESM
Material thickness of second layer:	0
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	1
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	2.794
Total Volume Through Riser (ac-ft.):	0.134
Total Volume Through Facility (ac-ft.):	3.099
Percent Infiltrated:	90.16
Total Precip Applied to Facility:	0.153
Total Evap From Facility:	0.066
Underdrain used	
Underdrain Diameter (feet):	0.25
Orifice Diameter (in.):	1
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	0.171
Total Outflow (ac-ft.):	3.099
Percent Through Underdrain:	5.52
Discharge Structure	
Riser Height:	0.25 ft.
Riser Diameter:	12 in.
Element Flows To:	
Outlet 1	Outlet 2

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0059	0.0000	0.0000	0.0000
0.0366	0.0059	0.0001	0.0000	0.0000
0.0733	0.0059	0.0001	0.0000	0.0000
0.1099	0.0059	0.0002	0.0059	0.0059
0.1465	0.0059	0.0003	0.0059	0.0059
0.1831	0.0059	0.0003	0.0059	0.0059
0.2198	0.0059	0.0004	0.0059	0.0059
0.2564	0.0059	0.0005	0.0059	0.0059
0.2930	0.0059	0.0005	0.0059	0.0059
0.3296	0.0059	0.0006	0.0059	0.0059
0.3663	0.0059	0.0006	0.0059	0.0059
0.4029	0.0059	0.0007	0.0059	0.0059
0.4395	0.0059	0.0008	0.0059	0.0059
0.4761	0.0059	0.0008	0.0059	0.0059
0.5128	0.0059	0.0009	0.0059	0.0059
0.5494	0.0059	0.0010	0.0059	0.0059
0.5860	0.0059	0.0010	0.0059	0.0059
0.6226	0.0059	0.0011	0.0059	0.0059
0.6593	0.0059	0.0012	0.0059	0.0059
0.6959	0.0059	0.0012	0.0059	0.0059
0.7325	0.0059	0.0013	0.0059	0.0059

0.7692	0.0059	0.0014	0.0059	0.0059
0.8058	0.0059	0.0014	0.0059	0.0059
0.8424	0.0059	0.0015	0.0059	0.0059
0.8790	0.0059	0.0016	0.0059	0.0059
0.9157	0.0059	0.0016	0.0059	0.0059
0.9523	0.0059	0.0017	0.0059	0.0059
0.9889	0.0059	0.0017	0.0059	0.0059
1.0255	0.0059	0.0018	0.0059	0.0059
1.0622	0.0059	0.0019	0.0059	0.0059
1.0988	0.0059	0.0019	0.0059	0.0059
1.1354	0.0059	0.0020	0.0059	0.0059
1.1720	0.0059	0.0021	0.0059	0.0059
1.2087	0.0059	0.0021	0.0059	0.0059
1.2453	0.0059	0.0022	0.0059	0.0059
1.2819	0.0059	0.0023	0.0059	0.0059
1.3185	0.0059	0.0023	0.0059	0.0059
1.3552	0.0059	0.0024	0.0059	0.0059
1.3918	0.0059	0.0025	0.0059	0.0059
1.4284	0.0059	0.0025	0.0059	0.0059
1.4651	0.0059	0.0026	0.0059	0.0059
1.5017	0.0059	0.0027	0.0059	0.0059
1.5383	0.0059	0.0027	0.0059	0.0059
1.5749	0.0059	0.0028	0.0059	0.0059
1.6116	0.0059	0.0028	0.0059	0.0059
1.6482	0.0059	0.0029	0.0059	0.0059
1.6848	0.0059	0.0030	0.0059	0.0059
1.7214	0.0059	0.0030	0.0059	0.0059
1.7581	0.0059	0.0031	0.0059	0.0059
1.7947	0.0059	0.0032	0.0059	0.0059
1.8313	0.0059	0.0032	0.0059	0.0059
1.8679	0.0059	0.0033	0.0059	0.0059
1.9046	0.0059	0.0034	0.0059	0.0059
1.9412	0.0059	0.0034	0.0059	0.0059
1.9778	0.0059	0.0035	0.0059	0.0059
2.0145	0.0059	0.0036	0.0059	0.0059
2.0511	0.0059	0.0036	0.0059	0.0059
2.0877	0.0059	0.0037	0.0059	0.0059
2.1243	0.0059	0.0038	0.0059	0.0059
2.1610	0.0059	0.0038	0.0059	0.0059
2.1976	0.0059	0.0039	0.0059	0.0059
2.2342	0.0059	0.0039	0.0059	0.0059
2.2708	0.0059	0.0040	0.0059	0.0059
2.3075	0.0059	0.0041	0.0059	0.0059
2.3441	0.0059	0.0041	0.0059	0.0059
2.3807	0.0059	0.0042	0.0059	0.0059
2.4173	0.0059	0.0043	0.0059	0.0059
2.4540	0.0059	0.0043	0.0059	0.0059
2.4906	0.0059	0.0044	0.0059	0.0059
2.5272	0.0059	0.0045	0.0059	0.0059
2.5638	0.0059	0.0045	0.0059	0.0059
2.6005	0.0059	0.0046	0.0059	0.0059
2.6371	0.0059	0.0047	0.0059	0.0059
2.6737	0.0059	0.0047	0.0059	0.0059
2.7104	0.0059	0.0048	0.0059	0.0059
2.7470	0.0059	0.0049	0.0059	0.0059
2.7836	0.0059	0.0049	0.0059	0.0059
2.8202	0.0059	0.0050	0.0059	0.0059
2.8569	0.0059	0.0050	0.0059	0.0059

2.8935	0.0059	0.0051	0.0059	0.0059
2.9301	0.0059	0.0052	0.0059	0.0059
2.9667	0.0059	0.0052	0.0059	0.0059
3.0000	0.0059	0.0053	0.0059	0.0059

Biofilter Hydraulic Table

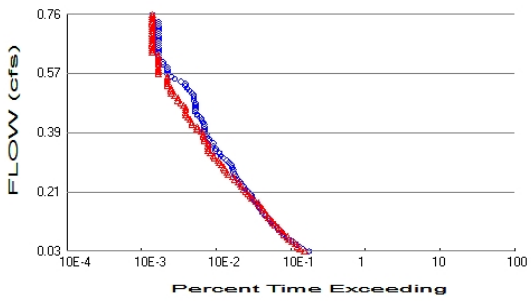
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.0000	0.0059	0.0053	0.0000	0.0300	0.0002
3.0366	0.0061	0.0055	0.0000	0.0300	0.0003
3.0733	0.0062	0.0057	0.0000	0.0304	0.0005
3.1099	0.0064	0.0060	0.0000	0.0308	0.0007
3.1465	0.0066	0.0062	0.0000	0.0311	0.0009
3.1831	0.0067	0.0065	0.0000	0.0315	0.0010
3.2198	0.0069	0.0067	0.0000	0.0319	0.0012
3.2564	0.0071	0.0070	0.0000	0.0322	0.0014
3.2930	0.0073	0.0072	0.0000	0.0326	0.0016
3.3296	0.0075	0.0075	0.0000	0.0329	0.0016
3.3330	0.0075	0.0075	0.0000	0.0330	0.0012

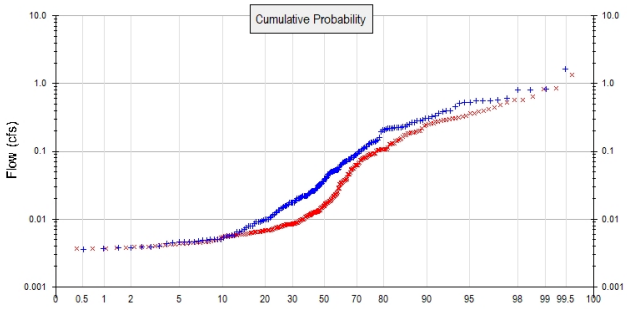
Surface Street Tree

Element Flows To:

Outlet 1	Outlet 2
	20' Dia. Street Tree

Analysis Results
POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.732
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.72
Total Impervious Area: 1.012

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.304423
5 year	0.552818
10 year	0.755818
25 year	0.973896

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.293618
5 year	0.464364
10 year	0.621246
25 year	0.940291

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0304	630	548	86	Pass
0.0378	525	482	91	Pass
0.0451	470	441	93	Pass
0.0524	419	412	98	Pass
0.0598	379	378	99	Pass
0.0671	338	340	100	Pass
0.0744	315	323	102	Pass
0.0817	291	297	102	Pass
0.0891	274	273	99	Pass
0.0964	250	257	102	Pass
0.1037	234	246	105	Pass
0.1110	219	224	102	Pass
0.1184	200	210	104	Pass
0.1257	189	197	104	Pass
0.1330	178	181	101	Pass
0.1403	164	174	106	Pass
0.1477	152	164	107	Pass
0.1550	144	154	106	Pass
0.1623	138	149	107	Pass
0.1697	130	139	106	Pass
0.1770	127	132	103	Pass
0.1843	119	122	102	Pass
0.1916	111	109	98	Pass
0.1990	108	103	95	Pass
0.2063	102	96	94	Pass
0.2136	97	91	93	Pass
0.2209	90	83	92	Pass
0.2283	83	79	95	Pass
0.2356	78	76	97	Pass
0.2429	75	72	96	Pass
0.2503	69	64	92	Pass
0.2576	66	60	90	Pass
0.2649	64	52	81	Pass
0.2722	62	50	80	Pass
0.2796	62	47	75	Pass
0.2869	59	45	76	Pass
0.2942	57	42	73	Pass
0.3015	53	40	75	Pass
0.3089	50	38	76	Pass
0.3162	45	34	75	Pass
0.3235	42	33	78	Pass
0.3309	40	30	75	Pass
0.3382	35	28	80	Pass
0.3455	35	28	80	Pass
0.3528	33	28	84	Pass
0.3602	33	28	84	Pass
0.3675	29	25	86	Pass
0.3748	29	25	86	Pass
0.3821	27	24	88	Pass
0.3895	27	24	88	Pass
0.3968	25	23	92	Pass
0.4041	25	20	80	Pass
0.4114	25	20	80	Pass

0.4188	25	17	68	Pass
0.4261	24	17	70	Pass
0.4334	23	16	69	Pass
0.4408	22	15	68	Pass
0.4481	20	14	70	Pass
0.4554	19	14	73	Pass
0.4627	19	14	73	Pass
0.4701	19	14	73	Pass
0.4774	19	13	68	Pass
0.4847	19	12	63	Pass
0.4920	18	11	61	Pass
0.4994	18	11	61	Pass
0.5067	18	10	55	Pass
0.5140	17	9	52	Pass
0.5214	16	9	56	Pass
0.5287	15	9	60	Pass
0.5360	14	8	57	Pass
0.5433	14	8	57	Pass
0.5507	12	8	66	Pass
0.5580	10	8	80	Pass
0.5653	9	8	88	Pass
0.5726	8	6	75	Pass
0.5800	8	6	75	Pass
0.5873	8	6	75	Pass
0.5946	8	6	75	Pass
0.6020	7	6	85	Pass
0.6093	7	6	85	Pass
0.6166	6	6	100	Pass
0.6239	6	6	100	Pass
0.6313	6	6	100	Pass
0.6386	6	5	83	Pass
0.6459	6	5	83	Pass
0.6532	6	5	83	Pass
0.6606	6	5	83	Pass
0.6679	6	5	83	Pass
0.6752	6	5	83	Pass
0.6825	6	5	83	Pass
0.6899	6	5	83	Pass
0.6972	6	5	83	Pass
0.7045	6	5	83	Pass
0.7119	6	5	83	Pass
0.7192	6	5	83	Pass
0.7265	6	5	83	Pass
0.7338	6	5	83	Pass
0.7412	5	5	100	Pass
0.7485	5	5	100	Pass
0.7558	5	5	100	Pass

Water Quality

Drawdown Time Results

Pond: Surface rtial Ret 2

Days	Stage(feet)	Percent of Total Run Time
1	N/A	N/A
2	N/A	N/A
3	N/A	N/A
4	N/A	N/A
5	N/A	N/A

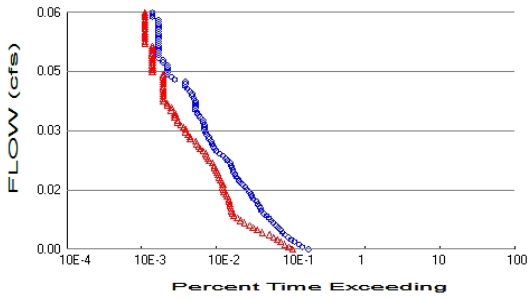
Maximum Stage: 0.500 Drawdown Time: Less than 1 day

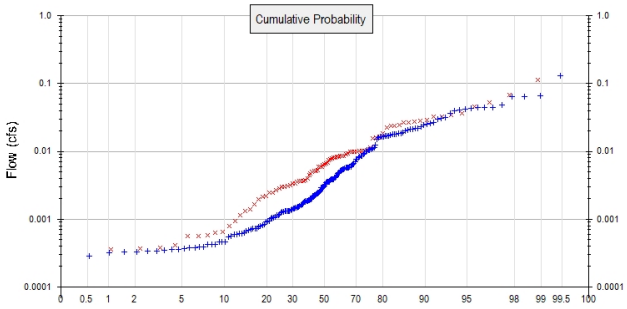
Pond: Bio Partial Ret 2

Days	Stage(feet)	Percent of Total Run Time
1	3.386	0.3739
2	0.000	N/A
3	0.000	N/A
4	0.000	N/A
5	0.000	N/A

Maximum Stage: 5.750 Drawdown Time: 01 09:21:60

POC 2





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #2
Total Pervious Area: 0.14
Total Impervious Area: 0

Mitigated Landuse Totals for POC #2
Total Pervious Area: 0.065
Total Impervious Area: 0.075

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	**Flow(cfs)**
2 year	0.022867
5 year	0.043882
10 year	0.060666
25 year	0.077797

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	**Flow(cfs)**
2 year	0.015464
5 year	0.030954
10 year	0.04359
25 year	0.076605

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0023	625	381	60	Pass
0.0029	515	339	65	Pass
0.0035	463	298	64	Pass
0.0041	404	262	64	Pass
0.0046	365	237	64	Pass
0.0052	333	212	63	Pass
0.0058	299	187	62	Pass
0.0064	280	149	53	Pass
0.0070	264	128	48	Pass
0.0076	244	112	45	Pass
0.0082	229	101	44	Pass
0.0088	210	86	40	Pass
0.0094	197	76	38	Pass
0.0100	182	69	37	Pass
0.0105	171	62	36	Pass
0.0111	156	59	37	Pass
0.0117	147	58	39	Pass
0.0123	140	57	40	Pass
0.0129	136	55	40	Pass
0.0135	129	55	42	Pass
0.0141	124	54	43	Pass
0.0147	114	53	46	Pass
0.0153	108	51	47	Pass
0.0158	105	49	46	Pass
0.0164	99	45	45	Pass
0.0170	92	45	48	Pass
0.0176	88	44	50	Pass
0.0182	81	44	54	Pass
0.0188	75	43	57	Pass
0.0194	72	41	56	Pass
0.0200	68	40	58	Pass
0.0206	65	38	58	Pass
0.0212	62	37	59	Pass
0.0217	60	36	60	Pass
0.0223	58	34	58	Pass
0.0229	57	34	59	Pass
0.0235	55	32	58	Pass
0.0241	51	29	56	Pass
0.0247	48	28	58	Pass
0.0253	45	27	60	Pass
0.0259	40	26	65	Pass
0.0265	36	24	66	Pass
0.0271	34	22	64	Pass
0.0276	33	21	63	Pass
0.0282	32	20	62	Pass
0.0288	31	19	61	Pass
0.0294	29	16	55	Pass
0.0300	29	16	55	Pass
0.0306	27	15	55	Pass
0.0312	26	14	53	Pass
0.0318	25	14	56	Pass
0.0324	25	13	52	Pass
0.0330	25	12	48	Pass

0.0335	24	11	45	Pass
0.0341	24	11	45	Pass
0.0347	22	10	45	Pass
0.0353	21	10	47	Pass
0.0359	20	10	50	Pass
0.0365	19	9	47	Pass
0.0371	19	9	47	Pass
0.0377	19	8	42	Pass
0.0383	19	8	42	Pass
0.0388	19	7	36	Pass
0.0394	18	7	38	Pass
0.0400	17	7	41	Pass
0.0406	17	7	41	Pass
0.0412	16	7	43	Pass
0.0418	15	7	46	Pass
0.0424	14	7	50	Pass
0.0430	14	7	50	Pass
0.0436	14	7	50	Pass
0.0442	10	7	70	Pass
0.0447	9	7	77	Pass
0.0453	8	7	87	Pass
0.0459	8	5	62	Pass
0.0465	8	5	62	Pass
0.0471	8	5	62	Pass
0.0477	8	5	62	Pass
0.0483	7	5	71	Pass
0.0489	7	5	71	Pass
0.0495	6	5	83	Pass
0.0501	6	5	83	Pass
0.0506	6	5	83	Pass
0.0512	6	5	83	Pass
0.0518	6	5	83	Pass
0.0524	6	5	83	Pass
0.0530	6	4	66	Pass
0.0536	6	4	66	Pass
0.0542	6	4	66	Pass
0.0548	6	4	66	Pass
0.0554	6	4	66	Pass
0.0559	6	4	66	Pass
0.0565	6	4	66	Pass
0.0571	6	4	66	Pass
0.0577	6	4	66	Pass
0.0583	6	4	66	Pass
0.0589	6	4	66	Pass
0.0595	5	4	80	Pass
0.0601	5	4	80	Pass
0.0607	5	4	80	Pass

Water Quality

Drawdown Time Results

Pond: Surface Street Tree

Days	Stage(feet)	Percent of Total Run Time
1	N/A	0.0002
2	N/A	0.0002
3	N/A	0.0002
4	N/A	0.0002
5	N/A	0.0002

Maximum Stage: 0.250 Drawdown Time: Less than 1 day

Pond: 20' Dia. Street Tree

Days	Stage(feet)	Percent of Total Run Time
1	0.000	N/A
2	0.000	N/A
3	0.000	N/A
4	0.000	N/A
5	0.000	N/A

Maximum Stage: 3.000 Drawdown Time: 00 05:38:20

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

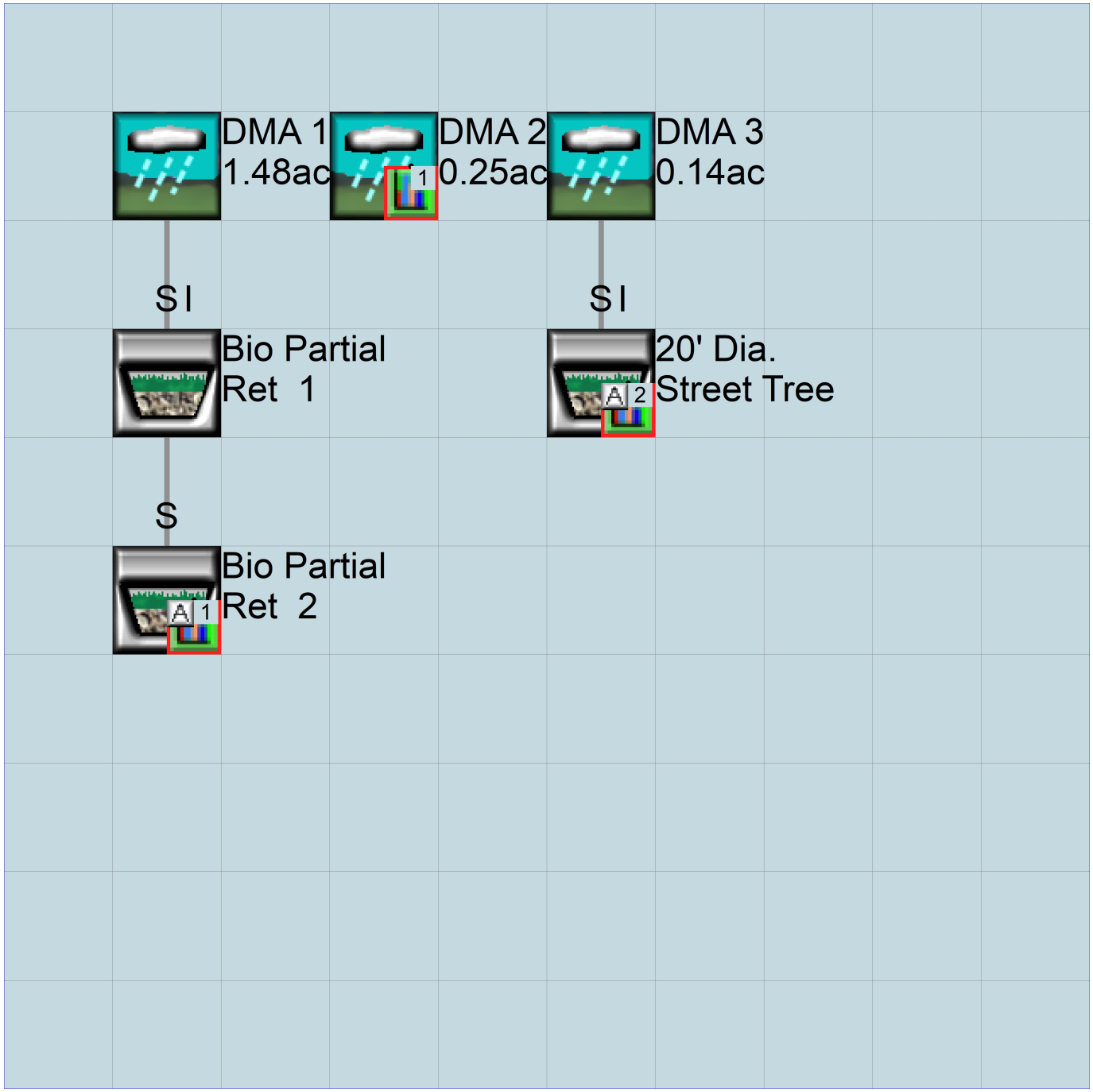
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic



Disclaimer

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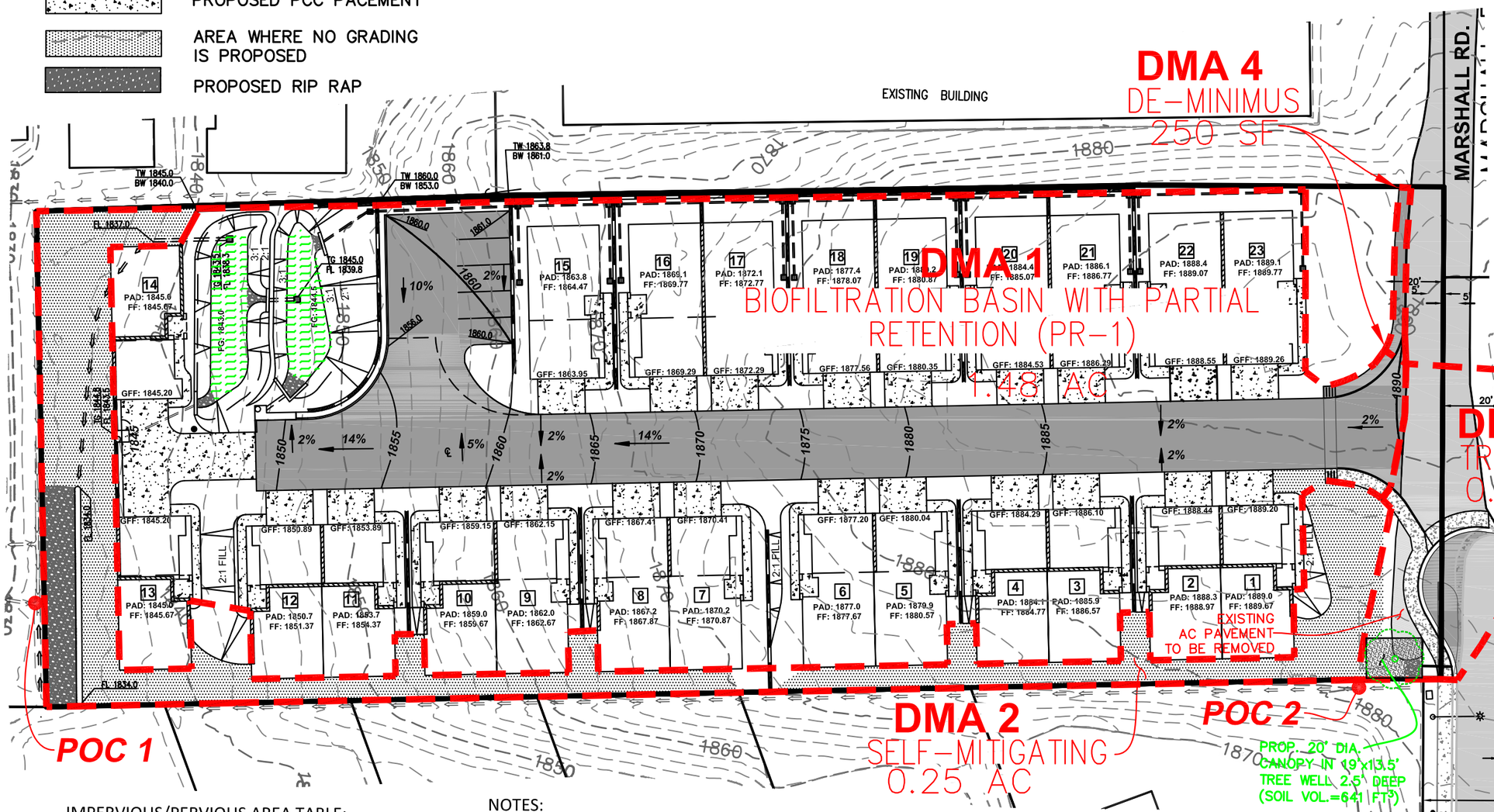
HYDROMODIFICATION EXIBIT

1460 MARSHALL ROAD
ALPINE, CA. 91901

HATCH LEGEND:

SYMBOL	ITEM
	EXISTING AC PAVEMENT
	PROPOSED AC PAVEMENT
	PROPOSED PCC PACEMENT
	AREA WHERE NO GRADING IS PROPOSED
	PROPOSED RIP RAP



BMP LEGEND

SOURCE CONTROL BMPS:

PREVENTION OF ILLICIT DISCHARGES INTO THE MS4	4.2.1
STORM DRAIN STENCILING	4.2.2
PROTECTED OUTDOOR MATERIALS STORAGE AREAS	4.2.3
PROTECTED MATERIALS STORED IN OUTDOOR WORK AREAS	4.2.4
PROTECT TRASH STORAGE AREAS	4.2.5
ON-SITE STORM DRAIN INLETS	4.2.6.A
LANDSCAPE/OUTDOOR PEST. USE	4.2.6.E
PLAZAS, SIDEWALKS, AND PARKING LOT	4.2.6.Q

SITE DESIGN BMPS:

CONSERVE NATURAL AREAS, SOILS, AND VEGETATION	4.3.2
MINIMIZE IMPERVIOUS AREA	4.3.3
MINIMIZE SOIL COMPACTION	4.3.4
IMPERVIOUS AREA DISPERSION	4.3.5
RUNOFF COLLECTION	4.3.6
LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES	4.3.7

IMPERVIOUS/PERVIOUS AREA TABLE:

DMA	1	2	3
IMPERVIOUS (SF)	44,099	0	3,309
PERVIOUS (SF)	20,473	10,890	2,879
TOTAL (SF)	64,572	10,890	6,188
SELF-RETAINING	X	–	X
SELF-MITIGATING	–	X	–
BMP AREA (SF) (IF APPLICABLE)	1,340	N/A	N/A-TREE WELL

NOTES:
1. SOIL: TYPE C

2. CRITICAL SEDIMENT YIELD COARSE AREAS: NONE

3. DEPTH TO GROUNDWATER: UNKNOWN DEPTH - KNOWN TO BE DEEP (DEPTH> 10')

4. PROPOSED CURB INLETS TO HAVE PROHIBITIVE LANGUAGE/SIGNAGE STATING : "NO DUMPING"

5. EACH UNIT IS 1,100 SF

BMP TREATMENT AREA:
COMBINE TREATMENT AREA OF BOTH BIOFILTRATION BASINS w/ PARTIAL RETENTION (PR-1): 1,340 SF

LEGEND:
DMA BOUNDARY
BIOFILTRATION BASIN WITH PARTIAL RETENTION (PR-1): 1,340 SF

40' 20' 0 40' 80' 120'

SCALE: 1"=40'

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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)

CRITICAL COARSE SEDIMENT YIELD MAP

NO SCALE

POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREA (NONE ON SITE)

(SOURCE: 2015 SAN DIEGO BAY WATERSHED MANAGEMENT AREA ANALYSIS)

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 Plan (Required)	☒ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Stormwater Maintenance Notification / Agreement (when applicable)	☒ Included ☐ Not Applicable

PR-1

Biofiltration with Partial Retention

BMP MAINTENANCE FACT SHEET
FOR
STRUCTURAL BMP PR-1 BIOFILTRATION WITH PARTIAL RETENTION

Biofiltration with partial retention facilities are vegetated surface water systems that filter water through vegetation and soil or engineered media prior to infiltrating into native soils, discharge via underdrain, or overflow to the downstream conveyance system. These BMPs have an elevated underdrain discharge point that creates storage capacity in the aggregate storage layer. Typical biofiltration with partial retention components include:

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

Normal Expected Maintenance

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

Non-Standard Maintenance or BMP Failure

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

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.
- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace such as media, filter course, and aggregate layers.

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

Other Special Considerations

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

PR-1
Biofiltration with Partial Retention

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR PR-1 BIOFILTRATION WITH PARTIAL RETENTION		
The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district. Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer.	• Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Obstructed inlet or outlet structure	Clear blockage.	• Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.	• Inspect annually. • Maintenance when needed.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintenance when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	• Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.

*"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR PR-1 BIOFILTRATION WITH PARTIAL RETENTION (Continued from previous page)		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	• Inspect monthly. • Maintenance when needed.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.	• Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.
Standing water in BMP for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water. If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Underdrain clogged	Clear blockage.	• Inspect if standing water is observed for longer than 24-96 hours following a storm event. • Maintenance when needed.

References

American Mosquito Control Association.
http://www.mosquito.org/
California Storm Water Quality Association (CASQA). 2003. Municipal BMP Handbook.
https://www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook
County of San Diego. 2014. Low Impact Development Handbook.
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/susmp/lid.html
San Diego County Copermittees. 2016. Model BMP Design Manual, Appendix E, Fact Sheet PR-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

BMP: Bioretention Area
MAINTENANCE ACTIVITIES

ROUTINE ACTION	MAINTENANCE INDICATOR	FIELD MEASUREMENT	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY	Frequency (# of times per year)	Hours per Event	Average Labor Crew Size	Avg. (Pro-Rated) Labor Rate/Hr. ($)	Equipment	Equipment Cost/Hour ($)	Materials & Incidentals Cost or Disposal Cost/Event ($)	Total cost per visit ($)	Total cost per year ($)
Vegetation Management for Aesthetics (optional)	Average vegetation height greater than 12-inches, emergence of trees or woody vegetation,	Visual observation and random measurements through out the side slope area	Annually, prior to start of wet season	Cut vegetation to an average height of 6-inches and remove trimmings. Remove any trees, or woody vegetation.	1.0	2.0	2	$ 74.97	Utility Truck	$ 14.39	$ 50.00	$ 379	$ 379
Soil Repair	Evidence of erosion	Visual observation	Annually, prior to start of wet season	Reseed/revegetate barren spots prior to wet season.	1.0	4.0	2	$ 74.97	Utility Truck	$ 14.39	$ 150.00	$ 807	$ 807
Standing Water	Standing water for more than 96 hrs	Visual observation	Annually, 96 hours after a target storm (0.60 in) event	Drain facility. Corrective action prior to wet season. Consult engineers if immediate solution is not evident.	1.0	1.0	2	$ 74.97	Utility Truck	$ 14.39		$ 164	$ 164
Trash and Debris	Trash and Debris present	Visual observation	Annually, prior to start of wet season	Remove and dispose of trash and debris	1.0	2.0	2	$ 74.97	Utility Truck	$ 14.39		$ 329	$ 329
Sediment Management	Sediment depth exceeds 10% of the facility design	Measure depth at apparent maximum and minimum accumulation of sediment. Calculate average depth	Annually, prior to start of wet season	Remove and properly dispose of sediment. Regrade if necessary. (expected every 2 years)	0.5	8.0	2	$ 74.97	Utility Truck, 10-15 yd Truck, Backhoe	$ 56.02	$ 400.00	$ 2,048	$ 1,024
Underdrains	Evidence of Clogging	Visual Observation	Annually, prior to start of wet season	Corrective action prior to wet season. Consult engineers if immediate solution is not evident.	1.0	0.5	2	$ 74.97	Utility Truck	$ 14.39		$ 82	$ 82
General Maintenance Inspection	Inlet structures, outlet structures, side slopes or other features damaged, significant erosion, burrows, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, etc.	Visual observation	Annually, prior to start of wet season	Corrective action prior to wet season. Consult engineers if immediate solution is not evident.	1.0	1.0	2	$ 74.97	Utility Truck	$ 14.39		$ 164	$ 164
Reporting					1.0	3.0	1	$ 74.97				$ 225	$ 225
				Average Annual Total		32.0							$ 3,174

				Small Bioretention (500 sf)		32.0							$ 3,174
				Medium Bioretention (2000 sf)		44.0							$ 4,078
				Large Bioretention (4000 sf)		68.0							$ 5,877

Labor Rate	$74.97/hr

Equipment	Equipment Cost
Utility Truck	$14.39/hr
10-15 yd truck	$28.27/hr
Backhoe	$13.36/hr
Vactor	$62.70/hr
Sweeper	$123.26/hr

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

Attachment 3a must identify:

- ☒ Specific maintenance indicators and actions for proposed structural BMP(s). This must 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 all Structural BMPs, Attachment 3b must include a draft maintenance agreement in the County's standard format depending on the Category (PDP applicant to contact County staff to obtain the current maintenance agreement forms). Refer to Section 7.3 in the BMP Design Manual for a description of the different categories.

RECORDING REQUESTED BY:

WHEN RECORDED MAIL TO:

(property owner)

SPACE ABOVE THIS LINE FOR RECORDER'S USE

MAINTENANCE NOTIFICATION AGREEMENT FOR CATEGORY 1 STORMWATER TREATMENT CONTROL BMP's

THIS AGREEMENT is made on the _____ day of _____, 20____.
Richard Bonjorno, the Owner(s) of the hereinafter described real property:
Address 1460 Marshall Road, Alpine Post Office _____ Zip Code 91901
Assessor Parcel No.(s) 398-390-66

List, identify, locate (plan/drawing number) and describe the TC BMP(s)

There are two biofiltration basin with partial retention (PR-1) located near the end of the proposed private road. The location and details of the basin are shown on the preliminary grading plan.

Owner(s) of the above property acknowledge the existence of the stormwater Treatment Control Best Management Practice (TC BMP) structure(s) on the said property. Perpetual maintenance of the TC BMP(s) is the requirement of the State NPDES Permit, Order No. R9-2007-0001, Section D.1.d.(6) and the County of San Diego Watershed Protection Ordinance (WPO) Ordinance No. 10096 Section 67.812 through Section 67.814, and County Standard Urban Stormwater Mitigation Plan (SUSMP) Chapter 5. In consideration of the requirement to construct and maintain TC BMP(s), as conditioned by Discretionary Permit, Grading Permit, and/or Building Permit (as may be applicable), I/we hereby covenant and agree that:

1. I/We are the owner(s) of the existing (or to be constructed concurrently) premises located on the above described property.
2. I/We shall take the responsibility for the perpetual maintenance of the TC BMP(s) as listed above in accordance with the maintenance plan and in compliance with County's self inspection reporting and verification for as long as I/we have ownership of said property(ies).
3. I/We shall cooperate with and allow the County staff to come onto said property(ies) and perform inspection duties as prescribed by local and state regulators.
4. I/We shall inform future buyer(s) or successors of said property(ies) of the existence and perpetual maintenance requirement responsibilities for TC BMP(s) as listed above and to ensure that such responsibility shall transfer to the future owner(s).
5. I/We will abide by all of the requirements and standards of Section 67.812 through Section 67.814 of the WPO (or renumbering thereof) as it exists on the date of this Agreement, and which hereby is incorporated herein by reference.

This Agreement shall run with the land. If the subject property is conveyed to any other person, firm, or corporation, the instrument that conveys title or any interest in or to said property, or any portion thereof, shall contain a provision transferring maintenance responsibility for TC BMP(s) to the successive owner according to the terms of this Agreement. Any violation of this Agreement is grounds for the County to impose penalties upon the property owner as prescribed in County Code of Regulatory Ordinances, Title 1, Division 8, Chapter 1 Administrative Citations §§18.101-18.116.

_____ _____
Owner(s) Signature(s)

_____ _____
Print Owner(s) Name(s) and Title

STATE OF CALIFORNIA)
COUNTY OF _____)

On _____ before me, _____Notary Public,
personally appeared _____ 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.

Signature _____

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

Attachment 3a must identify:

- ☒ Specific maintenance indicators and actions for proposed structural BMP(s). This must 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 all Structural BMPs, Attachment 3b must include a draft maintenance agreement in the County's standard format depending on the Category (PDP applicant to contact County staff to obtain the current maintenance agreement forms). Refer to Section 7.3 in the BMP Design Manual for a description of the different categories.

ATTACHMENT 4

County of San Diego PDP Structural BMP Verification for Permitted Land Development Projects

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County of San Diego BMP Design Manual Verification Form	
Project Summary Information	
Project Name	Bonjorno Property
Record ID (e.g., grading/improvement plan number)	
Project Address	1460 Marshall Road, Alpine, CA 91901
Assessor's Parcel Number(s) (APN(s))	403-271-20 & 21
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	
Responsible Party for Construction Phase	
Developer's Name	
Address	
Email Address	
Phone Number	
Engineer of Work	
Engineer's Phone Number	
Responsible Party for Ongoing Maintenance	
Owner's Name(s)*	
Address	
Email Address	
Phone Number	
*Note: If a corporation or LLC, provide information for principal partner or Agent for Service of Process. If an HOA, provide information for the Board or property manager at time of project closeout.	

County of San Diego BMP Design Manual Verification Form Page 2 of 4					
Stormwater Structural Pollutant Control & Hydromodification Control BMPs* (List all from SWQMP)					
Description/Type of Structural BMP	**Plan Sheet #**	**STRUCT-URAL BMP ID#**	**Maint-enance Category**	**Maintenance Agreement Recorded Doc #**	**Revisions**
*All Priority Development Projects (PDPs) require a Structural BMP					

Note: If this is a partial verification of Structural BMPs, provide a list and map denoting Structural BMPs that have already been submitted, those for this submission, and those anticipated in future submissions.

County of San Diego BMP Design Manual Verification Form Page 3 of 4

Checklist for Applicant to submit to PDCI:

- ☐ Copy of the final accepted SWQMP and any accepted addendum.
- ☐ Copy of the most current plan showing the Stormwater Structural BMP Table, plans/cross-section sheets of the Structural BMPs and the location of each verified as-built Structural BMP.
- ☐ Photograph of each Structural BMP.
- ☐ Photograph(s) of each Structural BMP during the construction process to illustrate proper construction.
- ☐ Copy of the approved Structural BMP maintenance agreement and associated security

By signing below, I certify that the Structural BMP(s) for this project have been constructed and all BMPs are in substantial conformance with the approved plans and applicable regulations. I understand the County reserves the right to inspect the above BMPs to verify compliance with the approved plans and Watershed Protection Ordinance (WPO). Should it be determined that the BMPs were not constructed to plan or code, corrective actions may be necessary before permits can be closed.

Please sign your name and seal.

Professional Engineer's Printed Name:

_____

Professional Engineer's Signed Name:

_____

[SEAL]

Date:_____

County of San Diego BMP Design Manual Verification Form Page 4 of 4

COUNTY - OFFICIAL USE ONLY:

For PDCI: Verification Package #: _____

PDCI Inspector: _____

Date Project has/expects to close: _____

Date verification received from EOW: _____

By signing below, PDCI Inspector concurs that every noted Structural BMP has been installed per plan.

PDCI Inspector's Signature: _____ Date: _____

FOR WPP:

Date Received from PDCI: _____

WPP Submittal Reviewer: _____

WPP Reviewer concurs that the information provided for the following Structural BMPs is acceptable to enter into the Structural BMP Maintenance verification inventory:

List **acceptable** Structural BMPs:

WPP Reviewer's Signature: _____ Date: _____

ATTACHMENT 5

Copy of Plan Sheets Showing Permanent Storm Water BMPs, Source Control, and Site Design

This is the cover sheet for Attachment 5.

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 Step 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 County staff
- ☐ 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 must be provided. Photocopies of general brochures are not acceptable.
- ☐ Include all source control and site design measures described in Steps 4 and 5 of the SWQMP. Can be included as a separate exhibit as necessary.

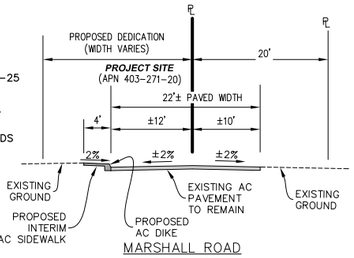
PRELIMINARY GRADING PLAN

LEGEND:

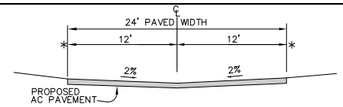
SYMBOL	ITEM
	EXISTING AC PAVEMENT
	PROPOSED AC PAVEMENT
	PROPOSED PCC PACEMENT
	AREA WHERE NO GRADING IS PROPOSED
	BUILDING WALL PER ARCHITECT'S PLAN
	PROPOSED RETAINING WALL
—OH—	OVERHEAD UTILITY LINES
—OH—	EXISTING OVERHEAD UTILITY LINES TO BE REMOVED/UNDERGROUNDED

NOTES:

1. EXISTING POWER POLE TO REMAIN
2. EXISTING POWER POLE TO BE RELOCATED TO THE EAST SIDE OF MARSHALL ROAD
3. EXISTING FENCE TO REMAIN
4. PROPOSED SEWER PUMP STATION
5. PROPOSED MODIFIED TYPE "C" CURB INLET PER RSD D-03A
6. REMOVE EXISTING GUY ANCHOR AND INSTALL PROPOSED GUY POLE
7. PROPOSED GUY ANCHOR
8. PROPOSED 8" PVC PRIVATE SEWER MAIN (GRAVITY)
9. PROPOSED 1.25" PVC PRIVATE SEWER (FORCE MAIN)
10. PROPOSED SEWER MANHOLE
11. PROPOSED TYPE G-1 CATCH BASIN PER RSD D-08
12. PROPOSED PROPOSED GRAVEL TO DISPERSE DITCH OVERFLOW
13. PROPOSED BIORETENTION BASIN
14. PROPOSED 12" HDPE STORM DRAIN PIPE
15. PROPOSED TYPE "B" BROW DITCH PER RSD D-75
16. PROPOSED L-TYPE HEADWALL PER RSD D-36
17. PROPOSED STRAIGHT HEADWALL PER RSD D-30
18. EXISTING EARTHEN DITCH
19. PROPOSED 12"x12" BROOKS BOX CATCH BASIN
20. PROPOSED 6" AC DIKE PER RSD G-05
21. 80' OF CONCRETE BROW DITCH AT ZERO PERCENT SLOPE. DITCH IS DESIGNED TO OVERFLOW IN A SHEET FLOW CONDITION TO MODEL THE EXISTING CONDITION
22. PROPOSED RIP-RAP PER RSD D-40
23. EXISTING CONCRETE BROW DITCH TO REMAIN
24. PROPOSED 14' CURB INLET TYPE B-1 PER RSD D-02
25. EXISTING CONCRETE BROW DITCH OUTLETTING ONTO EXISTING AC PARKING LOT
26. 15' OF PROPOSED BROW DITCH TO RUN UNDER CORNER OF UNIT ON PIERS
27. PROPOSED FIRE HYDRANT 3' OF EDGE OF ROAD
28. EXISTING FIRE HYDRANT TO REMAIN
29. EXISTING POWER POLE, GUY WIRE, AND ANCHOR TO BE REMOVED
30. EXISTING OVERHEAD UTILITY LINES TO BE REMOVED/UNDERGROUNDED
31. EXISTING WATER METERS TO BE RELOCATED
32. EXISTING MANHOLE TO REMAIN
33. EXISTING GUY WIRE AND ANCHOR TO REMAIN
34. PROPOSED INTERIM AC SIDEWALK
35. PROPOSED PED RAMP
36. EXISTING RETAINING WALL TO BE REMOVED
37. PROPOSED PCC SIDEWALK
38. EXISTING AC DIKE TO REMAIN
39. EXISTING AC PAVEMENT TO BE REMOVED
40. PROPOSED MONOLITHIC CURB, GUTTER, AND SIDEWALK PER RSD G-03
41. PROPOSED MODIFIED CURB OUTLET PER RSD D-25 ACTING AS INLET TO TRANSPORT RUNOFF TO STREET TREE
42. PROPOSED 20 FOOT DIAMETER CANOPY STREET TREE IN 19'x 13.5' TREE WELL WITH AMENDED SOIL DEPTH OF 2.5'. OVERFLOW DRAINS TOWARDS THE BROW DITCH AND NOT DOWN THE SLOPE
43. PROPOSED MODIFIED DRIVEWAY PER RSD G-14
44. PROPOSED 6" PCC CURB PER RSD G-1
45. 15' OF PROPOSED 6" AC DIKE PER RSD G-05

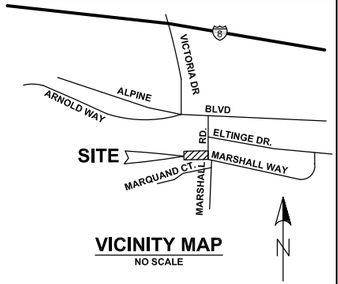


MARSHALL ROAD
LOOKING NORTH
NO SCALE



*"NO PARKING FIRE LANE" SIGNS POSTED EVERY 30 FEET ON BOTH SIDES OF PRIVATE ROAD "A". COMPLY WITH CVC 22500.2

PRIVATE ROAD "A" (TYPICAL SECTION)
NO SCALE



VICINITY MAP
NO SCALE

BMP LEGEND

SOURCE CONTROL BMPS:

PREVENTION OF ILLICIT DISCHARGES INTO THE MS4	4.2.1
STORM DRAIN STENCILING	4.2.2
PROTECTED OUTDOOR MATERIALS STORAGE AREAS	4.2.3
PROTECTED MATERIALS STORED IN OUTDOOR WORK AREAS	4.2.4
PROTECT TRASH STORAGE AREAS	4.2.5
ON-SITE STORM DRAIN INLETS	4.2.6.A
LANDSCAPE/OUTDOOR PEST. USE	4.2.6.E
PLAZAS, SIDEWALKS, AND PARKING LOT	4.2.6.Q

SITE DESIGN BMPS:

CONSERVE NATURAL AREAS, SOILS, AND VEGETATION	4.3.2
MINIMIZE IMPERVIOUS AREA	4.3.3
MINIMIZE SOIL COMPACTION	4.3.4
IMPERVIOUS AREA DISPERSION	4.3.5
RUNOFF COLLECTION	4.3.6
LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES	4.3.7

OWNER:
RICHARD J. BONJORNO
AND JUDY C. BONJORNO
1469 MARSHALL ROAD
ALPINE, CA 91901
(619) 379-9120

SCALE: 1"=20'

LEGAL DESCRIPTION:

A PORTION OF SOUTHWEST QUARTER OF SECTION 27, TOWNSHIP 15 SOUTH, RANGE 2 EAST, SAN BERNARDINO BASE & MERIDIAN IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA. AS DESCRIBED IN DEED REC JUNE 16, 1993 PER DOC. 1993-0381217

BENCHMARK:

DESCRIPTION: 3" BRASS DISC STAMPED "SD CO ENGR DEPT. SURVEY MON. 1975" IN STANDARD STREET WELL MONUMENT.

LOCATION: 188.77' SW FROM APPARENT CL/CL INTERSECTION OF ELTINGE DR. AND MARSHALL WAY. POINT IS ON APPARENT CL AND N'LY BC OF 46' CURVE.

ELEVATION: 1936.99 (NGVD 29)

SOURCE: SAN DIEGO COUNTY BENCH BOOK PER R.O.S. 13702

GRADING:

CUT: 5,500 C.Y.
FILL: 2,500 C.Y.
EXPORT: 3,000 C.Y.

TOPOGRAPHY:

BY PHOTOGEODETIC, INC. DATE FLOWN: 04-21-17

SITE ADDRESS:

1460 MARSHAL ROAD
ALPINE, CA 91901

ASSESSOR PARCEL NUMBERS:

403-271-20 & 21

EASEMENT NOTES:

(PER TITLE REPORT DATED JANUARY 22, 2018)

(A) EASEMENT FOR SANITATION UTILITIES PER DOC. RECORDED 12/22/1953, BOOK 5095, PAGE 452 OF OFFICIAL RECORDS.

(B) EASEMENT FOR WATER UTILITIES PER DOC.# 1962-58561 RECORDED 04/5/1962.

(C) EASEMENT FOR COUNTY HIGHWAY PER DOC.# 2004-0069636 RECORDED 01/29/2004.

(D) 26' WIDE EASEMENT FOR PUBLIC ROAD AND DRAINAGE PURPOSES DEDICATED AND ACCEPTED PER MAP 14936.

CENTERLINE OF SDG&E EASEMENT (NO WIDTH GIVEN) PER DOC. RECORDED 01/30/1934, BOOK 264, PAGE 363 OF OFFICIAL RECORDS NOT PLOTTED (TO BE VACATED)

2' WIDE SDG&E EASEMENT PER DOC. RECORDED 04/01/1924 BOOK 1006, PAGE 8 NOT PLOTTABLE; EXACT LOCATION NOT DISCLOSED (TO BE VACATED)

NOTE:

THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN VALID GRADING PERMISSIONS BEFORE COMMENCING SUCH ACTIVITY.

ALL EXISTING HOMES/STRUCTURES ON SITE ARE TO BE REMOVED AS PART OF THIS PROJECT.

REGISTERED PROFESSIONAL ENGINEER
LAWRENCE W. WALSH
46316
CIVIL
STATE OF CALIFORNIA

PREPARED BY:

LAWRENCE W. WALSH — DATE

Walsh Engineering & Surveying, Inc.
607 Aldwych Road, El Cajon, CA 92020
(619) 588-6747 (619) 792-1232 Fax

L:\PROJECTS 3D\16954-MARSHALL\PRODUCTION DRAWINGS\16954 PGP.DWG September 05, 2018 - 11:57am

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ATTACHMENT 6

Copy of Project's Drainage Report

This is the cover sheet for Attachment 6.

If hardcopy or CD is not attached, the following information should be provided:

Title: Marshall Road Drainage Study
Prepared By: Walsh Engineering & Surveying, Inc.
Date: 3-14-18

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ATTACHMENT 7

Copy of Project's Geotechnical and Groundwater Investigation Report

This is the cover sheet for Attachment 7.

If hardcopy or CD is not attached, the following information should be provided:

Title: Infiltration Testing Results, File No. 1234B6-17
Prepared By: Soils Testers
Date: 2-28-18

SOIL TESTERS

P.O. Box 1195
Lakeside, California
92040
(619) 443-0060

July 5, 2018

Richard Bonjorno
1460 Marshall Way
Alpine, California 91901

Subject: File No. 1234B6-17
Infiltration Testing
Stormwater for Bioinfiltration Testing
1460 Marshall Road
Alpine area, County of San Diego

Dear Mr. Bonjorno:

In accordance with your request, Infiltration Testing has been performed at the subject site. The purpose of this investigation was to examine existing site conditions to determine if Bio-retention ponds can be used and provide engineering recommendations for the Proposed 23 lot Major Subdivision. In addition, we have provided corrosive testing for the proposed project. See as attached to the Soil Report.

SITE EROSION CONTROL

During the construction, surface water should be controlled via berms, gravel bags and/or sandbags, silt fence, straw wattles, siltation basins, while maintaining positive surface grades or other methods to avoid damage to the finish work or adjoining properties. All site entrances and exits must have coarse gravel or steel shaker plates to minimize offsite sediment tracking. Best management Practices (BMP's) must be used to protect storm drains and minimize pollution. The contractor should take measures to prevent erosion of graded areas until such time as permanent drainage and erosion control measures have been installed. After completion of grading, all excavated surfaces should exhibit positive drainage and eliminate areas where water might pond.

SITE AND SURFACE DRAINAGE

Drainage at the site should be directed away from foundations, collected and tight lined to appropriate discharge points. Consideration may be given to collecting roof drainage by eave gutters and directing it away from foundations via non-erosive devices. Water, either natural or

from irrigation, should not be permitted to pond, saturate the surface soils or flow towards the foundation. Landscaping requiring a heavy irrigation schedule should not be planted adjacent to foundations or paved areas. The type of drainage issues found within the project and materials specified and used should be determined by the Engineer of Record.

Under Form I-3B, page 2 of 11, the question asks the existing drainage coming into the site. The existing surface drainage flows, **there is no off-site drainage flows that drains in either sheet flow and concentrated condition onto the subject project site from the surrounding residential parcels**.

GROUNDWATER AND SURFACE WATERS

There was no indication of a near-surface groundwater table within our exploratory trench or perched groundwater. Although groundwater is not expected to be a significant constraint to the proposed development, our experience indicates that near-surface groundwater conditions can develop in areas where no such groundwater conditions previously existed, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation or unusually heavy precipitation. It is anticipated that site development will include appropriate drainage provisions for control and discharge of surface water runoff. The type of drainage issues found within the project and materials specified and used should be determined by the Civil Engineer. The type of plants and soil specified along with proper irrigation used should be determined by the Landscape Architect.

INFILTRATION TESTING FOR BIOSYSTEMS

Water Capacity

The available water holding capacity is by NRCS prior to development is a high rate 7.8 in/hr. in the surface soil zone and afterwards from the mass grading of the development will be change by moderately an engineered documented fill from the surface to three feet down. The infiltration testing results indicated in Basin A, P-Ave. 4.35 IPH. to Basin B, P-Ave. 3.60 inches per hour for infiltration rates, which is less than 0.6 tenth of a foot per hour being equal to 5 inch per hour as a minimum. The site for the proposed Basins can't be regraded nor have equipment drive through the basin area. The ungraded site is a single soil group Fallbrook Sandy Loam, Landform. This type of soil profile has about 15 to 28 percent coarse and very coarse sand up to 5 percent 2 to 5 mm rock fragments in the top 24 inches. Weathered paralithic bedrock which begins between 24 and 40 inches. Runoff class is moderately high to high, and the erosion hazard is moderate to high, based upon slope. The rooting zones are estimated now between 8 to 24 inches prior to re-grading of the site.

Understanding of the Available Water Capacity (AWC) is referred to the quantity of water that the soil is capable of storing through infiltration only in the top 20 to 40 inches of 7.8 inches. The water

storage within the profile having sandy clay loam, loam soil poorly sorted (more described in the soil geology section) can be considered to be well drained in the top surface zone. The underlying soil zones drop from a well drained to a no draining at all.

Hydrologic Soil Group

Hydrologic studies are invaluable for estimating the run-off from a given area and designing flood control conditions along with structures adequate to handle the runoff storm water. The County of San Diego Planning and Land Use had joined with NRCS, United States Department of Agriculture, Soil Conservation Service and Forest Service, UC Davis, and United States Department of the Interior in the late 1960's and completed in December 1973, Part I and Part II along with the maps showing the soil survey and data information. They have established four Groups from A to D, with A being the best case and D being the worst case. The site falls within Group "C" prior to site development.

Under Form I-3B, page 2 of 11, the question asks the Underlying Soil Belongs to Hydrologic Soil Group: **NRCS Type C**

The soils we encountered were considered to be non expansive (with the Expansion Index of >36) with respect to change in volume along with change in moisture content.

Site-Specific Soil and Geology Description

According to the California Geologic Survey and United States Geological Survey "Geologic Map of the San Diego 30"x 60" Quadrangle, California" by Michael P. Kennedy and Siang S. Tan (2008), and reference; Geologic Map of the El Cajon, 30 x 60 min. Quadrangle; Todd, V., 2004, U.S.G.S. open file map no.2004-1361 The site is underlain by a granitic rock formation correlated with the Alpine Tonalite. This rock unit is a coarse-grained biotite rich and generally highly weathered unit that underlies much of the Alpine area.

The overlying fill soils consist of Reddish Brown sandy loam, sandy clay loam, dry, hard moderate medium angular blocky structure, slightly sticky and slightly plastic, common very fine roots, mixed with cobbles of < 6" and gravels from 3/8" to 1", Dry Dusty at the time of testing, while the soil is in a medium to very dense condition.

Groundwater

Static groundwater was not encountered within the depths of the explorations Bore holes and backhoe slices.

We hit refusal several times during our drilling operations in trying to establish a deep hole. Our deepest depth was six feet from both: hardpan, cobbles and bedrocks along with rock out- cropping

areas. In our deepest bore hole which is not expected to be a significant constraint to the proposed development, our experience indicates that near-surface groundwater conditions can develop in areas where no such groundwater conditions previously existed, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation or unusually heavy precipitation. The stormwater will increase as a sheet flow condition over the bedrock within the soil structure. Some of the stormwater will infiltrate into the rock cracks and voids. We don't expect a perched water condition to occur. We don't see this happening within this development based upon the preliminary design given to us of the first of June 2018, in the form of the Tentative Parcel Map, filed with the County of San Diego, State of California. Please refer to Storm Water Conclusions and Recommendations section.

Under Form I-3B, page 2 of 11, the question asks the approximate depth to groundwater (GW). The box to check for: **10 feet <GW Depth < 20 feet.** The groundwater depth is more than 80 inches.

Under Form I-3B, page 2 of 11, the question asks about the existing Natural Hydrologic features. The box to check for: **None**

Test Method for non-sandy soil condition

The Infiltration test is to determine the areas that are necessary to the development that will treat and maintain the storm water run-off during and after the storm event. The information will size the Bioretention Basins with the adequate infiltration surface based on an expected hydraulic conductivity of the soil and the rate of loading. This would provide for a system intended to allow for a long-term expectation of satisfactory performance. The method used was from the Riverside County Low Impact Development BMP Handbook-Ryan Method for Field Permeability Testing, Case I, water does remain after the 24 hour presoak and case III, which is "No water remains after 15 to 26 hours after the four hour presoak". This project had expensed both cases I and III, for the testing methods. Bio-pond in Parcel two, had only three test holes out of five that were able to be tested. Bio-pond in Parcel three, had four test holes with two holes having standing water and the other two were dry.

As for the testing method used, there was no additional 2.0 times safety factor included as standard for the residential development since the soils are not required to hold the 100 year storm event. The reason is due to the pond having a proposed overflow pipe located at the top of the storm water surface level of the basin having a positive flow "out of the Bio-retention Basin". When the soil becomes saturated and or the intensity is higher not permitting the basin to infiltrate then the storm water will begin flowing out. Otherwise the design shall have an overflow pipe installed that is connected to the existing storm drain system for the longer duration and or intensity of the storm event. The time for the pond to drain is shown within the Consultants Hydrology Report or Study. The storm water will pond above the surface level past 24 hours. In addition, the Landscape Architect has shrubs and trees that are designed for the up-take and pounding conditions occurring.

The building pads for the 23 units are located at an approximate elevation ranging from top to bottom (Building/Parcel) Parcel 1, Building/parcel = 1,889.1 feet to Parcel 14 of 1,845.20 feet, bottom. The preliminary grading plan doesn't state second floor elevations.

While the Bio-retention ponds are located along the northwesterly portion between units 14 and 15 and the westerly portion of the parking area and fire turn around. The storm water flows out towards in a westerly direction towards the existing Apartment Complex and unit 14.

Test Hole Preparation Procedure for shallow hole testing less than 10 feet

The location of the test holes shall be representative of the ponds and sitting area.

The identification of the test holes, were staked and flagged so the test holes can be located. In addition, each stake has been identified with the test number and depth and marked with the testing date.

The drilling/boring of each of the test holes were with a 6 inch diameter bit.

The preparation of the test holes were cleaned out after each boring and two inches of pea gravel placed at the bottom.

Following the test holes preparation a presoak commenced for the next 15-26 hours.

The following day the test shall begin using both Case methods. After cleaning out each hole and reestablish the hole with two inches of pea gravel and maintain a head of six inch water level after the first hour of testing and continue measuring from a fixed reference point at 60 minute intervals to the nearest 1/16" inch measuring the water difference for a minimum of four hours. During the drilling of the bore holes, the soils that were uncounted consisted of surface zone to be light-brown and red-brown, to three and half feet clayey fine to medium sand to deeper zone changing to light-gray clayey sand with clay chips of fine grains and clay balls up to an one size. With the moisture creating the soil to have loose to medium density. Some holes zones having very dense density.
With this type of soil a 30 minute test would not show to be reasonable and it was ran by a 60 minute test method.

The Calculation

It is a basic time vs. the water drop, example 60 minutes divided by the drop of 1 inch equals 60 minutes per hour (mph), the reporting valves are in, in/hr, inches per hour below.

The following test holes have been observed the minimum time of fifteen hours from the presoak to the drop test reading. The rates are the results in Table I.

Test Hole Number	Test Depth	Stabilized Rate (iph)
I-1-A	4'-7 7/16"	**1-5/8"**
I-2-A	4'-8 1/2"	**3-1/4"**
I-3-A	4'-6 1/8"	**2-0"**
I-4-A	4'-6 1/8"	**1-3/8"**
I-5-B	4'-8 5/8"	**1-3/4"**
I-6-B	4'-5"	**1-1/8"**
I-7-B	4'-6 1/8"	**0-5/8"**
I-8-B	4'-6"	**1-1/2"**

Attached in the following pages, the percolation test data field work sheet are along with the Porchet conversation.

The Average Infiltration rates are set forth in two ponds.

Average Infiltration rate for the pond A before conversion: 2-5/8" in/hr. native soil condition.

Average Infiltration rate for the pond B before conversion: 1-1/4" in/hr. native soil condition.

Percolation Rate Conversion

"However, there is a relationship between the values obtained by a percolation test and infiltration rate. Based on the Porchet Method, the following equation may be used to convert percolation rates to the tested infiltration rate, I_t :

$$I_t = \frac{\Delta H\, \pi r^2\, 60}{\Delta t\, (\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t\, (r + 2H_{avg})},$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
$^*r$ = effective radius of test hole: r = 3"
H_{avg} = average head over the time interval, inches

* Where a rectangular test hole is used, an equivalent radius should be determined based on the actual area of the rectangular test hole. (i.e., $r = (A/\pi)^{0.5}$)"

No rectangular test hole was used.

The data collected at the final interval is as follows:

Time interval, $\Delta t = 60$ minutes
Initial Depth to Water, $D_o =$ inches
Final Depth to Water, $D_f =$ inches
Total Depth of test Hole, $D_T =$ inches
*Test Hole Radius, r = 3 inches

The conversion equation is used:

$$\frac{\Delta H \ 60 \ r}{\Delta t \ (r + 2H_{avg})},$$

Understanding that the soil type in each pond location is basically uniform with a different density. The predominant soil type is a reddish-brown sandy loam, sandy clay loam, coarse and very coarse sand material within the existing pad as post-compacted condition throughout the site at the minimum of 90% and less. Therefore, the standard Delta Time of ten minutes does not apply. The slow rate changes the Delta Time to either 30 minutes per hour or 60 minutes per hour. The testing was done as 60 minutes per hour. In addition having one test hole per pond does not give a statistical value. Therefore, four holes where tested per pond area. See the spread sheets on the following pages for the valves. The measured depths are in inches and were converted to decimal of an inch for the calculations and reconverted back into inches. Everything is in inches per hours.

Adjusted Average Infiltration rate for the pond Basin A: $I_t = 4.35$ in/hr.

Adjusted Average Infiltration rate for the pond Basin B: $I_t = 3.60$ in/hr.

The modeling rate can be 1" in/hr. for both ponds or separate each one based upon sizing.

Basin 1
Percolation Rates

Test Hole #1

Depth (D_T) = 55.44
Hole Dia. = 6 inches r=3"
Time Interval = 60 minutes

Action	Time	Elapsed Time	Measure (ft)	Dd (ft)	Rate IPH
Fill/ START	10:43		3.58		
		1:00		0.25	0.17
	11:43		3.83		
		1:00		1.01	0.04
	12:43		4.84		
		1:00		-0.83	-0.05
	13:43		4.01		
		0:00		-0.17	0.00
FILL	13:43		3.84		
		1:00		0.3	0.14
END	14:43		4.14		

Average Rate = 0.07 IPH

Convert to Infiltration using Porchet

D_T =	55.44	inches	Total Depth of Test Hole
D_0 =	43	inches	Initial Depth to Water
D_f =	49.63	inches	Final Depth to Water
H_0 =	12.44	inches	
H_f =	5.81	inches	
ΔH =	6.63	inches	
H_{ave} =	3.315	inches	
I_t =	5.35	IPH	

Test Hole #2

Depth (D_T) = 56.5
Hole Dia. = 6 inches r=3"
Time Interval = 60 minutes

Action	Time	Elapsed Time	Measure (ft)	Dd (ft)	Rate IPH
Fill/ START	10:48		3.55		
		1:00		0.43	0.10
	11:48		3.98		
		1:00		0.21	0.20
	12:48		4.19		
		1:00		0.165	0.25
	13:48		4.355		
		0:00		-0.19	0.00
FILL	13:48		4.165		
		1:00		0.275	0.15
END	14:48		4.44		

Average Rate = 0.17 IPH

Convert to Infiltration using Porchet

D_T =	56.5	inches	Total Depth of Test Hole
D_0 =	42.63	inches	Initial Depth to Water
D_f =	53.25	inches	Final Depth to Water
H_0 =	13.87	inches	
H_f =	3.25	inches	
ΔH =	10.62	inches	
H_{ave} =	5.31	inches	
I_t =	7.72	IPH	

Basin 1
Percolation Rates

Test Hole #3

Depth (D_T) = 54.13
Hole Dia. = 6 inches r=3"
Time Interval = 60 minutes

Action	Time	Elapsed Time	Measure (ft)	Dd (ft)	Rate IPH
Fill	10:55		3.665		
		1:00		0.26	0.16
	11:55		3.92		
		1:00		0.16	0.26
	12:55		4.08		
		1:00		0.17	0.25
	13:55		4.25		
		1:00		0.11	0.38
STOP	14:55		4.36		
		1:00		0	0.00
	15:55		0		

Average Rate = 0.27 IPH

Convert to Infiltration using Porchet

D_T =	54.13	inches	Total Depth of Test Hole
D_0 =	41.56	inches	Initial Depth to Water
D_f =	48.75	inches	Final Depth to Water
H_0 =	12.57	inches	
H_f =	5.38	inches	
ΔH =	7.19	inches	
H_{ave} =	3.595	inches	
I_t =	2.12	IPH	

Basin 1
Percolation Rates

Test Hole #4

Depth (D_T) = 57.25
Hole Dia. = 6 inches r=3"
Time Interval = 60 minutes

Action	Time	Elapsed Time	Measure (ft)	Dd (ft)	Rate IPH
Fill	10:55		3.665		
		1:00		0.26	0.16
	11:55		3.92		
		1:00		0.16	0.26
	12:55		4.08		
		1:00		0.17	0.25
	13:55		4.25		
		1:00		0.11	0.38
STOP	14:55		4.36		
		1:00		0	0.00
	15:55		0		

Average Rate = 0.27 IPH

Convert to Infiltration using Porchet

D_T =	57.25	inches	Total Depth of Test Hole
D_0 =	44	inches	Initial Depth to Water
D_f =	52.38	inches	Final Depth to Water
H_0 =	13.25	inches	
H_f =	4.87	inches	
ΔH =	8.38	inches	
H_{ave} =	4.19	inches	
I_t =	2.21	IPH	

Basin 2
Percolation Rates

Test Hole #5

Depth (D_T) = 56.63
Hole Dia. = 6 inches r=3"
Time Interval = 60 minutes

Action	Time	Elapsed Time	Measure (ft)	Dd (ft)	Rate IPH
Fill/ START	11:00		3.665		
		1:00		0.27	0.16
	12:00		3.93		
		1:00		0.17	0.25
	13:00		4.095		
		1:00		0.155	0.27
	14:00		4.25		
		0:00		-0.25	0.00
FILL	14:00		4		
		1:00		0.05	0.83
END	15:00		4.05		

Average Rate = 0.38 IPH

Convert to Infiltration using Porchet

D_T =	56.63	inches	Total Depth of Test Hole
D_0 =	44	inches	Initial Depth to Water
D_f =	49.75	inches	Final Depth to Water
H_0 =	12.63	inches	
H_f =	6.88	inches	
ΔH =	5.75	inches	
H_{ave} =	2.875	inches	
I_t =	4.78	IPH	

Basin 2
Percolation Rates

Test Hole #6

Depth (D_T) = 53
Hole Dia. = 6 inches r=3"
Time Interval = 60 minutes

Action	Time	Elapsed Time	Measure (ft)	Dd (ft)	Rate IPH
Fill/ START	11:07		3.325		
		1:00		0.36	0.12
	12:07		3.685		
		1:00		0.17	0.25
	13:07		3.85		
		1:00		-0.18	-0.23
Fill	14:07		3.67		
		0:00		0.16	0.00
	14:07		3.83		
		1:00		0.1	0.42
END	15:07		3.93		

Average Rate = 0.14 IPH

Convert to Infiltration using Porchet

D_T =	53	inches	Total Depth of Test Hole
D_0 =	39.88	inches	Initial Depth to Water
D_f =	47.13	inches	Final Depth to Water
H_0 =	13.12	inches	
H_f =	5.87	inches	
ΔH =	7.25	inches	
H_{ave} =	3.625	inches	
I_t =	5.69	IPH	

Basin 2
Percolation Rates

Test Hole #7

Depth (D_T) = 54.13
Hole Dia. = 6 inches r=3"
Time Interval = 60 minutes

Action	Time	Elapsed Time	Measure (ft)	Dd (ft)	Rate IPH
Fill	11:11		3.41		
		1:00		0.13	0.32
	12:11		3.54		
		1:00		0.11	0.40
	13:11		3.645		
		1:00		0.105	0.40
	14:11		3.75		
		1:00		0.05	0.83
STOP	15:11		3.8		
		1:00		0	0.00
	16:11		0		

Average Rate = 0.52 IPH

Convert to Infiltration using Porchet

D_T =	54.13	inches	Total Depth of Test Hole
D_0 =	41	inches	Initial Depth to Water
D_f =	45.63	inches	Final Depth to Water
H_0 =	13.13	inches	
H_f =	8.5	inches	
ΔH =	4.63	inches	
H_{ave} =	2.315	inches	
I_t =	1.82	IPH	

Basin 2
Percolation Rates

Test Hole #8

Depth (D_T) = 54
Hole Dia. = 6 inches r=3"
Time Interval = 60 minutes

Action	Time	Elapsed Time	Measure (ft)	Dd (ft)	Rate IPH
Fill	11:15		3.4		
		1:00		0.18	0.24
	12:15		3.575		
		1:00		0.20	0.21
	13:15		3.775		
		1:00		0.135	0.31
	14:15		3.91		
		1:00		0.1	0.42
	15:15		4.01		
		1:00		0	0.00
	16:15		0		

Average Rate = 0.29 IPH

Convert to Infiltration using Porchet

D_T =	54	inches	Total Depth of Test Hole
D_0 =	40.88	inches	Initial Depth to Water
D_f =	48.01	inches	Final Depth to Water
H_0 =	13.12	inches	
H_f =	5.99	inches	
ΔH =	7.13	inches	
H_{ave} =	3.565	inches	
I_t =	2.11	IPH	

Basin1 - A

Average Infiltration Rate

TP1	5.35	IPH
TP2	7.72	IPH
TP3	2.12	IPH
TP4	2.21	IPH
Average =	4.35	IPH

Basin 2 - B

Average Infiltration Rate

TP5	4.78	IPH
TP6	5.69	IPH
TP7	1.82	IPH
TP8	2.11	IPH
Average =	3.60	IPH

INCH		DECIMAL OF A FOOT
1 inch		0.0833
2 inches		0.167
3 inches		0.25
4 inches		0.333
5 inches		0.417
6 inches		0.5
7 inches		0.583
8 inches		0.667
9 inches		0.75
10 inches		0.833
11 inches		0.917
12 inches		1

TO CONVERT FURTHER, 1/8" IS ALMOST 1/100TH OF A FOOT.		
1"	=	0.08
1 1/8"	=	0.09
1 1/4"	=	0.1
1 3/8"	=	0.11
1 1/2"	=	0.13
1 5/8"	=	0.14
1 3/4"	=	0.15
1 7/8"	=	0.16
2"	=	0.17

TYPE OF SOILS ENCOUNTED DURING THE DRILLING OPERATION LOG

There are eight exploration drilled holes that were tested ranging from 4.40 feet to 4.75 feet deep that were logged in the field.

Due to soil condition, our jeep mounted drill rig wasn't able to create a single deep bore hole to 19 feet. The soil identification list below shows the standard depths and types based upon the testing logs. The remaining holes are representative of the holes listed. Therefore, we are only going to list the zones and consistent major groups. We did not drill any additional sets of test holes, which were due to the indurated zones and large cobbles and bedrock, which we were not able to penetrate to any depth.

Deep Hole 7 ft.

0 to 1'	Red-Brown sandy loam, sandy clay loam, coarse-grained Loam sand, Dry, medium dense with fine sand with clay binder top soil, shallow roots in the top 8 to 12 inches. Native soils. Gravelly in some slices.
1' to 4.6'	Tan varied between Light-Brown, medium to coarse sandy loam, Dry, , mixed with cobbles of < 6" and gravels from 3/8" to 1", Dry Dusty at the time of testing, while the soil is in a medium to very dense condition.
	All the test holes had a 3 inch PVC pipe placed down inside with a minimum of two feet above grade as to be identified for the tested locations. Drilled on December 06, 2017, and backfilled on December 07, 2017.

Please refer to the soil report for additional soil profile information from the backhoe slices.

STORM WATER CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based upon the analysis of the data and information obtained from "Walsh Engineering and Surveying Inc." and the field testing for the proposed Bioretention Pond as shown on the Proposed Grading Plan with no assigned number as of November 29, 2017, file with the County of San Diego. In addition to reviewing the NRCS Soil Custom Resource Report, December 2017. and the California Geologic Survey and United States Geological Survey "Geologic Map of the San Diego 30" x 60" Quadrangle, California" for the Proposed twenty-three units, Single-Family Residences with ten duplex units and three single units located along the westerly side of Marshall Road, Alpine, California, and our Site Inspection

Report, File No. 1234B6-17, dated June 18, 2018. This includes site reconnaissance; field investigation; limited field testing and our general knowledge of the soils native to the site. For the subject property it is our recommendation to have the ponds not lined, maintaining the natural soil conditions. Refer to the Proposed Grading Plan design for the sections showing the development of the bio-retention ponds. Additional grading recommendation for the multi-family house pads on said parcel refer to section stated "Grading Recommendation" within our Site Inspection. Understanding that the bio-retention ponds; A and B are located in the northwest portion which is at the bottom of the slope. The two ponds measure east from the northwest corner for pond A at 45 feet or so, and 90 feet or so for pond B, with both ponds going out towards the existing power pole.

The project civil engineer shall implement into the construction documents the design and precise method(s) of site walls, drainage into and out with overflow, along with the engineered soil that goes within the pond areas. The areas of discharge from the ponds are the basin over flow and subsurface flows that goes towards Unit 14. The subsurface flows need to be examined for storm water flowing under the unit or up against the foundation system by the project Architect and Engineer.

The soils at 54 inches have been tested for both ponds. In addition, we had samples analyzed for planting concerns for the Landscape Architect to design guidelines for planting in and round the basins. This information is in the "Waypoint Analytical" Report dated March 14, 2019, which is able to be used for the overall project in soil preparation for turf, groundcover, shrubs, and trees.

The site is suitable for the proposed multi-single family residential development providing the recommendations as set forth are implemented during construction. Our field representative will verify the documents and field construction conditions at the time of construction. The design of the development is a standard proposed multi-residential development that should not create any issues. The setback of eight feet from the proposed utilities, driveways, private and public road and structures should not impact the bio-retention ponds or infiltration swales. To have a sustainable pond, it would to be placed within the landscape areas.

For both Bio-ponds, do not let any equipment, materials, stock piles of any kind to enter the pond areas at any time, other than those materials and equipment and that are required for the construction of the ponds.

The area for the Bio-pond shall not be graded above 80 percent compaction and shall be with only a sandy loam material with 72 percent sand, 3 percent clay and not more than 5 percent, and 25 percent loam structurally graded. As for the Basel area it shall be ripped and mixed in the top 12 inches. As for the drainage it shall not be permitted to be concentrated along the northerly and easterly portion of the sides of the pond for the discharge. It is recognized that compaction of soil within the project site will have a major influence on the infiltration rates.

During the field investigation, we found undocumented fill from private dump areas within the vacant portion area of the property. Along with construction debris, trash, buried vegetation and

loose sands varying depths within the areas. The over sized materials, rock, and concrete from a possible demolished building or patio was also found. Construction debris and oversized materials must be removed prior to use as structural fill materials. Underground utilities are still present and will need to be removed.

Under Form I-3B, page 4 of 11, the question asks about the project includes grading and changes to site topography: The response is: **No,** only remedial grading as well as trenching and excavation for removing undocumented fills and items mention above along with excavation for new foundation system, footings, utilities, and retaining walls. This remedial grading will not change the site conditions for drainage and stormwater.

Under Form I-3B, page 5 of 11, the question asks about, does the project include changes to the site drainage (.ie. Installation of the new storm water conveyance system). The response is: **NO.**

In addition, minimum setbacks for any type of Infiltration Basin, Trenches or Bio-swales, Permeable Pavement.

- 10 feet from the historic high groundwater (measured vertically from the bottom of the basin).
- 5 feet from bedrock or impermeable surface layer (measured vertically from the bottom of the basin).
- From all existing mature tree drip lines. Whereas the sitting of existing and proposed tree locations from their campy and root structures at maturity issues will be found within the project and materials specified and used should be determined by the Landscape Architect and Engineer of Record.
- 100 feet horizontally from wells, tanks or springs.
- The setback of eight feet from the proposed utilities, driveways, private and public road and structures should not impact the bio-retention ponds or infiltration swales.
- 5:1 setback from any natural or manmade slopes with a maximum of 25 feet. Also with the recommendation from the Soil Engineer if additional setbacks are required or can be reduced.
- An overflow route is needed to bypass storm flows larger than the V_{BMP} or in the event of clogging. overflow systems must connect to an acceptable discharge point such as a downstream conveyance system.
- Downstream of erodible areas of the discharge.
- Areas where geotechnical concerns, such as soils with low infiltration rates, would preclude the use of this BMP.
- Maximum slope of permeable pavement 3%.
- Maximum contributing area slope 5%. Based upon the Soils Engineer and regardless of the slope of the pavement surface design, the bottom of the reservoir layers shall be flat and level. A terraced design utilizing non-permeable check dams shall be used.

- When using Permeable Pavement design it is good to have the surface water drain over a bio-swale or grass swale which will reduce the trash, and sediments from clogging.
- Additional setbacks can be recommend from the Soils Engineer based upon final design conditions within the construction documents and/or changes in the field during construction.

We hereby understand that there might be changes in the upcoming construction documents when working with all the agencies for their approvals that could cause a change in design and require additional recommendations.

GENERAL: Soil Testers and `Engineer' are synonymous hereinafter and shall be employed to inspect and test earthwork in accordance with these specifications, the accepted plans, and the requirements of any jurisdictive governmental agencies. They are to be allowed adequate access so that the inspections and tests may be performed. The Engineer shall be apprised of schedules and any unforeseen soil conditions.

Substandard conditions or workmanship, inadequate compaction, adverse weather, or deviation from the lines and grades shown on the plans, etc., shall be cause for the engineer to either stop construction until the conditions are corrected or recommend rejection of the work. Refusal to comply with these specifications or the recommendations and/or interpretations of the engineer will be cause for the engineer and/or his representative to immediately terminate his services.

Deviations from the recommendations of the Soil Report, from the plans, or from these Specifications must be approved in writing by the owner and the contractor and endorsed by the engineer.

UNFORESEEN CONDITIONS: Soil Testers assume no responsibility for conditions, which differ from those, described in the applicable current reports and documents for this property. Upon termination of the engineer's services for any reason, his fees up to the time of termination become due and payable. If it is necessary for the engineer to issue an unfavorable report concerning the work that he has been hired to test and inspect, the engineer shall not be held liable for any damages that might result from his `unfavorable report'.

If we can be of any further assistance, please do not hesitate to contact our office. This opportunity to be of service is sincerely appreciated. The Waypoint Analytical report, the NRCS report and the Preliminary Grading Plan are attached to this report.

Respectfully submitted,

Chin C. Chen, RPE C34442

CCC/mlj