County of San Diego

Stormwater Quality Management Plan (SWQMP)
For Priority Development Projects (PDPs)

Use for all PDPs (see Storm Water Intake Form, Part 4)

Priority Development Project

Project Information	
Project Name	Summit Estates
Project Address	2510 Summit Drive, Escondido, CA 92025
Assessor's Parcel # (APN)	237-090-05
Permit # / Record ID	PDS2019-TM-5635

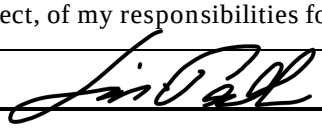
Project Applicant / Project Proponent		
Name	2510 Summit, LLC	
Address	19782 MacArthur Blvd., Suite 300, Irvine, CA 92612	
Phone	(949) 933-4103	**Email:** oscar@img-cm.com

SWQMP Preparer		
Name	Giovanni Posillico	
Company (if applicable)	Latitude 33 Planning and Engineering	
Address	9968 Hibert St, Second Floor, San Diego, CA 92131	
Phone	(858) 751-0633	**Email:** gio.posillico@latitude33.com
PE Number (if applicable)	66332	

Preparer's Certification

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

This SWQMP is intended to comply with applicable requirements of the BMP Design Manual. I certify that it has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this SWQMP by County staff is confined to a review and does not relieve me as the person in charge of overseeing the selection and design of storm water BMPs for this project, of my responsibilities for project design.

Signature  **Date** June 1, 2020

COUNTY ACCEPTED

SWQMP Approved By: *Approval Date*:

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

Submittal Record: List the dates of SWQMP and plan submittals and updates. Briefly describe key changes from previous versions. If responding to plan check comments, note this in the entry and attach the responses as applicable.

No.	Date	Summary of Changes
Preliminary Design / Planning / CEQA		
1	6/13/2019	Initial Submittal
2	4/10/2020	Second submittal, Addressed plan check comments including add POC and use SDHM
3	6/1/2020	Third submittal, Addressed plan check comments including add DMA 3-TS and update Onsite Alternative Compliance.
4	Date	Summary of Change
No.	Date	Summary of Change
Final Design		
1	Date	Initial Submittal
2	Date	Summary of Change
3	Date	Summary of Change
4	Date	Summary of Change
No.	Date	Summary of Change
Plan Changes		
1	Date	Initial Submittal
2	Date	Summary of Change
3	Date	Summary of Change
4	Date	Summary of Change
No.	Date	Summary of Change

PDP SWQMP Submittal Checklist

SWQMP Tables: All of the eight tables below must be completed.

SWQMP Attachments[1]: Use the checklist below to identify which attachments will be included with this submittal. Attachments with boxes already checked (☒) are required for all projects. The applicability of other attachments will be determined upon completing this form.

☒ Attachment 1: Storm Water Intake Form

☒ Attachment 2: DMA Exhibits and Construction Plan Sheets

☐ Attachment 3: Source Control BMP Worksheet

☐ Attachment 4: Previous SWQMP Submittals

☒ Attachment 5: Existing Site and Drainage Description

☒ Attachment 6: Documentation of DMAs without Structural BMPs

☒ Attachment 7: Documentation of DMAs with Structural Pollutant Control BMPs

☒ Attachment 8: Documentation of DMAs with Structural Hydromodification Management BMPs

☒ Attachment 9: Management of Critical Coarse Sediment Yield Areas

☒ Attachment 10: Installation Verification Form

☒ Attachment 11: BMP Maintenance Agreements and Plans

☐ Attachment 12: Documentation of Alternative Compliance Projects (ACPs)

After completing the remainder of this form, check the applicable SWQMP Attachment boxes to summarize your selections.

[1] All SWQMP attachments are available at www.sandiego.gov/stormwater under the Development Resources tab. Some attachments are presented out of order because they are shared between multiple SWQMP forms.

Table 1 – Scope of SWQMP Submittal

Select one option below that describes the scope of this SWQMP Submittal. Document your selection as indicated.

SWQMP Scope	Required Documentation
☒ ***a. SWQMP addresses the entire project***	No additional documentation.
☐ ***b. SWQMP implements requirements of an earlier master SWQMP submittal***	Include a copy of the previous submittal as **Attachment 4**.
☐ ***c. First of multiple SWQMP submittals***	Use the spaces below to identify the elements addressed in this submittal and in future submittals.

(1) Elements addressed in current submittal (streets, common areas, first project phase, etc.):

(2) Elements to be addressed in future submittal(s) (individual lots, future project phases, etc.):

Table 2 – Baseline BMPs for Existing and Proposed Site Features

Site Features Select each feature that applies.		BMP Implementation Describe BMP implementation for each selected site feature.				
Group 1: Existing Natural Site Features [See BMPDM Sections 4.3.1 and 4.3.2]						
		Maintain & conserve natural features		**Establish buffers for waterbodies**		
		Full	Partial	Full	Partial	
☒	**Natural waterbodies**	☒	☐	☒	☐	
☒	**Natural storage reservoirs & drainage corridors**	☐	☒			
☒	**Natural areas, soils, & vegetation (incl. trees)**	☐	☒			
Group 2: Common Impervious Outdoor Site Features [See BMPDM Sections 4.3.3 and 4.3.5]						
		Disperse impervious areas (See SD-B)		**Use permeable materials (See SD-D)**		**Minimize impervious areas**
		Full	Partial	Full	Partial	☒ Check here to confirm that impervious surfaces have been minimized where applicable and feasible for all outdoor impervious areas. If not, explain in Table 4.
☒	**Streets and roads**	☐	☒	☐	☐	
☒	**Sidewalks & walkways**	☐	☒	☐	☐	
☐	**Parking areas & lots**	☐	☐	☐	☐	
☒	**Driveways**	☐	☒	☐	☐	
☒	**Patios, decks, & courtyards**	☐	☒	☐	☐	
☐	**Hardcourt recreation areas**	☐	☐	☐	☐	
☐	Add impervious feature	☐	☐	☐	☐	
☐	Add impervious feature	☐	☐	☐	☐	
☐	Add impervious feature	☐	☐	☐	☐	
Group 3: Other Outdoor Site Features [See BMPDM Sections 4.2.6, 4.3.4, 4.3.5, 4.3.7, and 4.3.8]						
☒	**Rooftop areas**	**Disperse rooftop runoff (See SD-B)**		**Install green roofs (optional; See SD-C)**		**Use rain barrels to capture runoff (optional; See SD-E)**
		Full	Partial	Full	Partial	Full / Partial
		☒	☐	☐	☐	☐ / ☐
☒	**Landscaped areas**	**Use water-efficient landscaping (required)**		**Install efficient irrigation systems (required)**		**Minimize erosion of slopes and surfaces (required)**
		Full		Full		Full
		☒		☒		☒
☐	**Water features (pools, spas, etc.)**	**Provide a designated washing area**		**Drain feature to the sanitary sewer (if allowed)**		**Drain feature to a pervious area**
		Full	Partial	Full	Partial	Full / Partial
		☐	☐	☐	☐	☐ / ☐

Note: Justification is required in Table 4 for any feature not selecting at least one BMP (either full or partial implementation). For Group 2 features this means not selecting either SD-B or SD-D. Additional justifications may be required on request by County staff. Also use Table 4 to describe sources or BMPs other than those listed.

Table 3 –Baseline BMPs for Pollutant-generating Sources (Group 4)

A. Requirements for Documentation Select either or both as applicable.	Completion of Part B is not required because: ☐ This is a Small Residential Project, OR ☐ None of these sources or features is proposed.	☐ ***Source Control BMP Requirements Worksheet E.1-1*** (SC in Appendix E of the BMP Design Manual) is included as **Attachment 3** (optional unless requested by County staff).

B. Sources and BMPs Select all proposed sources and features below. Then select the BMPs on the right to be implemented for each.	**Plumb to sanitary sewer**	**Drain feature to a pervious area**	**Provide containment for spills and discharges**	**Prevent contact with rainfall**	**Isolate flows from adjacent areas**	**Prevent wind dispersal**	**Label with stencils or signs**
Common Source Areas							
☐ **Trash & Refuse Storage**	☐	---	☐	☐	☐	☐	---
☐ **Materials & Equipment Storage**	☐	---	☐	☐	☐	☐	---
☐ **Loading & Unloading**	☐	---	☐	☐	☐	---	---
☐ **Fueling**	☐	---	☐	☐	☐	---	---
☐ **Maintenance & Repair**	☐	---	☐	☐	☐	---	---
☐ **Vehicle & Equipment Cleaning**	☐	---	☐	☐	☐	---	---
☐ **Food Preparation or Service**	☐	---	☐	☐	☐	---	---
Distributed Features							
☒ **Storm drain inlets & catch basins**	---	---	---	---	---	---	☒
☐ **Interior floor drains and sumps**	☐	---	---	---	---	---	---
☐ **Drain lines (air conditioning, etc.)**	☐	☐	☐	---	---	---	---
☐ **Fire test sprinkler discharges**	☐	☐	☐	---	---	---	---

Provide the following in Table 4: (1) justification of any source area or feature with NO BMPs selected, (2) justification of individual unselected BMPs *if requested by County staff*, and (3) identification of any proposed pollutant-generating sources and BMPs not listed here.

Note: Pollutant-generating sources and features may not discharge directly to the MS4. Discharging to any of the stormwater BMPs identified in Table 5 Part B is also discouraged. If doing so, however, the source or feature area must be included in applicable DCV calculations.

Table 4 – Explanations and Justifications for Table 2 and 3 Baseline BMPs

☐ **Check here if no explanations or justifications for Table 2 or 3 BMPs are required.**

- **Required Justifications**: If NO BMPs are selected for a source or feature, justify why all BMPs are either not applicable or are infeasible. For Group 2 features NO BMPs means not selecting either SD-B or SD-D.
- **If Requested**: Justify why individual BMPs will not be implemented or will only be partially implemented.
- **Additional Explanation**: Describe any proposed features and/or BMPs not listed in Tables 2 or 3.

BMP-Feature Combination		**Explanation**
Feature	Group 2	No parking lots or recreational hardscape are proposed as a part of this project; therefore, these have not been selected in Table 2.
BMP	SD-B, SD-D	
Feature	Group 3	No pools and spas are proposed as a part of this project; therefore, these BMPS have not been selected in Table 2.
BMP	SC-A, SC-B,SC-C	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	

Table 5: DMA Structural Compliance Strategies and Documentation

Part A – Selection and Application Structural Performance Standards

1. Selection of Standards (select one; see BMPDM Section 6.1)

☒ a. Pollutant control + hydromodification ☐ b. Pollutant control only (project is exempt from hydromodification requirements)

2. Application of Structural Performance Standards (select one; see BMPDM Section 1.7)

☒ **New Development Projects:** Standards apply to all impervious surfaces.

☐ **Redevelopment Projects:** Complete the calculations below. Select the applicable scenario based on the results.

a. Existing impervious area (ft²)	b. Impervious area created / replaced (ft²)	c. % Impervious created / replaced [(b/a)*100]

☐ *Scenario 1: c is 50% or more*: Performance standards apply to all impervious surfaces (a + b).

☐ *Scenario 2: c is less than 50%*: Performance standards apply only to created or replaced impervious surfaces (b only).

Part B – Compliance Strategies and Required Attachments

1.*Complete and submit each of the applicable attachments on the right.*

Att. 1	Att. 2	Att. 3	Att. 4	Att. 5
Storm Water Intake Form ☒	DMA Exhibits and Construction Plan Sheets ☒	Source Control BMP Worksheet (see Table 3) ☐	Previous SWQMP Submittals (see Table 1) ☐	Existing Site and Drainage Description ☒

2. *Indicate each compliance strategy below that will be used for one or more DMAs on the site.*

	Att. 6 DMAs without Structural BMPs	Att. 7 DMAs w/ Structural Pollutant Control BMPs	Att. 8 DMAs w/ Structural Hydromod. BMPs	Att. 9 Critical Coarse Sediment Yield Areas	Att. 10 Installation Verification Form	Att. 11 Maintenance Agreements/ Plans	Att. 12 Alternative Compliance Projects
☒Self-mitigating DMAs (BMPDM Section 5.2.1)	☒			☒			
☐De Minimis DMAs (BMPDM Section 5.2.2)	☐			☐			
☐Self-retaining DMAs (BMPDM Section 5.2.3)	☐			☐	☐		
Structural BMPs (select all that apply)							
☒Pollutant Control BMPs (BMPDM Section 5.4)		☒		☒	☒	☒	
☒Hydromodification BMPs (BMPDM Chapter 6)			☒	☒	☒	☒	
☐Alternative Compliance Project (BMPDM Section 1.8)				☐	☐	☐	☐

☒ **Please check this box after you complete this list. Corresponding attachments will be automatically selected on the right.**

- *Attachments 1, 2, and 5 are required for all projects.*

Table 6: Critical Coarse Sediment Yield Area (CCSYA) Requirements

- Identify one applicable compliance pathway for the PDP below.
- Document your selection in **Attachment 9**.

A. Hydromodification Management Exemption (BMPDM Sections 1.6 and 6.1)

☐ **PDP is Exempt from Hydromodification Management Requirements**

Select if hydromodification management exemption was selected in Table 4 Part A.1.

B. Watershed Management Area (WMAA) Mapping (BMPDM Appendix H.1.1.2)

☐ **WMAA mapping demonstrates the following:**

a. <5% of potential onsite CCYSAs will be impacted (built on or obstructed)

b. All potential upstream offsite CCYSAs will be bypassed

C. Resource Protection Ordinance (RPO) Methods (BMPDM Appendix H.1.1.1)

☒ **RPO Scenario 1: PDP is subject to and in compliance with RPO requirements**

a. Project requires one or more discretionary permits (RPO applicability is confirmed during discretionary review)

b. Onsite AND upstream offsite CCSYAs will be avoided and/or bypassed

☐ **RPO Scenario 2: PDP is entirely exempt/not subject to RPO requirements**[2]

a. Project does not require discretionary permits

b. Project will bypass all upstream offsite CCSYAs (no requirements for onsite CCSYAs)

D. No Net Impact Analysis (BMPDM Appendix H.4)

☐ **Project demonstrates no net impact to receiving waters**

[2] Does not include PDPs utilizing exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3).

Table 7 –Minimum Construction Stormwater BMPs

Minimum Required BMPs by Activity Type Select all applicable activities and at least one BMP for each	References Caltrans[3]	 County of San Diego	
☒ **Erosion Control for Disturbed Slopes** (choose at least 1 per season)			
☐ Vegetation Stabilization Planting[4] (Summer)	SS-2, SS-4		
☒ Hydraulic Stabilization Hydroseeding[9] (Summer)	SS-4		
☒ Bonded Fiber Matrix or Stabilized Fiber Matrix[5] (Winter)	SS-3		
☐ Physical Stabilization Erosion Control Blanket[7] (Winter)	SS-7		
☒ **Erosion control for disturbed flat areas (slope < 5%)**			
☒ County Standard Lot Perimeter Protection Detail	SC-2	PDS 659[6]	
☐ Use of Item A erosion control measures on flat areas	SS-3, SS-4, SS-7		
☐ County Standard Desilting Basin (must treat all site runoff)	SC-2	PDS 660[7]	
☐ Mulch, straw, wood chips, soil application	SS-6, SS-8		
☒ **Energy dissipation (required to control velocity for concentrated runoff or dewatering discharge)**			
☒ Energy Dissipater Outlet Protection	SS-10	RSD D-40[8]	
☒ **Sediment control for all disturbed areas**			
☒ Silt Fence	SC-1		
☒ Fiber Rolls (Straw Wattles)	SC-5		
☒ Gravel & Sand Bags	SC-6, SC-8		
☐ Dewatering Filtration	NS-2		
☒ Storm Drain Inlet Protection	SC-10		
☐ Engineered Desilting Basin (sized for 10-year flow)	SC-2		
☒ **Preventing offsite tracking of sediment**			
☒ 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		
☒ **Materials Management**			
☒ Material Delivery & Storage	WM-1		
☒ Spill Prevention and Control	WM-4		
☒ **Waste Management[9]**			
☒ Waste Management Concrete Waste Management	WM-8		
☒ Solid Waste Management	WM-5		
☒ Sanitary Waste Management	WM-9		
☐ Hazardous Waste Management	WM-6		

[3] See Caltrans 2017 Storm Water Quality Handbooks, Construction Site BMP Manual, available at: (http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm)
[4] Planting or Hydroseeding may be installed between May 1st and August 15th. Slope irrigation must be in place and operable for slopes >3 feet. Vegetation must be watered and established prior to October 1st. A contingency physical BMP must be implemented by August 15th if vegetation is not established 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.
[5] All slopes over three feet must have established vegetative cover prior to final permit approval.
[6] County PDS 659. Standard Lot Perimeter Protection Design System (Bldg. Division)
[7] County PDS 660. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Bldg. Division
[8] Regional Standard Drawing D-40 – Rip Rap Energy Dissipater (also acceptable for velocity reduction)
[9] Applicants are responsible to apply appropriate BMPs for specific wastes (e.g., BMP WM-8 for concrete).

Table 8 – Explanations and Justifications for Construction Phase BMPs

☒ **Check here if no explanations or justifications for Table 7 BMPs are required.**		
Justifications for Table 7 Temporary Construction Phase BMPs • **Required Justifications**: Justify all construction activity types for which NO BMPs were selected. • **If Requested**: Justify why specific individual BMPs were not selected. • **Additional Explanation**: Describe any proposed features and/or BMPs not listed in Table 7.		
Activity Type / BMP		**Explanation**
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	

County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 1: Storm Water Intake Form for All Permit Applications

This form establishes Stormwater Quality Management Plan (SWQMP) requirements for Development Projects per Sections 67.809 and 67.811 of the County of San Diego Watershed Protection Ordinance (WPO).
See ***Storm Water Intake Form Instructions*** for additional guidance and explanation of terms.

Part 1. Project Information	
Project Name:	Summit Estates
Record ID (Permit) No(s):	PDS2019-TM-5635
Assessor's Parcel No(s):	237-090-05
Street Address (or Intersection):	2510 Summit Drive
City, State, Zip:	San Diego CA 92025

Part 2. Applicant / Project Proponent Information	
Name:	Oscar Uranga
Company:	2510 Summit, LLC
Street Address:	19782 MacArthur Blvd Suite 300
City, State, Zip:	Irvine CA 92612
Phone Number	949-933-4103
Email:	oscar@img-cm.com

Part 3. Required Information for All Development Projects

Ⓐ **1. Existing (pre-development) impervious surfaces (ft²)**	**2. Created or replaced impervious surfaces (ft²)**	**3. Total disturbed area (acres or ft²)**
3,760	170,660	12.55

Ⓑ ☒ Check here and provide a WDID# if this project is subject to the California Construction General Permit (Order No. 2009-0009-DWQ)[1]	**WDID # (if issued)**

For County Use Only	Reviewed By:	Review Date:
☐ Standard SWQMP	☐ PDP SWQMP	☐ Green Streets PDP Exemption SWQMP

[1] Available at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html

Part 4. Priority Classification & SWQMP Form Selection

(A) *If your project is the following ... (select one)*	(B) *You must complete ...*
☐ **Standard Project** ☐ a. Project is East of the Pacific/Salton Sea Divide ☐ b. None of the PDP criteria below applies	→ **Standard *SWQMP Form***
☒ **Priority Development Project (PDP)** ☐ 1. Project is part of an existing PDP, OR ☒ 2. Project does any of the following: ☒ a. Creates or replaces a total of 10,000 ft² or more of impervious surface ☒ b. Creates or replaces a combined total of 5,000 ft² or more of impervious surface within one or more of the following uses: (1) parking lots; (2) streets, roads, highways, freeways, and/or driveways; (3) restaurants; and (4) hillsides ☐ c. Creates or replaces a combined total of 5,000 ft² or more of impervious surface within one or more of the following uses: (1) automotive repair shops; and (2) retail gasoline outlets ☒ d. Discharges directly to an Environmentally Sensitive Area (ESA) AND creates or replaces 2,500 ft² or more of impervious surface ☒ e. Disturbs one or more acres of land (43,560 ft²) and is expected to generate pollutants post-construction ☐ f. Is a redevelopment project that creates or replaces 5,000 ft² or more of impervious surface on a site already having at least 10,000 ft² of impervious surface	→ **PDP *SWQMP Form***
☐ **Green Streets PDP Exemption**[2]	→ **Green *Streets PDP Exemption SWQMP Form***

Part 5. Applicant Signature

I have reviewed the information in this form, and it is true and correct to the best of my knowledge.

Applicant / Project Proponent Signature: [signature] Date: 4/9/2020

- ***Upon completion*** *submit this form to the County.*
- ***If requested****, attach supporting documentation to justify selections made or exemptions claimed.*
- ***If this is a PDP that is part of a larger existing PDP****, you will be required to attach a copy of the existing SWQMP to the newer SWQMP submittal.*

[2] ***Green Streets PDP Exemption Projects*** are those claiming exemption from PDP classification per WPO Section 67.811(b)(2) because they consist exclusively of *either* 1) development of new sidewalks, bike lanes, and/or trails; *or* 2) improvements to existing roads, sidewalks, bike lanes, and/or trails.

2.0 General Requirements

- Attachment 2 consolidates exhibits and plans required for the entire project.
- Complete the table below to indicate which sub-attachments are included with the submittal. Sub-attachments that are not applicable can be excluded from the submittal.
- Unless otherwise stated, features and BMPs identified and described in each corresponding Attachment (6 through 9) must be shown on applicable DMA Exhibits and construction plans submitted for the project.

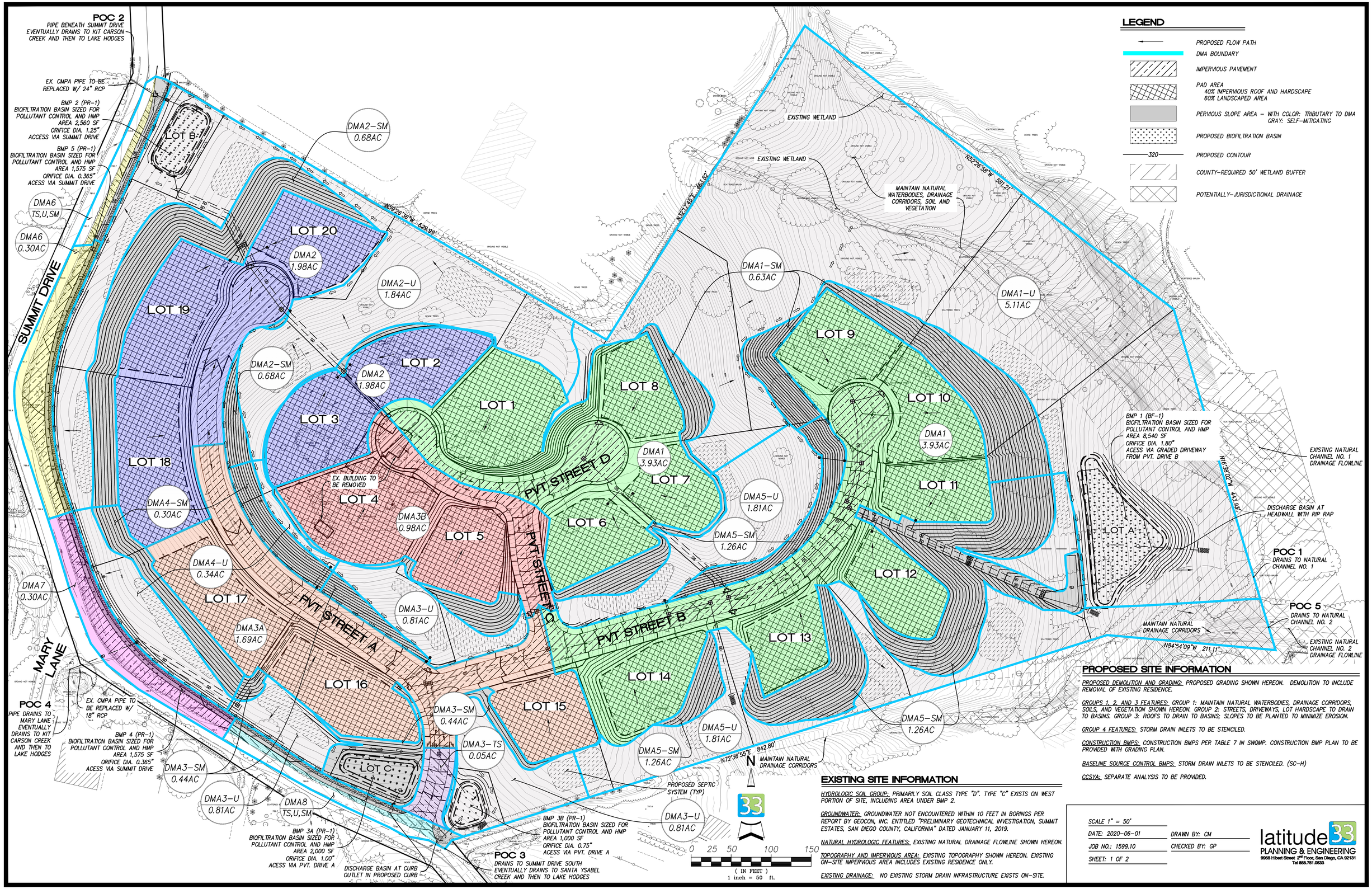
Sub-attachments	Requirement
☒ **2.1: DMA Exhibits**	All PDPs
☒ **2.2: Individual Structural BMP DMA Mapbook**	PDPs with structural BMPs
☒ **2.3: Construction Plan Sets**	All projects

2.1 DMA Exhibits

- DMA Exhibits must show all DMAs on the project site. Exhibits must include all applicable features identified in applicable SWQMP attachments.
- Exhibits may be prepared individually for the BMPs associated with each applicable SWQMP Attachment (6, 7, 8, and/or 9) or combined into one or more consolidated exhibits.
- Use this checklist to ensure required information is included on each exhibit (copy as needed).

DMA Exhibit ID #:	**Summit Estates DMA Exhibit**	
A. Features required for all exhibits		
1. Existing Site Features		
☒ Underlying hydrologic soil group (A, B, C, D)	☒ Topography and impervious areas	
☒ Approximate depth to groundwater	☒ Existing drainage network, directions, and offsite connections	
☒ Natural hydrologic features		
2. Drainage Management Area (DMA) Information		
☒ Proposed drainage network, directions, and offsite connections	☒ DMA boundaries, ID numbers, areas, and type (structural BMP, de minimis, etc.)	
3. Proposed Site Changes, Features, and BMPs		
☒ Proposed demolition and grading	☒ Construction BMPs[2]	
☒ Group 1, 2, and 3 Features[1]	☒ Baseline source control BMPs	
☒ Group 4 Features	☒ Baseline source control BMPs	
B. Proposed Features and BMPs Specific to Individual SWQMP Attachments[3]		
☐ Attachment 6	☐ SSD-BMP impervious dispersion areas ☐ SSD-BMP tree wells	
☒ Attachment 7	☒ Structural pollutant control BMPs	
☒ Attachment 8	☒ Structural hydromodification management BMPs ☒ Point(s) of Compliance (POC) for hydromodification management ☒ Proposed drainage boundary and drainage area to each POC	
☒ Attachment 9	☒ Onsite CCSYAs	☐ Bypass of onsite CCSYAs ☐ Bypass of upstream offsite CCSYAs

[1] Group 1-4 features and baseline BMPs from PDP SWQMP Tables 2 and 3.
[2] Minimum Construction Stormwater BMPs from PDP SWQMP Table 7.
[3] Identify the location, ID numbers, type, and size/detail of BMPs.



PROPOSED SITE INFORMATION

PROPOSED DEMOLITION AND GRADING: PROPOSED GRADING SHOWN HEREON. DEMOLITION TO INCLUDE REMOVAL OF EXISTING RESIDENCE.

GROUPS 1, 2, AND 3 FEATURES: GROUP 1: MAINTAIN NATURAL WATERBODIES, DRAINAGE CORRIDORS, SOILS, AND VEGETATION SHOWN HEREON. GROUP 2: STREETS, DRIVEWAYS, LOT HARDSCAPE TO DRAIN TO BASINS. GROUP 3: ROOFS TO DRAIN TO BASINS; SLOPES TO BE PLANTED TO MINIMIZE EROSION.

GROUP 4 FEATURES: STORM DRAIN INLETS TO BE STENCILED.

CONSTRUCTION BMPS: CONSTRUCTION BMPS PER TABLE 7 IN SWQMP. CONSTRUCTION BMP PLAN TO BE PROVIDED WITH GRADING PLAN.

BASELINE SOURCE CONTROL BMPS: STORM DRAIN INLETS TO BE STENCILED. (SC-H)

CCSYA: SEPARATE ANALYSIS TO BE PROVIDED.

EXISTING SITE INFORMATION

HYDROLOGIC SOIL GROUP: PRIMARILY SOIL CLASS TYPE "D". TYPE "C" EXISTS ON WEST PORTION OF SITE, INCLUDING AREA UNDER BMP 2.

GROUNDWATER: GROUNDWATER NOT ENCOUNTERED WITHIN 10 FEET IN BORINGS PER REPORT BY GEOCON, INC. ENTITLED "PRELIMINARY GEOTECHNICAL INVESTIGATION, SUMMIT ESTATES, SAN DIEGO COUNTY, CALIFORNIA" DATED JANUARY 11, 2019.

NATURAL HYDROLOGIC FEATURES: EXISTING NATURAL DRAINAGE FLOWLINE SHOWN HEREON.

TOPOGRAPHY AND IMPERVIOUS AREA: EXISTING TOPOGRAPHY SHOWN HEREON. EXISTING ON-SITE IMPERVIOUS AREA INCLUDES EXISTING RESIDENCE ONLY.

EXISTING DRAINAGE: NO EXISTING STORM DRAIN INFRASTRUCTURE EXISTS ON-SITE.

SCALE 1" = 50'
DATE: 2020-06-01
JOB NO.: 1599.10
SHEET: 1 OF 2
DRAWN BY: CM
CHECKED BY: GP

latitude33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

DMA SUMMARY TABLE (ON-SITE)

DMA NO.	AREA (SF/AC)	DMA TYPE
1-1	26,700/0.61	IMPERVIOUS – PAVEMENT, DRAINS TO BMP
1-2	106,400/2.44	PAD AREA LOTS 1, 7-16 40% IMPERVIOUS – ROOF AND HARDSCAPE, DRAINS TO BMP 60% PERVIOUS – LANDSCAPING DRAINS TO BMP
1-3	38,100/0.87	PERVIOUS – LANDSCAPING, DRAINS TO BMP
TOTAL TO BMP 1	171,200/3.93	
1-SM	27,500/0.63	SELF-MITIGATING – BYPASSES BMP
1-U	222,500/5.11	UNDISTURBED – BYPASSES BMP
TOTAL TO POC 1	421,200/9.67	
2-1	8,300/0.19	IMPERVIOUS – PAVEMENT, DRAINS TO BMP
2-2	67,100/1.54	PAD AREA LOTS 2-4, 20-23 40% IMPERVIOUS – ROOF AND HARDSCAPE, DRAINS TO BMP 60% PERVIOUS – LANDSCAPING DRAINS TO BMP
2-3	10,700/0.25	PERVIOUS – LANDSCAPING, DRAINS TO BMP
TOTAL TO BMP 2	86,100/1.98	
2-SM	29,400/0.68	SELF-MITIGATING – BYPASSES BMP
2-U	80,300/1.84	UNDISTURBED – BYPASSES BMP
TOTAL TO POC 2	195,800/4.50	
3A-1	16,000/0.37	IMPERVIOUS – PAVEMENT, DRAINS TO BMP
3A-2	36,200/0.83	PAD AREA LOTS 5-6, 17-19 40% IMPERVIOUS – ROOF AND HARDSCAPE, DRAINS TO BMP 60% PERVIOUS – LANDSCAPING DRAINS TO BMP
3A-3	21,300/0.49	PERVIOUS – LANDSCAPING, DRAINS TO BMP
TOTAL TO BMP 3A	73,500/1.69	
3B-1	7,800/0.18	IMPERVIOUS – PAVEMENT, DRAINS TO BMP
3B-2	27,700/0.64	PAD AREA LOTS 5-6, 17-19 40% IMPERVIOUS – ROOF AND HARDSCAPE, DRAINS TO BMP 60% PERVIOUS – LANDSCAPING DRAINS TO BMP
3B-3	7,100/0.16	PERVIOUS – LANDSCAPING, DRAINS TO BMP
TOTAL TO BMP 3B	42,600/0.98	
3-TS	2,300/0.05	NEW AC PAVEMENT MITIGATED THROUGH ONSITE ALTERNATIVE COMPLIANCE WITH UNDISTURBED DMA 6-3
3-SM	19,100/0.44	SELF-MITIGATING – BYPASSES BMP
3-U	35,400/0.81	UNDISTURBED – BYPASSES BMP
TOTAL TO POC 3	172,900/3.97	
4-SM	13,300/0.30	SELF-MITIGATING – BYPASSES BMP
4-U	14,900/0.34	UNDISTURBED – BYPASSES BMP
TOTAL TO POC 4	28,200/0.64	
5-SM	54,900/1.26	SELF-MITIGATING – BYPASSES BMP
5-U	78,800/1.81	UNDISTURBED – BYPASSES BMP
TOTAL TO POC 5	133,700/3.07	
TOTAL ON-SITE	951,800/ 21.85	

DMA SUMMARY TABLE (RIGHT-OF-WAY)

DMA NO.	AREA (SF/AC)	DMA TYPE
6-1	5,300/0.12	IMPERVIOUS – PAVEMENT, DRAINS TO BMP
6-2	3,500/0.08	PERVIOUS – DG AND BMP, DRAINS TO BMP
6-3	4,400/0.10	UNDISTURBED PAVEMENT – DRAINS TO BMP, USED FOR ONSITE ALTERNATIVE COMPLIANCE
TOTAL TO BMP 5	13,200/0.30	
6-SM	2,500/0.06	SELF-MITIGATING – BYPASSES BMP
6-U	2,500/0.06	UNDISTURBED – BYPASSES BMP
6-TS	1,600/0.04	NEW AC PAVEMENT MITIGATED THROUGH ONSITE ALTERNATIVE COMPLIANCE WITH UNDISTURBED DMA 6-3
TOTAL OFF-SITE TO POC 2	19,800/0.45	
7-1	5,400/0.12	IMPERVIOUS – PAVEMENT, DRAINS TO BMP
7-2	3,400/0.08	PERVIOUS – DG AND BMP, DRAINS TO BMP
7-3	4,200/0.10	UNDISTURBED PAVEMENT – DRAINS TO BMP, USED FOR ONSITE ALTERNATIVE COMPLIANCE
TOTAL TO BMP 4 AND OFF-SITE TO POC 4	13,000/0.30	
8-SM	3,000/0.06	SELF-MITIGATING – BYPASSES BMP
8-U	3,100/0.07	UNDISTURBED – BYPASSES BMP
8-TS	2,300/0.05	NEW AC PAVEMENT MITIGATED THROUGH ONSITE ALTERNATIVE COMPLIANCE WITH UNDISTURBED DMA 7-3
TOTAL OFF-SITE TO POC 3	8,400/0.19	
TOTAL OFF-SITE	41,200/0.95	

POC SUMMARY TABLE

POC	TOTAL DISTURBED AREA (SF/AC)	RECEIVES DMAS
1	421,200/9.67	1
2	215,600/4.95	2 AND 6
3	181,300/4.16	3A, 3B AND 8
4	41,200/0.94	4 AND 7
5	133,700/3.07	5
TOTAL	993,000/22.80	

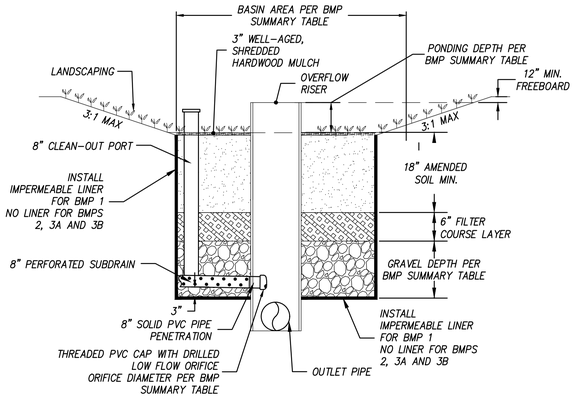
NOTE:
1. POCS 1 AND 5 CONVERGE 500' DOWNSTREAM OF SITE.
2. POCS 1, 3, AND 5 EVENTUALLY DRAIN TO SANTA YSABEL CREEK AND THEN TO LAKE HODGES.
3. POCS 2 AND 4 EVENTUALLY DRAIN TO KIT CARSON CREEK AND THEN TO LAKE HODGES

BMP SUMMARY TABLE

BMP	BASIN AREA (SF)	PONDING DEPTH (IN)	GRAVEL DEPTH (IN)	ORIFICE DIAMETER (IN)
1	8,540	18	33	1.8
2	2,560	12	12	1.25
3A	2,000	12	18	1
3B	1,000	12	18	0.75
4	1,575	6	15	0.365
5	1,575	6	15	0.365

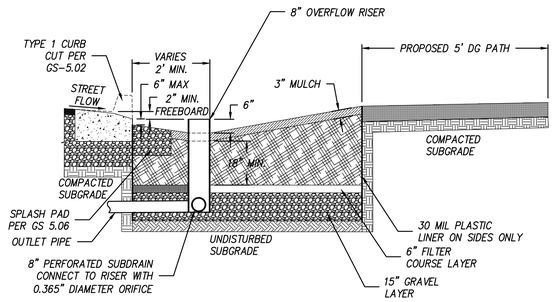
ONSITE ALTERNATIVE COMPLIANCE TABLE

DMA NO.	AREA (SF/AC)	DMA TYPE
6-3	4,400/0.10	UNDISTURBED PAVEMENT – DRAINS TO BMP, USED FOR ONSITE ALTERNATIVE COMPLIANCE. MITIGATES FOR DMA 6-TS.
7-3	4,200/0.10	UNDISTURBED PAVEMENT – DRAINS TO BMP, USED FOR ONSITE ALTERNATIVE COMPLIANCE. MITIGATES FOR DMA 8-TS.
3-TS	2,300/0.05	NEW AC PAVEMENT MITIGATED THROUGH ONSITE ALTERNATIVE COMPLIANCE WITH UNDISTURBED DMA 6-3
6-TS	1,600/0.04	NEW AC PAVEMENT MITIGATED THROUGH ONSITE ALTERNATIVE COMPLIANCE WITH UNDISTURBED DMA 6-3
8-TS	2,300/0.05	NEW AC PAVEMENT MITIGATED THROUGH ONSITE ALTERNATIVE COMPLIANCE WITH UNDISTURBED DMA 7-3



BIOFILTRATION BASIN SECTION (BMP 1, 2, 3A AND 3B)

NOT TO SCALE



BIOFILTRATION PLANTER BASIN SECTION BMP 4 AND 5

(MODIFIED GS-3.01A)
NOT TO SCALE

NOTE

BMP 4 AND 5 SHALL BOTH BE 350' LONG

SUMMIT ESTATES DMA EXHIBIT

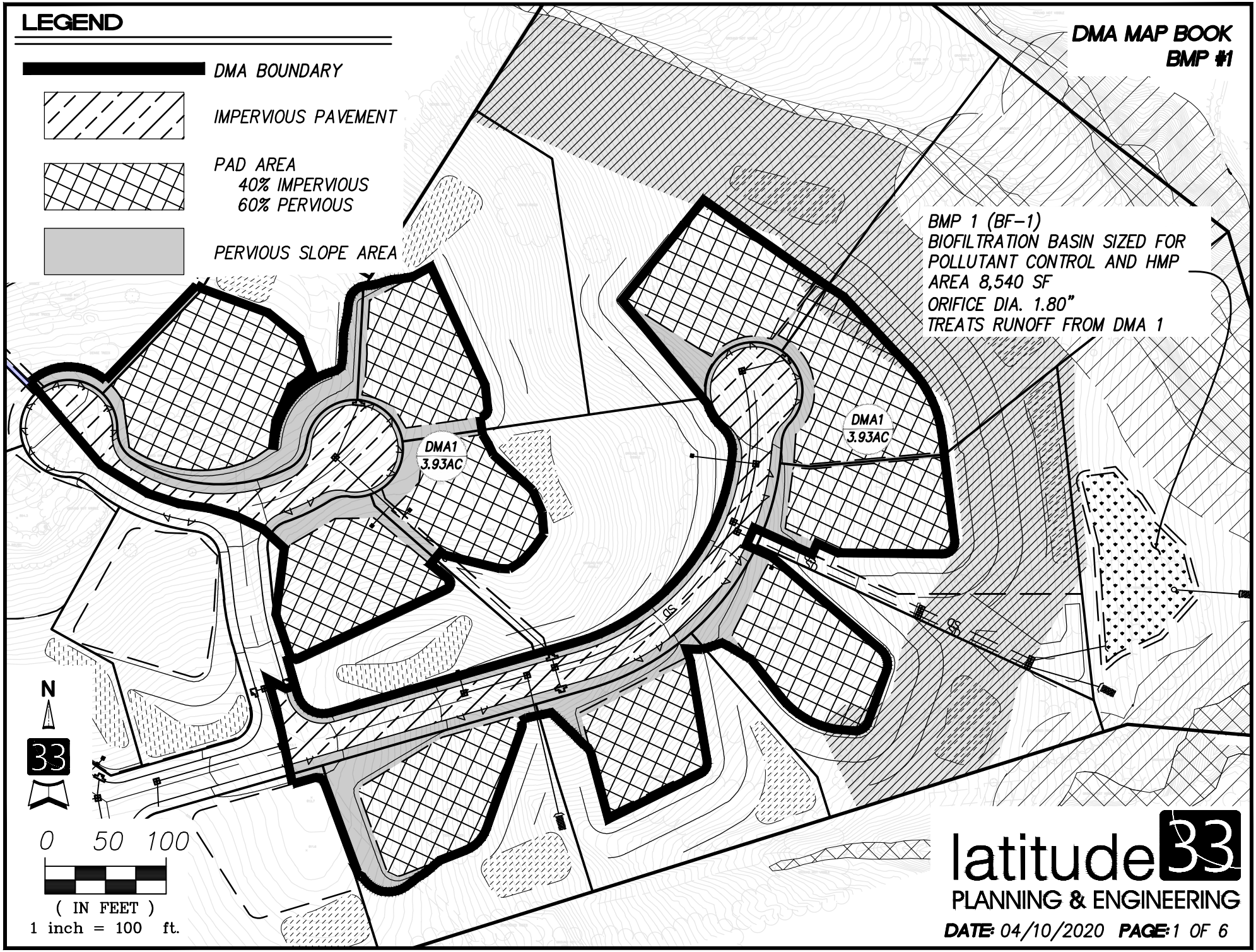
SCALE 1" = 50'
DATE: 2020-06-01
JOB NO.: 1599.10
SHEET: 2 OF 2
DRAWN BY: CM
CHECKED BY: GP

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

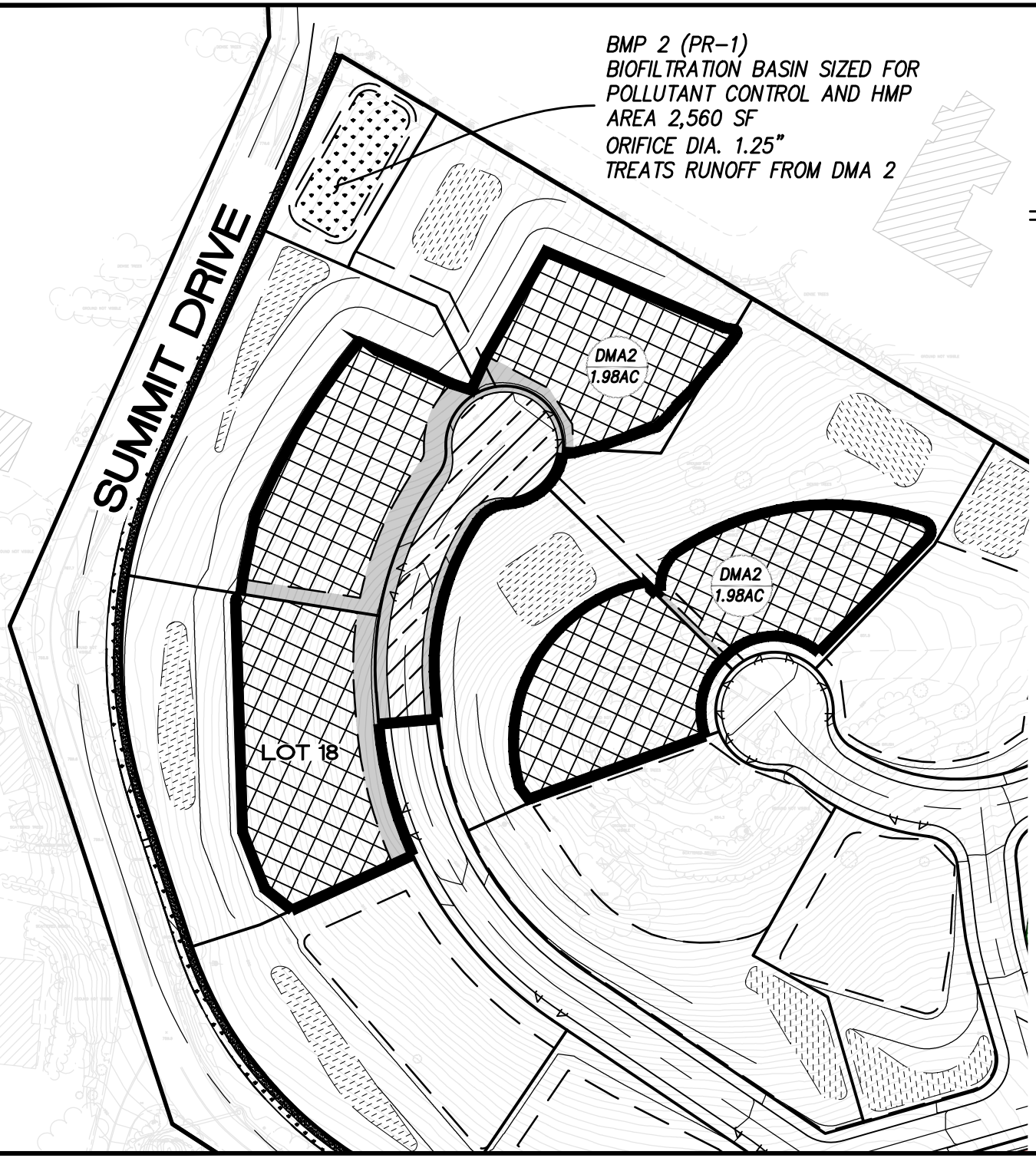
2.2 Individual Structural BMP DMA Mapbook

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

☒	All Mapbooks are attached
☐	All Mapbooks are in Attachment 11


LEGEND
DMA BOUNDARY
IMPERVIOUS PAVEMENT
PAD AREA
40% IMPERVIOUS
60% PERVIOUS
PERVIOUS SLOPE AREA
DMA MAP BOOK
BMP #1
BMP 1 (BF-1)
BIOFILTRATION BASIN SIZED FOR
POLLUTANT CONTROL AND HMP
AREA 8,540 SF
ORIFICE DIA. 1.80"
TREATS RUNOFF FROM DMA 1
DMA1
3.93AC
DMA1
3.93AC
SD
SD
SD
N
33
0 50 100
(IN FEET)
1 inch = 100 ft.
latitude 33
PLANNING & ENGINEERING
DATE: 04/10/2020 PAGE: 1 OF 6

DMA MAP BOOK
BMP #2



LEGEND

- DMA BOUNDARY
- IMPERVIOUS PAVEMENT
- PAD AREA
  40% IMPERVIOUS
  60% PERVIOUS
- PERVIOUS SLOPE AREA

0 50 100
(IN FEET)
1 inch = 100 ft.

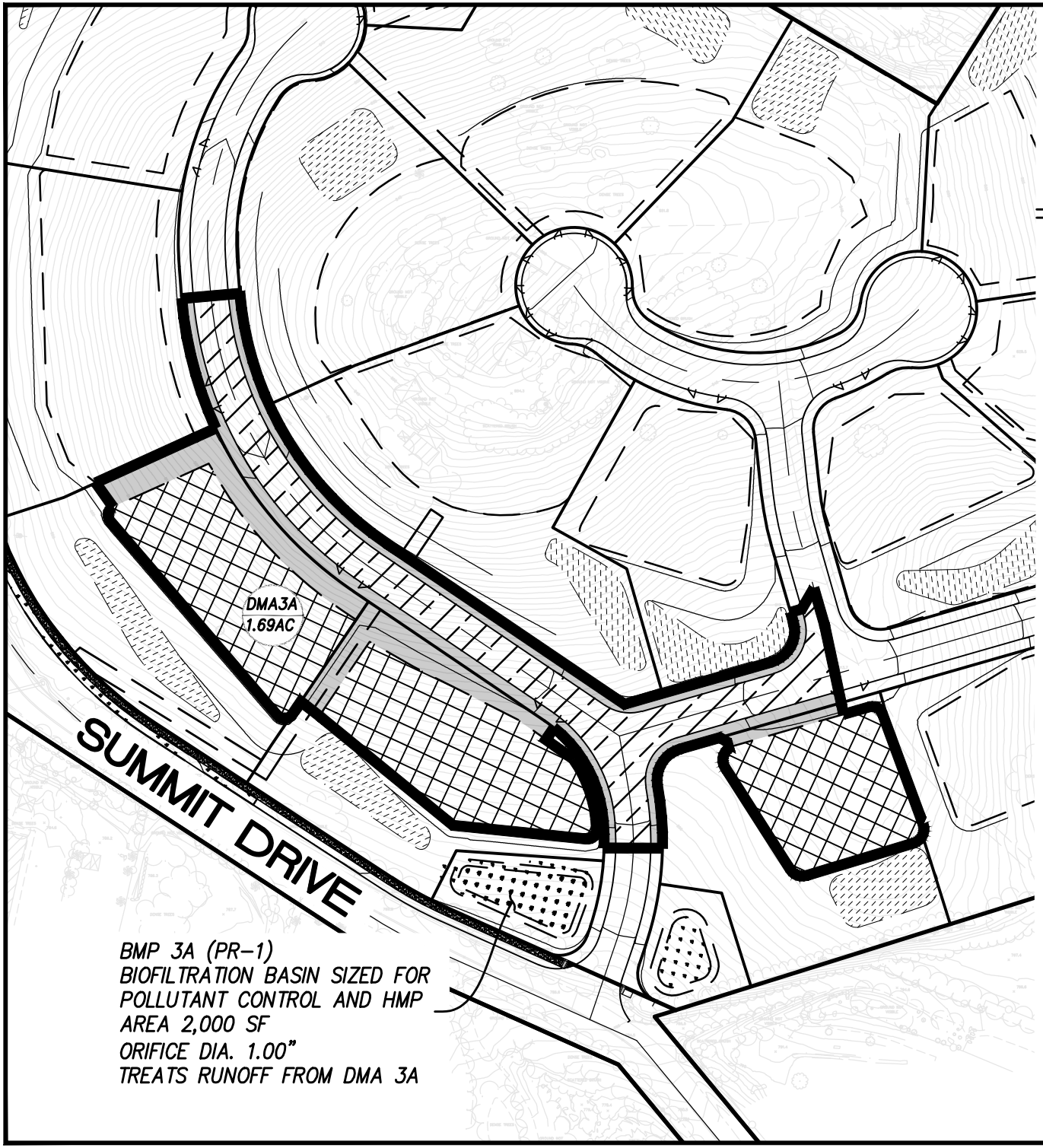
N

33

latitude 33
PLANNING & ENGINEERING

DATE: 04/10/2020 **PAGE:** 2 OF 6

DMA MAP BOOK
BMP #3A



LEGEND

- DMA BOUNDARY
- IMPERVIOUS PAVEMENT
- PAD AREA
  - 40% IMPERVIOUS
  - 60% PERVIOUS
- PERVIOUS SLOPE AREA

0 50 100
(IN FEET)
1 inch = 100 ft.

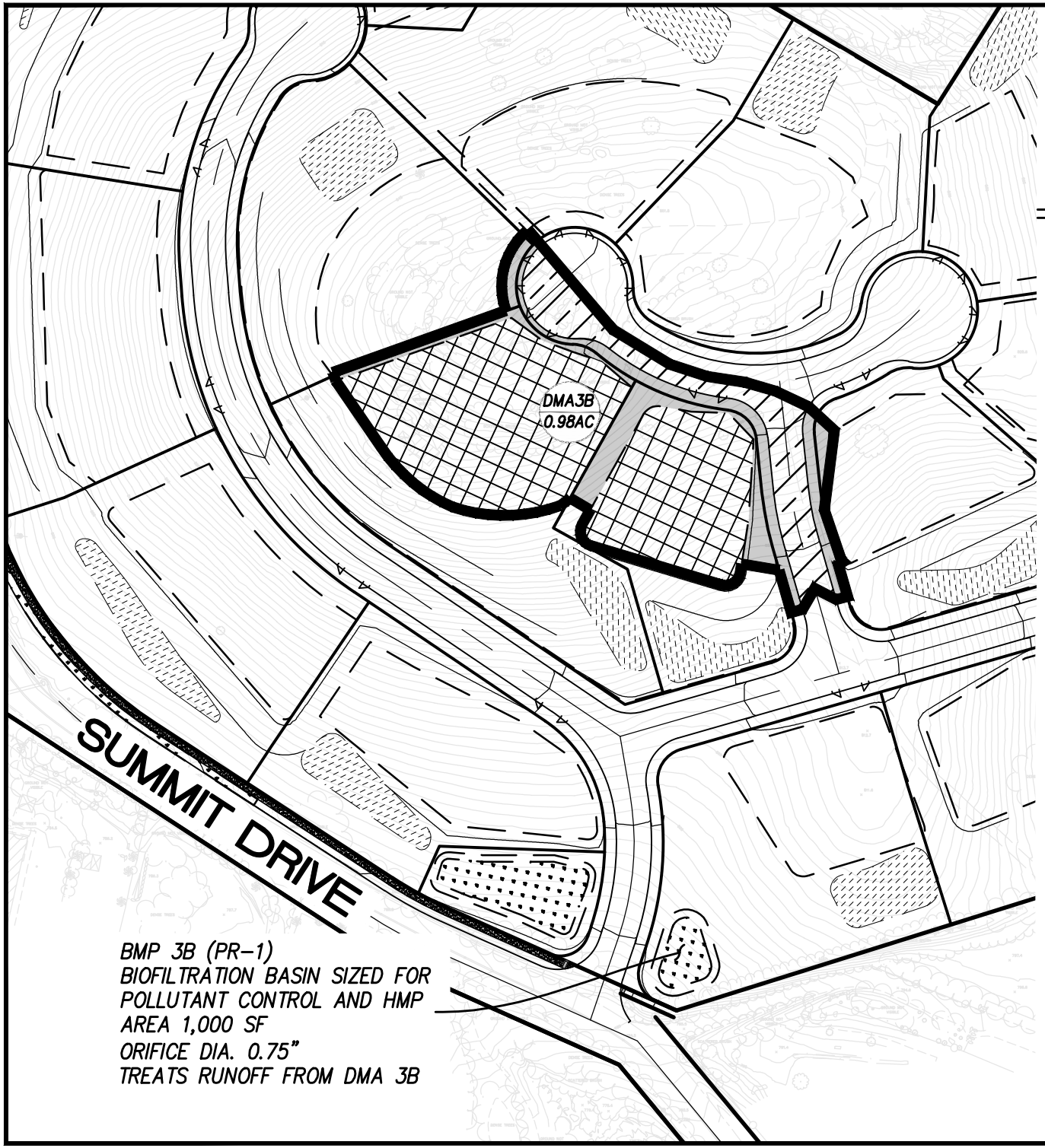
N

33

BMP 3A (PR-1)
BIOFILTRATION BASIN SIZED FOR POLLUTANT CONTROL AND HMP
AREA 2,000 SF
ORIFICE DIA. 1.00"
TREATS RUNOFF FROM DMA 3A

latitude 33
PLANNING & ENGINEERING

DATE: 04/10/2020 **PAGE:** 3 OF 6



DMA MAP BOOK
BMP #3B

LEGEND

- DMA BOUNDARY
- IMPERVIOUS PAVEMENT
- PAD AREA
  40% IMPERVIOUS
  60% PERVIOUS
- PERVIOUS SLOPE AREA

0 50 100
(IN FEET)
1 inch = 100 ft.

N

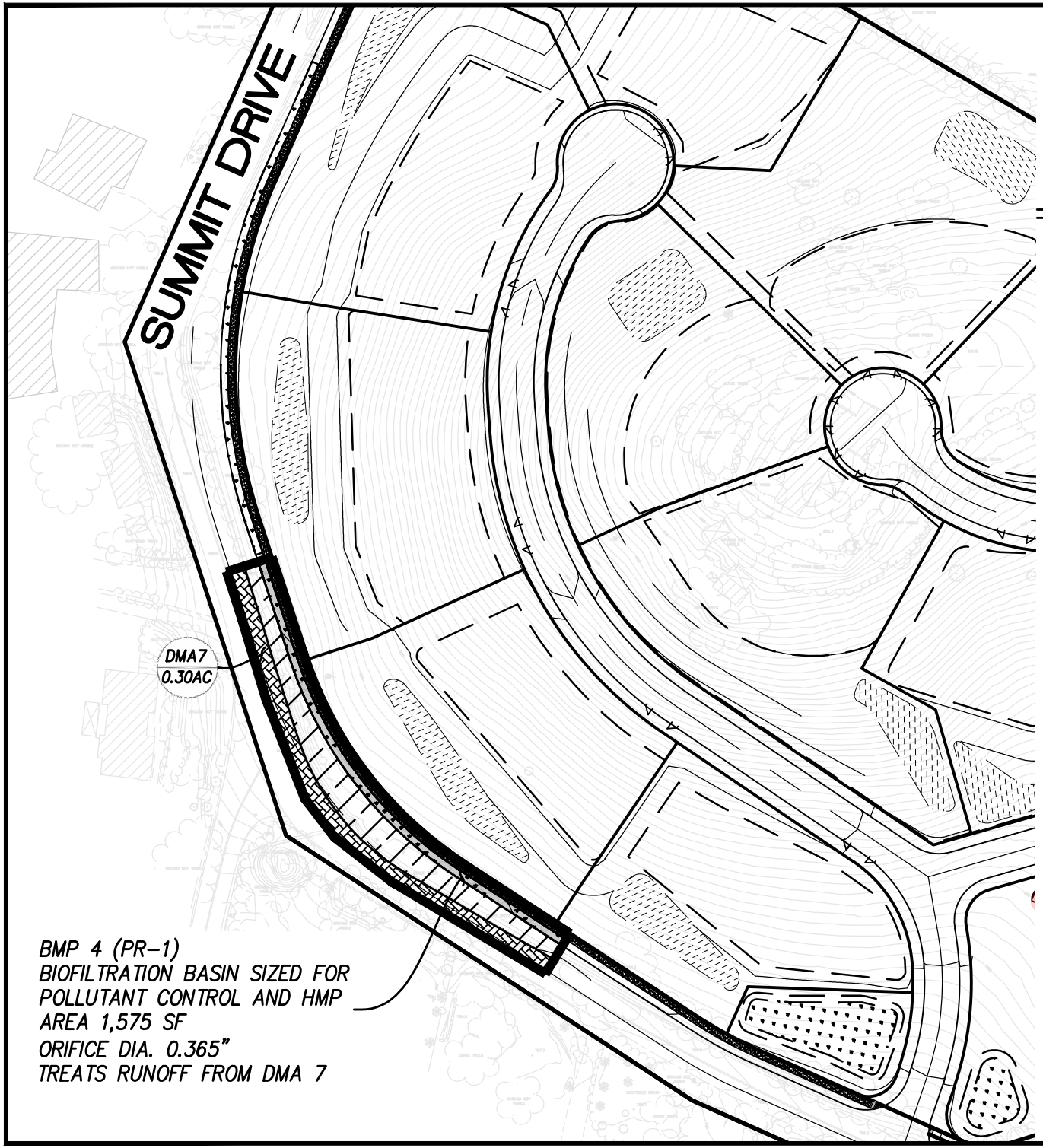
33

BMP 3B (PR-1)
BIOFILTRATION BASIN SIZED FOR POLLUTANT CONTROL AND HMP
AREA 1,000 SF
ORIFICE DIA. 0.75"
TREATS RUNOFF FROM DMA 3B

latitude 33
PLANNING & ENGINEERING

DATE: 04/10/2020 **PAGE:** 4 OF 6

DMA MAP BOOK
BMP #4



LEGEND

- DMA BOUNDARY
- IMPERVIOUS PAVEMENT
- UNDISTURBED IMPERVIOUS PAVEMENT
- PERVIOUS SLOPE AREA

0 50 100
(IN FEET)
1 inch = 100 ft.

N

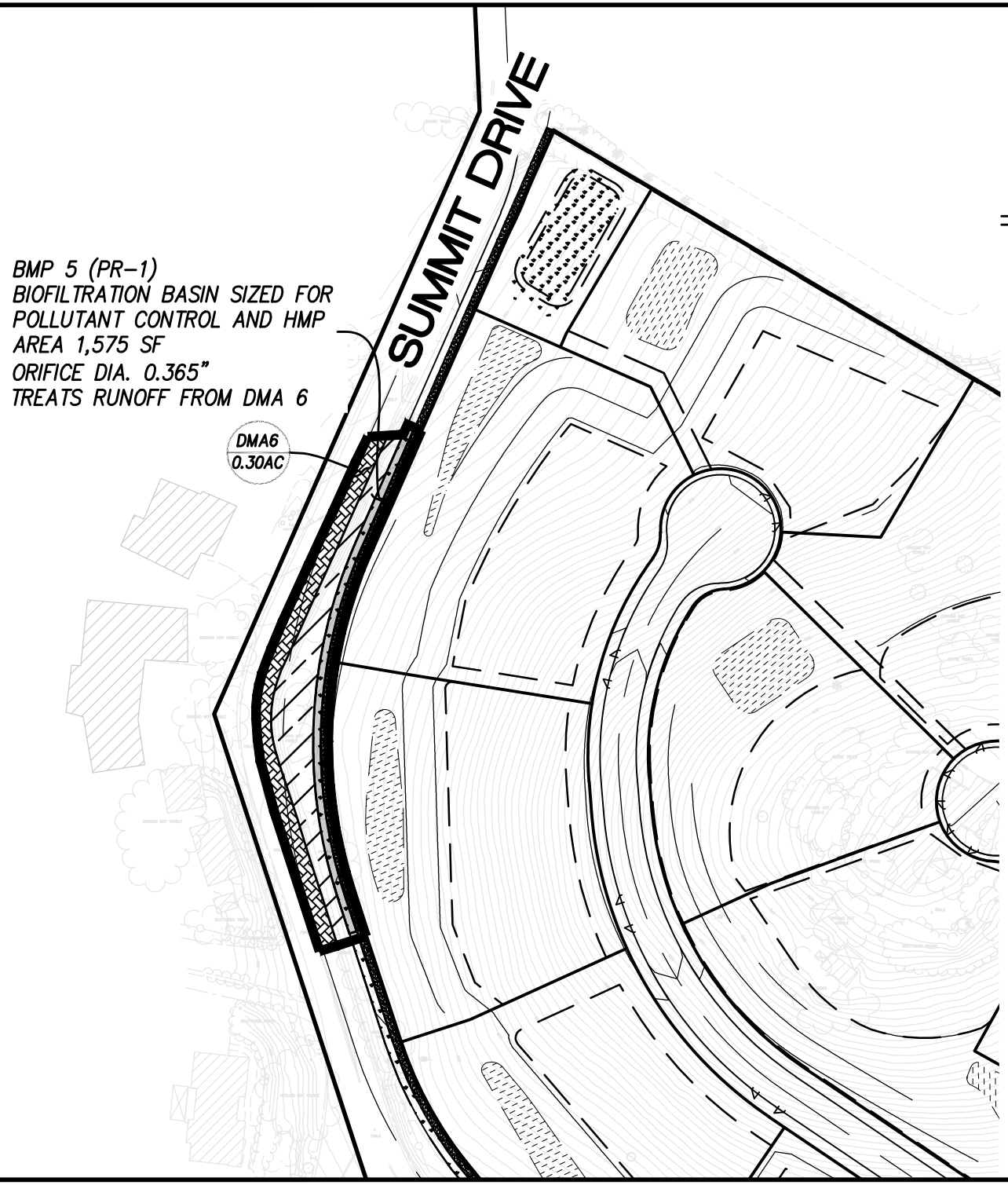
33

BMP 4 (PR-1)
BIOFILTRATION BASIN SIZED FOR POLLUTANT CONTROL AND HMP
AREA 1,575 SF
ORIFICE DIA. 0.365"
TREATS RUNOFF FROM DMA 7

latitude 33
PLANNING & ENGINEERING

DATE: 04/10/2020 **PAGE:** 5 OF 6

DMA MAP BOOK
BMP #5



LEGEND

- DMA BOUNDARY
- IMPERVIOUS PAVEMENT
- UNDISTURBED IMPERVIOUS PAVEMENT
- PERVIOUS SLOPE AREA

0 50 100

(IN FEET)
1 inch = 100 ft.

N

33

latitude 33
PLANNING & ENGINEERING

DATE: 04/10/2020 **PAGE:** 6 OF 6

2.3 Construction Plan Sets

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

Plan Type	**TM – This is a TM so many of these items to be shown in final engineering**
Required Information[4]	
☒ Structural BMP(s) and Significant Site Design BMPs (if applicable) with ID numbers.	
☒ 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) and Significant Site Design BMPs (if applicable).	
☐ 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).	
☐ 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 (if available) 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 manufacturer model number must be provided. Photocopies of general brochures are not acceptable.	
☒ Include all source control and site design measures described in the SWQMP.	
☐ Include all construction BMPs described in the SWQMP.	

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

COUNTY OF SAN DIEGO
TENTATIVE MAP: TM5635

GENERAL NOTES:

1. TOTAL PROPOSED LOTS: 25
   RESIDENTIAL LOTS: 20
   NON-RESIDENTIAL LOTS: 5
   AVERAGE LOT SIZE: 38,092 SQFT
   MINIMUM LOT SIZE: 4697 SQFT
2. ACREAGE WITHIN SUBDIVISION BOUNDARY:
   GROSS AREA: 22.2 ACRES. NET AREA: 20.2 ACRES.
3. GRADING QUANTITIES: CUT: 61,980 CY. FILL: 66,870 CY.
4. SUBREGIONAL PLAN AREA: NORTH COUNTY METROPOLITAN
5. GENERAL PLAN CATEGORY: SEMI-RURAL
6. GENERAL PLAN DESIGNATION: SEMI-RURAL RESIDENTIAL (SR-1)
7. TAX RATE AREA: 74019
8. SEWER & WATER:
   SEWER: N/A
   WATER: CITY OF ESCONDIDO; PHONE: 760-839-6290
9. GAS & ELECTRIC: SAN DIEGO GAS & ELECTRIC COMPANY
   PHONE: 800-411-7343
10. TELEPHONE: COX COMMUNICATIONS; PHONE: 888-921-4105
11. CABLE: COX COMMUNICATIONS; PHONE: 888-921-4105
12. FIRE DISTRICT: ESCONDIDO FIRE DEPARTMENT
13. SCHOOL DISTRICT:
    ELEMENTARY: ESCONDIDO UNION SCHOOL DISTRICT
    PHONE: 760-432-2400
    HIGH SCHOOL: ESCONDIDO UNION HIGH SCHOOL DISTRICT
    PHONE: 760-291-3200
14. TOPOGRAPHY: SURVEY PROVIDED BY ALYSON CONULTING, JUNE 2018
    BENCHMARK: POINT 1007 PER RECORD OF SURVEY 14236
    ELEVATION: 627.705 (NGVD 29)
15. SUBREGIONAL AREA PLAN: NORTH COUNTY METROPOLITAN
16. DESIGN STANDARDS: STANDARDS FOR PUBLIC ROADWAY DESIGN WITHIN THIS PROJECT SHALL CONFORM WITH THE STANDARDS OF THE COUNTY OF SAN DIEGO.
17. STREET LIGHT STATEMENT: THE REQUIRED LIGHTING SYSTEM SHALL BE INSTALLED ACCORDING TO COUNTY ROAD STANDARDS. THE PUBLIC WORKS DEPARTMENT SHALL ADMINISTER THE COMPLIANCE PROCEDURES TO ASSURE PROPER INSTALLATION AND CONTINUED OPERATION.
18. SPECIAL ASSESSMENT ACT STATEMENT: THE SUBDIVIDER MAY TAKE A REQUEST TO THE BOARD OF SUPERVISORS FOR PERMISSION TO INITIATE PROCEEDINGS UNDER A SPECIAL ASSESSMENT ACT FOR CONSTRUCTION OF MAJOR UTILITY AND TRANSPORTATION INFRASTRUCTURE.
19. PER SECTION 81.401(M) ALL LOTS WILL HAVE UNOBSTRUCTED ACCESS TO SUNLIGHT TO AN AREA OF NOT LESS THAN 100 SQFT, FALLING IN A HORIZONTAL PLANE 10 FEET ABOVE THE GRADE OF BUILDING AREA OF THE LOT BETWEEN AZIMUTHS OF THE SUN AT 45 DEGREES TO THE EAST AND 45 DEGREES TO THE WEST OF TRUE SOUTH, WHEN MEASURED ON THE WINTER SOLSTICE.

EXISTING ZONING:

USE REGULATIONS:	A70
ANIMAL REGULATIONS:	L
DENSITY:	--
LOT SIZE:	1AC
BUILDING TYPE:	C
MAX FLOOR AREA:	N/A
FLOOR AREA RATIO:	N/A
HEIGHT:	G
LOT COVERAGE:	N/A
SETBACKS:	FRONT YARD: 40' INTERIOR SIDE YARD: 15' EXTERIOR SIDE YARD: 35' REAR YARD: 25'
OPEN SPACE:	N/A
SPECIAL AREA REGULATIONS:	A
TAX RATE AREA (UNINCORPORATED ESCONDIDO):	74000

IMPROVEMENT PLAN NOTE:

PROPOSED IMPROVEMENTS INCLUDE THE CONSTRUCTION OF PUBLIC WATER AND STORM DRAIN SYSTEMS, AND PRIVATE ROADS AND SEPTIC SYSTEMS AS INDICATED ON THESE PLANS.

SHEET INDEX

SITE ADDRESS

2510 SUMMIT DRIVE
ESCONDIDO, CA 92025

THOMAS GUIDE PAGE 23 GRID B5

LEGAL DESCRIPTION:

LOT "F" IN BLOCK 275 OF RANCHO RINCO DEL DIABLO, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1676, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, ON OCTOBER 6, 1915.

ALSO THAT PORTION OF LOT "H" IN BLOCK 275 OF RANCHO RINCON DEL DIABLO, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1676, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 6, 1916. DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER COMMON TO LOTS "H", "F", "E", AND "D" IN SAID BLOCK 275;

THENCE ALONG THE SOUTHERLY LINE OF SAID LOT "H" NORTH 59° 51' WEST, 274.5 FEET;

THENCE NORTH 31° 55' EAST, 466 FEET TO THE MOST WESTERLY CORNER OF THAT PARCEL OF LAND DESCRIBED IN DEED TO A.L. HOUGHTELIN, ET AL., RECORDED NOVEMBER 15, 1943 AS INSTRUMENT NO. 24975, IN BOOK 1589, PAGE 283 OF OFFICIAL RECORDS;

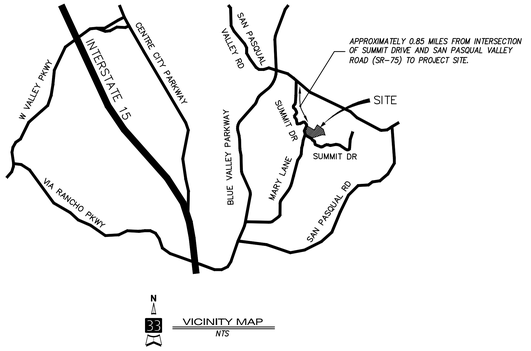
THENCE ALONG THE ALONG THE SOUTHWESTERLY LINE OF SAID HOUGHTELIN LAND SOUTH 52° 35' EAST, 579.7 FEET, AND SOUTH 17° 07' EAST, 444 FEET TO THE SOUTHERLY LINE OF SAID LOT "H";

THENCE ALONG SAID SOUTHERLY LINE NORTH 85° 25' WEST 211 FEET TO THE POINT OF BEGINNING.

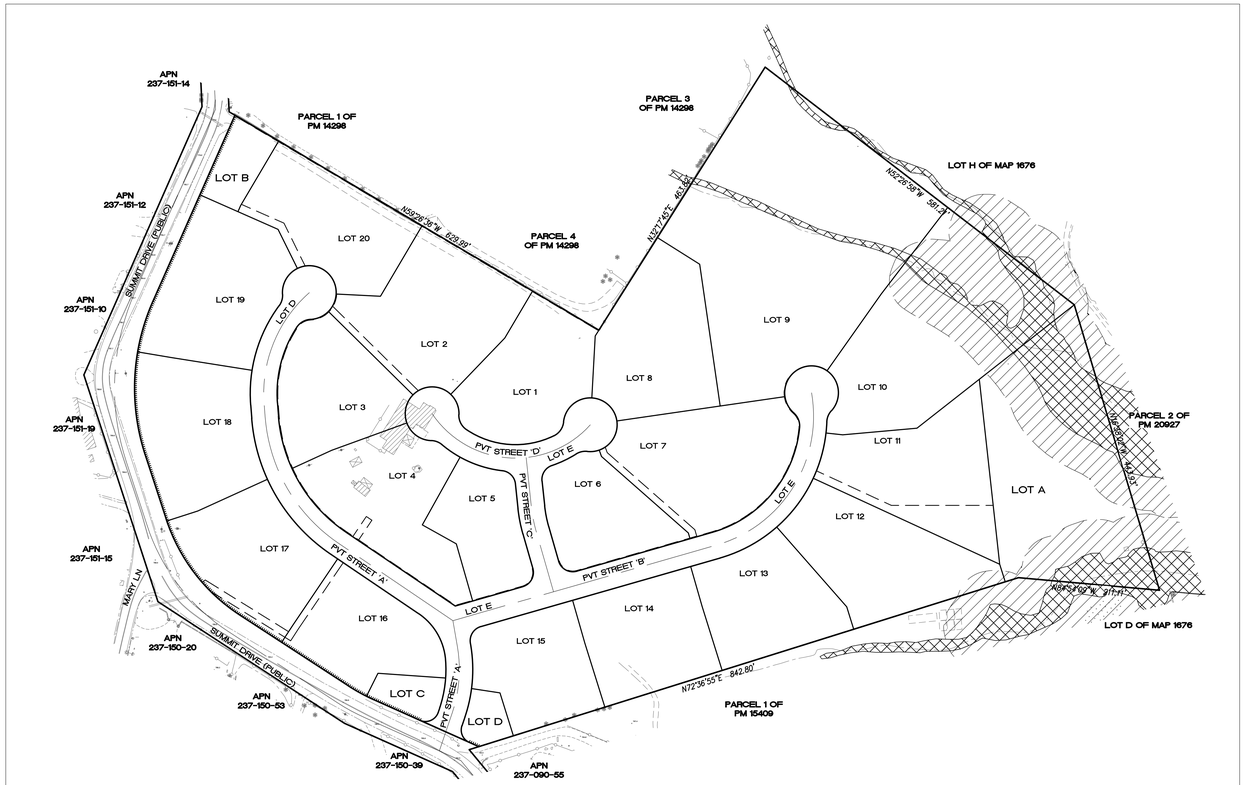
APN(s): 237-090-05-00

FEMA NOTE

SITE IS NOT IMPACTED BY THE 100 YR FLOOD



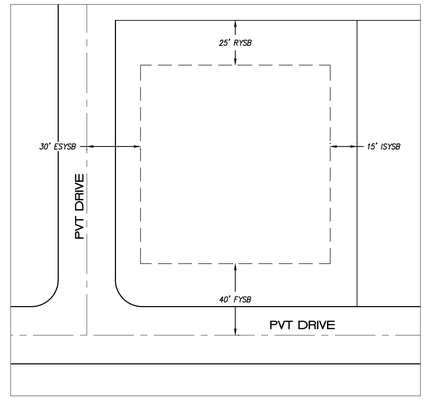
VICINITY MAP
NTS



KEY MAP
1" = 80'

LEGEND

- PROPERTY LINE
- LOT LINE
- CENTERLINE
- EASEMENT
- LOT SETBACKS
- RELINQUISHED ABUTTERS RIGHTS
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED PAD LIMITS
- PROPOSED DAYLIGHT LINE
- PROPOSED PRIVATE STORM DRAIN
- PROPOSED HEADWALL PER SDRSD D-34
- PROPOSED PUBLIC DOMESTIC WATER LINE
- PROPOSED DOMESTIC WATER SERVICE
- PROPOSED FIRE HYDRANT PER SDRSD WF-05
- PROPOSED BIORETENTION BASIN
- PROPOSED ALTERNATIVE SEPTIC SYSTEM
- PROPOSED FUEL MODIFICATION ZONE / LBZ EASEMENT
- PROPOSED BIOLOGICAL OPEN SPACE EASEMENT
- POTENTIALLY JURISDICTIONAL DRAINAGE AREA
- PROPOSED 6" CURB AND GUTTER PER SDRSD G-02 TYPE G
- PROPOSED STREET LIGHT PER COUNTY OF SAN DIEGO STREET LIGHTING SPECIFICATIONS - REVISED JANUARY 2015
- LOT DRAINAGE DIRECTION
- RIP RAP ENERGY DISSIPATER PER SDRSD D-40
- PROPOSED 16' WIDE DRIVEWAY



TYPICAL LOT SETBACK DETAIL ("C" DESIGNATOR)
NTS

LOT SUMMARY TABLE

LOT NO.	GROSS AREA (SQFT)	NET AREA (SQFT)	PAD ELEVATION (FT)
1	30934.76	30934.76	844
2	40536.77	38546.19	841
3	29506.27	29233.42	843
4	36540.43	36191.48	840
5	20928.13	20816.79	832
6	24106.76	23897.56	822
7	40251.48	38029.92	824
8	36178.09	36178.09	827
9	116093.71	116065.06	767
10	64524.27	64524.27	766
11	38291.68	29064.67	768
12	37553.70	37553.70	773
13	27159.36	27159.36	788
14	30813.76	30813.76	798
15	26497.21	26497.21	809
16	27408.09	27408.09	804
17	32699.66	32699.66	812
18	35727.94	35727.94	814
19	38714.86	38714.86	812
20	32447.45	30573.66	818
A	72767.98	72767.98	718
B	9972.77	9897.08	785
C	5823.21	5823.21	792
D	4696.45	4696.45	790.75
E	92126.35	92126.35	n/a

EARTHWORK SUMMARY

CUT:	61,980 CY
FILL:	66,870 CY
NET:	4,890 CY (FILL)

N

0 20 40 80 120
(IN FEET)
1 inch = 40 ft.

OWNER & APPLICANT INFORMATION

2510 SUMMIT, LLC
19782 MACARTHUR BLVD SUITE 300
IRVINE, CA 92612
PHONE: 949-933-4103

AGENT DATE

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH THE CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

LATITUDE 33: PLANNING AND ENGINEERING
9968 HIBERT STREET, 2ND FLOOR, SAN DIEGO, CA 92131
858-875-1735
GIO.POSILLICO@LATITUDE33.COM

REGISTERED PROFESSIONAL ENGINEER
GIOVANNI POSILLICO
No. 66332
CIVIL
STATE OF CALIFORNIA

GIOVANNI POSILLICO R.C.E. NO. 66332

06/02/2020
DATE

REVISION 9: _____
REVISION 8: _____
REVISION 7: _____
REVISION 6: _____
REVISION 5: _____
REVISION 4: _____
REVISION 3: _____
REVISION 2: _____
REVISION 1: _____

SUBDIVISION TENTATIVE
MAP OF APN 237-090-05-00
COUNTY OF SAN DIEGO, CA.
92025

TENTATIVE MAP
SUMMIT ESTATES
RESIDENTIAL DEVELOPMENT

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street, 2nd Floor, San Diego, CA 92131
Tel 858.875.0033

TENTATIVE MAP

SHEET TITLE:
TITLE SHEET

DATE PRINTED:
06-02-2020

SHEET NUMBER:
1

EXISTING EASEMENTS

1. EXISTING EASEMENT FOR PIPELINES PER DEED RECORDED APRIL 18, 1936 IN BOOK 508, PAGE 172, O.R. TO BE VACATED. (OVER LOT 'H' PORTION)
2. EXISTING EASEMENT FOR PIPELINES PER DEED RECORDED APRIL 24, 1936 IN BOOK 490, PAGE 441, O.R. TO BE VACATED. (OVER LOT 'F' PORTION)
3. EXISTING EASEMENT FOR PIPELINES GRANTED TO THE UNITED STATES OF AMERICA PER DEED RECORDED NOVEMBER 10, 1948 IN BOOK 3381, PAGE 361, O.R. TO BE VACATED DUE TO PROPOSED ROW DEDICATION OVER THIS PORTION OF LAND. (PLOTTED HEREON)

REVISION 9: _____
REVISION 8: _____
REVISION 7: _____
REVISION 6: _____
REVISION 5: _____
REVISION 4: _____
REVISION 3: _____
REVISION 2: _____
REVISION 1: _____

SUBDIVISION TENTATIVE
MAP OF APN 237-090-05-00
COUNTY OF SAN DIEGO, CA.
9/2025

TENTATIVE MAP
SUMMIT ESTATES
RESIDENTIAL DEVELOPMENT

PREPARED IN THE OFFICE OF:

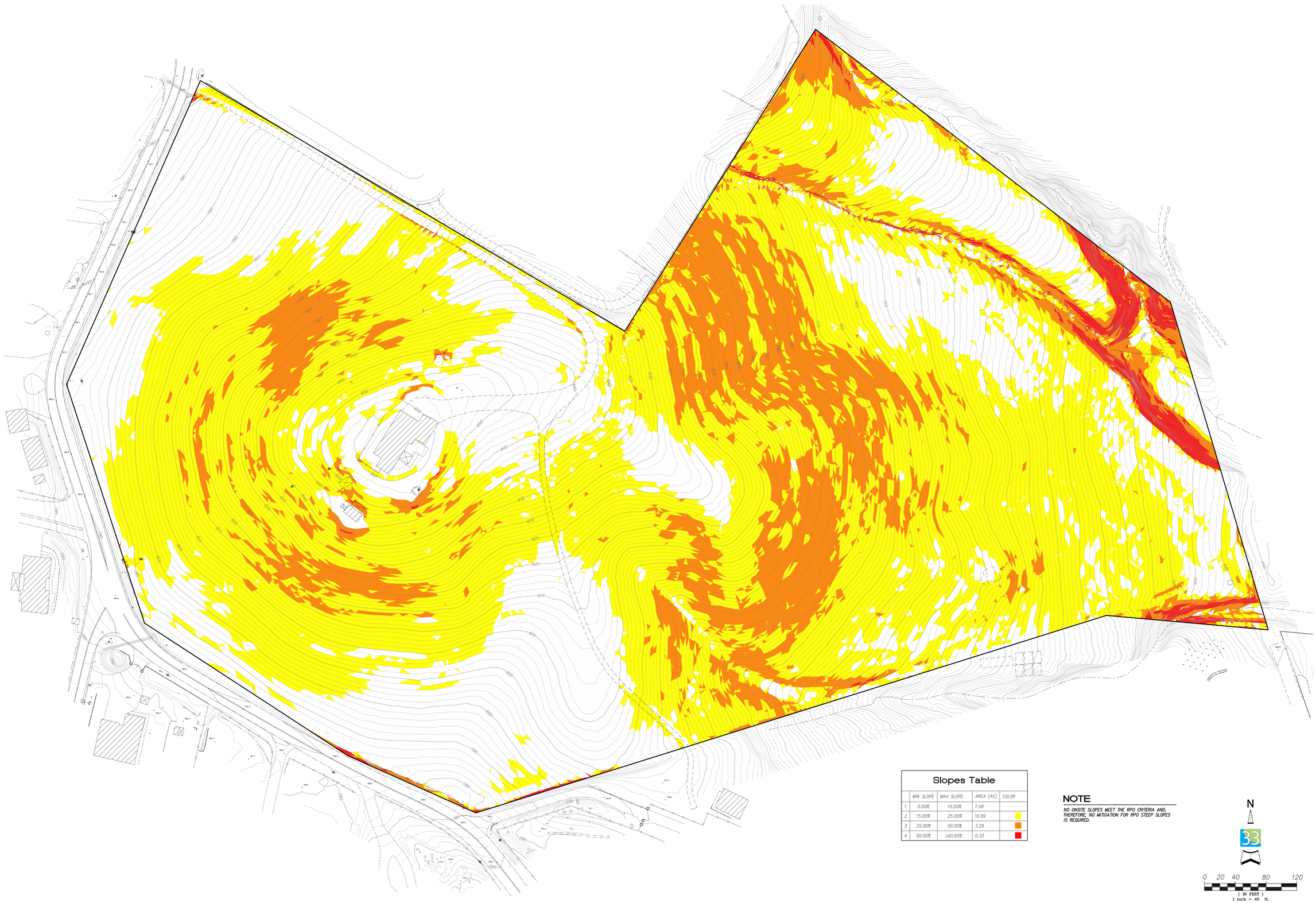
latitude 33
PLANNING & ENGINEERING
1903 Wright Place, 2nd Floor, San Diego, CA 92101
Tel (858) 558-0500

TENTATIVE MAP

SHEET TITLE: EXISTING CONDITIONS

DATE PRINTED: 06-02-2020

SHEET NUMBER: 2



Slopes Table				
	MIN. SLOPE	MAX. SLOPE	AREA (AC)	COLOR
1	0.00%	15.00%	7.58	
2	15.00%	25.00%	10.99	
3	25.00%	50.00%	3.29	
4	50.00%	>50.00%	0.33	

NOTE

NO ONSITE SLOPES MEET THE RPO CRITERIA AND, THEREFORE, NO MITIGATION FOR RPO STEEP SLOPES IS REQUIRED.

N

0 20 40 80 120

(IN FEET)
1 inch = 40 ft.

REVISION 9: _____
REVISION 8: _____
REVISION 7: _____
REVISION 6: _____
REVISION 5: _____
REVISION 4: _____
REVISION 3: _____
REVISION 2: _____
REVISION 1: _____

SUBDIVISION TENTATIVE
MAP OF APN 237-090-05-00
COUNTY OF SAN DIEGO, CA.
92025

TENTATIVE MAP
SUMMIT ESTATES
RESIDENTIAL DEVELOPMENT

PREPARED IN THE OFFICE OF:

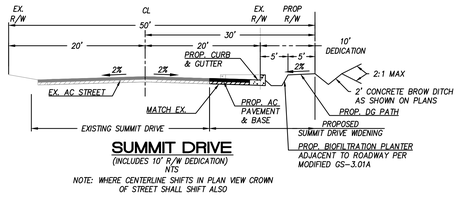
latitude33
PLANNING & ENGINEERING
9665 Hibert Street, 2nd Floor, San Diego, CA 92131
Tel 858.757.0839

TENTATIVE MAP

SHEET TITLE:
STEEP SLOPE ANALYSIS

DATE PRINTED:
06-02-2020

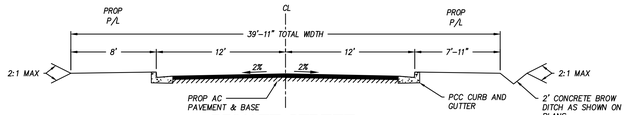
SHEET NUMBER:
3



SUMMIT DRIVE

(INCLUDES 10' R/W DEDICATION)
NTS

NOTE: WHERE CENTERLINE SHIFTS IN PLAN VIEW CROWN OF STREET SHALL SHIFT ALSO



PRIVATE STREET

NTS

NOTES

1. ALL PRIVATE STREET RADII ARE 150 FEET OR GREATER.
2. PROPOSED STRUCTURES WILL NEED TO BE KEPT OUTSIDE OF THE FUEL MODIFICATION ZONES OR THE PORTIONS OF STRUCTURES BUILT WITHIN THE FUEL MODIFICATION ZONES WILL NEED TO COMPLY WITH APPLICABLE CODES FOR FIRE-RESISTANCE CONSTRUCTION
3. PROPOSED ALTERNATIVE SEPTIC SYSTEMS SHALL BE DESIGNED AND SIZED TO ACCOMMODATE ANTICIPATED LOADING (APPROX. 2,500 SQ. FT.)
4. DRIVEWAY GRADES AND LOCATIONS FOR EACH LOT ARE PRELIMINARY AND SUBJECT TO CHANGE IN FINAL ENGINEERING.

LEGEND

- PROPERTY LINE
- LOT LINE
- CENTERLINE
- EASEMENT
- LOT SETBACKS
- RELINQUISHED ABUTTERS RIGHTS
- EXISTING MAJOR CONTOUR (800)
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR (800)
- PROPOSED MINOR CONTOUR
- PROPOSED PAD LIMITS
- PROPOSED DAYLIGHT LINE
- PROPOSED PRIVATE STORM DRAIN (SD)
- PROPOSED HEADWALL PER SDRSD D-34
- PROPOSED PUBLIC DOMESTIC WATER LINE (W)
- PROPOSED DOMESTIC WATER SERVICE (W)
- PROPOSED FIRE HYDRANT PER SDRSD WF-05
- PROPOSED BIORETENTION BASIN
- PROPOSED ALTERNATIVE SEPTIC SYSTEM
- PROPOSED FUEL MODIFICATION ZONE / LBZ EASEMENT
- PROPOSED BIOLOGICAL OPEN SPACE EASEMENT
- POTENTIALLY JURISDICTIONAL DRAINAGE AREA
- PROPOSED 6" CURB AND GUTTER PER SDRSD G-02 TYPE G
- PROPOSED STREET LIGHT PER COUNTY OF SAN DIEGO STREET LIGHTING SPECIFICATIONS – REVISED JANUARY 2015
- LOT DRAINAGE DIRECTION
- RIP RAP ENERGY DISSIPATER PER SDRSD D-40
- PROPOSED 16' WIDE DRIVEWAY

APN 237-151-14

PARCEL 1 OF PM 14298

PARCEL 3 OF PM 14298

LOT H OF MAP 1676

APN 237-151-12

PARCEL 4 OF PM 14298

APN 237-151-10

APN 237-151-19

APN 237-151-15

APN 237-150-20

APN 237-150-53

APN 237-150-39

APN 237-090-55

PARCEL 2 OF PM 20927

PARCEL 1 OF PM 15409

LOT D OF MAP 1676

SUMMIT DRIVE

MARY LANE

PVT STREET A

PVT STREET B

PVT STREET C

PVT STREET D

PVT STREET A

LOT B
8,555 SF
0.20 AC LOT
BASIN 2
785.00

LOT 20
818.0
11,800 SF PAD
32,445 SF, 0.74 AC LOT

LOT 19
812.0
13,300 SF PAD
38,715 SF, 0.89 AC LOT

LOT 2
841.0
12,200 SF PAD
40,537 SF, 0.93 AC LOT

LOT 1
844.0
16,300 SF PAD
30,935 SF, 0.71 AC LOT

LOT 8
827.0
9,200 SF PAD
36,178 SF, 0.83 AC LOT

LOT 3
843.0
13,300 SF PAD
29,506 SF, 0.68 AC LOT

LOT 18
814.0
16,500 SF PAD
35,728 SF, 0.82 AC LOT

LOT 4
840.0
17,300 SF PAD
36,500 SF, 0.84 AC LOT

LOT 5
832.0
10,300 SF PAD
20,930 SF, 0.48 AC LOT

LOT 6
822.0
10,200 SF PAD
22,105 SF, 0.55 AC LOT

LOT 7
824.0
9,000 SF PAD
40,250 SF, 0.93 AC LOT

LOT 17
812.0
12,600 SF PAD
32,700 SF, 0.75 AC LOT

LOT 16
804.0
13,200 SF PAD
27,410 SF, 0.63 AC LOT

LOT 15
809.0
10,300 SF PAD
26,500 SF, 0.61 AC LOT

LOT 14
798.0
10,300 SF PAD
30,810 SF, 0.71 AC LOT

LOT 9
767.0
11,200 SF PAD
116,100 SF, 2.67 AC LOT

LOT 10
766.0
12,000 SF PAD
64,525 SF, 1.48 AC LOT

LOT 11
768.0
9,500 SF PAD
38,290 SF, 0.88 AC LOT

LOT 12
773.0
10,350 SF PAD
37,500 SF, 0.86 AC LOT

LOT 13
788.0
8,300 SF PAD
27,160 SF, 0.62 AC LOT

LOT A
BASIN 1
718.00
71,530 SF, 1.64 AC LOT

LOT C
5,825 SF 0.13 AC LOT
BASIN 3A
792.00

LOT D
4,700 SF 0.11 AC LOT
BASIN 3B
790.75

10' PRIVATE DRAINAGE AND ACCESS EASEMENT

12' PRIVATE DRAINAGE AND ACCESS EASEMENT

1' PRIVATE ACCESS RESTRICTION EASEMENT

100' FUEL MODIFICATION ZONE / LIMITED BUILDING ZONE (LBZ) EASEMENT

PROPOSED 10' STREET WIDENING AND ROW DEDICATION

RELOCATE EXISTING POWER POLE

PROPOSED 6" CURB & GUTTER

EXIST SUMMIT DRIVE ℄

PROP SUMMIT DRIVE ℄

EXISTING EDGE OF PVMT, TYP.

PROPOSED PEDESTRIAN CURB RAMP

N

0 20 40 80 120

(IN FEET)
1 inch = 40 ft.

REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3:
REVISION 2:
REVISION 1:

SUBDIVISION TENTATIVE
MAP OF APN 237-090-05-00
COUNTY OF SAN DIEGO, CA.
9/2025

TENTATIVE MAP
SUMMIT ESTATES
RESIDENTIAL DEVELOPMENT

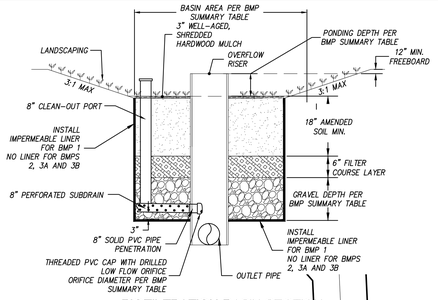
PREPARED IN THE OFFICE OF:
latitude 33
PLANNING & ENGINEERING
9665 Hibert Street, 2nd Floor, San Diego, CA 92131
Tel 858.757.0925

TENTATIVE MAP

SHEET TITLE:
SITE PLAN

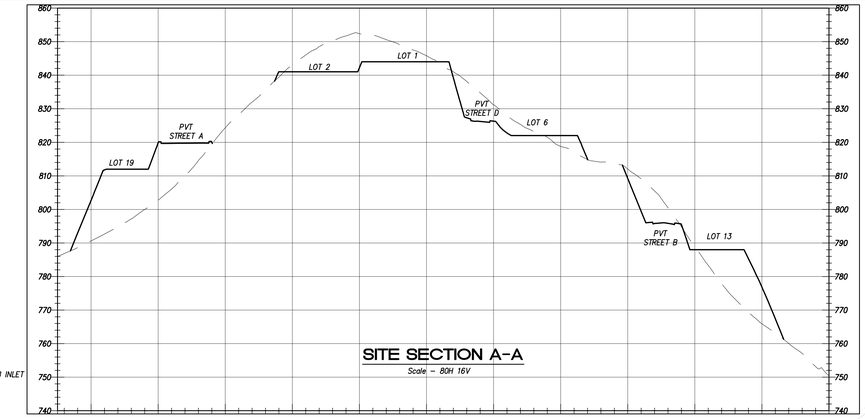
DATE PRINTED:
06-02-2020

SHEET NUMBER:
4



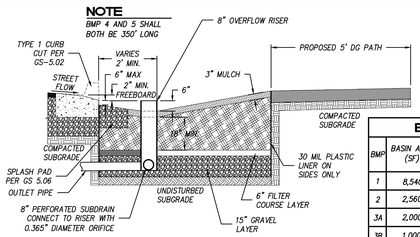
BIOFILTRATION BASIN SECTION (BMP 1, 2, 3A AND 3B)

NOT TO SCALE



SITE SECTION A-A

Scale - 80H 16V



NOTE

BMP 4 AND 5 SHALL BOTH BE 350' LONG

BIOFILTRATION PLANTER BASIN SECTION BMP 4 AND 5

(MODIFIED GS-3.01A) NOT TO SCALE

BMP SUMMARY TABLE

BMP	BASIN AREA (SF)	PONDING DEPTH (IN)	GRAVEL DEPTH (IN)	ORIFICE DIAMETER (IN)
1	8,540	18	33	1.8
2	2,560	12	12	1.25
3A	2,000	12	18	1
3B	1,000	12	18	0.75
4	1,575	6	15	0.365
5	1,575	6	15	0.365

LEGEND

- PROPERTY LINE
- LOT LINE
- CENTERLINE
- EASEMENT
- LOT SETBACKS
- RELINQUISHED ABUTTERS RIGHTS
- EXISTING MAJOR CONTOUR — 800
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR — 800
- PROPOSED MINOR CONTOUR
- PROPOSED PAD LIMITS
- PROPOSED DAYLIGHT LINE
- PROPOSED PRIVATE STORM DRAIN — SD — SD —
- PROPOSED HEADWALL PER SDRSD D-34
- PROPOSED PUBLIC DOMESTIC WATER LINE
- PROPOSED DOMESTIC WATER SERVICE
- PROPOSED FIRE HYDRANT PER SDRSD WF-05
- PROPOSED BIORETENTION BASIN
- PROPOSED ALTERNATIVE SEPTIC SYSTEM
- PROPOSED FUEL MODIFICATION ZONE / LBZ EASEMENT
- PROPOSED BIOLOGICAL OPEN SPACE EASEMENT
- POTENTIALLY JURISDICTIONAL DRAINAGE AREA
- PROPOSED 6" CURB AND GUTTER PER SDRSD G-02 TYPE G
- PROPOSED DRIVEWAY CUT
- PROPOSED STREET LIGHT PER COUNTY OF SAN DIEGO STREET LIGHTING SPECIFICATIONS - REVISED JANUARY 2015
- LOT DRAINAGE DIRECTION
- RIP RAP ENERGY DISSIPATER PER SDRSD D-40

REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3:
REVISION 2:
REVISION 1:

SUBDIVISION TENTATIVE MAP OF APN 237-090-05-00 COUNTY OF SAN DIEGO, CA. 92025

TENTATIVE MAP
SUMMIT ESTATES
RESIDENTIAL DEVELOPMENT

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9665 Hibert Street, 2nd Floor, San Diego, CA 92131
Tel: (858) 751-0633

TENTATIVE MAP

SHEET TITLE: GRADING AND UTILITY PLAN

DATE PRINTED: 06-02-2020

SHEET NUMBER: 5

PARCEL 1 OF PM 14298

PARCEL 3 OF PM 14298

PARCEL 4 OF PM 14298

PARCEL 1 OF PM 15409

PARCEL 2 OF PM 20927

LOT H OF MAP 1676

LOT D OF MAP 1676

APN 237-151-14

APN 237-151-12

APN 237-151-10

APN 237-151-19

APN 237-151-15

APN 237-150-20

APN 237-150-53

APN 237-150-39

APN 237-090-55

SUMMIT DRIVE

MARY LANE

LOT B — 8,555 SF, 0.20 AC LOT, BASIN 2, 785.00

LOT 20 — 818.0, 11,800 SF PAD, 32,445 SF, 0.74 AC LOT

LOT 19 — 812.0, 13,300 SF PAD, 38,715 SF, 0.89 AC LOT

LOT 18 — 814.0, 16,500 SF PAD, 35,728 SF, 0.82 AC LOT

LOT 17 — 812.0, 12,600 SF PAD, 32,700 SF, 0.75 AC LOT

LOT 16 — 804.0, 13,200 SF PAD, 27,410 SF, 0.63 AC LOT

LOT 15 — 809.0, 10,300 SF PAD, 26,500 SF, 0.61 AC LOT

LOT 14 — 798.0, 10,300 SF PAD, 30,810 SF, 0.71 AC LOT

LOT 13 — 788.0, 8,300 SF PAD, 27,160 SF, 0.62 AC LOT

LOT 12 — 773.0, 10,350 SF PAD, 37,500 SF, 0.86 AC LOT

LOT 11 — 768.0, 9,500 SF PAD, 38,290 SF, 0.88 AC LOT

LOT 10 — 766.0, 12,000 SF PAD, 64,525 SF, 1.48 AC LOT

LOT 9 — 767.0, 11,200 SF PAD, 116,100 SF, 2.67 AC LOT

LOT 8 — 827.0, 9,200 SF PAD, 36,178 SF, 0.83 AC LOT

LOT 7 — 824.0, 9,000 SF PAD, 40,250 SF, 0.93 AC LOT

LOT 6 — 822.0, 10,200 SF PAD, 24,105 SF, 0.55 AC LOT

LOT 5 — 832.0, 10,300 SF PAD, 20,930 SF, 0.48 AC LOT

LOT 4 — 840.0, 17,300 SF PAD, 36,500 SF, 0.84 AC LOT

LOT 3 — 843.0, 13,300 SF PAD, 29,506 SF, 0.68 AC LOT

LOT 2 — 841.0, 12,200 SF PAD, 40,537 SF, 0.93 AC LOT

LOT 1 — 844.0, 16,300 SF PAD, 30,935 SF, 0.71 AC LOT

LOT A — BASIN 1, 715.00, 71,530 SF, 1.64 AC LOT

LOT C — 5,825 SF, 0.13 AC LOT, BASIN 3A, 792.00

LOT D — 4,700 SF, 0.11 AC LOT, BASIN 3B, 790.75

BMP 1 (BF-1) — BIOFILTRATION BASIN SIZED FOR POLLUTANT CONTROL AND HMP AREA 8,540 SF, ORIFICE DIA. 1.80", ACCESS VIA GRADED DRIVEWAY FROM PVT. DRIVE B

BMP 2 (PR-1) — BIOFILTRATION BASIN SIZED FOR POLLUTANT CONTROL AND HMP AREA 2,560 SF, ORIFICE DIA. 1.25", ACCESS VIA SUMMIT DRIVE

BMP 3A (PR-1) — BIOFILTRATION BASIN SIZED FOR POLLUTANT CONTROL AND HMP AREA 2,000 SF, ORIFICE DIA. 1", ACCESS VIA PVT. DRIVE A

BMP 3B (PR-1) — BIOFILTRATION BASIN SIZED FOR POLLUTANT CONTROL AND HMP AREA 1,000 SF, ORIFICE DIA. 0.75", ACCESS VIA PVT. DRIVE A

BMP 4 (PR-1) — BIOFILTRATION BASIN SIZED FOR POLLUTANT CONTROL AND HMP AREA 1,575 SF, ORIFICE DIA. 0.365", ACESS VIA PVT. DRIVE A

BMP 5 (PR-1) — BIOFILTRATION BASIN SIZED FOR POLLUTANT CONTROL AND HMP AREA 1,575 SF, ORIFICE DIA. 0.365", ACESS VIA PVT. DRIVE A

PVT STREET A — PVT STREET B — PVT STREET C — PVT STREET D

NEW TYPE-B CURB INLET FL = 775.0' FL = 775.1'

PROPOSED 10' STREET WIDENING AND ROW DEDICATION

EXISTING STORM PIPE TO BE REMOVED AND REPLACED WITH 18" RCP. REPLACEMENT IS REQUIRED TO THE SATISFACTION OF THE DIRECTOR OF DPW, PER SUBDIVISION ORDINANCE 81.402(M). WORK AREAS AND IMPROVEMENTS WILL BE LIMITED TO THE SUBJECT PROPERTY AND PUBLIC RIGHT OF WAY.

EXISTING STORM PIPE TO BE REMOVED AND REPLACED WITH 18" RCP. REPLACEMENT IS REQUIRED TO THE SATISFACTION OF THE DIRECTOR OF DPW, PER SUBDIVISION ORDINANCE 81.402(M). WORK AREAS AND IMPROVEMENTS MILL BE LIMITED TO THE SUBJECT PROPERTY AND PUBLIC RIGHT OF WAY.

PROVIDE CURB CUTS SPACED ALONG LENGTH OF BIOFILTRATION BASIN

PROPOSED CENTERLINE

EXISTING PVMT MARKINGS

EXIST EDGE OF PVMT

RELOCATE EXISTING POWER POLE

1' PRIVATE ACCESS RESTRICTION EASEMENT

10' PRIVATE DRAINAGE AND ACCESS EASEMENT

12' PRIVATE DRAINAGE AND ACCESS EASEMENT

DRIVEWAY GRADE =12%

DRIVEWAY GRADE =14%

DRIVEWAY GRADE =13%

DRIVEWAY GRADE =11%

DRIVEWAY GRADE =15%

DISCHARGE BASIN AT CURB OUTLET IN PROPOSED CURB

DISCHARGE BASIN AT HEADWALL WITH RIP RAP

N25°28'36"W 829.89'

N25°28'36"W 581.01'

N27°14'57"E 463.85'

N84°54'09"W 211.11'

N72°36'55"E 842.80'

100' FUEL MODIFICATION ZONE/ LIMITED BUILDING ZONE (LBZ) EASEMENT

2:1 MAX FILL

5:1 MAX CUT

PRELIMINARY GRADING PLAN 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.

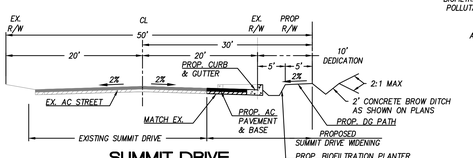
NOTES

1. ALL ONSITE WATER, SEWER AND STORM DRAIN FACILITIES WILL BE PRIVATE UNLESS NOTED OTHERWISE. PUBLIC EASEMENTS SHALL BE PROVIDED FOR ALL PUBLIC UTILITIES ON PRIVATE PROPERTY. PRIVATE WATER AND SEWER FACILITIES SHALL BE DESIGNED TO MEET THE REQUIREMENTS OF THE CALIFORNIA UNIFORM PLUMBING CODE AND SHALL BE REVIEWED AS A PART OF THE BUILDING PERMIT PLAN CHECK.
2. DRIVEWAY GRADES AND LOCATIONS FOR EACH LOT ARE PRELIMINARY AND SUBJECT TO CHANGE IN FINAL ENGINEERING.

NOTICE:

THE SUBJECT PROPERTY CONTAINS WETLANDS, A LAKE, A STREAM, AND/OR WATERS OF THE U.S. AND/OR STATE WHICH MAY BE SUBJECT TO REGULATION BY STATE AND/OR FEDERAL AGENCIES, INCLUDING, BUT NOT LIMITED TO, THE REGIONAL WATER QUALITY CONTROL BOARD, U.S. ARMY CORPS OF ENGINEERS AND THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE. IT IS THE APPLICANT'S RESPONSIBILITY TO CONSULT WITH EACH AGENCY TO DETERMINE IF A PERMIT, AGREEMENT OR OTHER APPROVAL IS REQUIRED AND TO OBTAIN ALL NECESSARY PERMITS, AGREEMENTS OR APPROVALS BEFORE COMMENCING ANY ACTIVITY WHICH COULD IMPACT THE WETLANDS, LAKE, STREAM, AND/OR WATERS OF THE U.S. LOCATED ON THE SUBJECT PROPERTY. THE AGENCY CONTACT INFORMATION IS PROVIDED BELOW.

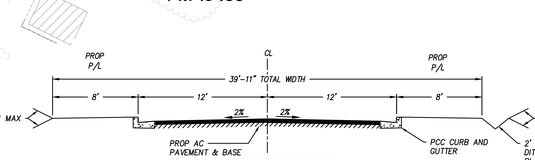
U.S. ARMY CORPS OF ENGINEERS: 5900 LA PLACE COURT, SUITE 100, CARLSBAD, CA 92008; (760) 602-4850; HTTP://WWW.USACE.ARMY.MIL/
REGIONAL WATER QUALITY CONTROL BOARD: U.S. ARMY CORPS OF ENGINEERS AND THE 2375 NORTHSIDE DRIVE, SUITE 100, SAN DIEGO, CA 92108; (619) 521-3967; HTTP://WWW.WATERBOARDS.CA.GOV/SANDIEGO/
UNITED STATES FISH AND WILDLIFE SERVICE: 2177 SALK AVE, SUITE 250, CARLSBAD, CA 92008; (760) 431-9440; HTTPS://WWW.FWS.GOV/
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE: 3883 RUFFIN RD., SAN DIEGO, CA 92123; (858) 467-4207; HTTP://WWW.DFG.CA.GOV/



SUMMIT DRIVE

(INCLUDES 10' R/W DEDICATION) NTS

NOTE: WHERE CENTERLINE SHIFTS IN PLAN VIEW CROWN OF STREET SHALL SHIFT ALSO



PRIVATE STREET

NTS

N

0 20 40 80 120

(IN FEET)

1 inch = 40 ft.

REVISION 9:
REVISION 8:
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REVISION 2:
REVISION 1:

SUBDIVISION TENTATIVE
MAP OF APN 237-090-05-00
COUNTY OF SAN DIEGO, CA.
92025

TENTATIVE MAP
SUMMIT ESTATES

RESIDENTIAL DEVELOPMENT

PREPARED IN THE OFFICE OF:

latitude 33
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TENTATIVE MAP

SHEET TITLE:
FIRE ACCESS PLAN

DATE PRINTED:
06-02-2020

SHEET NUMBER:
6

5.0 General Requirements

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

  ☒ **Yes**

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

    Title: Preliminary Drainage Study for Summit Estates TM

    Prepared By: Latitude 33 Planning & Engineering

    Date: 06/01/2020

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

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

6.0 General Requirements

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

DMA Compliance Option	Required Sub-attachments	BMPDM Design Resources
☒ **Self-mitigating**	• Sub-attachment 6.1	• BMPDM Section 5.2.1
☐ **De minimis**	• Sub-attachment 6.2	• BMPDM Section 5.2.2
☐ **Self-retaining**[1]	• Sub-attachment 6.3	• BMPDM Section 5.2.3 (all options)
SSD-BMP Type(s)		
☐ **Impervious Area Dispersion**	• Sub-attachment 6.3.1	• Fact Sheet SD-B (Appendix E.8)
☐ **Tree Wells**	• Sub-attachment 6.3.2	• Fact Sheet SD-A (Appendix E.7)

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

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

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

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

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

DMA #	*a. DMA Area (ft^2)*	*Incidental Impervious Area*		*Permit # and Sheet #*
		b. Size(ft^2)	*c. % (b/a*100)*	
1-SM	27,500	0	0	TM Sheet 5
2-SM	29,400	0	0	TM Sheet 5
3-SM	19,100	0	0	TM Sheet 5
4-SM	13,300	0	0	TM Sheet 5
5-SM	54,900	0	0	TM Sheet 5
6-SM	2,500	0	0	TM Sheet 5
8-SM	3,000	0	0	TM Sheet 5

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

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

<u>Natural and Landscaped Areas</u>

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

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

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

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

<u>Incidental Impervious Areas (if applicable; see above)</u>

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

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

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

7.0 General Requirements

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

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

7.1 Engineer of Work Certification for Structural BMPs

Project Name Summit Estates
Permit Application Number PDS2019-TM-5635

CERTIFICATION

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

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

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

RCE 66332 Exp. 06/30/2020

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

Giovanni Posillico

Print Name

Latitude 33 Planning & Engineering

Company

06/01/2020

Date

Engineer's Seal:

7.2 Structural BMP Strategy

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

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

The project was graded to follow existing drainage conditions as much as possible. The site was broken into DMAs. Each DMA will be treated with a BMP for pollutant control and HMP, except for the self-mitigating DMAs.

The following design strategy per BMPDM Section 5 was followed:

Step 1. DCV for each DMA was calculated.

Step 2. Retention requirements were calculated. Infiltration recommendations are presented in the Geotechnical investigation.

Step 3. Biofiltration basins were selected as BMPs. BMP performance calculations confirmed minimum size of BMP for water quality.

Onsite alternative compliance was implemented within this project to satisfy pollutant control performance standard. The BMPs within Summit Drive ROW were sized for pollutant control based on the actual tributary area, which included existing and proposed impervious areas. It was then shown that the area treated was greater than the area requiring treatment. No land use factor was used because the land use of the required area (Transportation - Impervious) is the same as the land use of the excess area (Transportation - Impervious).

Step 4. HMP volume requirements were confirmed for each POC and BMPs sized accordingly.

7.2.2 Structural BMP Summary Table (Complete for all proposed structural BMPs)

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

BMP ID #	**DMA #**	**DMA Area (ft²)**	**Structural BMP Type:** Harvest and Use	Infiltration	Unlined Biofiltration	Lined Biofiltration	Flow-thru treatment	Hydromodification Management[1]	Other	**Permit # and Sheet #**
1	1	171,200	☐	☐	☐	☒	☐	☐	☐	TM Sheet 5
2	2	86,100	☐	☐	☒	☐	☐	☐	☐	TM Sheet 5
3A	3A	73,500	☐	☐	☒	☐	☐	☐	☐	TM Sheet 5
3B	3B	42,600	☐	☐	☒	☐	☐	☐	☐	TM Sheet 5
4	7	13,000	☐	☐	☒	☐	☐	☐	☐	TM Sheet 5
5	6	13,200	☐	☐	☒	☐	☐	☐	☐	TM Sheet 5
			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	
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			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	

Copy and Paste table here for additional BMPs

[1] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

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

Structural BMP ID # 1	**Permit # and Sheet #** TM Sheet 5
BMP Type	
Infiltration ☐ Infiltration basin (INF-1) ☐ Bioretention (INF-2) ☐ Permeable pavement (INF-3) **Unlined Biofiltration** ☐ Biofiltration with partial retention (PR-1) **Lined Biofiltration** ☒ Biofiltration (BF-1) ☐ Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3)	**Harvest and Use** ☐ Cistern (HU-1) **Flow-thru Treatment** (describe below) ☐ With prior lawful approval to meet earlier PDP requirements ☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2] ☐ With alternative compliance **Hydromodification Management**[3] ☐ Detention pond or vault ☐ **Other** (describe below)
BMP Purpose	
☐ Pollutant control only ☐ Hydromodification control only ☒ Combined pollutant control and hydromodification	☐ Pre-treatment/forebay for another BMP ☐ Other (describe below)
BMP Verification (See BMPDM Section 8.3)	
Provide name and contact information for the party responsible to sign BMP verification forms	Keegan McNamara 2510 Summit, LLC 19782 MacArthur Blvd Suite 300 Irvine, CA 92612

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)				
BMP Maintenance Category	Cat. 1 ☐	Cat. 2 ☒	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):
Maintenance of BMP into perpetuity	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):

Discussion (As needed; Continue on subsequent pages as necessary)

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID # 2	**Permit # and Sheet #** TM Sheet 5

BMP Type

Infiltration
- ☐ Infiltration basin (INF-1)
- ☐ Bioretention (INF-2)
- ☐ Permeable pavement (INF-3)

Unlined Biofiltration
- ☒ Biofiltration with partial retention (PR-1)

Lined Biofiltration
- ☐ Biofiltration (BF-1)
- ☐ Nutrient Sensitive Media Design (BF-2)
- ☐ Proprietary Biofiltration (BF-3)

Harvest and Use
- ☐ Cistern (HU-1)

Flow-thru Treatment (describe below)
- ☐ With prior lawful approval to meet earlier PDP requirements
- ☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
- ☐ With alternative compliance

Hydromodification Management[3]
- ☐ Detention pond or vault

☐ **Other** (describe below)

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

BMP Verification (See BMPDM Section 8.3)

Provide name and contact information for the party responsible to sign BMP verification forms	Keegan McNamara 2510 Summit, LLC 19782 MacArthur Blvd Suite 300 Irvine, CA 92612

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)

BMP Maintenance Category	Cat. 1 ☐	Cat. 2 ☒	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):
Maintenance of BMP into perpetuity	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):

Discussion (As needed; Continue on subsequent pages as necessary)

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID # 3A	**Permit # and Sheet #** TM Sheet 5

BMP Type

Infiltration

☐ Infiltration basin (INF-1)
☐ Bioretention (INF-2)
☐ Permeable pavement (INF-3)

Unlined Biofiltration

☒ Biofiltration with partial retention (PR-1)

Lined Biofiltration

☐ Biofiltration (BF-1)
☐ Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3)

Harvest and Use

☐ Cistern (HU-1)

Flow-thru Treatment (describe below)

☐ With prior lawful approval to meet earlier PDP requirements
☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
☐ With alternative compliance

Hydromodification Management[3]

☐ Detention pond or vault

☐ **Other** (describe below)

BMP Purpose

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

BMP Verification (See BMPDM Section 8.3)

Provide name and contact information for the party responsible to sign BMP verification forms	Keegan McNamara 2510 Summit, LLC 19782 MacArthur Blvd Suite 300 Irvine, CA 92612

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)

BMP Maintenance Category	Cat. 1 ☐	Cat. 2 ☒	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):
Maintenance of BMP into perpetuity	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):

Discussion (As needed; Continue on subsequent pages as necessary)

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID # 3B	**Permit # and Sheet #** TM Sheet 5

BMP Type

Infiltration

☐ Infiltration basin (INF-1)
☐ Bioretention (INF-2)
☐ Permeable pavement (INF-3)

Unlined Biofiltration

☒ Biofiltration with partial retention (PR-1)

Lined Biofiltration

☐ Biofiltration (BF-1)
☐ Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3)

Harvest and Use

☐ Cistern (HU-1)

Flow-thru Treatment (describe below)

☐ With prior lawful approval to meet earlier PDP requirements
☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
☐ With alternative compliance

Hydromodification Management[3]

☐ Detention pond or vault

☐ **Other** (describe below)

BMP Purpose

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

BMP Verification (See BMPDM Section 8.3)

Provide name and contact information for the party responsible to sign BMP verification forms	Keegan McNamara 2510 Summit, LLC 19782 MacArthur Blvd Suite 300 Irvine, CA 92612

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)

BMP Maintenance Category	Cat. 1 ☐	Cat. 2 ☒	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):
Maintenance of BMP into perpetuity	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):

Discussion (As needed; Continue on subsequent pages as necessary)

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID # 4	**Permit # and Sheet #** TM Sheet 5

BMP Type

Infiltration
- ☐ Infiltration basin (INF-1)
- ☐ Bioretention (INF-2)
- ☐ Permeable pavement (INF-3)

Unlined Biofiltration
- ☒ Biofiltration with partial retention (PR-1)

Lined Biofiltration
- ☐ Biofiltration (BF-1)
- ☐ Nutrient Sensitive Media Design (BF-2)
- ☐ Proprietary Biofiltration (BF-3)

Harvest and Use
- ☐ Cistern (HU-1)

Flow-thru Treatment (describe below)
- ☐ With prior lawful approval to meet earlier PDP requirements
- ☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
- ☐ With alternative compliance

Hydromodification Management[3]
- ☐ Detention pond or vault
- ☐ **Other** (describe below)

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

BMP Verification (See BMPDM Section 8.3)

Provide name and contact information for the party responsible to sign BMP verification forms	Keegan McNamara 2510 Summit, LLC 19782 MacArthur Blvd Suite 300 Irvine, CA 92612

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)

BMP Maintenance Category	Cat. 1 ☐	Cat. 2 ☒	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):
Maintenance of BMP into perpetuity	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):

Discussion (As needed; Continue on subsequent pages as necessary)

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID # 5	**Permit # and Sheet #** TM Sheet 5

BMP Type

Infiltration

- ☐ Infiltration basin (INF-1)
- ☐ Bioretention (INF-2)
- ☐ Permeable pavement (INF-3)

Unlined Biofiltration

- ☒ Biofiltration with partial retention (PR-1)

Lined Biofiltration

- ☐ Biofiltration (BF-1)
- ☐ Nutrient Sensitive Media Design (BF-2)
- ☐ Proprietary Biofiltration (BF-3)

Harvest and Use

- ☐ Cistern (HU-1)

Flow-thru Treatment (describe below)

- ☐ With prior lawful approval to meet earlier PDP requirements
- ☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
- ☐ With alternative compliance

Hydromodification Management[3]

- ☐ Detention pond or vault

☐ **Other** (describe below)

BMP Purpose

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

BMP Verification (See BMPDM Section 8.3)

Provide name and contact information for the party responsible to sign BMP verification forms	Keegan McNamara 2510 Summit, LLC 19782 MacArthur Blvd Suite 300 Irvine, CA 92612

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)

	Cat. 1	Cat. 2	Cat. 3	Cat. 4
BMP Maintenance Category	☐	☒	☐	☐
Final owner of BMP	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):
Maintenance of BMP into perpetuity	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):

Discussion (As needed; Continue on subsequent pages as necessary)

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

7.4 Storm Water Pollutant Control Worksheet Calculations

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

Worksheet	Requirement
☒ Worksheet B.1 Calculation of Design Capture Volume (DCV)	Required
☒ Worksheet B.2 Retention Requirements	Required
☒ Worksheet B.3 BMP Performance	Required
☐ Worksheet B.4 Major Maintenance Intervals for Reduced-sized BMPs	If applicable
☐ Other worksheets	As required

County of San Diego Automated Stormwater Pollutant Control Worksheets
(Version 2.0)

WELCOME:

Welcome to the County of San Diego Automated Stormwater Pollutant Control Worksheets. These worksheets may be used to demonstrate compliance with stormwater pollutant control standards set forth in the 2013 MS4 Permit for Priority Development Projects and Green Street Projects.

INSTRUCTIONS:

General: To use this workbook, navigate to each of the worksheet tabs below and populate all yellow cells with project specific information. Yellow cells require user input, white cells are locked for editing and are automatically calculated, blue cells are also locked for editing and are automatically populated based on results from previous worksheet tabs, grey cells are items that do not require user input because of previous user inputs, orange cells represent warnings where supplemental information and/or revisions may be required for compliance. The worksheets are formatted to accommodate calculations for up to 10 drainage areas and associated BMPs. Each drainage area and BMP is represented as a discrete column with corresponding user inputs and calculations appearing in the rows below. Please note that projects with more than 10 drainage areas may need to use more than one workbook to accommodate the entire project.

Step 1. DCV: Provide the required inputs to determine the design capture volume for each PDP drainage area. The calculations in this worksheet determine the initial design capture volume and also apply any applicable reductions associated with site design techniques including dispersion to pervious surfaces, incorporation of tree wells, and incorporation of rain barrels.

Step 2. Retention Requirements: Provide required inputs to determine the minimum retention requirements for each drainage area.

Step 3. BMP Performance: Provide required inputs to determine the portion of the pollutant control performance standards that are satisfied by the proposed BMPs.

Reduced Size BMP Maintenance (optional): If BMPs with a footprint of less than 3% of the effective impervious tributary are proposed, provide required inputs to determine the anticipated frequency for major BMP maintenance activities.

DISCLAIMER:

The County of San Diego has developed this tool in an effort to streamline traditionally complex efforts associated with planning, design, submittal, and review of PDPs that are subject to stormwater pollutant control requirements set forth in the 2013 MS4 Permit. While the calculations performed herein are deemed to be in compliance with Permit requirements, applicants may elect to provide their own calculations. Use of this tool is optional and the County will not be held liable for any errors or other negative impacts associated with its use. In the event that the County performs updates to these worksheets, applicants that have not established reliance on previous versions of the worksheet via discretionary approval may be required to utilize the latest version of the worksheets. A summary of version releases is included below.

QUESTIONS:

-Questions relating to specific projects, submittal requirements, approval process, and/or policy-related issues should be directed your PDS Land Development Project Manager (link below).

PDS Land Development Project Manager

-General questions/comments on this worksheet may be directed to Charles Mohrlock in the County of San Diego Watershed Protection Program (link below).

charles.mohrlock@sdcounty.ca.gov

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	BMP 1	BMP 2	BMP 3A	BMP 3B	BMP 4	BMP 5					unitless
	2	85th Percentile 24-hr Storm Depth	0.65	0.65	0.65	0.65	0.65	0.65					inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	69,260	35,140	30,480	18,880	9,600	9,700					sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	101,940	50,960	43,020	23,720	3,400	3,500					sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	171,200	86,100	73,500	42,600	13,000	13,200	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.42	0.43	0.43	0.45	0.69	0.69	0.00	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.42	0.43	0.43	0.45	0.69	0.69	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	3,895	2,005	1,712	1,038	486	493	0	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.42	0.43	0.43	0.45	0.69	0.69	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	3,895	2,005	1,712	1,038	486	493	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.42	0.43	0.43	0.45	0.69	0.69	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	71,904	37,023	31,605	19,170	8,970	9,108	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	3,895	2,005	1,712	1,038	486	493	0	0	0	0	cubic-feet

No Warning Messages

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	BMP 1	BMP 2	BMP 3A	BMP 3B	BMP 4	BMP 5	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.65	0.65	0.65	0.65	0.65	0.65	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	D	C	D	D	C	C					unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted					unitless
	5	Nature of Restriction	Slopes										unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No					yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes					yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.045	0.090	0.090	0.090	0.045					in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.045	0.090	0.090	0.090	0.045	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	1.5%	1.5%	15.3%	15.3%	15.3%	1.5%	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.01	0.01	0.10	0.10	0.10	0.01	-	-	-	-	ratio
	13	Required Retention Volume	39	20	171	104	49	5	-	-	-	-	cubic-feet

No Warning Messages

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	BMP 1	BMP 2	BMP 3A	BMP 3B	BMP 4	BMP 5	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.045	0.090	0.090	0.090	0.045	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	3,895	2,005	1,712	1,038	486	493	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated					unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Unlined	Unlined	Unlined	Unlined	Unlined					unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain					unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard					unitless
	8	Provided Surface Area	8,540	2,560	2,000	1,000	1,575	1,575					sq-ft
	9	Provided Surface Ponding Depth	18	12	12	12	6	6					inches
	10	Provided Soil Media Thickness	18	18	18	18	18	18					inches
	11	Provided Gravel Thickness (Total Thickness)	39	18	24	24	21	21					inches
	12	Underdrain Offset	3	3	3	3	3	3					inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.80	1.25	1.00	0.75	0.37	0.37					inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	58	90	45	71	35	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.10	2.10	2.10	2.10	2.10	2.10	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.38	0.25	0.26	0.21	0.71	0.63	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	47	23	23	23	47	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.37	0.37	0.50	0.43	0.95	0.73	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	1,460	738	858	448	464	361	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	2,435	1,267	854	590	22	132	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.2071	0.0789	0.0539	0.0303	0.0065	0.0065	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	1.05	1.33	1.16	1.31	0.18	0.18	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	1.05	1.33	1.16	1.31	0.18	0.18	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	6.29	7.99	6.98	7.86	1.07	1.07	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	36.00	21.60	24.00	24.00	16.80	16.80	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	17	9	10	9	22	27	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	34	16	19	17	62	75	0	0	0	0	hours
	40	Total Depth Biofiltered	42.29	29.59	30.98	31.86	17.87	17.87	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	3,652	1,901	1,281	885	33	199	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	3,652	1,901	1,281	885	33	199	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	1,826	951	640	442	17	99	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	1,826	951	640	442	17	99	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

Attention!

-Vegetated BMPs with surface ponding drawdown times over 24 hours must be certified by a landscape architect or agronomist. All BMPs must have a surface ponding drawdown time of 96 hours or less

8.0 General Requirements

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

Sub-attachments (check all that are completed)
☒ **8.1: Flow Control Facility Design** (required)[1] Submit using ☒ the Sub-attachment 8.1 cover sheet provided, or ☐ as a separate stand-alone document labeled Sub-attachment 8.1.
☒ **8.2: Hydromodification Management Points of Compliance** (required) Complete the table provided in Sub-attachment 8.2.
8.3: Geomorphic Assessment of Receiving Channels 1. Has a geomorphic assessment been performed for the receiving channel(s)? ☒ No, the low flow threshold is 0.1Q2 (default low flow threshold)
☐ Yes (provide the information below): Low flow threshold: ☐ 0.1Q2 ☐ 0.3Q2 ☐ 0.5Q2
Title: Date: Preparer:
Submit using ☐ the Sub-attachment 8.3 cover sheet provided, or ☐ as a separate stand-alone document labeled Sub-attachment 8.3.
8.4: Vector Control Plan (required if BMPs will not drain in less than 96 hours) ☐ Included with this attachment ☒ Not required

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

8.1 Flow Control Facility Design

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

SDHM 3.1

PROJECT REPORT

Note: See drawdown calculations, web soil survey, and existing DMA areas at the end of this attachment.

General Model Information

Project Name:	Summit Estates - Entire Site Add BMP
Site Name:	Summit Estates
Site Address:	2510 Summit Drive
City:	Escondido
Report Date:	5/29/2020
Gage:	ESCONDID
Data Start:	10/01/1964
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.000
Version Date:	2020/03/12

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
Low Flow Threshold for POC3:	10 Percent of the 2 Year
High Flow Threshold for POC3:	10 Year
Low Flow Threshold for POC4:	10 Percent of the 2 Year
High Flow Threshold for POC4:	10 Year
Low Flow Threshold for POC5:	10 Percent of the 2 Year
High Flow Threshold for POC5:	10 Year

Landuse Basin Data

Predeveloped Land Use

See Existing DMAs for reference at the end of this attachment.

E1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Steep	8.45
Pervious Total	8.45
Impervious Land Use	acre
Impervious Total	0
Basin Total	8.45

Element Flows To:

Surface	Interflow	Groundwater

E2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
D,NatVeg,Steep	2.48
C,NatVeg,Flat	0.3
C,NatVeg,Steep	2.38
Pervious Total	5.16

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.16
Impervious Total	0.16
Basin Total	5.32

Element Flows To:

Surface	Interflow	Groundwater

Note: E2 models the undisturbed portion of street that is tributary to the DMA as impervious (DMA 6-3 and 6-U on the DMA Exhibit in Attachment 2). Everything else is modeled as pre-developed.

E3

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
D,NatVeg,Steep	3.19
C,NatVeg,Steep	0.09
C,NatVeg,Flat	0.12
Pervious Total	3.4

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.07
Impervious Total	0.07
Basin Total	3.47

Element Flows To:

Surface	Interflow	Groundwater

Note: E3 models the undisturbed portion of street that is tributary to the DMA as impervious (DMA 8-U on the DMA Exhibit in Attachment 2). Everything else is modeled as pre-developed.

E4

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
D,NatVeg,Steep	0.82
C,NatVeg,Steep	0.48
C,NatVeg,Flat	0.2
Pervious Total	1.5

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.1
Impervious Total	0.1
Basin Total	1.6

Note: E4 models the undisturbed portion of street that is tributary to the DMA as impervious (DMA 7-3 on the DMA Exhibit in Attachment 2). Everything else is modeled as pre-developed.

Element Flows To:

Surface	Interflow	Groundwater

E5

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Steep	3.95
Pervious Total	3.95
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.95

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

DMA 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
D,Urban,Flat	1.47
D,NatVeg,Steep	0.87
Pervious Total	2.34

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.98
IMPERVIOUS-MOD	0.61
Impervious Total	1.59
Basin Total	3.93

Note: For all proposed DMAs, streets are modeled as impervious and either flat or moderate depending on the average grade. Pads are modeled as flat and 40% impervious and 60% pervious urban. Graded slopes are modeled as steep with native vegetation.

See the DMA Exhibit in Attachment 2 for a description of each proposed DMA.

Element Flows To:

Surface	Interflow	Groundwater
Surface BMP 1	Surface BMP 1	

DMA 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
D,Urban,Flat	0.46
C,Urban,Flat	0.46
D,NatVeg,Steep	0.12
C,NatVeg,Steep	0.12
Pervious Total	1.16

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.81
Impervious Total	0.81
Basin Total	1.97

Element Flows To:

Surface	Interflow	Groundwater
Surface BMP 2	Surface BMP 2	

DMA 3a

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
D,NatVeg,Steep	0.49
D,Urban,Flat	0.5
Pervious Total	0.99

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.33
IMPERVIOUS-MOD	0.37
Impervious Total	0.7
Basin Total	1.69

Element Flows To:

Surface	Interflow	Groundwater
Surface BMP 3A	Surface BMP 3A	

DMA 1-SM

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Steep	0.63
Pervious Total	0.63
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.63

Element Flows To:

Surface	Interflow	Groundwater

DMA 1-U

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Steep	5.11
Pervious Total	5.11
Impervious Land Use	acre
Impervious Total	0
Basin Total	5.11

Element Flows To:

Surface	Interflow	Groundwater

DMA 2-SM

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Steep	0.67
Pervious Total	0.67
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.67

Element Flows To:

Surface	Interflow	Groundwater

DMA 2-U

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Steep	0.92
C,NatVeg,Steep	0.92
Pervious Total	1.84
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.84

Element Flows To:

Surface	Interflow	Groundwater

DMA 3-SM

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Steep	0.44
Pervious Total	0.44
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.44

Element Flows To:

Surface	Interflow	Groundwater

DMA 3-U

Bypass:	Yes
GroundWater:	No

Pervious Land Use	acre
C,NatVeg,Steep	0.41
D,NatVeg,Steep	0.41
Pervious Total	0.82

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.82

Element Flows To:

Surface	Interflow	Groundwater

DMA 4-SM

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C,NatVeg,Steep	0.3
Pervious Total	0.3
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.3

Element Flows To:

Surface	Interflow	Groundwater

DMA 4-U

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C,NatVeg,Steep	0.34
Pervious Total	0.34
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.34

Element Flows To:

Surface	Interflow	Groundwater

DMA 5-SM

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Steep	1.26
Pervious Total	1.26
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.26

Element Flows To:

Surface	Interflow	Groundwater

DMA 5-U

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Steep	1.81
Pervious Total	1.81
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.81

Element Flows To:

Surface	Interflow	Groundwater

DMA 6

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C,Urban,Flat	0.08
Pervious Total	0.08

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.22
Impervious Total	0.22
Basin Total	0.3

Element Flows To:

Surface	Interflow	Groundwater
Surface BMP 5	Surface BMP 5	

DMA 6-SM

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C,Urban,Flat	0.06
Pervious Total	0.06
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.06

Element Flows To:

Surface	Interflow	Groundwater

DMA 6-U

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
IMPERVIOUS-FLAT	0.06
Impervious Total	0.06
Basin Total	0.06

Element Flows To:

Surface	Interflow	Groundwater

DMA 6-TS

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
IMPERVIOUS-FLAT	0.04
Impervious Total	0.04
Basin Total	0.04

Element Flows To:

Surface	Interflow	Groundwater

DMA 7

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C,Urban,Flat	0.08
Pervious Total	0.08

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.22
Impervious Total	0.22
Basin Total	0.3

Element Flows To:

Surface	Interflow	Groundwater
Surface BMP 4	Surface BMP 4	

DMA 8-SM

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C,Urban,Flat	0.07
Pervious Total	0.07
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.07

Element Flows To:

Surface	Interflow	Groundwater

DMA 8-U

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
IMPERVIOUS-FLAT	0.07
Impervious Total	0.07
Basin Total	0.07

Element Flows To:

Surface	Interflow	Groundwater

DMA 8-TS

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
IMPERVIOUS-FLAT	0.05
Impervious Total	0.05
Basin Total	0.05

Element Flows To:

Surface	Interflow	Groundwater

DMA 3b

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
D,Urban,Flat	0.38
D,NatVeg,Steep	0.16
Pervious Total	0.54

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.25
IMPERVIOUS-MOD	0.18
Impervious Total	0.43
Basin Total	0.97

Element Flows To:

Surface	Interflow	Groundwater
Surface BMP 3B	Surface BMP 3B	

DMA 3-TS

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
IMPERVIOUS-MOD	0.05
Impervious Total	0.05
Basin Total	0.05

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

BMP 1

Bottom Length:	140.00 ft.
Bottom Width:	61.00 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:	3.25
Material type for third layer:	GRAVEL
Underdrain used	
Underdrain Diameter (feet):	0.67
Orifice Diameter (in.):	1.8
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	80.357
Total Outflow (ac-ft.):	84.138
Percent Through Underdrain:	95.51
Discharge Structure	
Riser Height:	1.5 ft.
Riser Diameter:	26 in.
Element Flows To:	
Outlet 1	Outlet 2

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
718.00	0.1961	0.0000	0.0000	0.0000
718.07	0.1961	0.0043	0.0000	0.0000
718.15	0.1961	0.0086	0.0000	0.0000
718.22	0.1961	0.0129	0.0000	0.0000
718.29	0.1961	0.0172	0.0000	0.0000
718.37	0.1961	0.0216	0.0000	0.0000
718.44	0.1961	0.0259	0.0000	0.0000
718.51	0.1961	0.0302	0.0000	0.0000
718.59	0.1961	0.0345	0.0000	0.0000
718.66	0.1961	0.0388	0.0000	0.0000
718.73	0.1961	0.0431	0.0000	0.0000
718.81	0.1961	0.0474	0.0000	0.0000
718.88	0.1961	0.0517	0.0000	0.0000
718.95	0.1961	0.0560	0.0000	0.0000
719.03	0.1961	0.0604	0.0000	0.0000
719.10	0.1961	0.0647	0.0000	0.0000
719.17	0.1961	0.0690	0.0000	0.0000
719.25	0.1961	0.0733	0.0000	0.0000
719.32	0.1961	0.0776	0.0000	0.0000
719.39	0.1961	0.0819	0.0000	0.0000
719.47	0.1961	0.0862	0.0000	0.0000
719.54	0.1961	0.0905	0.0000	0.0000
719.61	0.1961	0.0948	0.0000	0.0000
719.69	0.1961	0.0992	0.0000	0.0000
719.76	0.1961	0.1051	0.0000	0.0000
719.83	0.1961	0.1111	0.0000	0.0000
719.91	0.1961	0.1170	0.0000	0.0000
719.98	0.1961	0.1230	0.0000	0.0000
720.05	0.1961	0.1290	0.0000	0.0000

720.13	0.1961	0.1349	0.0000	0.0000
720.20	0.1961	0.1409	0.0000	0.0000
720.27	0.1961	0.1469	0.0000	0.0000
720.35	0.1961	0.1528	0.0000	0.0000
720.42	0.1961	0.1588	0.0000	0.0000
720.49	0.1961	0.1648	0.0000	0.0000
720.57	0.1961	0.1707	0.0000	0.0000
720.64	0.1961	0.1767	0.0000	0.0000
720.71	0.1961	0.1826	0.0000	0.0000
720.79	0.1961	0.1886	0.0000	0.0000
720.86	0.1961	0.1946	0.0000	0.0000
720.93	0.1961	0.2005	0.0000	0.0000
721.01	0.1961	0.2065	0.0000	0.0000
721.08	0.1961	0.2125	0.0000	0.0000
721.15	0.1961	0.2184	0.0000	0.0000
721.23	0.1961	0.2244	0.0000	0.0000
721.30	0.1961	0.2303	0.0000	0.0000
721.37	0.1961	0.2363	0.0000	0.0000
721.44	0.1961	0.2423	0.0000	0.0000
721.52	0.1961	0.2482	0.0000	0.0000
721.59	0.1961	0.2542	0.0000	0.0000
721.66	0.1961	0.2602	0.0000	0.0000
721.74	0.1961	0.2661	0.0000	0.0000
721.81	0.1961	0.2721	0.0000	0.0000
721.88	0.1961	0.2781	0.0000	0.0000
721.96	0.1961	0.2840	0.0000	0.0000
722.03	0.1961	0.2900	0.0000	0.0000
722.10	0.1961	0.2959	0.0000	0.0000
722.18	0.1961	0.3019	0.0000	0.0000
722.25	0.1961	0.3079	0.0000	0.0000
722.32	0.1961	0.3138	0.0000	0.0000
722.40	0.1961	0.3198	0.0000	0.0000
722.47	0.1961	0.3258	0.0000	0.0000
722.54	0.1961	0.3317	0.0000	0.0000
722.62	0.1961	0.3377	0.0000	0.0000
722.69	0.1961	0.3437	0.0000	0.0000
722.76	0.1961	0.3496	0.0000	0.0000
722.84	0.1961	0.3556	0.0000	0.0000
722.91	0.1961	0.3615	0.0000	0.0000
722.98	0.1961	0.3675	0.0000	0.0000
723.00	0.1961	0.3688	0.0000	0.0000

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
5.0000	0.1961	0.3688	0.0000	0.9884	0.0000
5.0733	0.1981	0.3832	0.0000	0.9884	0.0000
5.1466	0.2001	0.3978	0.0000	1.2498	0.0000
5.2199	0.2022	0.4126	0.0000	1.2981	0.0000
5.2932	0.2042	0.4275	0.0000	1.3464	0.0000
5.3665	0.2063	0.4425	0.0000	1.3947	0.0000
5.4398	0.2084	0.4577	0.0000	1.4430	0.0000
5.5131	0.2105	0.4731	0.0000	1.4913	0.0000
5.5864	0.2126	0.4886	0.0000	1.5396	0.0000
5.6597	0.2147	0.5042	0.0000	1.5879	0.0000
5.7330	0.2168	0.5200	0.0000	1.6362	0.0000
5.8063	0.2189	0.5360	0.0000	1.6845	0.0000
5.8796	0.2210	0.5521	0.0000	1.7328	0.0000
5.9529	0.2232	0.5684	0.0000	1.7811	0.0000

6.0262	0.2253	0.5849	0.0000	1.8293	0.0000
6.0995	0.2275	0.6014	0.0011	1.8776	0.0000
6.1727	0.2297	0.6182	0.0017	1.9259	0.0000
6.2460	0.2318	0.6351	0.0094	1.9742	0.0000
6.3193	0.2340	0.6522	0.0132	2.0225	0.0000
6.3926	0.2362	0.6694	0.0187	2.0708	0.0000
6.4659	0.2384	0.6868	0.0214	2.1191	0.0000
6.5392	0.2406	0.7044	0.0254	2.1674	0.0000
6.6125	0.2428	0.7221	0.0274	2.2157	0.0000
6.6700	0.2446	0.7361	0.0307	2.2536	0.0000

Surface BMP 1

Element Flows To:

Outlet 1	Outlet 2
	BMP 1

BMP 2

Bottom Length:	80.00 ft.
Bottom Width:	32.00 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:	1.5
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.045
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	10.352
Total Volume Through Riser (ac-ft.):	5.614
Total Volume Through Facility (ac-ft.):	42.695
Percent Infiltrated:	24.25
Total Precip Applied to Facility:	2.431
Total Evap From Facility:	2.12
Underdrain used	
Underdrain Diameter (feet):	0.67
Orifice Diameter (in.):	1.25
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	26.729
Total Outflow (ac-ft.):	42.695
Percent Through Underdrain:	62.6
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	30 in.
Element Flows To:	
Outlet 1	Outlet 2

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
785.00	0.0588	0.0000	0.0000	0.0000
785.05	0.0588	0.0009	0.0000	0.0000
785.10	0.0588	0.0017	0.0000	0.0000
785.15	0.0588	0.0026	0.0000	0.0000
785.19	0.0588	0.0034	0.0000	0.0000
785.24	0.0588	0.0043	0.0000	0.0000
785.29	0.0588	0.0051	0.0000	0.0000
785.34	0.0588	0.0060	0.0027	0.0027
785.39	0.0588	0.0069	0.0027	0.0027
785.44	0.0588	0.0077	0.0027	0.0027
785.49	0.0588	0.0086	0.0027	0.0027
785.53	0.0588	0.0094	0.0027	0.0027
785.58	0.0588	0.0103	0.0027	0.0027
785.63	0.0588	0.0111	0.0027	0.0027
785.68	0.0588	0.0120	0.0027	0.0027
785.73	0.0588	0.0128	0.0027	0.0027
785.78	0.0588	0.0137	0.0027	0.0027
785.83	0.0588	0.0146	0.0027	0.0027
785.87	0.0588	0.0154	0.0027	0.0027
785.92	0.0588	0.0163	0.0027	0.0027
785.97	0.0588	0.0171	0.0027	0.0027
786.02	0.0588	0.0180	0.0027	0.0027

786.07	0.0588	0.0188	0.0027	0.0027
786.12	0.0588	0.0197	0.0027	0.0027
786.17	0.0588	0.0206	0.0027	0.0027
786.21	0.0588	0.0214	0.0027	0.0027
786.26	0.0588	0.0223	0.0027	0.0027
786.31	0.0588	0.0231	0.0027	0.0027
786.36	0.0588	0.0240	0.0027	0.0027
786.41	0.0588	0.0248	0.0027	0.0027
786.46	0.0588	0.0257	0.0027	0.0027
786.51	0.0588	0.0265	0.0027	0.0027
786.55	0.0588	0.0274	0.0027	0.0027
786.60	0.0588	0.0283	0.0027	0.0027
786.65	0.0588	0.0291	0.0027	0.0027
786.70	0.0588	0.0300	0.0027	0.0027
786.75	0.0588	0.0308	0.0027	0.0027
786.80	0.0588	0.0320	0.0027	0.0027
786.85	0.0588	0.0332	0.0027	0.0027
786.89	0.0588	0.0344	0.0027	0.0027
786.94	0.0588	0.0356	0.0027	0.0027
786.99	0.0588	0.0368	0.0027	0.0027
787.04	0.0588	0.0379	0.0027	0.0027
787.09	0.0588	0.0391	0.0027	0.0027
787.14	0.0588	0.0403	0.0027	0.0027
787.19	0.0588	0.0415	0.0027	0.0027
787.23	0.0588	0.0427	0.0027	0.0027
787.28	0.0588	0.0439	0.0027	0.0027
787.33	0.0588	0.0450	0.0027	0.0027
787.38	0.0588	0.0462	0.0027	0.0027
787.43	0.0588	0.0474	0.0027	0.0027
787.48	0.0588	0.0486	0.0027	0.0027
787.53	0.0588	0.0498	0.0027	0.0027
787.57	0.0588	0.0510	0.0027	0.0027
787.62	0.0588	0.0522	0.0027	0.0027
787.67	0.0588	0.0533	0.0027	0.0027
787.72	0.0588	0.0545	0.0027	0.0027
787.77	0.0588	0.0557	0.0027	0.0027
787.82	0.0588	0.0569	0.0027	0.0027
787.87	0.0588	0.0581	0.0027	0.0027
787.91	0.0588	0.0593	0.0027	0.0027
787.96	0.0588	0.0604	0.0027	0.0027
788.01	0.0588	0.0616	0.0027	0.0027
788.06	0.0588	0.0628	0.0027	0.0027
788.11	0.0588	0.0640	0.0027	0.0027
788.16	0.0588	0.0652	0.0027	0.0027
788.21	0.0588	0.0664	0.0027	0.0027
788.25	0.0588	0.0674	0.0027	0.0027

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.2500	0.0588	0.0674	0.0000	0.2963	0.0000
3.2986	0.0595	0.0703	0.0000	0.2963	0.0000
3.3471	0.0603	0.0732	0.0000	0.3649	0.0000
3.3957	0.0610	0.0762	0.0000	0.3745	0.0000
3.4443	0.0618	0.0792	0.0000	0.3841	0.0000
3.4929	0.0626	0.0822	0.0000	0.3937	0.0000
3.5414	0.0633	0.0852	0.0000	0.4032	0.0000
3.5900	0.0641	0.0883	0.0000	0.4128	0.0000
3.6386	0.0649	0.0915	0.0000	0.4224	0.0000

3.6871	0.0657	0.0946	0.0000	0.4320	0.0000
3.7357	0.0665	0.0978	0.0000	0.4416	0.0000
3.7843	0.0672	0.1011	0.0000	0.4512	0.0000
3.8329	0.0680	0.1044	0.0000	0.4608	0.0000
3.8814	0.0688	0.1077	0.0000	0.4704	0.0000
3.9300	0.0696	0.1111	0.0000	0.4800	0.0000
3.9786	0.0704	0.1145	0.0000	0.4896	0.0000
4.0271	0.0713	0.1179	0.0000	0.4992	0.0000
4.0757	0.0721	0.1214	0.0000	0.5088	0.0000
4.1243	0.0729	0.1249	0.0000	0.5184	0.0000
4.1729	0.0737	0.1285	0.0000	0.5280	0.0000
4.2214	0.0745	0.1321	0.0000	0.5376	0.0000
4.2700	0.0754	0.1357	0.0000	0.5472	0.0000
4.3186	0.0762	0.1394	0.0000	0.5568	0.0000
4.3671	0.0770	0.1431	0.0000	0.5663	0.0000
4.4157	0.0779	0.1469	0.0000	0.5759	0.0000
4.4200	0.0780	0.1472	0.0000	0.5768	0.0000

Surface BMP 2

Element Flows To:

Outlet 1	Outlet 2
	BMP 2

BMP 3A

Bottom Length:	100.00 ft.
Bottom Width:	20.00 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:	2
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.09
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	11.574
Total Volume Through Riser (ac-ft.):	5.49
Total Volume Through Facility (ac-ft.):	37.435
Percent Infiltrated:	30.92
Total Precip Applied to Facility:	1.982
Total Evap From Facility:	1.723
Underdrain used	
Underdrain Diameter (feet):	0.67
Orifice Diameter (in.):	1
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	20.371
Total Outflow (ac-ft.):	37.435
Percent Through Underdrain:	54.42
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	25 in.
Element Flows To:	
Outlet 1	Outlet 2

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
792.00	0.0459	0.0000	0.0000	0.0000
792.05	0.0459	0.0007	0.0000	0.0000
792.11	0.0459	0.0015	0.0000	0.0000
792.16	0.0459	0.0022	0.0000	0.0000
792.22	0.0459	0.0030	0.0000	0.0000
792.27	0.0459	0.0037	0.0000	0.0000
792.32	0.0459	0.0045	0.0000	0.0000
792.38	0.0459	0.0052	0.0032	0.0032
792.43	0.0459	0.0060	0.0042	0.0042
792.49	0.0459	0.0067	0.0042	0.0042
792.54	0.0459	0.0074	0.0042	0.0042
792.59	0.0459	0.0082	0.0042	0.0042
792.65	0.0459	0.0089	0.0042	0.0042
792.70	0.0459	0.0097	0.0042	0.0042
792.76	0.0459	0.0104	0.0042	0.0042
792.81	0.0459	0.0112	0.0042	0.0042
792.87	0.0459	0.0119	0.0042	0.0042
792.92	0.0459	0.0127	0.0042	0.0042
792.97	0.0459	0.0134	0.0042	0.0042
793.03	0.0459	0.0141	0.0042	0.0042
793.08	0.0459	0.0149	0.0042	0.0042
793.14	0.0459	0.0156	0.0042	0.0042

793.19	0.0459	0.0164	0.0042	0.0042
793.24	0.0459	0.0171	0.0042	0.0042
793.30	0.0459	0.0179	0.0042	0.0042
793.35	0.0459	0.0186	0.0042	0.0042
793.41	0.0459	0.0194	0.0042	0.0042
793.46	0.0459	0.0201	0.0042	0.0042
793.51	0.0459	0.0209	0.0042	0.0042
793.57	0.0459	0.0216	0.0042	0.0042
793.62	0.0459	0.0223	0.0042	0.0042
793.68	0.0459	0.0231	0.0042	0.0042
793.73	0.0459	0.0238	0.0042	0.0042
793.78	0.0459	0.0249	0.0042	0.0042
793.84	0.0459	0.0259	0.0042	0.0042
793.89	0.0459	0.0269	0.0042	0.0042
793.95	0.0459	0.0280	0.0042	0.0042
794.00	0.0459	0.0290	0.0042	0.0042
794.05	0.0459	0.0300	0.0042	0.0042
794.11	0.0459	0.0310	0.0042	0.0042
794.16	0.0459	0.0321	0.0042	0.0042
794.22	0.0459	0.0331	0.0042	0.0042
794.27	0.0459	0.0341	0.0042	0.0042
794.32	0.0459	0.0352	0.0042	0.0042
794.38	0.0459	0.0362	0.0042	0.0042
794.43	0.0459	0.0372	0.0042	0.0042
794.49	0.0459	0.0383	0.0042	0.0042
794.54	0.0459	0.0393	0.0042	0.0042
794.60	0.0459	0.0403	0.0042	0.0042
794.65	0.0459	0.0413	0.0042	0.0042
794.70	0.0459	0.0424	0.0042	0.0042
794.76	0.0459	0.0434	0.0042	0.0042
794.81	0.0459	0.0444	0.0042	0.0042
794.87	0.0459	0.0455	0.0042	0.0042
794.92	0.0459	0.0465	0.0042	0.0042
794.97	0.0459	0.0475	0.0042	0.0042
795.03	0.0459	0.0486	0.0042	0.0042
795.08	0.0459	0.0496	0.0042	0.0042
795.14	0.0459	0.0506	0.0042	0.0042
795.19	0.0459	0.0516	0.0042	0.0042
795.24	0.0459	0.0527	0.0042	0.0042
795.30	0.0459	0.0537	0.0042	0.0042
795.35	0.0459	0.0547	0.0042	0.0042
795.41	0.0459	0.0558	0.0042	0.0042
795.46	0.0459	0.0568	0.0042	0.0042
795.51	0.0459	0.0578	0.0042	0.0042
795.57	0.0459	0.0589	0.0042	0.0042
795.62	0.0459	0.0599	0.0042	0.0042
795.68	0.0459	0.0609	0.0042	0.0042
795.73	0.0459	0.0619	0.0042	0.0042
795.75	0.0459	0.0623	0.0042	0.0042

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.7500	0.0459	0.0623	0.0000	0.2315	0.0000
3.8041	0.0468	0.0648	0.0000	0.2315	0.0000
3.8581	0.0477	0.0674	0.0000	0.2867	0.0000
3.9122	0.0486	0.0700	0.0000	0.2951	0.0000
3.9663	0.0495	0.0726	0.0000	0.3034	0.0000
4.0203	0.0504	0.0753	0.0000	0.3118	0.0000

4.0744	0.0514	0.0781	0.0000	0.3201	0.0000
4.1285	0.0523	0.0809	0.0000	0.3285	0.0000
4.1825	0.0532	0.0837	0.0000	0.3368	0.0000
4.2366	0.0542	0.0866	0.0000	0.3452	0.0000
4.2907	0.0551	0.0896	0.0000	0.3535	0.0000
4.3447	0.0560	0.0926	0.0000	0.3618	0.0000
4.3988	0.0570	0.0957	0.0000	0.3702	0.0000
4.4529	0.0579	0.0988	0.0000	0.3785	0.0000
4.5069	0.0589	0.1019	0.0000	0.3869	0.0000
4.5610	0.0599	0.1051	0.0000	0.3952	0.0000
4.6151	0.0608	0.1084	0.0000	0.4036	0.0000
4.6691	0.0618	0.1117	0.0000	0.4119	0.0000
4.7232	0.0628	0.1151	0.0000	0.4202	0.0000
4.7773	0.0638	0.1185	0.0000	0.4286	0.0000
4.8313	0.0648	0.1220	0.0000	0.4369	0.0000
4.8854	0.0657	0.1255	0.0000	0.4453	0.0000
4.9200	0.0664	0.1278	0.0000	0.4506	0.0000

Surface BMP 3A

Element Flows To:

Outlet 1	Outlet 2
	BMP 3A

BMP 5

Bottom Length:	350.00 ft.
Bottom Width:	0.50 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:	1.75
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.045
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	1.217
Total Volume Through Riser (ac-ft.):	0.994
Total Volume Through Facility (ac-ft.):	10.927
Percent Infiltrated:	11.14
Total Precip Applied to Facility:	3.45
Total Evap From Facility:	1.435
Underdrain used	
Underdrain Diameter (feet):	0.67
Orifice Diameter (in.):	0.365
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	8.716
Total Outflow (ac-ft.):	10.927
Percent Through Underdrain:	79.77
Discharge Structure	
Riser Height:	0.5 ft.
Riser Diameter:	8 in.
Element Flows To:	
Outlet 1	Outlet 2

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
781.00	0.1212	0.0000	0.0000	0.0000
781.05	0.1206	0.0000	0.0000	0.0000
781.09	0.1190	0.0001	0.0000	0.0000
781.14	0.1174	0.0001	0.0000	0.0000
781.18	0.1158	0.0002	0.0000	0.0000
781.23	0.1142	0.0003	0.0000	0.0000
781.27	0.1126	0.0003	0.0000	0.0000
781.32	0.1110	0.0004	0.0000	0.0000
781.37	0.1095	0.0005	0.0000	0.0000
781.41	0.1079	0.0007	0.0002	0.0002
781.46	0.1063	0.0008	0.0002	0.0002
781.50	0.1047	0.0009	0.0002	0.0002
781.55	0.1031	0.0011	0.0002	0.0002
781.60	0.1016	0.0012	0.0002	0.0002
781.64	0.1000	0.0014	0.0002	0.0002
781.69	0.0984	0.0016	0.0002	0.0002
781.73	0.0969	0.0017	0.0002	0.0002
781.78	0.0953	0.0019	0.0002	0.0002
781.82	0.0937	0.0021	0.0002	0.0002
781.87	0.0922	0.0024	0.0002	0.0002
781.92	0.0906	0.0026	0.0002	0.0002
781.96	0.0890	0.0028	0.0002	0.0002

782.01	0.0875	0.0031	0.0002	0.0002
782.05	0.0859	0.0033	0.0002	0.0002
782.10	0.0844	0.0036	0.0002	0.0002
782.15	0.0828	0.0039	0.0002	0.0002
782.19	0.0812	0.0042	0.0002	0.0002
782.24	0.0797	0.0045	0.0002	0.0002
782.28	0.0781	0.0048	0.0002	0.0002
782.33	0.0766	0.0051	0.0002	0.0002
782.37	0.0750	0.0054	0.0002	0.0002
782.42	0.0735	0.0058	0.0002	0.0002
782.47	0.0719	0.0061	0.0002	0.0002
782.51	0.0704	0.0065	0.0002	0.0002
782.56	0.0689	0.0069	0.0002	0.0002
782.60	0.0673	0.0073	0.0002	0.0002
782.65	0.0658	0.0076	0.0002	0.0002
782.70	0.0642	0.0081	0.0002	0.0002
782.74	0.0627	0.0085	0.0002	0.0002
782.79	0.0612	0.0091	0.0002	0.0002
782.83	0.0596	0.0097	0.0002	0.0002
782.88	0.0581	0.0103	0.0002	0.0002
782.92	0.0566	0.0109	0.0002	0.0002
782.97	0.0551	0.0116	0.0002	0.0002
783.02	0.0535	0.0122	0.0002	0.0002
783.06	0.0520	0.0129	0.0002	0.0002
783.11	0.0505	0.0136	0.0002	0.0002
783.15	0.0490	0.0143	0.0002	0.0002
783.20	0.0474	0.0150	0.0002	0.0002
783.25	0.0459	0.0157	0.0002	0.0002
783.29	0.0444	0.0165	0.0002	0.0002
783.34	0.0429	0.0173	0.0002	0.0002
783.38	0.0414	0.0180	0.0002	0.0002
783.43	0.0399	0.0188	0.0002	0.0002
783.47	0.0383	0.0196	0.0002	0.0002
783.52	0.0368	0.0205	0.0002	0.0002
783.57	0.0353	0.0213	0.0002	0.0002
783.61	0.0338	0.0222	0.0002	0.0002
783.66	0.0323	0.0230	0.0002	0.0002
783.70	0.0308	0.0239	0.0002	0.0002
783.75	0.0293	0.0248	0.0002	0.0002
783.80	0.0278	0.0257	0.0002	0.0002
783.84	0.0263	0.0267	0.0002	0.0002
783.89	0.0248	0.0276	0.0002	0.0002
783.93	0.0233	0.0286	0.0002	0.0002
783.98	0.0218	0.0295	0.0002	0.0002
784.02	0.0203	0.0305	0.0002	0.0002
784.07	0.0188	0.0315	0.0002	0.0002
784.12	0.0174	0.0325	0.0002	0.0002
784.16	0.0159	0.0336	0.0002	0.0002
784.21	0.0144	0.0346	0.0002	0.0002
784.25	0.0129	0.0357	0.0002	0.0002
784.30	0.0114	0.0368	0.0002	0.0002
784.35	0.0099	0.0379	0.0002	0.0002
784.39	0.0084	0.0390	0.0002	0.0002
784.44	0.0070	0.0401	0.0002	0.0002
784.48	0.0055	0.0412	0.0002	0.0002
784.50	0.0040	0.0417	0.0002	0.0002

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.5000	0.1212	0.0417	0.0000	0.0203	0.0000
3.5458	0.1228	0.0473	0.0000	0.0203	0.0000
3.5916	0.1244	0.0529	0.0000	0.0249	0.0000
3.6375	0.1260	0.0587	0.0000	0.0255	0.0000
3.6833	0.1275	0.0645	0.0000	0.0261	0.0000
3.7291	0.1291	0.0703	0.0000	0.0267	0.0000
3.7749	0.1308	0.0763	0.0000	0.0273	0.0000
3.8208	0.1324	0.0823	0.0000	0.0280	0.0000
3.8666	0.1340	0.0884	0.0000	0.0286	0.0000
3.9124	0.1356	0.0946	0.0000	0.0292	0.0000
3.9582	0.1372	0.1009	0.0000	0.0298	0.0000
4.0041	0.1388	0.1072	0.0000	0.0304	0.0000
4.0499	0.1404	0.1136	0.0000	0.0311	0.0000
4.0957	0.1420	0.1200	0.0000	0.0317	0.0000
4.1415	0.1436	0.1266	0.0000	0.0323	0.0000
4.1700	0.1446	0.1307	0.0000	0.0327	0.0000

Surface BMP 5

Element Flows To:

Outlet 1	Outlet 2
	BMP 5

BMP 4

Bottom Length:	350.00 ft.
Bottom Width:	0.50 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:	1.75
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.09
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	2.053
Total Volume Through Riser (ac-ft.):	0.965
Total Volume Through Facility (ac-ft.):	11.078
Percent Infiltrated:	18.53
Total Precip Applied to Facility:	3.44
Total Evap From Facility:	1.277
Underdrain used	
Underdrain Diameter (feet):	0.67
Orifice Diameter (in.):	0.365
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	8.06
Total Outflow (ac-ft.):	11.078
Percent Through Underdrain:	72.76
Discharge Structure	
Riser Height:	0.5 ft.
Riser Diameter:	8 in.
Element Flows To:	
Outlet 1	Outlet 2

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
788.00	0.1212	0.0000	0.0000	0.0000
788.05	0.1206	0.0000	0.0000	0.0000
788.09	0.1190	0.0001	0.0000	0.0000
788.14	0.1174	0.0001	0.0000	0.0000
788.18	0.1158	0.0002	0.0000	0.0000
788.23	0.1142	0.0003	0.0000	0.0000
788.27	0.1126	0.0003	0.0000	0.0000
788.32	0.1110	0.0004	0.0000	0.0000
788.37	0.1095	0.0005	0.0000	0.0000
788.41	0.1079	0.0007	0.0003	0.0003
788.46	0.1063	0.0008	0.0004	0.0004
788.50	0.1047	0.0009	0.0004	0.0004
788.55	0.1031	0.0011	0.0004	0.0004
788.60	0.1016	0.0012	0.0004	0.0004
788.64	0.1000	0.0014	0.0004	0.0004
788.69	0.0984	0.0016	0.0004	0.0004
788.73	0.0969	0.0017	0.0004	0.0004
788.78	0.0953	0.0019	0.0004	0.0004
788.82	0.0937	0.0021	0.0004	0.0004
788.87	0.0922	0.0024	0.0004	0.0004
788.92	0.0906	0.0026	0.0004	0.0004
788.96	0.0890	0.0028	0.0004	0.0004

789.01	0.0875	0.0031	0.0004	0.0004
789.05	0.0859	0.0033	0.0004	0.0004
789.10	0.0844	0.0036	0.0004	0.0004
789.15	0.0828	0.0039	0.0004	0.0004
789.19	0.0812	0.0042	0.0004	0.0004
789.24	0.0797	0.0045	0.0004	0.0004
789.28	0.0781	0.0048	0.0004	0.0004
789.33	0.0766	0.0051	0.0004	0.0004
789.37	0.0750	0.0054	0.0004	0.0004
789.42	0.0735	0.0058	0.0004	0.0004
789.47	0.0719	0.0061	0.0004	0.0004
789.51	0.0704	0.0065	0.0004	0.0004
789.56	0.0689	0.0069	0.0004	0.0004
789.60	0.0673	0.0073	0.0004	0.0004
789.65	0.0658	0.0076	0.0004	0.0004
789.70	0.0642	0.0081	0.0004	0.0004
789.74	0.0627	0.0085	0.0004	0.0004
789.79	0.0612	0.0091	0.0004	0.0004
789.83	0.0596	0.0097	0.0004	0.0004
789.88	0.0581	0.0103	0.0004	0.0004
789.92	0.0566	0.0109	0.0004	0.0004
789.97	0.0551	0.0116	0.0004	0.0004
790.02	0.0535	0.0122	0.0004	0.0004
790.06	0.0520	0.0129	0.0004	0.0004
790.11	0.0505	0.0136	0.0004	0.0004
790.15	0.0490	0.0143	0.0004	0.0004
790.20	0.0474	0.0150	0.0004	0.0004
790.25	0.0459	0.0157	0.0004	0.0004
790.29	0.0444	0.0165	0.0004	0.0004
790.34	0.0429	0.0173	0.0004	0.0004
790.38	0.0414	0.0180	0.0004	0.0004
790.43	0.0399	0.0188	0.0004	0.0004
790.47	0.0383	0.0196	0.0004	0.0004
790.52	0.0368	0.0205	0.0004	0.0004
790.57	0.0353	0.0213	0.0004	0.0004
790.61	0.0338	0.0222	0.0004	0.0004
790.66	0.0323	0.0230	0.0004	0.0004
790.70	0.0308	0.0239	0.0004	0.0004
790.75	0.0293	0.0248	0.0004	0.0004
790.80	0.0278	0.0257	0.0004	0.0004
790.84	0.0263	0.0267	0.0004	0.0004
790.89	0.0248	0.0276	0.0004	0.0004
790.93	0.0233	0.0286	0.0004	0.0004
790.98	0.0218	0.0295	0.0004	0.0004
791.02	0.0203	0.0305	0.0004	0.0004
791.07	0.0188	0.0315	0.0004	0.0004
791.12	0.0174	0.0325	0.0004	0.0004
791.16	0.0159	0.0336	0.0004	0.0004
791.21	0.0144	0.0346	0.0004	0.0004
791.25	0.0129	0.0357	0.0004	0.0004
791.30	0.0114	0.0368	0.0004	0.0004
791.35	0.0099	0.0379	0.0004	0.0004
791.39	0.0084	0.0390	0.0004	0.0004
791.44	0.0070	0.0401	0.0004	0.0004
791.48	0.0055	0.0412	0.0004	0.0004
791.50	0.0040	0.0417	0.0004	0.0004

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.5000	0.1212	0.0417	0.0000	0.0203	0.0000
3.5458	0.1228	0.0473	0.0000	0.0203	0.0000
3.5916	0.1244	0.0529	0.0000	0.0249	0.0000
3.6375	0.1260	0.0587	0.0000	0.0255	0.0000
3.6833	0.1275	0.0645	0.0000	0.0261	0.0000
3.7291	0.1291	0.0703	0.0000	0.0267	0.0000
3.7749	0.1308	0.0763	0.0000	0.0273	0.0000
3.8208	0.1324	0.0823	0.0000	0.0280	0.0000
3.8666	0.1340	0.0884	0.0000	0.0286	0.0000
3.9124	0.1356	0.0946	0.0000	0.0292	0.0000
3.9582	0.1372	0.1009	0.0000	0.0298	0.0000
4.0041	0.1388	0.1072	0.0000	0.0304	0.0000
4.0499	0.1404	0.1136	0.0000	0.0311	0.0000
4.0957	0.1420	0.1200	0.0000	0.0317	0.0000
4.1415	0.1436	0.1266	0.0000	0.0323	0.0000
4.1700	0.1446	0.1307	0.0000	0.0327	0.0000

Surface BMP 4

Element Flows To:

Outlet 1	Outlet 2
	BMP 4

BMP 3B

Bottom Length:	50.00 ft.
Bottom Width:	20.00 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:	2
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.09
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	6.116
Total Volume Through Riser (ac-ft.):	3.633
Total Volume Through Facility (ac-ft.):	22.356
Percent Infiltrated:	27.36
Total Precip Applied to Facility:	1.013
Total Evap From Facility:	0.896
Underdrain used	
Underdrain Diameter (feet):	0.67
Orifice Diameter (in.):	0.75
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	12.607
Total Outflow (ac-ft.):	22.356
Percent Through Underdrain:	56.39
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	25 in.
Element Flows To:	
Outlet 1	Outlet 2

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
792.00	0.0230	0.0000	0.0000	0.0000
792.05	0.0230	0.0004	0.0000	0.0000
792.11	0.0230	0.0007	0.0000	0.0000
792.16	0.0230	0.0011	0.0000	0.0000
792.22	0.0230	0.0015	0.0000	0.0000
792.27	0.0230	0.0019	0.0000	0.0000
792.32	0.0230	0.0022	0.0000	0.0000
792.38	0.0230	0.0026	0.0016	0.0016
792.43	0.0230	0.0030	0.0021	0.0021
792.49	0.0230	0.0034	0.0021	0.0021
792.54	0.0230	0.0037	0.0021	0.0021
792.59	0.0230	0.0041	0.0021	0.0021
792.65	0.0230	0.0045	0.0021	0.0021
792.70	0.0230	0.0048	0.0021	0.0021
792.76	0.0230	0.0052	0.0021	0.0021
792.81	0.0230	0.0056	0.0021	0.0021
792.87	0.0230	0.0060	0.0021	0.0021
792.92	0.0230	0.0063	0.0021	0.0021
792.97	0.0230	0.0067	0.0021	0.0021
793.03	0.0230	0.0071	0.0021	0.0021
793.08	0.0230	0.0074	0.0021	0.0021
793.14	0.0230	0.0078	0.0021	0.0021

793.19	0.0230	0.0082	0.0021	0.0021
793.24	0.0230	0.0086	0.0021	0.0021
793.30	0.0230	0.0089	0.0021	0.0021
793.35	0.0230	0.0093	0.0021	0.0021
793.41	0.0230	0.0097	0.0021	0.0021
793.46	0.0230	0.0101	0.0021	0.0021
793.51	0.0230	0.0104	0.0021	0.0021
793.57	0.0230	0.0108	0.0021	0.0021
793.62	0.0230	0.0112	0.0021	0.0021
793.68	0.0230	0.0115	0.0021	0.0021
793.73	0.0230	0.0119	0.0021	0.0021
793.78	0.0230	0.0124	0.0021	0.0021
793.84	0.0230	0.0129	0.0021	0.0021
793.89	0.0230	0.0135	0.0021	0.0021
793.95	0.0230	0.0140	0.0021	0.0021
794.00	0.0230	0.0145	0.0021	0.0021
794.05	0.0230	0.0150	0.0021	0.0021
794.11	0.0230	0.0155	0.0021	0.0021
794.16	0.0230	0.0160	0.0021	0.0021
794.22	0.0230	0.0166	0.0021	0.0021
794.27	0.0230	0.0171	0.0021	0.0021
794.32	0.0230	0.0176	0.0021	0.0021
794.38	0.0230	0.0181	0.0021	0.0021
794.43	0.0230	0.0186	0.0021	0.0021
794.49	0.0230	0.0191	0.0021	0.0021
794.54	0.0230	0.0196	0.0021	0.0021
794.60	0.0230	0.0202	0.0021	0.0021
794.65	0.0230	0.0207	0.0021	0.0021
794.70	0.0230	0.0212	0.0021	0.0021
794.76	0.0230	0.0217	0.0021	0.0021
794.81	0.0230	0.0222	0.0021	0.0021
794.87	0.0230	0.0227	0.0021	0.0021
794.92	0.0230	0.0232	0.0021	0.0021
794.97	0.0230	0.0238	0.0021	0.0021
795.03	0.0230	0.0243	0.0021	0.0021
795.08	0.0230	0.0248	0.0021	0.0021
795.14	0.0230	0.0253	0.0021	0.0021
795.19	0.0230	0.0258	0.0021	0.0021
795.24	0.0230	0.0263	0.0021	0.0021
795.30	0.0230	0.0269	0.0021	0.0021
795.35	0.0230	0.0274	0.0021	0.0021
795.41	0.0230	0.0279	0.0021	0.0021
795.46	0.0230	0.0284	0.0021	0.0021
795.51	0.0230	0.0289	0.0021	0.0021
795.57	0.0230	0.0294	0.0021	0.0021
795.62	0.0230	0.0299	0.0021	0.0021
795.68	0.0230	0.0305	0.0021	0.0021
795.73	0.0230	0.0310	0.0021	0.0021
795.75	0.0230	0.0312	0.0021	0.0021

Biofilter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.7500	0.0230	0.0312	0.0000	0.1157	0.0000
3.8041	0.0235	0.0324	0.0000	0.1157	0.0000
3.8581	0.0240	0.0337	0.0000	0.1434	0.0000
3.9122	0.0245	0.0350	0.0000	0.1475	0.0000
3.9663	0.0251	0.0364	0.0000	0.1517	0.0000
4.0203	0.0256	0.0377	0.0000	0.1559	0.0000

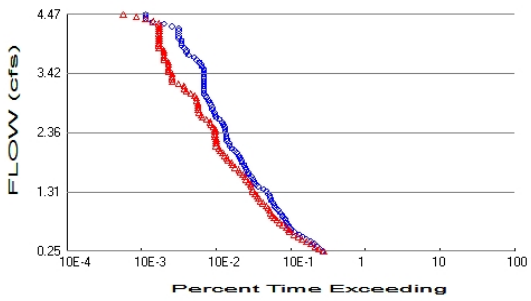
4.0744	0.0262	0.0391	0.0000	0.1601	0.0000
4.1285	0.0267	0.0406	0.0000	0.1642	0.0000
4.1825	0.0273	0.0420	0.0000	0.1684	0.0000
4.2366	0.0278	0.0435	0.0000	0.1726	0.0000
4.2907	0.0284	0.0450	0.0000	0.1767	0.0000
4.3447	0.0290	0.0466	0.0000	0.1809	0.0000
4.3988	0.0296	0.0482	0.0000	0.1851	0.0000
4.4529	0.0301	0.0498	0.0000	0.1893	0.0000
4.5069	0.0307	0.0514	0.0000	0.1934	0.0000
4.5610	0.0313	0.0531	0.0000	0.1976	0.0000
4.6151	0.0319	0.0548	0.0000	0.2018	0.0000
4.6691	0.0325	0.0565	0.0000	0.2060	0.0000
4.7232	0.0331	0.0583	0.0000	0.2101	0.0000
4.7773	0.0337	0.0601	0.0000	0.2143	0.0000
4.8313	0.0343	0.0620	0.0000	0.2185	0.0000
4.8854	0.0350	0.0638	0.0000	0.2226	0.0000
4.9200	0.0354	0.0651	0.0000	0.2253	0.0000

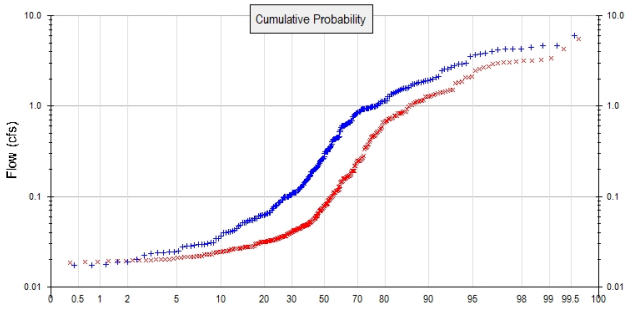
Surface BMP 3B

Element Flows To:

Outlet 1	Outlet 2
	BMP 3B

Analysis Results
POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 8.45
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 8.08
Total Impervious Area: 1.59

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	2.513848
5 year	4.186647
10 year	4.471466
25 year	5.014756

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	1.821215
5 year	3.043805
10 year	3.253378
25 year	4.564098

Duration Flows

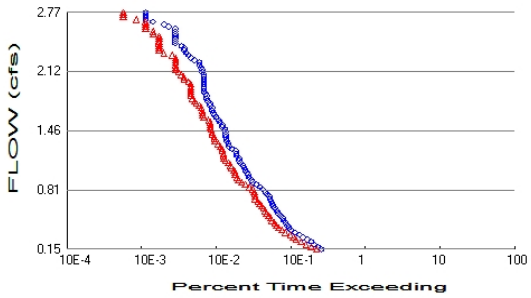
The Facility PASSED

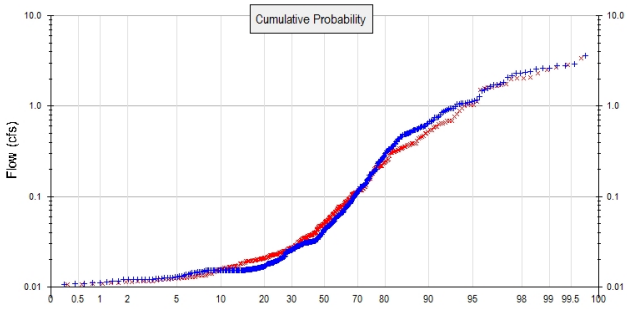
Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2514	930	967	103	Pass
0.2940	858	830	96	Pass
0.3366	789	740	93	Pass
0.3793	716	650	90	Pass
0.4219	647	569	87	Pass
0.4645	567	498	87	Pass
0.5071	499	439	87	Pass
0.5498	451	383	84	Pass
0.5924	390	336	86	Pass
0.6350	356	330	92	Pass
0.6777	339	305	89	Pass
0.7203	323	276	85	Pass
0.7629	309	248	80	Pass
0.8055	297	229	77	Pass
0.8482	283	211	74	Pass
0.8908	270	197	72	Pass
0.9334	253	187	73	Pass
0.9760	240	181	75	Pass
1.0187	223	174	78	Pass
1.0613	212	164	77	Pass
1.1039	204	148	72	Pass
1.1466	193	136	70	Pass
1.1892	186	130	69	Pass
1.2318	183	124	67	Pass
1.2744	174	118	67	Pass
1.3171	166	110	66	Pass
1.3597	153	107	69	Pass
1.4023	129	104	80	Pass
1.4449	119	101	84	Pass
1.4876	114	94	82	Pass
1.5302	109	89	81	Pass
1.5728	104	85	81	Pass
1.6155	95	79	83	Pass
1.6581	93	73	78	Pass
1.7007	89	71	79	Pass
1.7433	86	63	73	Pass
1.7860	83	58	69	Pass
1.8286	78	56	71	Pass
1.8712	77	50	64	Pass
1.9138	74	49	66	Pass
1.9565	71	45	63	Pass
1.9991	67	43	64	Pass
2.0417	62	40	64	Pass
2.0843	57	38	66	Pass
2.1270	53	35	66	Pass
2.1696	52	35	67	Pass
2.2122	49	35	71	Pass
2.2549	49	35	71	Pass
2.2975	48	34	70	Pass
2.3401	48	34	70	Pass
2.3827	46	34	73	Pass
2.4254	46	34	73	Pass
2.4680	45	32	71	Pass

2.5106	44	30	68	Pass
2.5532	42	29	69	Pass
2.5959	39	26	66	Pass
2.6385	35	23	65	Pass
2.6811	34	22	64	Pass
2.7238	33	21	63	Pass
2.7664	31	20	64	Pass
2.8090	31	20	64	Pass
2.8516	30	20	66	Pass
2.8943	29	20	68	Pass
2.9369	28	19	67	Pass
2.9795	26	19	73	Pass
3.0221	25	18	72	Pass
3.0648	24	16	66	Pass
3.1074	24	14	58	Pass
3.1500	24	13	54	Pass
3.1927	24	13	54	Pass
3.2353	24	11	45	Pass
3.2779	24	9	37	Pass
3.3205	24	9	37	Pass
3.3632	24	9	37	Pass
3.4058	24	9	37	Pass
3.4484	24	8	33	Pass
3.4910	24	8	33	Pass
3.5337	23	8	34	Pass
3.5763	22	8	36	Pass
3.6189	21	8	38	Pass
3.6616	19	7	36	Pass
3.7042	18	7	38	Pass
3.7468	15	7	46	Pass
3.7894	14	7	50	Pass
3.8321	14	7	50	Pass
3.8747	13	6	46	Pass
3.9173	12	6	50	Pass
3.9599	12	6	50	Pass
4.0026	12	6	50	Pass
4.0452	11	6	54	Pass
4.0878	11	6	54	Pass
4.1304	11	6	54	Pass
4.1731	11	6	54	Pass
4.2157	11	6	54	Pass
4.2583	9	6	66	Pass
4.3010	7	6	85	Pass
4.3436	5	5	100	Pass
4.3862	4	4	100	Pass
4.4288	4	3	75	Pass
4.4715	4	2	50	Pass

Water Quality

POC 2





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #2
Total Pervious Area: 5.16
Total Impervious Area: 0.16

Mitigated Landuse Totals for POC #2
Total Pervious Area: 3.81
Total Impervious Area: 1.13

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	**Flow(cfs)**
2 year	1.495843
5 year	2.399788
10 year	2.771829
25 year	3.089906

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	**Flow(cfs)**
2 year	1.015874
5 year	2.016835
10 year	2.496937
25 year	2.95896

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1496	898	775	86	Pass
0.1761	816	659	80	Pass
0.2026	727	565	77	Pass
0.2290	657	479	72	Pass
0.2555	582	414	71	Pass
0.2820	508	379	74	Pass
0.3085	458	346	75	Pass
0.3350	397	296	74	Pass
0.3615	351	266	75	Pass
0.3880	332	241	72	Pass
0.4145	313	224	71	Pass
0.4409	299	213	71	Pass
0.4674	281	197	70	Pass
0.4939	273	188	68	Pass
0.5204	255	177	69	Pass
0.5469	241	165	68	Pass
0.5734	228	159	69	Pass
0.5999	216	151	69	Pass
0.6264	205	143	69	Pass
0.6528	198	135	68	Pass
0.6793	191	128	67	Pass
0.7058	185	118	63	Pass
0.7323	179	116	64	Pass
0.7588	167	115	68	Pass
0.7853	161	113	70	Pass
0.8118	148	109	73	Pass
0.8383	137	98	71	Pass
0.8647	121	86	71	Pass
0.8912	108	77	71	Pass
0.9177	103	70	67	Pass
0.9442	98	67	68	Pass
0.9707	93	62	66	Pass
0.9972	90	62	68	Pass
1.0237	86	61	70	Pass
1.0502	83	56	67	Pass
1.0766	80	55	68	Pass
1.1031	73	51	69	Pass
1.1296	72	47	65	Pass
1.1561	71	44	61	Pass
1.1826	67	44	65	Pass
1.2091	65	44	67	Pass
1.2356	64	42	65	Pass
1.2621	57	42	73	Pass
1.2885	52	40	76	Pass
1.3150	51	37	72	Pass
1.3415	49	34	69	Pass
1.3680	48	33	68	Pass
1.3945	47	33	70	Pass
1.4210	47	31	65	Pass
1.4475	47	31	65	Pass
1.4740	46	30	65	Pass
1.5004	42	29	69	Pass
1.5269	42	29	69	Pass

1.5534	40	29	72	Pass
1.5799	38	28	73	Pass
1.6064	35	24	68	Pass
1.6329	33	23	69	Pass
1.6594	32	23	71	Pass
1.6858	31	23	74	Pass
1.7123	31	22	70	Pass
1.7388	29	21	72	Pass
1.7653	29	19	65	Pass
1.7918	27	18	66	Pass
1.8183	26	17	65	Pass
1.8448	26	16	61	Pass
1.8713	25	16	64	Pass
1.8977	24	16	66	Pass
1.9242	24	16	66	Pass
1.9507	24	16	66	Pass
1.9772	24	16	66	Pass
2.0037	24	15	62	Pass
2.0302	24	13	54	Pass
2.0567	24	13	54	Pass
2.0832	24	12	50	Pass
2.1096	23	11	47	Pass
2.1361	23	10	43	Pass
2.1626	22	10	45	Pass
2.1891	21	10	47	Pass
2.2156	21	10	47	Pass
2.2421	18	10	55	Pass
2.2686	16	10	62	Pass
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2.3745	13	6	46	Pass
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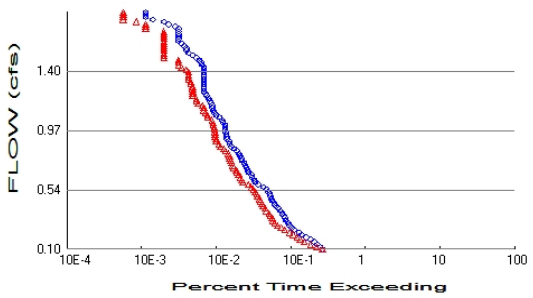
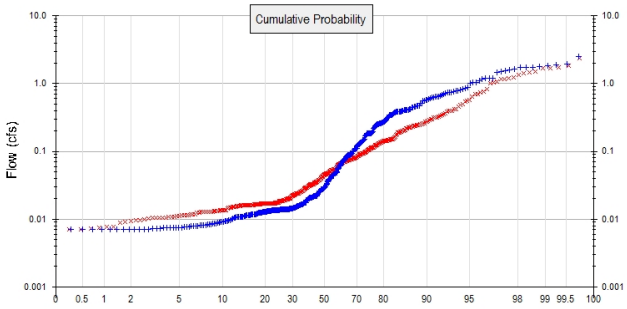
2.4275	10	6	60	Pass
2.4540	10	6	60	Pass
2.4805	10	6	60	Pass
2.5070	10	6	60	Pass
2.5334	10	5	50	Pass
2.5599	10	5	50	Pass
2.5864	10	4	40	Pass
2.6129	8	4	50	Pass
2.6394	7	4	57	Pass
2.6659	5	4	80	Pass
2.6924	4	3	75	Pass
2.7189	4	2	50	Pass
2.7453	4	2	50	Pass
2.7718	4	2	50	Pass

Water Quality

POC 3





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #3
Total Pervious Area: 3.4
Total Impervious Area: 0.07

Mitigated Landuse Totals for POC #3
Total Pervious Area: 2.86
Total Impervious Area: 1.3

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #3

Return Period	**Flow(cfs)**
2 year	1.03273
5 year	1.702335
10 year	1.835929
25 year	2.055092

Flow Frequency Return Periods for Mitigated. POC #3

Return Period	**Flow(cfs)**
2 year	0.698682
5 year	1.400687
10 year	1.706139
25 year	1.964373

Duration Flows

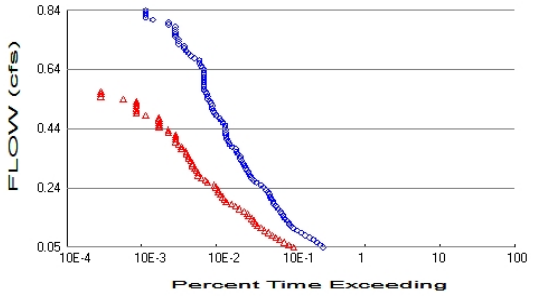
The Facility PASSED

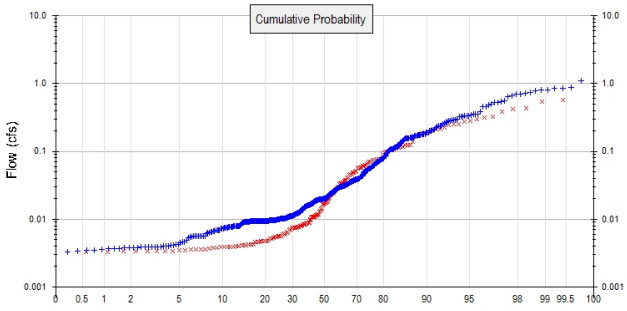
Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1033	938	931	99	Pass
0.1208	867	776	89	Pass
0.1383	798	643	80	Pass
0.1558	726	529	72	Pass
0.1733	648	469	72	Pass
0.1908	571	428	74	Pass
0.2083	498	380	76	Pass
0.2258	454	337	74	Pass
0.2433	391	293	74	Pass
0.2608	357	261	73	Pass
0.2783	339	233	68	Pass
0.2958	322	214	66	Pass
0.3133	307	201	65	Pass
0.3308	296	197	66	Pass
0.3483	282	186	65	Pass
0.3658	269	179	66	Pass
0.3833	254	165	64	Pass
0.4008	241	158	65	Pass
0.4183	222	148	66	Pass
0.4358	211	143	67	Pass
0.4533	201	139	69	Pass
0.4708	192	133	69	Pass
0.4883	186	126	67	Pass
0.5058	183	123	67	Pass
0.5233	173	117	67	Pass
0.5408	166	111	66	Pass
0.5583	151	103	68	Pass
0.5758	128	94	73	Pass
0.5933	118	80	67	Pass
0.6108	114	77	67	Pass
0.6283	106	74	69	Pass
0.6458	104	69	66	Pass
0.6633	95	66	69	Pass
0.6808	92	65	70	Pass
0.6983	89	61	68	Pass
0.7158	86	59	68	Pass
0.7333	83	56	67	Pass
0.7508	78	55	70	Pass
0.7683	76	53	69	Pass
0.7858	73	53	72	Pass
0.8033	71	51	71	Pass
0.8208	66	47	71	Pass
0.8383	61	44	72	Pass
0.8558	56	40	71	Pass
0.8733	53	38	71	Pass
0.8908	52	35	67	Pass
0.9083	49	35	71	Pass
0.9258	49	34	69	Pass
0.9433	48	34	70	Pass
0.9609	47	34	72	Pass
0.9784	46	33	71	Pass
0.9959	46	33	71	Pass
1.0134	46	32	69	Pass

1.0309	43	32	74	Pass
1.0484	42	31	73	Pass
1.0659	39	27	69	Pass
1.0834	35	27	77	Pass
1.1009	33	25	75	Pass
1.1184	32	24	75	Pass
1.1359	31	24	77	Pass
1.1534	31	23	74	Pass
1.1709	30	20	66	Pass
1.1884	29	19	65	Pass
1.2059	28	19	67	Pass
1.2234	26	17	65	Pass
1.2409	25	17	68	Pass
1.2584	24	17	70	Pass
1.2759	24	17	70	Pass
1.2934	24	17	70	Pass
1.3109	24	16	66	Pass
1.3284	24	16	66	Pass
1.3459	24	15	62	Pass
1.3634	24	15	62	Pass
1.3809	24	15	62	Pass
1.3984	24	15	62	Pass
1.4159	24	14	58	Pass
1.4334	24	12	50	Pass
1.4509	23	11	47	Pass
1.4684	22	11	50	Pass
1.4859	21	11	52	Pass
1.5034	19	7	36	Pass
1.5209	17	7	41	Pass
1.5384	15	7	46	Pass
1.5559	14	7	50	Pass
1.5734	14	7	50	Pass
1.5909	13	7	53	Pass
1.6084	12	7	58	Pass
1.6259	11	7	63	Pass
1.6434	11	7	63	Pass
1.6609	11	7	63	Pass
1.6784	11	7	63	Pass
1.6959	11	7	63	Pass
1.7134	11	4	36	Pass
1.7309	10	4	40	Pass
1.7484	8	4	50	Pass
1.7659	7	3	42	Pass
1.7834	5	2	40	Pass
1.8009	4	2	50	Pass
1.8184	4	2	50	Pass
1.8359	4	2	50	Pass

Water Quality

POC 4





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #4
Total Pervious Area: 1.5
Total Impervious Area: 0.1

Mitigated Landuse Totals for POC #4
Total Pervious Area: 0.72
Total Impervious Area: 0.22

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #4

Return Period	**Flow(cfs)**
2 year	0.457935
5 year	0.73801
10 year	0.838593
25 year	0.932947

Flow Frequency Return Periods for Mitigated. POC #4

Return Period	**Flow(cfs)**
2 year	0.179701
5 year	0.295787
10 year	0.420151
25 year	0.545236

Duration Flows

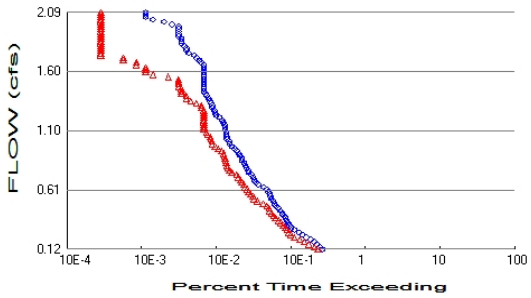
The Facility PASSED

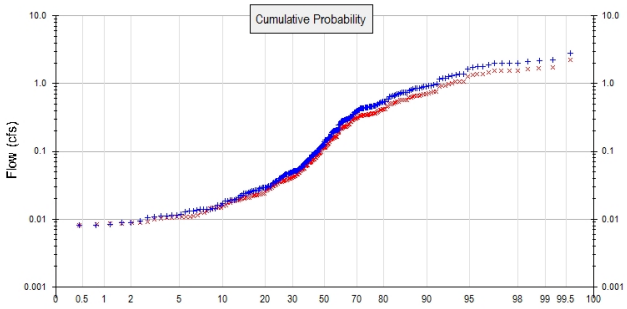
Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0458	949	386	40	Pass
0.0538	870	331	38	Pass
0.0618	787	288	36	Pass
0.0698	706	249	35	Pass
0.0778	624	222	35	Pass
0.0858	546	198	36	Pass
0.0938	484	177	36	Pass
0.1019	431	156	36	Pass
0.1099	372	139	37	Pass
0.1179	348	125	35	Pass
0.1259	332	117	35	Pass
0.1339	313	112	35	Pass
0.1419	296	106	35	Pass
0.1499	280	96	34	Pass
0.1579	266	92	34	Pass
0.1659	253	83	32	Pass
0.1739	238	72	30	Pass
0.1819	224	64	28	Pass
0.1899	210	56	26	Pass
0.1979	203	48	23	Pass
0.2060	194	45	23	Pass
0.2140	188	43	22	Pass
0.2220	182	40	21	Pass
0.2300	173	37	21	Pass
0.2380	162	37	22	Pass
0.2460	153	35	22	Pass
0.2540	139	33	23	Pass
0.2620	122	27	22	Pass
0.2700	112	25	22	Pass
0.2780	105	22	20	Pass
0.2860	100	20	20	Pass
0.2940	95	20	21	Pass
0.3021	90	19	21	Pass
0.3101	87	18	20	Pass
0.3181	84	17	20	Pass
0.3261	82	17	20	Pass
0.3341	76	16	21	Pass
0.3421	74	15	20	Pass
0.3501	73	15	20	Pass
0.3581	68	14	20	Pass
0.3661	65	14	21	Pass
0.3741	64	12	18	Pass
0.3821	57	12	21	Pass
0.3901	53	11	20	Pass
0.3981	51	10	19	Pass
0.4062	49	10	20	Pass
0.4142	48	10	20	Pass
0.4222	47	10	21	Pass
0.4302	47	8	17	Pass
0.4382	47	8	17	Pass
0.4462	46	6	13	Pass
0.4542	46	6	13	Pass
0.4622	43	6	13	Pass

0.4702	41	6	14	Pass
0.4782	39	6	15	Pass
0.4862	35	4	11	Pass
0.4942	33	3	9	Pass
0.5023	32	3	9	Pass
0.5103	31	3	9	Pass
0.5183	31	3	9	Pass
0.5263	30	3	10	Pass
0.5343	29	3	10	Pass
0.5423	27	2	7	Pass
0.5503	27	1	3	Pass
0.5583	26	1	3	Pass
0.5663	25	1	4	Pass
0.5743	24	0	0	Pass
0.5823	24	0	0	Pass
0.5903	24	0	0	Pass
0.5984	24	0	0	Pass
0.6064	24	0	0	Pass
0.6144	24	0	0	Pass
0.6224	24	0	0	Pass
0.6304	24	0	0	Pass
0.6384	24	0	0	Pass
0.6464	23	0	0	Pass
0.6544	22	0	0	Pass
0.6624	21	0	0	Pass
0.6704	21	0	0	Pass
0.6784	18	0	0	Pass
0.6864	16	0	0	Pass
0.6944	15	0	0	Pass
0.7025	14	0	0	Pass
0.7105	13	0	0	Pass
0.7185	13	0	0	Pass
0.7265	11	0	0	Pass
0.7345	11	0	0	Pass
0.7425	11	0	0	Pass
0.7505	10	0	0	Pass
0.7585	10	0	0	Pass
0.7665	10	0	0	Pass
0.7745	10	0	0	Pass
0.7825	10	0	0	Pass
0.7905	8	0	0	Pass
0.7986	8	0	0	Pass
0.8066	5	0	0	Pass
0.8146	4	0	0	Pass
0.8226	4	0	0	Pass
0.8306	4	0	0	Pass
0.8386	4	0	0	Pass

Water Quality

POC 5





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #5
Total Pervious Area: 3.95
Total Impervious Area: 0

Mitigated Landuse Totals for POC #5
Total Pervious Area: 3.07
Total Impervious Area: 0

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #5

Return Period	**Flow(cfs)**
2 year	1.175112
5 year	1.957072
10 year	2.090212
25 year	2.344176

Flow Frequency Return Periods for Mitigated. POC #5

Return Period	**Flow(cfs)**
2 year	0.913315
5 year	1.521066
10 year	1.624544
25 year	1.821929

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1175	932	814	87	Pass
0.1374	859	721	83	Pass
0.1574	789	619	78	Pass
0.1773	717	530	73	Pass
0.1972	646	460	71	Pass
0.2171	567	388	68	Pass
0.2371	499	350	70	Pass
0.2570	451	326	72	Pass
0.2769	394	311	78	Pass
0.2968	356	295	82	Pass
0.3168	339	277	81	Pass
0.3367	323	257	79	Pass
0.3566	309	240	77	Pass
0.3766	297	218	73	Pass
0.3965	283	206	72	Pass
0.4164	270	193	71	Pass
0.4363	253	185	73	Pass
0.4563	240	179	74	Pass
0.4762	223	168	75	Pass
0.4961	212	149	70	Pass
0.5160	204	126	61	Pass
0.5360	193	114	59	Pass
0.5559	186	109	58	Pass
0.5758	183	101	55	Pass
0.5957	174	95	54	Pass
0.6157	167	91	54	Pass
0.6356	153	85	55	Pass
0.6555	129	82	63	Pass
0.6754	119	78	65	Pass
0.6954	114	74	64	Pass
0.7153	109	70	64	Pass
0.7352	104	66	63	Pass
0.7552	95	57	60	Pass
0.7751	93	53	56	Pass
0.7950	89	50	56	Pass
0.8149	86	49	56	Pass
0.8349	83	48	57	Pass
0.8548	78	47	60	Pass
0.8747	78	46	58	Pass
0.8946	74	45	60	Pass
0.9146	71	44	61	Pass
0.9345	67	41	61	Pass
0.9544	62	37	59	Pass
0.9743	57	34	59	Pass
0.9943	53	31	58	Pass
1.0142	52	31	59	Pass
1.0341	49	30	61	Pass
1.0540	49	29	59	Pass
1.0740	48	27	56	Pass
1.0939	48	26	54	Pass
1.1138	46	24	52	Pass
1.1338	46	24	52	Pass
1.1537	45	24	53	Pass

1.1736	44	24	54	Pass
1.1935	42	24	57	Pass
1.2135	39	24	61	Pass
1.2334	35	24	68	Pass
1.2533	34	24	70	Pass
1.2732	33	24	72	Pass
1.2932	31	22	70	Pass
1.3131	31	22	70	Pass
1.3330	30	19	63	Pass
1.3529	29	16	55	Pass
1.3729	28	14	50	Pass
1.3928	26	14	53	Pass
1.4127	25	12	48	Pass
1.4326	24	12	50	Pass
1.4526	24	12	50	Pass
1.4725	24	11	45	Pass
1.4924	24	11	45	Pass
1.5124	24	11	45	Pass
1.5323	24	11	45	Pass
1.5522	24	8	33	Pass
1.5721	24	5	20	Pass
1.5921	24	4	16	Pass
1.6120	24	4	16	Pass
1.6319	24	4	16	Pass
1.6518	24	3	12	Pass
1.6718	22	3	13	Pass
1.6917	21	2	9	Pass
1.7116	19	2	10	Pass
1.7315	18	1	5	Pass
1.7515	15	1	6	Pass
1.7714	14	1	7	Pass
1.7913	14	1	7	Pass
1.8112	13	1	7	Pass
1.8312	12	1	8	Pass
1.8511	12	1	8	Pass
1.8710	12	1	8	Pass
1.8909	11	1	9	Pass
1.9109	11	1	9	Pass
1.9308	11	1	9	Pass
1.9507	11	1	9	Pass
1.9707	11	1	9	Pass
1.9906	9	1	11	Pass
2.0105	7	1	14	Pass
2.0304	5	1	20	Pass
2.0504	4	1	25	Pass
2.0703	4	1	25	Pass
2.0902	4	1	25	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

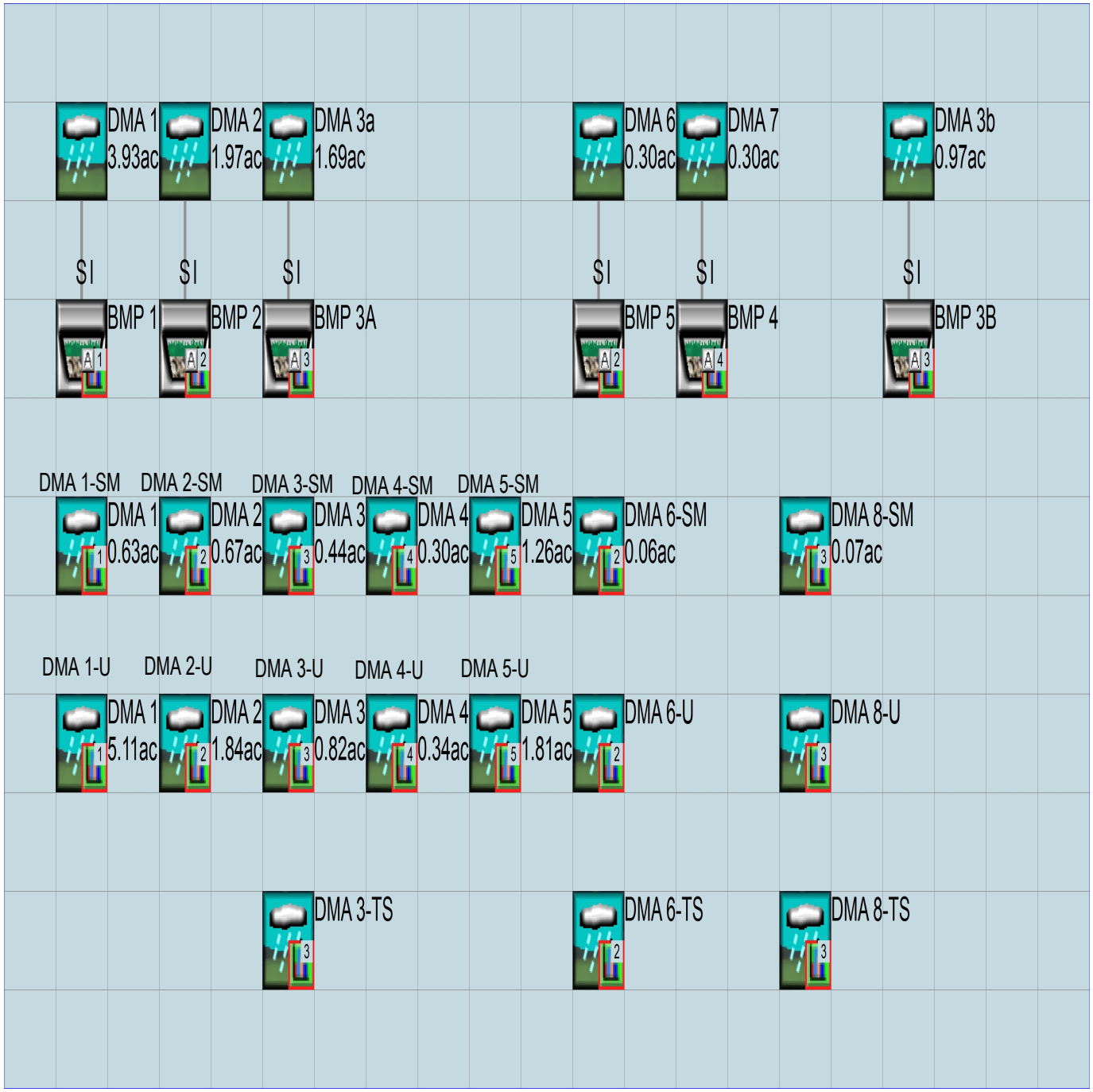
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1964 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Summit Estates - Entire Site Add BMP.wdm
MESSU       25   PreSummit Estates - Entire Site Add BMP.MES
            27   PreSummit Estates - Entire Site Add BMP.L61
            28   PreSummit Estates - Entire Site Add BMP.L62
            30   POCSummit Estates - Entire Site Add BMP1.dat
            31   POCSummit Estates - Entire Site Add BMP2.dat
            32   POCSummit Estates - Entire Site Add BMP3.dat
            33   POCSummit Estates - Entire Site Add BMP4.dat
            34   POCSummit Estates - Entire Site Add BMP5.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:60
      PERLND      30
      PERLND      19
      PERLND      21
      IMPLND       1
      COPY       501
      COPY       502
      COPY       503
      COPY       504
      COPY       505
      DISPLY       1
      DISPLY       2
      DISPLY       3
      DISPLY       4
      DISPLY       5
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        E1                           MAX                   1    2   30    9
    2        E2                           MAX                   1    2   31    9
    3        E3                           MAX                   1    2   32    9
    4        E4                           MAX                   1    2   33    9
    5        E5                           MAX                   1    2   34    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  502         1    1
  503         1    1
  504         1    1
  505         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
```

```
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
   30      D,NatVeg,Steep         1    1    1    1   27    0
   19      C,NatVeg,Flat          1    1    1    1   27    0
   21      C,NatVeg,Steep         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   30         0    0    1    0    0    0    0    0    0    0    0    0
   19         0    0    1    0    0    0    0    0    0    0    0    0
   21         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   19         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   21         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   30         0    1    1    1    0    0    0    0    1    1    0
   19         0    1    1    1    0    0    0    0    1    1    0
   21         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   30              0       2.7      0.02        75      0.15       2.5     0.915
   19              0       3.8     0.035       100      0.05       2.5     0.915
   21              0       3.2      0.03        75      0.15       2.5     0.915
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   30              0         0         2         2         0      0.05      0.05
   19              0         0         2         2         0      0.05      0.05
   21              0         0         2         2         0      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                          ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   30              0       0.6      0.04         1       0.3         0
   19              0       0.6      0.04         1       0.3         0
   21              0       0.6      0.04         1       0.3         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   30       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
   19       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
   21       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   30       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
```

```
   19       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
   21       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   30              0         0      0.01         0       0.4      0.01         0
   19              0         0      0.01         0       0.4      0.01         0
   21              0         0      0.01         0       0.4      0.01         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      IMPERVIOUS-FLAT        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05     0.011       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
E1***
PERLND  30                      8.45     COPY   501     12
PERLND  30                      8.45     COPY   501     13
E2***
PERLND  30                      2.48     COPY   502     12
```

```
PERLND  30                      2.48     COPY   502     13
PERLND  19                       0.3     COPY   502     12
PERLND  19                       0.3     COPY   502     13
PERLND  21                      2.38     COPY   502     12
PERLND  21                      2.38     COPY   502     13
IMPLND   1                      0.16     COPY   502     15
E3***
PERLND  30                      3.19     COPY   503     12
PERLND  30                      3.19     COPY   503     13
PERLND  21                      0.09     COPY   503     12
PERLND  21                      0.09     COPY   503     13
PERLND  19                      0.12     COPY   503     12
PERLND  19                      0.12     COPY   503     13
IMPLND   1                      0.07     COPY   503     15
E4***
PERLND  30                      0.82     COPY   504     12
PERLND  30                      0.82     COPY   504     13
PERLND  21                      0.48     COPY   504     12
PERLND  21                      0.48     COPY   504     13
PERLND  19                       0.2     COPY   504     12
PERLND  19                       0.2     COPY   504     13
IMPLND   1                       0.1     COPY   504     15
E5***
PERLND  30                      3.95     COPY   505     12
PERLND  30                      3.95     COPY   505     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1
COPY   502 OUTPUT MEAN   1 1   12.1        DISPLY   2     INPUT  TIMSER 1
COPY   503 OUTPUT MEAN   1 1   12.1        DISPLY   3     INPUT  TIMSER 1
COPY   504 OUTPUT MEAN   1 1   12.1        DISPLY   4     INPUT  TIMSER 1
COPY   505 OUTPUT MEAN   1 1   12.1        DISPLY   5     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                     in  out                                ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
```

```
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><--------> ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                          ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    501 FLOW     ENGL      REPL
COPY   502 OUTPUT MEAN   1 1     12.1      WDM    502 FLOW     ENGL      REPL
COPY   503 OUTPUT MEAN   1 1     12.1      WDM    503 FLOW     ENGL      REPL
COPY   504 OUTPUT MEAN   1 1     12.1      WDM    504 FLOW     ENGL      REPL
COPY   505 OUTPUT MEAN   1 1     12.1      WDM    505 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1964 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM         26   Summit Estates - Entire Site Add BMP.wdm
MESSU       25   MitSummit Estates - Entire Site Add BMP.MES
            27   MitSummit Estates - Entire Site Add BMP.L61
            28   MitSummit Estates - Entire Site Add BMP.L62
            34   POCSummit Estates - Entire Site Add BMP5.dat
            30   POCSummit Estates - Entire Site Add BMP1.dat
            31   POCSummit Estates - Entire Site Add BMP2.dat
            32   POCSummit Estates - Entire Site Add BMP3.dat
            33   POCSummit Estates - Entire Site Add BMP4.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:60
      PERLND      46
      PERLND      30
      IMPLND       1
      IMPLND       2
      PERLND      43
      PERLND      21
      GENER        2
      RCHRES       1
      RCHRES       2
      GENER        4
      RCHRES       3
      RCHRES       4
      GENER        6
      RCHRES       5
      RCHRES       6
      GENER        8
      RCHRES       7
      RCHRES       8
      GENER       10
      RCHRES       9
      RCHRES      10
      GENER       12
      RCHRES      11
      RCHRES      12
      COPY       505
      COPY         1
      COPY       501
      COPY       601
      COPY         2
      COPY       502
      COPY       602
      COPY         3
      COPY       503
      COPY       603
      COPY         4
      COPY       504
      COPY       604
      DISPLY       5
      DISPLY       1
      DISPLY       2
      DISPLY       3
      DISPLY       4
    END INGRP
```

```
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    5        DMA 5-SM                  MAX                    1    2   34    9
    1        Surface BMP 1             MAX                    1    2   30    9
    2        Surface BMP 2             MAX                    1    2   31    9
    3        Surface BMP 3A            MAX                    1    2   32    9
    4        Surface BMP 4             MAX                    1    2   33    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  505         1    1
  501         1    1
  601         1    1
    2         1    1
  502         1    1
  602         1    1
    3         1    1
  503         1    1
  603         1    1
    4         1    1
  504         1    1
  604         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    2         24
    4         24
    6         24
    8         24
   10         24
   12         24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
    4             0.
    6             0.
    8             0.
   10             0.
   12             0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   46      D,Urban,Flat           1    1    1    1   27    0
   30      D,NatVeg,Steep         1    1    1    1   27    0
   43      C,Urban,Flat           1    1    1    1   27    0
   21      C,NatVeg,Steep         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   46         0    0    1    0    0    0    0    0    0    0    0    0
   30         0    0    1    0    0    0    0    0    0    0    0    0
   43         0    0    1    0    0    0    0    0    0    0    0    0
   21         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
```

```
PRINT-INFO
  <PLS > ***************** Print-flags ***************************** PIVL  PYR
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
 46         0    0    4    0    0    0    0    0    0    0    0    0    1    9
 30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
 43         0    0    4    0    0    0    0    0    0    0    0    0    1    9
 21         0    0    4    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO

PWAT-PARM1
  <PLS >  PWATER variable monthly parameter value flags  ***
  # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
 46         0    1    1    1    0    0    0    0    1    1    0
 30         0    1    1    1    0    0    0    0    1    1    0
 43         0    1    1    1    0    0    0    0    1    1    0
 21         0    1    1    1    0    0    0    0    1    1    0
END PWAT-PARM1

PWAT-PARM2
  <PLS >      PWATER input info: Part 2         ***
  # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR      KVARY      AGWRC
 46              0       3.8      0.03        50      0.05        2.5      0.915
 30              0       2.7      0.02        75      0.15        2.5      0.915
 43              0       3.8      0.04        50      0.05        2.5      0.915
 21              0       3.2      0.03        75      0.15        2.5      0.915
END PWAT-PARM2

PWAT-PARM3
  <PLS >      PWATER input info: Part 3         ***
  # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 46              0         0         2         2         0      0.05      0.05
 30              0         0         2         2         0      0.05      0.05
 43              0         0         2         2         0      0.05      0.05
 21              0         0         2         2         0      0.05      0.05
END PWAT-PARM3
PWAT-PARM4
  <PLS >     PWATER input info: Part 4                              ***
  # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
 46              0       0.6      0.03         1       0.3         0
 30              0       0.6      0.04         1       0.3         0
 43              0       0.6      0.03         1       0.3         0
 21              0       0.6      0.04         1       0.3         0
END PWAT-PARM4
MON-LZETPARM
  <PLS >      PWATER input info: Part 3         ***
  # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
 46       0.6  0.6  0.6  0.6  0.7  0.7  0.7  0.7  0.7  0.6  0.6  0.6
 30       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
 43       0.6  0.6  0.6  0.6  0.7  0.7  0.7  0.7  0.7  0.6  0.6  0.6
 21       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
END MON-LZETPARM
MON-INTERCEP
  <PLS >      PWATER input info: Part 3         ***
  # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
 46       0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1
 30       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
 43       0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1
 21       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
END MON-INTERCEP

PWAT-STATE1
  <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
  # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
 46              0         0      0.15         0         1      0.05         0
 30              0         0      0.01         0       0.4      0.01         0
 43              0         0      0.15         0         1      0.05         0
 21              0         0      0.01         0       0.4      0.01         0
END PWAT-STATE1
```

```
END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                    in  out           ***
    1      IMPERVIOUS-FLAT        1    1    1   27    0
    2      IMPERVIOUS-MOD         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    2         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
    2         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    1
    2         0    0    0    0    1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05     0.011       0.1
    2            100       0.1     0.011      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    2              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    2              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
DMA 1***
PERLND  46                      1.47     RCHRES   1      2
PERLND  46                      1.47     RCHRES   1      3
PERLND  30                      0.87     RCHRES   1      2
PERLND  30                      0.87     RCHRES   1      3
IMPLND   1                      0.98     RCHRES   1      5
IMPLND   2                      0.61     RCHRES   1      5
DMA 2***
PERLND  46                      0.46     RCHRES   3      2
PERLND  46                      0.46     RCHRES   3      3
PERLND  43                      0.46     RCHRES   3      2
```

```
PERLND  43                    0.46     RCHRES   3      3
PERLND  30                    0.12     RCHRES   3      2
PERLND  30                    0.12     RCHRES   3      3
PERLND  21                    0.12     RCHRES   3      2
PERLND  21                    0.12     RCHRES   3      3
IMPLND   1                    0.81     RCHRES   3      5
DMA 3a***
PERLND  30                    0.49     RCHRES   5      2
PERLND  30                    0.49     RCHRES   5      3
PERLND  46                     0.5     RCHRES   5      2
PERLND  46                     0.5     RCHRES   5      3
IMPLND   1                    0.33     RCHRES   5      5
IMPLND   2                    0.37     RCHRES   5      5
DMA 6***
PERLND  43                    0.08     RCHRES   7      2
PERLND  43                    0.08     RCHRES   7      3
IMPLND   1                    0.22     RCHRES   7      5
DMA 7***
PERLND  43                    0.08     RCHRES   9      2
PERLND  43                    0.08     RCHRES   9      3
IMPLND   1                    0.22     RCHRES   9      5
DMA 3b***
PERLND  46                    0.38     RCHRES  11      2
PERLND  46                    0.38     RCHRES  11      3
PERLND  30                    0.16     RCHRES  11      2
PERLND  30                    0.16     RCHRES  11      3
IMPLND   1                    0.25     RCHRES  11      5
IMPLND   2                    0.18     RCHRES  11      5
DMA 1-SM***
PERLND  30                    0.63     COPY   501     12
PERLND  30                    0.63     COPY   601     12
PERLND  30                    0.63     COPY   501     13
PERLND  30                    0.63     COPY   601     13
DMA 1-U***
PERLND  30                    5.11     COPY   501     12
PERLND  30                    5.11     COPY   601     12
PERLND  30                    5.11     COPY   501     13
PERLND  30                    5.11     COPY   601     13
DMA 2-SM***
PERLND  30                    0.67     COPY   502     12
PERLND  30                    0.67     COPY   602     12
PERLND  30                    0.67     COPY   502     13
PERLND  30                    0.67     COPY   602     13
DMA 2-U***
PERLND  30                    0.92     COPY   502     12
PERLND  30                    0.92     COPY   602     12
PERLND  30                    0.92     COPY   502     13
PERLND  30                    0.92     COPY   602     13
PERLND  21                    0.92     COPY   502     12
PERLND  21                    0.92     COPY   602     12
PERLND  21                    0.92     COPY   502     13
PERLND  21                    0.92     COPY   602     13
DMA 3-SM***
PERLND  30                    0.44     COPY   503     12
PERLND  30                    0.44     COPY   603     12
PERLND  30                    0.44     COPY   503     13
PERLND  30                    0.44     COPY   603     13
DMA 3-U***
PERLND  21                    0.41     COPY   503     12
PERLND  21                    0.41     COPY   603     12
PERLND  21                    0.41     COPY   503     13
PERLND  21                    0.41     COPY   603     13
PERLND  30                    0.41     COPY   503     12
PERLND  30                    0.41     COPY   603     12
PERLND  30                    0.41     COPY   503     13
PERLND  30                    0.41     COPY   603     13
DMA 4-SM***
PERLND  21                     0.3     COPY   504     12
PERLND  21                     0.3     COPY   604     12
PERLND  21                     0.3     COPY   504     13
```

```
PERLND  21                      0.3     COPY   604     13
DMA 4-U***
PERLND  21                     0.34     COPY   504     12
PERLND  21                     0.34     COPY   604     12
PERLND  21                     0.34     COPY   504     13
PERLND  21                     0.34     COPY   604     13
DMA 5-SM***
PERLND  30                     1.26     COPY   505     12
PERLND  30                     1.26     COPY   505     13
DMA 5-U***
PERLND  30                     1.81     COPY   505     12
PERLND  30                     1.81     COPY   505     13
DMA 6-SM***
PERLND  43                     0.06     COPY   502     12
PERLND  43                     0.06     COPY   602     12
PERLND  43                     0.06     COPY   502     13
PERLND  43                     0.06     COPY   602     13
DMA 6-U***
IMPLND   1                     0.06     COPY   502     15
IMPLND   1                     0.06     COPY   602     15
DMA 6-TS***
IMPLND   1                     0.04     COPY   502     15
IMPLND   1                     0.04     COPY   602     15
DMA 8-SM***
PERLND  43                     0.07     COPY   503     12
PERLND  43                     0.07     COPY   603     12
PERLND  43                     0.07     COPY   503     13
PERLND  43                     0.07     COPY   603     13
DMA 8-U***
IMPLND   1                     0.07     COPY   503     15
IMPLND   1                     0.07     COPY   603     15
DMA 8-TS***
IMPLND   1                     0.05     COPY   503     15
IMPLND   1                     0.05     COPY   603     15
DMA 3-TS***
IMPLND   2                     0.05     COPY   503     15
IMPLND   2                     0.05     COPY   603     15

******Routing******
PERLND  46                     1.47     COPY     1     12
PERLND  30                     0.87     COPY     1     12
IMPLND   1                     0.98     COPY     1     15
IMPLND   2                     0.61     COPY     1     15
PERLND  46                     1.47     COPY     1     13
PERLND  30                     0.87     COPY     1     13
PERLND  46                     0.46     COPY     2     12
PERLND  43                     0.46     COPY     2     12
PERLND  30                     0.12     COPY     2     12
PERLND  21                     0.12     COPY     2     12
IMPLND   1                     0.81     COPY     2     15
PERLND  46                     0.46     COPY     2     13
PERLND  43                     0.46     COPY     2     13
PERLND  30                     0.12     COPY     2     13
PERLND  21                     0.12     COPY     2     13
PERLND  30                     0.49     COPY     3     12
PERLND  46                      0.5     COPY     3     12
IMPLND   1                     0.33     COPY     3     15
IMPLND   2                     0.37     COPY     3     15
PERLND  30                     0.49     COPY     3     13
PERLND  46                      0.5     COPY     3     13
RCHRES   1                       1     RCHRES   2      8
RCHRES   3                       1     RCHRES   4      8
RCHRES   5                       1     RCHRES   6      8
PERLND  43                     0.08     COPY     2     12
IMPLND   1                     0.22     COPY     2     15
PERLND  43                     0.08     COPY     2     13
RCHRES   7                       1     RCHRES   8      8
PERLND  43                     0.08     COPY     4     12
IMPLND   1                     0.22     COPY     4     15
PERLND  43                     0.08     COPY     4     13
```

```
RCHRES   9                             1     RCHRES  10      8
RCHRES  11                             1     RCHRES  12      8
RCHRES  11                                   COPY     3     18
RCHRES   2                             1     COPY   501     16
RCHRES   1                             1     COPY   501     17
RCHRES   4                             1     COPY   502     17
RCHRES   3                             1     COPY   502     17
RCHRES   6                             1     COPY   503     17
RCHRES   5                             1     COPY   503     17
RCHRES   8                             1     COPY   502     17
RCHRES   7                             1     COPY   502     17
RCHRES  10                             1     COPY   504     17
RCHRES   9                             1     COPY   504     17
RCHRES  12                             1     COPY   503     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   505 OUTPUT MEAN   1 1   12.1        DISPLY   5     INPUT  TIMSER 1
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1
COPY   502 OUTPUT MEAN   1 1   12.1        DISPLY   2     INPUT  TIMSER 1
COPY   503 OUTPUT MEAN   1 1   12.1        DISPLY   3     INPUT  TIMSER 1
COPY   504 OUTPUT MEAN   1 1   12.1        DISPLY   4     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER       .0002778     RCHRES   1     EXTNL  OUTDGT 1
GENER    4 OUTPUT TIMSER       .0002778     RCHRES   3     EXTNL  OUTDGT 1
GENER    6 OUTPUT TIMSER       .0002778     RCHRES   5     EXTNL  OUTDGT 1
GENER    8 OUTPUT TIMSER       .0002778     RCHRES   7     EXTNL  OUTDGT 1
GENER   10 OUTPUT TIMSER       .0002778     RCHRES   9     EXTNL  OUTDGT 1
GENER   12 OUTPUT TIMSER       .0002778     RCHRES  11     EXTNL  OUTDGT 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<-----------------><---> User T-series  Engl Metr LKFG            ***
                                       in  out                              ***
    1     Surface BMP 1           2    1    1    1   28    0    1
    2     BMP 1                   1    1    1    1   28    0    1
    3     Surface BMP 2           2    1    1    1   28    0    1
    4     BMP 2                   2    1    1    1   28    0    1
    5     Surface BMP 3A          2    1    1    1   28    0    1
    6     BMP 3A                  2    1    1    1   28    0    1
    7     Surface BMP 5           2    1    1    1   28    0    1
    8     BMP 5                   2    1    1    1   28    0    1
    9     Surface BMP 4           2    1    1    1   28    0    1
   10     BMP 4                   2    1    1    1   28    0    1
   11     Surface BMP 3B          2    1    1    1   28    0    1
   12     BMP 3B                  2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
    4         1    0    0    0    0    0    0    0    0    0
    5         1    0    0    0    0    0    0    0    0    0
    6         1    0    0    0    0    0    0    0    0    0
    7         1    0    0    0    0    0    0    0    0    0
    8         1    0    0    0    0    0    0    0    0    0
    9         1    0    0    0    0    0    0    0    0    0
   10         1    0    0    0    0    0    0    0    0    0
```

```
 11         1    0    0    0    0    0    0    0    0    0
 12         1    0    0    0    0    0    0    0    0    0
END ACTIVITY

PRINT-INFO
  <PLS > ***************** Print-flags ******************* PIVL  PYR
  # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  1          4    0    0    0    0    0    0    0    0    0    1    9
  2          4    0    0    0    0    0    0    0    0    0    1    9
  3          4    0    0    0    0    0    0    0    0    0    1    9
  4          4    0    0    0    0    0    0    0    0    0    1    9
  5          4    0    0    0    0    0    0    0    0    0    1    9
  6          4    0    0    0    0    0    0    0    0    0    1    9
  7          4    0    0    0    0    0    0    0    0    0    1    9
  8          4    0    0    0    0    0    0    0    0    0    1    9
  9          4    0    0    0    0    0    0    0    0    0    1    9
 10          4    0    0    0    0    0    0    0    0    0    1    9
 11          4    0    0    0    0    0    0    0    0    0    1    9
 12          4    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO

HYDR-PARM1
  RCHRES  Flags for each HYDR Section                                    ***
  # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
         FG FG FG FG  possible  exit  *** possible  exit      possible  exit
          *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
  1       0  1  0  0    4  5  0  0  0       0  1  0  0  0        2  1  2  2  2
  2       0  1  0  0    4  0  0  0  0       0  0  0  0  0        2  2  2  2  2
  3       0  1  0  0    4  5  0  0  0       0  1  0  0  0        2  1  2  2  2
  4       0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
  5       0  1  0  0    4  5  0  0  0       0  1  0  0  0        2  1  2  2  2
  6       0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
  7       0  1  0  0    4  5  0  0  0       0  1  0  0  0        2  1  2  2  2
  8       0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
  9       0  1  0  0    4  5  0  0  0       0  1  0  0  0        2  1  2  2  2
 10       0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
 11       0  1  0  0    4  5  0  0  0       0  1  0  0  0        2  1  2  2  2
 12       0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
END HYDR-PARM1

HYDR-PARM2
  # -  #    FTABNO       LEN      DELTH     STCOR       KS      DB50       ***
<------><--------><--------><--------><--------><--------><-------->      ***
  1              1      0.01       0.0     718.0       0.0       0.0
  2              2      0.03       0.0     718.0       0.0       0.0
  3              3      0.01       0.0     785.0       0.0       0.0
  4              4      0.02       0.0     785.0       0.0       0.0
  5              5      0.01       0.0     792.0       0.0       0.0
  6              6      0.02       0.0     792.0       0.0       0.0
  7              7      0.01       0.0     781.0       0.0       0.0
  8              8      0.07       0.0     781.0       0.0       0.0
  9              9      0.01       0.0     788.0       0.0       0.0
 10             10      0.07       0.0     788.0       0.0       0.0
 11             11      0.01       0.0     792.0       0.0       0.0
 12             12      0.01       0.0     792.0       0.0       0.0
END HYDR-PARM2
HYDR-INIT
  RCHRES  Initial conditions for each HYDR section                       ***
  # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
        *** ac-ft     for each possible exit        for each possible exit
<------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  1            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  2            0        4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  3            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  4            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  5            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  6            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  7            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  8            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  9            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
```

```
   10         0            4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
   11         0            4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
   12         0            4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL              4
  UVQUAN v2m2   GLOBAL     WORKSP  1        3
  UVQUAN vpo2   GLOBAL     WORKSP  2        3
  UVQUAN v2d2   GENER    2 K       1        3
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol4   RCHRES   4 VOL              4
  UVQUAN v2m4   GLOBAL     WORKSP  3        3
  UVQUAN vpo4   GLOBAL     WORKSP  4        3
  UVQUAN v2d4   GENER    4 K       1        3
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol6   RCHRES   6 VOL              4
  UVQUAN v2m6   GLOBAL     WORKSP  5        3
  UVQUAN vpo6   GLOBAL     WORKSP  6        3
  UVQUAN v2d6   GENER    6 K       1        3
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol8   RCHRES   8 VOL              4
  UVQUAN v2m8   GLOBAL     WORKSP  7        3
  UVQUAN vpo8   GLOBAL     WORKSP  8        3
  UVQUAN v2d8   GENER    8 K       1        3
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol10  RCHRES  10 VOL              4
  UVQUAN v2m10  GLOBAL     WORKSP  9        3
  UVQUAN vpo10  GLOBAL     WORKSP 10        3
  UVQUAN v2d10  GENER   10 K       1        3
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol12  RCHRES  12 VOL              4
  UVQUAN v2m12  GLOBAL     WORKSP 11        3
  UVQUAN vpo12  GLOBAL     WORKSP 12        3
  UVQUAN v2d12  GENER   12 K       1        3
*** User-Defined Target Variable Names
***                  addr or                       addr or
***                 <------>                      <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1         1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2         1.0 QUAN
  UVNAME  v2d2    1 K       1         1.0 QUAN
*** User-Defined Target Variable Names
```

```
***                  addr or                          addr or
***                 <------>                         <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m4    1 WORKSP  3         1.0 QUAN
  UVNAME  vpo4    1 WORKSP  4         1.0 QUAN
  UVNAME  v2d4    1 K       1         1.0 QUAN
*** User-Defined Target Variable Names
***                  addr or                          addr or
***                 <------>                         <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m6    1 WORKSP  5         1.0 QUAN
  UVNAME  vpo6    1 WORKSP  6         1.0 QUAN
  UVNAME  v2d6    1 K       1         1.0 QUAN
*** User-Defined Target Variable Names
***                  addr or                          addr or
***                 <------>                         <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m8    1 WORKSP  7         1.0 QUAN
  UVNAME  vpo8    1 WORKSP  8         1.0 QUAN
  UVNAME  v2d8    1 K       1         1.0 QUAN
*** User-Defined Target Variable Names
***                  addr or                          addr or
***                 <------>                         <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m10   1 WORKSP  9         1.0 QUAN
  UVNAME  vpo10   1 WORKSP 10         1.0 QUAN
  UVNAME  v2d10   1 K       1         1.0 QUAN
*** User-Defined Target Variable Names
***                  addr or                          addr or
***                 <------>                         <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m12   1 WORKSP 11         1.0 QUAN
  UVNAME  vpo12   1 WORKSP 12         1.0 QUAN
  UVNAME  v2d12   1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   2                               v2m2            =  16754.7
*** Compute remaining available pore space
  GENER   2                               vpo2            =  v2m2
  GENER   2                               vpo2           -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                               vpo2            =  0.0
END IF
*** Infiltration volume
  GENER   2                               v2d2            =  vpo2
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   4                               v2m4            =  3212.01
*** Compute remaining available pore space
  GENER   4                               vpo4            =  v2m4
  GENER   4                               vpo4           -=  vol4
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo4 < 0.0) THEN
  GENER   4                               vpo4            =  0.0
END IF
*** Infiltration volume
  GENER   4                               v2d4            =  vpo4
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   6                               v2m6            =  2912.34
*** Compute remaining available pore space
  GENER   6                               vpo6            =  v2m6
  GENER   6                               vpo6           -=  vol6
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
```

```
IF (vpo6 < 0.0) THEN
  GENER   6                                vpo6           =  0.0
END IF
*** Infiltration volume
  GENER   6                                v2d6           =  vpo6
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <---><-><-><-><-><--------> <> <-><->
  GENER   8                                v2m8           =  1839.16
*** Compute remaining available pore space
  GENER   8                                vpo8           =  v2m8
  GENER   8                                vpo8          -=  vol8
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo8 < 0.0) THEN
  GENER   8                                vpo8           =  0.0
END IF
*** Infiltration volume
  GENER   8                                v2d8           =  vpo8
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <---><-><-><-><-><--------> <> <-><->
  GENER  10                                v2m10          =  1839.81
*** Compute remaining available pore space
  GENER  10                                vpo10          =  v2m10
  GENER  10                                vpo10         -=  vol10
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo10 < 0.0) THEN
  GENER  10                                vpo10          =  0.0
END IF
*** Infiltration volume
  GENER  10                                v2d10          =  vpo10
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <---><-><-><-><-><--------> <> <-><->
  GENER  12                                v2m12          =  1467.59
*** Compute remaining available pore space
  GENER  12                                vpo12          =  v2m12
  GENER  12                                vpo12         -=  vol12
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo12 < 0.0) THEN
  GENER  12                                vpo12          =  0.0
END IF
*** Infiltration volume
  GENER  12                                v2d12          =  vpo12
END SPEC-ACTIONS
FTABLES
  FTABLE      2
   70    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.196051  0.000000  0.000000
  0.073297  0.196051  0.004311  0.000000
  0.146593  0.196051  0.008622  0.000000
  0.219890  0.196051  0.012933  0.000000
  0.293187  0.196051  0.017244  0.000000
  0.366484  0.196051  0.021555  0.000000
  0.439780  0.196051  0.025866  0.000000
  0.513077  0.196051  0.030177  0.000000
  0.586374  0.196051  0.034488  0.000000
  0.659670  0.196051  0.038799  0.000000
  0.732967  0.196051  0.043110  0.000000
  0.806264  0.196051  0.047421  0.000000
  0.879560  0.196051  0.051732  0.000000
  0.952857  0.196051  0.056043  0.000000
  1.026154  0.196051  0.060354  0.000000
  1.099451  0.196051  0.064665  0.001104
  1.172747  0.196051  0.068976  0.001656
  1.246044  0.196051  0.073287  0.009384
  1.319341  0.196051  0.077598  0.013248
  1.392637  0.196051  0.081909  0.018668
  1.465934  0.196051  0.086220  0.021378
  1.539231  0.196051  0.090531  0.025414
  1.612527  0.196051  0.094841  0.027431
```

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1.685824  0.196051  0.099152  0.030701
1.759121  0.196051  0.105116  0.032335
1.832418  0.196051  0.111080  0.035144
1.905714  0.196051  0.117043  0.036548
1.979011  0.196051  0.123007  0.039050
2.052308  0.196051  0.128970  0.040301
2.125604  0.196051  0.134934  0.042582
2.198901  0.196051  0.140897  0.045500
2.272198  0.196051  0.146861  0.049750
2.345495  0.196051  0.152824  0.051897
2.418791  0.196051  0.158788  0.053063
2.492088  0.196051  0.164751  0.056161
2.565385  0.196051  0.170715  0.060026
2.638681  0.196051  0.176678  0.064116
2.711978  0.196051  0.182642  0.068190
2.785275  0.196051  0.188605  0.072147
2.858571  0.196051  0.194569  0.075953
2.931868  0.196051  0.200532  0.079603
3.005165  0.196051  0.206496  0.083104
3.078462  0.196051  0.212459  0.086467
3.151758  0.196051  0.218423  0.089706
3.225055  0.196051  0.224386  0.092832
3.298352  0.196051  0.230350  0.095855
3.371648  0.196051  0.236313  0.098785
3.444945  0.196051  0.242277  0.101630
3.518242  0.196051  0.248240  0.104397
3.591538  0.196051  0.254204  0.107091
3.664835  0.196051  0.260167  0.109719
3.738132  0.196051  0.266131  0.112286
3.811429  0.196051  0.272094  0.114794
3.884725  0.196051  0.278058  0.117249
3.958022  0.196051  0.284022  0.119654
4.031319  0.196051  0.289985  0.122011
4.104615  0.196051  0.295949  0.124323
4.177912  0.196051  0.301912  0.126594
4.251209  0.196051  0.307876  0.128824
4.324505  0.196051  0.313839  0.131017
4.397802  0.196051  0.319803  0.133175
4.471099  0.196051  0.325766  0.135299
4.544396  0.196051  0.331730  0.137391
4.617692  0.196051  0.337693  0.139453
4.690989  0.196051  0.343657  0.141486
4.764286  0.196051  0.349620  0.143494
4.837582  0.196051  0.355584  0.145478
4.910879  0.196051  0.361547  0.147443
4.984176  0.196051  0.367511  0.149416
5.000000  0.196051  0.384635  0.191624
END FTABLE  2
FTABLE      1
 24    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
0.000000  0.196051  0.000000  0.000000  0.000000
0.073297  0.198085  0.014444  0.000000  0.988427
0.146593  0.200128  0.029038  0.000000  1.249762
0.219890  0.202179  0.043782  0.000000  1.298061
0.293187  0.204240  0.058677  0.000000  1.346360
0.366484  0.206309  0.073723  0.000000  1.394659
0.439780  0.208387  0.088921  0.000000  1.442958
0.513077  0.210474  0.104271  0.000000  1.491257
0.586374  0.212570  0.119775  0.000000  1.539556
0.659670  0.214675  0.135433  0.000000  1.587855
0.732967  0.216788  0.151245  0.000000  1.636154
0.806264  0.218911  0.167213  0.000000  1.684453
0.879560  0.221042  0.183336  0.000000  1.732752
0.952857  0.223183  0.199617  0.000000  1.781051
1.026154  0.225332  0.216054  0.000000  1.829350
1.099451  0.227490  0.232649  0.000000  1.877649
1.172747  0.229657  0.249403  0.000000  1.925948
1.246044  0.231832  0.266316  0.000000  1.974247
```

```
1.319341  0.234017  0.283388  0.000000  2.022546
1.392637  0.236211  0.300621  0.000000  2.070844
1.465934  0.238413  0.318015  0.000000  2.119143
1.539231  0.240625  0.335571  0.178653  2.167442
1.612527  0.242845  0.353290  0.866641  2.215741
1.670000  0.244592  0.367297  1.834123  2.253613
END FTABLE  1
FTABLE      4
 68    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
0.000000  0.058770  0.000000  0.000000  0.000000
0.048571  0.058770  0.000856  0.000000  0.000000
0.097143  0.058770  0.001713  0.000000  0.000000
0.145714  0.058770  0.002569  0.000000  0.000000
0.194286  0.058770  0.003425  0.000000  0.000000
0.242857  0.058770  0.004282  0.000000  0.000000
0.291429  0.058770  0.005138  0.000000  0.000000
0.340000  0.058770  0.005994  0.000000  0.002667
0.388571  0.058770  0.006851  0.000000  0.002667
0.437143  0.058770  0.007707  0.000000  0.002667
0.485714  0.058770  0.008564  0.000000  0.002667
0.534286  0.058770  0.009420  0.000000  0.002667
0.582857  0.058770  0.010276  0.000000  0.002667
0.631429  0.058770  0.011133  0.000000  0.002667
0.680000  0.058770  0.011989  0.000000  0.002667
0.728571  0.058770  0.012845  0.000000  0.002667
0.777143  0.058770  0.013702  0.000000  0.002667
0.825714  0.058770  0.014558  0.000000  0.002667
0.874286  0.058770  0.015414  0.000000  0.002667
0.922857  0.058770  0.016271  0.000000  0.002667
0.971429  0.058770  0.017127  0.000000  0.002667
1.020000  0.058770  0.017983  0.000000  0.002667
1.068571  0.058770  0.018840  0.000000  0.002667
1.117143  0.058770  0.019696  0.000000  0.002667
1.165714  0.058770  0.020553  0.000000  0.002667
1.214286  0.058770  0.021409  0.000000  0.002667
1.262857  0.058770  0.022265  0.000000  0.002667
1.311429  0.058770  0.023122  0.001114  0.002667
1.360000  0.058770  0.023978  0.001670  0.002667
1.408571  0.058770  0.024834  0.004348  0.002667
1.457143  0.058770  0.025691  0.005687  0.002667
1.505714  0.058770  0.026547  0.007684  0.002667
1.554286  0.058770  0.027403  0.008682  0.002667
1.602857  0.058770  0.028260  0.010215  0.002667
1.651429  0.058770  0.029116  0.010982  0.002667
1.700000  0.058770  0.029972  0.012242  0.002667
1.748571  0.058770  0.030829  0.012872  0.002667
1.797143  0.058770  0.032013  0.013962  0.002667
1.845714  0.058770  0.033198  0.014507  0.002667
1.894286  0.058770  0.034383  0.015481  0.002667
1.942857  0.058770  0.035567  0.015968  0.002667
1.991429  0.058770  0.036752  0.016858  0.002667
2.040000  0.058770  0.037937  0.017302  0.002667
2.088571  0.058770  0.039121  0.018127  0.002667
2.137143  0.058770  0.040306  0.018539  0.002667
2.185714  0.058770  0.041490  0.019310  0.002667
2.234286  0.058770  0.042675  0.019696  0.002667
2.282857  0.058770  0.043860  0.020394  0.002667
2.331429  0.058770  0.045044  0.021741  0.002667
2.380000  0.058770  0.046229  0.023333  0.002667
2.428571  0.058770  0.047414  0.024984  0.002667
2.477143  0.058770  0.048598  0.026613  0.002667
2.525714  0.058770  0.049783  0.028187  0.002667
2.574286  0.058770  0.050967  0.029697  0.002667
2.622857  0.058770  0.052152  0.031142  0.002667
2.671429  0.058770  0.053337  0.032527  0.002667
2.720000  0.058770  0.054521  0.033858  0.002667
2.768571  0.058770  0.055706  0.035138  0.002667
2.817143  0.058770  0.056891  0.036374  0.002667
```

```
2.865714  0.058770  0.058075  0.037570  0.002667
2.914286  0.058770  0.059260  0.038729  0.002667
2.962857  0.058770  0.060444  0.039855  0.002667
3.011429  0.058770  0.061629  0.040951  0.002667
3.060000  0.058770  0.062814  0.042019  0.002667
3.108571  0.058770  0.063998  0.043063  0.002667
3.157143  0.058770  0.065183  0.044087  0.002667
3.205714  0.058770  0.066368  0.045096  0.002667
3.250000  0.058770  0.073738  0.073441  0.002667
END FTABLE  4
FTABLE      3
 26    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.058770  0.000000  0.000000  0.000000
0.048571  0.059521  0.002873  0.000000  0.296297
0.097143  0.060276  0.005782  0.000000  0.364868
0.145714  0.061035  0.008728  0.000000  0.374462
0.194286  0.061798  0.011711  0.000000  0.384057
0.242857  0.062565  0.014732  0.000000  0.393651
0.291429  0.063336  0.017789  0.000000  0.403245
0.340000  0.064110  0.020884  0.000000  0.412840
0.388571  0.064889  0.024017  0.000000  0.422434
0.437143  0.065671  0.027188  0.000000  0.432029
0.485714  0.066458  0.030397  0.000000  0.441623
0.534286  0.067248  0.033644  0.000000  0.451217
0.582857  0.068042  0.036929  0.000000  0.460812
0.631429  0.068840  0.040254  0.000000  0.470406
0.680000  0.069642  0.043617  0.000000  0.480000
0.728571  0.070448  0.047019  0.000000  0.489595
0.777143  0.071258  0.050460  0.000000  0.499189
0.825714  0.072071  0.053941  0.000000  0.508783
0.874286  0.072889  0.057462  0.000000  0.518378
0.922857  0.073710  0.061022  0.000000  0.527972
0.971429  0.074536  0.064622  0.000000  0.537567
1.020000  0.075365  0.068263  0.075072  0.547161
1.068571  0.076198  0.071944  0.476174  0.556755
1.117143  0.077035  0.075665  1.062380  0.566350
1.165714  0.077876  0.079427  1.785494  0.575944
1.170000  0.077950  0.079761  2.620689  0.576791
END FTABLE  3
FTABLE      6
 71    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.045914  0.000000  0.000000  0.000000
0.054066  0.045914  0.000745  0.000000  0.000000
0.108132  0.045914  0.001489  0.000000  0.000000
0.162198  0.045914  0.002234  0.000000  0.000000
0.216264  0.045914  0.002979  0.000000  0.000000
0.270330  0.045914  0.003724  0.000000  0.000000
0.324396  0.045914  0.004468  0.000000  0.000000
0.378462  0.045914  0.005213  0.000000  0.003201
0.432527  0.045914  0.005958  0.000000  0.004167
0.486593  0.045914  0.006702  0.000000  0.004167
0.540659  0.045914  0.007447  0.000000  0.004167
0.594725  0.045914  0.008192  0.000000  0.004167
0.648791  0.045914  0.008937  0.000000  0.004167
0.702857  0.045914  0.009681  0.000000  0.004167
0.756923  0.045914  0.010426  0.000000  0.004167
0.810989  0.045914  0.011171  0.000000  0.004167
0.865055  0.045914  0.011915  0.000000  0.004167
0.919121  0.045914  0.012660  0.000000  0.004167
0.973187  0.045914  0.013405  0.000000  0.004167
1.027253  0.045914  0.014149  0.000000  0.004167
1.081319  0.045914  0.014894  0.000000  0.004167
1.135385  0.045914  0.015639  0.000000  0.004167
1.189451  0.045914  0.016384  0.000000  0.004167
1.243516  0.045914  0.017128  0.000000  0.004167
1.297582  0.045914  0.017873  0.000000  0.004167
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1.351648  0.045914  0.018618  0.001162  0.004167
1.405714  0.045914  0.019362  0.001743  0.004167
1.459780  0.045914  0.020107  0.003403  0.004167
1.513846  0.045914  0.020852  0.004233  0.004167
1.567912  0.045914  0.021597  0.005502  0.004167
1.621978  0.045914  0.022341  0.006136  0.004167
1.676044  0.045914  0.023086  0.007131  0.004167
1.730110  0.045914  0.023831  0.007628  0.004167
1.784176  0.045914  0.024861  0.008456  0.004167
1.838242  0.045914  0.025891  0.008870  0.004167
1.892308  0.045914  0.026921  0.009591  0.004167
1.946374  0.045914  0.027951  0.009952  0.004167
2.000440  0.045914  0.028982  0.010599  0.004167
2.054505  0.045914  0.030012  0.010923  0.004167
2.108571  0.045914  0.031042  0.011516  0.004167
2.162637  0.045914  0.032072  0.011812  0.004167
2.216703  0.045914  0.033102  0.012362  0.004167
2.270769  0.045914  0.034133  0.012739  0.004167
2.324835  0.045914  0.035163  0.013654  0.004167
2.378901  0.045914  0.036193  0.014771  0.004167
2.432967  0.045914  0.037223  0.015938  0.004167
2.487033  0.045914  0.038253  0.017089  0.004167
2.541099  0.045914  0.039283  0.018199  0.004167
2.595165  0.045914  0.040314  0.019260  0.004167
2.649231  0.045914  0.041344  0.020273  0.004167
2.703297  0.045914  0.042374  0.021240  0.004167
2.757363  0.045914  0.043404  0.022166  0.004167
2.811429  0.045914  0.044434  0.023055  0.004167
2.865495  0.045914  0.045465  0.023911  0.004167
2.919560  0.045914  0.046495  0.024737  0.004167
2.973626  0.045914  0.047525  0.025537  0.004167
3.027692  0.045914  0.048555  0.026312  0.004167
3.081758  0.045914  0.049585  0.027064  0.004167
3.135824  0.045914  0.050615  0.027796  0.004167
3.189890  0.045914  0.051646  0.028510  0.004167
3.243956  0.045914  0.052676  0.029206  0.004167
3.298022  0.045914  0.053706  0.029886  0.004167
3.352088  0.045914  0.054736  0.030551  0.004167
3.406154  0.045914  0.055766  0.031202  0.004167
3.460220  0.045914  0.056797  0.031840  0.004167
3.514286  0.045914  0.057827  0.032467  0.004167
3.568352  0.045914  0.058857  0.033082  0.004167
3.622418  0.045914  0.059887  0.033688  0.004167
3.676484  0.045914  0.060917  0.034287  0.004167
3.730549  0.045914  0.061947  0.034885  0.004167
3.750000  0.045914  0.066858  0.050768  0.004167
END FTABLE  6
FTABLE      5
 23    5
    Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
     (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
0.000000  0.045914  0.000000  0.000000  0.000000
0.054066  0.046810  0.002507  0.000000  0.231482
0.108132  0.047711  0.005062  0.000000  0.286749
0.162198  0.048616  0.007666  0.000000  0.295092
0.216264  0.049527  0.010319  0.000000  0.303436
0.270330  0.050442  0.013021  0.000000  0.311780
0.324396  0.051363  0.015773  0.000000  0.320123
0.378462  0.052288  0.018575  0.000000  0.328467
0.432527  0.053218  0.021428  0.000000  0.336810
0.486593  0.054152  0.024330  0.000000  0.345154
0.540659  0.055092  0.027283  0.000000  0.353497
0.594725  0.056036  0.030287  0.000000  0.361841
0.648791  0.056985  0.033343  0.000000  0.370184
0.702857  0.057939  0.036449  0.000000  0.378528
0.756923  0.058898  0.039608  0.000000  0.386871
0.810989  0.059862  0.042818  0.000000  0.395215
0.865055  0.060831  0.046081  0.000000  0.403558
0.919121  0.061804  0.049396  0.000000  0.411902
0.973187  0.062782  0.052764  0.000000  0.420245
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1.027253  0.063765  0.056185  0.099484  0.428589
1.081319  0.064753  0.059659  0.512220  0.436932
1.135385  0.065746  0.063187  1.098833  0.445276
1.170000  0.066384  0.065474  1.814278  0.450618
END FTABLE  5
FTABLE      8
 78    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.121166  0.000000  0.000000  0.000000
0.045824  0.120563  0.000033  0.000000  0.000000
0.091648  0.118972  0.000076  0.000000  0.000000
0.137473  0.117382  0.000129  0.000000  0.000000
0.183297  0.115793  0.000192  0.000000  0.000000
0.229121  0.114207  0.000265  0.000000  0.000000
0.274945  0.112622  0.000349  0.000000  0.000000
0.320769  0.111038  0.000442  0.000000  0.000000
0.366593  0.109456  0.000546  0.000000  0.000000
0.412418  0.107875  0.000660  0.000000  0.000182
0.458242  0.106296  0.000785  0.000000  0.000182
0.504066  0.104719  0.000919  0.000000  0.000182
0.549890  0.103143  0.001064  0.000000  0.000182
0.595714  0.101569  0.001220  0.000000  0.000182
0.641538  0.099996  0.001385  0.000000  0.000182
0.687363  0.098424  0.001561  0.000000  0.000182
0.733187  0.096855  0.001747  0.000000  0.000182
0.779011  0.095287  0.001943  0.000000  0.000182
0.824835  0.093720  0.002150  0.000000  0.000182
0.870659  0.092155  0.002367  0.000000  0.000182
0.916484  0.090591  0.002594  0.000000  0.000182
0.962308  0.089029  0.002832  0.000000  0.000182
1.008132  0.087469  0.003080  0.000000  0.000182
1.053956  0.085910  0.003338  0.000000  0.000182
1.099780  0.084352  0.003607  0.000000  0.000182
1.145604  0.082796  0.003886  0.000000  0.000182
1.191429  0.081242  0.004176  0.000000  0.000182
1.237253  0.079689  0.004476  0.000167  0.000182
1.283077  0.078138  0.004786  0.000250  0.000182
1.328901  0.076588  0.005107  0.000447  0.000182
1.374725  0.075040  0.005438  0.000546  0.000182
1.420549  0.073494  0.005780  0.000697  0.000182
1.466374  0.071949  0.006132  0.000773  0.000182
1.512198  0.070405  0.006495  0.000892  0.000182
1.558022  0.068863  0.006868  0.000952  0.000182
1.603846  0.067323  0.007252  0.001052  0.000182
1.649670  0.065784  0.007646  0.001102  0.000182
1.695495  0.064246  0.008051  0.001189  0.000182
1.741319  0.062711  0.008466  0.001233  0.000182
1.787143  0.061176  0.009055  0.001312  0.000182
1.832967  0.059644  0.009658  0.001351  0.000182
1.878791  0.058112  0.010277  0.001423  0.000182
1.924615  0.056583  0.010909  0.001459  0.000182
1.970440  0.055055  0.011557  0.001527  0.000182
2.016264  0.053528  0.012219  0.001527  0.000182
2.062088  0.052003  0.012896  0.001527  0.000182
2.107912  0.050480  0.013587  0.001527  0.000182
2.153736  0.048958  0.014293  0.001560  0.000182
2.199560  0.047437  0.015014  0.001581  0.000182
2.245385  0.045919  0.015750  0.001633  0.000182
2.291209  0.044401  0.016500  0.001730  0.000182
2.337033  0.042886  0.017265  0.001857  0.000182
2.382857  0.041371  0.018045  0.001994  0.000182
2.428681  0.039859  0.018840  0.002131  0.000182
2.474505  0.038348  0.019649  0.002265  0.000182
2.520330  0.036838  0.020474  0.002393  0.000182
2.566154  0.035330  0.021313  0.002515  0.000182
2.611978  0.033823  0.022167  0.002633  0.000182
2.657802  0.032318  0.023036  0.002745  0.000182
2.703626  0.030815  0.023919  0.002853  0.000182
2.749451  0.029313  0.024818  0.002957  0.000182
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2.795275  0.027813  0.025731  0.003058  0.000182
2.841099  0.026314  0.026660  0.003155  0.000182
2.886923  0.024817  0.027603  0.003250  0.000182
2.932747  0.023321  0.028561  0.003342  0.000182
2.978571  0.021827  0.029535  0.003431  0.000182
3.024396  0.020334  0.030523  0.003518  0.000182
3.070220  0.018843  0.031526  0.003603  0.000182
3.116044  0.017354  0.032544  0.003686  0.000182
3.161868  0.015866  0.033578  0.003767  0.000182
3.207692  0.014379  0.034626  0.003847  0.000182
3.253516  0.012894  0.035689  0.003925  0.000182
3.299341  0.011411  0.036768  0.004001  0.000182
3.345165  0.009929  0.037861  0.004077  0.000182
3.390989  0.008449  0.038970  0.004151  0.000182
3.436813  0.006970  0.040093  0.004224  0.000182
3.482637  0.005493  0.041232  0.004298  0.000182
3.500000  0.004017  0.042221  0.006518  0.000182
END FTABLE  8
FTABLE      7
 16    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.004017  0.000000  0.000000  0.000000
0.045824  0.122760  0.005589  0.000000  0.020255
0.091648  0.124355  0.011251  0.000000  0.024868
0.137473  0.125951  0.016986  0.000000  0.025487
0.183297  0.127549  0.022794  0.000000  0.026105
0.229121  0.129149  0.028676  0.000000  0.026724
0.274945  0.130750  0.034630  0.000000  0.027343
0.320769  0.132353  0.040659  0.000000  0.027962
0.366593  0.133957  0.046760  0.000000  0.028581
0.412418  0.135563  0.052936  0.000000  0.029199
0.458242  0.137170  0.059184  0.000000  0.029818
0.504066  0.138779  0.065507  0.001835  0.030437
0.549890  0.140390  0.071903  0.078597  0.031056
0.595714  0.142002  0.078374  0.205986  0.031674
0.641538  0.143615  0.084918  0.357180  0.032293
0.670000  0.144618  0.089019  0.508956  0.032677
END FTABLE  7
FTABLE     10
 78    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.121166  0.000000  0.000000  0.000000
0.045824  0.120563  0.000033  0.000000  0.000000
0.091648  0.118972  0.000076  0.000000  0.000000
0.137473  0.117382  0.000129  0.000000  0.000000
0.183297  0.115793  0.000192  0.000000  0.000000
0.229121  0.114207  0.000265  0.000000  0.000000
0.274945  0.112622  0.000349  0.000000  0.000000
0.320769  0.111038  0.000442  0.000000  0.000000
0.366593  0.109456  0.000546  0.000000  0.000000
0.412418  0.107875  0.000660  0.000000  0.000309
0.458242  0.106296  0.000785  0.000000  0.000365
0.504066  0.104719  0.000919  0.000000  0.000365
0.549890  0.103143  0.001064  0.000000  0.000365
0.595714  0.101569  0.001220  0.000000  0.000365
0.641538  0.099996  0.001385  0.000000  0.000365
0.687363  0.098424  0.001561  0.000000  0.000365
0.733187  0.096855  0.001747  0.000000  0.000365
0.779011  0.095287  0.001943  0.000000  0.000365
0.824835  0.093720  0.002150  0.000000  0.000365
0.870659  0.092155  0.002367  0.000000  0.000365
0.916484  0.090591  0.002594  0.000000  0.000365
0.962308  0.089029  0.002832  0.000000  0.000365
1.008132  0.087469  0.003080  0.000000  0.000365
1.053956  0.085910  0.003338  0.000000  0.000365
1.099780  0.084352  0.003607  0.000000  0.000365
1.145604  0.082796  0.003886  0.000000  0.000365
1.191429  0.081242  0.004176  0.000000  0.000365
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1.237253  0.079689  0.004476  0.000167  0.000365
1.283077  0.078138  0.004786  0.000250  0.000365
1.328901  0.076588  0.005107  0.000447  0.000365
1.374725  0.075040  0.005438  0.000546  0.000365
1.420549  0.073494  0.005780  0.000697  0.000365
1.466374  0.071949  0.006132  0.000773  0.000365
1.512198  0.070405  0.006495  0.000892  0.000365
1.558022  0.068863  0.006868  0.000952  0.000365
1.603846  0.067323  0.007252  0.001052  0.000365
1.649670  0.065784  0.007646  0.001102  0.000365
1.695495  0.064246  0.008051  0.001189  0.000365
1.741319  0.062711  0.008466  0.001233  0.000365
1.787143  0.061176  0.009055  0.001312  0.000365
1.832967  0.059644  0.009658  0.001351  0.000365
1.878791  0.058112  0.010277  0.001423  0.000365
1.924615  0.056583  0.010909  0.001459  0.000365
1.970440  0.055055  0.011557  0.001527  0.000365
2.016264  0.053528  0.012219  0.001527  0.000365
2.062088  0.052003  0.012896  0.001527  0.000365
2.107912  0.050480  0.013587  0.001527  0.000365
2.153736  0.048958  0.014293  0.001560  0.000365
2.199560  0.047437  0.015014  0.001581  0.000365
2.245385  0.045919  0.015750  0.001633  0.000365
2.291209  0.044401  0.016500  0.001730  0.000365
2.337033  0.042886  0.017265  0.001857  0.000365
2.382857  0.041371  0.018045  0.001994  0.000365
2.428681  0.039859  0.018840  0.002131  0.000365
2.474505  0.038348  0.019649  0.002265  0.000365
2.520330  0.036838  0.020474  0.002393  0.000365
2.566154  0.035330  0.021313  0.002515  0.000365
2.611978  0.033823  0.022167  0.002633  0.000365
2.657802  0.032318  0.023036  0.002745  0.000365
2.703626  0.030815  0.023919  0.002853  0.000365
2.749451  0.029313  0.024818  0.002957  0.000365
2.795275  0.027813  0.025731  0.003058  0.000365
2.841099  0.026314  0.026660  0.003155  0.000365
2.886923  0.024817  0.027603  0.003250  0.000365
2.932747  0.023321  0.028561  0.003342  0.000365
2.978571  0.021827  0.029535  0.003431  0.000365
3.024396  0.020334  0.030523  0.003518  0.000365
3.070220  0.018843  0.031526  0.003603  0.000365
3.116044  0.017354  0.032544  0.003686  0.000365
3.161868  0.015866  0.033578  0.003767  0.000365
3.207692  0.014379  0.034626  0.003847  0.000365
3.253516  0.012894  0.035689  0.003925  0.000365
3.299341  0.011411  0.036768  0.004001  0.000365
3.345165  0.009929  0.037861  0.004077  0.000365
3.390989  0.008449  0.038970  0.004151  0.000365
3.436813  0.006970  0.040093  0.004224  0.000365
3.482637  0.005493  0.041232  0.004298  0.000365
3.500000  0.004017  0.042236  0.006518  0.000365
END FTABLE 10
FTABLE      9
 16    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.004017  0.000000  0.000000  0.000000
0.045824  0.122760  0.005589  0.000000  0.020255
0.091648  0.124355  0.011251  0.000000  0.024868
0.137473  0.125951  0.016986  0.000000  0.025487
0.183297  0.127549  0.022794  0.000000  0.026105
0.229121  0.129149  0.028676  0.000000  0.026724
0.274945  0.130750  0.034630  0.000000  0.027343
0.320769  0.132353  0.040659  0.000000  0.027962
0.366593  0.133957  0.046760  0.000000  0.028581
0.412418  0.135563  0.052936  0.000000  0.029199
0.458242  0.137170  0.059184  0.000000  0.029818
0.504066  0.138779  0.065507  0.001835  0.030437
0.549890  0.140390  0.071903  0.078597  0.031056
0.595714  0.142002  0.078374  0.205986  0.031674
```

```
0.641538  0.143615  0.084918  0.357180  0.032293
0.670000  0.144618  0.089019  0.508956  0.032677
END FTABLE  9
FTABLE     12
 71    5
    Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
     (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
0.000000  0.022957  0.000000  0.000000  0.000000
0.054066  0.022957  0.000372  0.000000  0.000000
0.108132  0.022957  0.000745  0.000000  0.000000
0.162198  0.022957  0.001117  0.000000  0.000000
0.216264  0.022957  0.001489  0.000000  0.000000
0.270330  0.022957  0.001862  0.000000  0.000000
0.324396  0.022957  0.002234  0.000000  0.000000
0.378462  0.022957  0.002606  0.000000  0.001600
0.432527  0.022957  0.002979  0.000000  0.002083
0.486593  0.022957  0.003351  0.000000  0.002083
0.540659  0.022957  0.003724  0.000000  0.002083
0.594725  0.022957  0.004096  0.000000  0.002083
0.648791  0.022957  0.004468  0.000000  0.002083
0.702857  0.022957  0.004841  0.000000  0.002083
0.756923  0.022957  0.005213  0.000000  0.002083
0.810989  0.022957  0.005585  0.000000  0.002083
0.865055  0.022957  0.005958  0.000000  0.002083
0.919121  0.022957  0.006330  0.000000  0.002083
0.973187  0.022957  0.006702  0.000000  0.002083
1.027253  0.022957  0.007075  0.000000  0.002083
1.081319  0.022957  0.007447  0.000000  0.002083
1.135385  0.022957  0.007819  0.000000  0.002083
1.189451  0.022957  0.008192  0.000000  0.002083
1.243516  0.022957  0.008564  0.000000  0.002083
1.297582  0.022957  0.008937  0.000000  0.002083
1.351648  0.022957  0.009309  0.000654  0.002083
1.405714  0.022957  0.009681  0.000980  0.002083
1.459780  0.022957  0.010054  0.001914  0.002083
1.513846  0.022957  0.010426  0.002381  0.002083
1.567912  0.022957  0.010798  0.003095  0.002083
1.621978  0.022957  0.011171  0.003451  0.002083
1.676044  0.022957  0.011543  0.004011  0.002083
1.730110  0.022957  0.011915  0.004291  0.002083
1.784176  0.022957  0.012430  0.004757  0.002083
1.838242  0.022957  0.012946  0.004989  0.002083
1.892308  0.022957  0.013461  0.005395  0.002083
1.946374  0.022957  0.013976  0.005598  0.002083
2.000440  0.022957  0.014491  0.005962  0.002083
2.054505  0.022957  0.015006  0.006144  0.002083
2.108571  0.022957  0.015521  0.006478  0.002083
2.162637  0.022957  0.016036  0.006644  0.002083
2.216703  0.022957  0.016551  0.006954  0.002083
2.270769  0.022957  0.017066  0.007166  0.002083
2.324835  0.022957  0.017581  0.007680  0.002083
2.378901  0.022957  0.018096  0.008309  0.002083
2.432967  0.022957  0.018612  0.008965  0.002083
2.487033  0.022957  0.019127  0.009613  0.002083
2.541099  0.022957  0.019642  0.010237  0.002083
2.595165  0.022957  0.020157  0.010834  0.002083
2.649231  0.022957  0.020672  0.011403  0.002083
2.703297  0.022957  0.021187  0.011947  0.002083
2.757363  0.022957  0.021702  0.012468  0.002083
2.811429  0.022957  0.022217  0.012969  0.002083
2.865495  0.022957  0.022732  0.013450  0.002083
2.919560  0.022957  0.023247  0.013915  0.002083
2.973626  0.022957  0.023762  0.014364  0.002083
3.027692  0.022957  0.024278  0.014800  0.002083
3.081758  0.022957  0.024793  0.015224  0.002083
3.135824  0.022957  0.025308  0.015635  0.002083
3.189890  0.022957  0.025823  0.016037  0.002083
3.243956  0.022957  0.026338  0.016428  0.002083
3.298022  0.022957  0.026853  0.016811  0.002083
3.352088  0.022957  0.027368  0.017185  0.002083
```

```
  3.406154  0.022957  0.027883  0.017551  0.002083
  3.460220  0.022957  0.028398  0.017910  0.002083
  3.514286  0.022957  0.028913  0.018262  0.002083
  3.568352  0.022957  0.029428  0.018609  0.002083
  3.622418  0.022957  0.029944  0.018950  0.002083
  3.676484  0.022957  0.030459  0.019286  0.002083
  3.730549  0.022957  0.030974  0.019623  0.002083
  3.750000  0.022957  0.033691  0.028557  0.002083
  END FTABLE 12
  FTABLE     11
   23    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.022957  0.000000  0.000000  0.000000
  0.054066  0.023481  0.001255  0.000000  0.115741
  0.108132  0.024009  0.002539  0.000000  0.143374
  0.162198  0.024542  0.003852  0.000000  0.147546
  0.216264  0.025081  0.005193  0.000000  0.151718
  0.270330  0.025624  0.006564  0.000000  0.155890
  0.324396  0.026172  0.007964  0.000000  0.160062
  0.378462  0.026724  0.009394  0.000000  0.164233
  0.432527  0.027282  0.010854  0.000000  0.168405
  0.486593  0.027844  0.012344  0.000000  0.172577
  0.540659  0.028411  0.013865  0.000000  0.176749
  0.594725  0.028983  0.015416  0.000000  0.180920
  0.648791  0.029560  0.016999  0.000000  0.185092
  0.702857  0.030142  0.018613  0.000000  0.189264
  0.756923  0.030728  0.020258  0.000000  0.193436
  0.810989  0.031320  0.021936  0.000000  0.197607
  0.865055  0.031916  0.023645  0.000000  0.201779
  0.919121  0.032517  0.025387  0.000000  0.205951
  0.973187  0.033123  0.027161  0.000000  0.210123
  1.027253  0.033734  0.028969  0.099484  0.214294
  1.081319  0.034349  0.030809  0.512220  0.218466
  1.135385  0.034969  0.032683  1.098833  0.222638
  1.170000  0.035369  0.033901  1.814278  0.225309
  END FTABLE 11
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM     22 IRRG     ENGL    0.7       SAME PERLND  46     EXTNL  SURLI
WDM     22 IRRG     ENGL    0.7       SAME PERLND  43     EXTNL  SURLI
WDM      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      2 PREC     ENGL    1              RCHRES   3     EXTNL  PREC
WDM      2 PREC     ENGL    1              RCHRES   5     EXTNL  PREC
WDM      2 PREC     ENGL    1              RCHRES   7     EXTNL  PREC
WDM      2 PREC     ENGL    1              RCHRES   9     EXTNL  PREC
WDM      2 PREC     ENGL    1              RCHRES  11     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5            RCHRES   3     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   4     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5            RCHRES   5     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   6     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5            RCHRES   7     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   8     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5            RCHRES   9     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES  10     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5            RCHRES  11     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES  12     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
```

```
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   2 HYDR   RO     1 1         1      WDM   1000 FLOW     ENGL       REPL
RCHRES   2 HYDR   STAGE  1 1         1      WDM   1001 STAG     ENGL       REPL
RCHRES   1 HYDR   STAGE  1 1         1      WDM   1002 STAG     ENGL       REPL
RCHRES   1 HYDR   O      1 1         1      WDM   1003 FLOW     ENGL       REPL
COPY     1 OUTPUT MEAN   1 1      12.1      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN   1 1      12.1      WDM    801 FLOW     ENGL       REPL
COPY   601 OUTPUT MEAN   1 1      12.1      WDM    901 FLOW     ENGL       REPL
RCHRES   4 HYDR   RO     1 1         1      WDM   1004 FLOW     ENGL       REPL
RCHRES   4 HYDR   O      1 1         1      WDM   1005 FLOW     ENGL       REPL
RCHRES   4 HYDR   O      2 1         1      WDM   1006 FLOW     ENGL       REPL
RCHRES   4 HYDR   STAGE  1 1         1      WDM   1007 STAG     ENGL       REPL
RCHRES   3 HYDR   STAGE  1 1         1      WDM   1008 STAG     ENGL       REPL
RCHRES   3 HYDR   O      1 1         1      WDM   1009 FLOW     ENGL       REPL
COPY     2 OUTPUT MEAN   1 1      12.1      WDM    702 FLOW     ENGL       REPL
COPY   502 OUTPUT MEAN   1 1      12.1      WDM    802 FLOW     ENGL       REPL
COPY   602 OUTPUT MEAN   1 1      12.1      WDM    902 FLOW     ENGL       REPL
RCHRES   6 HYDR   RO     1 1         1      WDM   1010 FLOW     ENGL       REPL
RCHRES   6 HYDR   O      1 1         1      WDM   1011 FLOW     ENGL       REPL
RCHRES   6 HYDR   O      2 1         1      WDM   1012 FLOW     ENGL       REPL
RCHRES   6 HYDR   STAGE  1 1         1      WDM   1013 STAG     ENGL       REPL
RCHRES   5 HYDR   STAGE  1 1         1      WDM   1014 STAG     ENGL       REPL
RCHRES   5 HYDR   O      1 1         1      WDM   1015 FLOW     ENGL       REPL
COPY     3 OUTPUT MEAN   1 1      12.1      WDM    703 FLOW     ENGL       REPL
COPY   503 OUTPUT MEAN   1 1      12.1      WDM    803 FLOW     ENGL       REPL
COPY   603 OUTPUT MEAN   1 1      12.1      WDM    903 FLOW     ENGL       REPL
COPY     4 OUTPUT MEAN   1 1      12.1      WDM    704 FLOW     ENGL       REPL
COPY   504 OUTPUT MEAN   1 1      12.1      WDM    804 FLOW     ENGL       REPL
COPY   604 OUTPUT MEAN   1 1      12.1      WDM    904 FLOW     ENGL       REPL
COPY     5 OUTPUT MEAN   1 1      12.1      WDM    705 FLOW     ENGL       REPL
COPY   505 OUTPUT MEAN   1 1      12.1      WDM    805 FLOW     ENGL       REPL
COPY   605 OUTPUT MEAN   1 1      12.1      WDM    905 FLOW     ENGL       REPL
RCHRES   8 HYDR   RO     1 1         1      WDM   1016 FLOW     ENGL       REPL
RCHRES   8 HYDR   O      1 1         1      WDM   1017 FLOW     ENGL       REPL
RCHRES   8 HYDR   O      2 1         1      WDM   1018 FLOW     ENGL       REPL
RCHRES   8 HYDR   STAGE  1 1         1      WDM   1019 STAG     ENGL       REPL
RCHRES   7 HYDR   STAGE  1 1         1      WDM   1020 STAG     ENGL       REPL
RCHRES   7 HYDR   O      1 1         1      WDM   1021 FLOW     ENGL       REPL
RCHRES  10 HYDR   RO     1 1         1      WDM   1022 FLOW     ENGL       REPL
RCHRES  10 HYDR   O      1 1         1      WDM   1023 FLOW     ENGL       REPL
RCHRES  10 HYDR   O      2 1         1      WDM   1024 FLOW     ENGL       REPL
RCHRES  10 HYDR   STAGE  1 1         1      WDM   1025 STAG     ENGL       REPL
RCHRES   9 HYDR   STAGE  1 1         1      WDM   1026 STAG     ENGL       REPL
RCHRES   9 HYDR   O      1 1         1      WDM   1027 FLOW     ENGL       REPL
RCHRES  12 HYDR   RO     1 1         1      WDM   1028 FLOW     ENGL       REPL
RCHRES  12 HYDR   O      1 1         1      WDM   1029 FLOW     ENGL       REPL
RCHRES  12 HYDR   O      2 1         1      WDM   1030 FLOW     ENGL       REPL
RCHRES  12 HYDR   STAGE  1 1         1      WDM   1031 STAG     ENGL       REPL
RCHRES  11 HYDR   STAGE  1 1         1      WDM   1032 STAG     ENGL       REPL
RCHRES  11 HYDR   O      1 1         1      WDM   1033 FLOW     ENGL       REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
```

```
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17

  MASS-LINK       18
RCHRES     OFLOW  OVOL   2                 COPY           INPUT  MEAN
  END MASS-LINK   18


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1966/12/ 5  8: 0

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
24 1.5389E+04 1.5999E+04 1.6066E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1966/12/ 5  8: 0

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
7.6100E+01 2.1157E+04 -2.355E+04    1.1085  1.1085E+00      3
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1966/12/ 6 20: 0

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
24 1.5389E+04 1.5999E+04 1.6192E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1966/12/ 6 20: 0

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
7.6100E+01 2.1157E+04 -2.793E+04    1.3138  1.3138E+00      3
```

Disclaimer

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DRAWDOWN CALCULATIONS

Drawdown calculations have been performed using the storage capacity of the proposed basin, and the standard equation for Orifice shown below.

Darcy's law equation was used for soil and gravel dry-time, to account for the signicant energy loss achieved in these layers.

Based on these calculations:

-No Vector Control Plan is required since structural BMP will drain in less than 96 hrs.

EQUATIONS

Orifice Discharge

$$Q_0 = \frac{\pi D^2 \times c_g \times \sqrt{2g(H - \frac{D}{24})}}{576}$$

Max Q based on infiltration rate of 5in/hr

$$Q_{max} = \frac{A_{basin}}{8640}$$

Drawdown calculation

$$t(sec) = \int_0^{H_1} \frac{L}{\sqrt{(H)}} + \int_{H_1}^{H_2} \frac{L}{\sqrt{(H)}}$$

Height at witch Qmax is reached

$$H_Q = \frac{A_{basin} \times 4}{8640 \times \pi D^2 \times c_g \times \sqrt{2g}}$$

$$L_1 = \frac{0.4 \times A_{basin} \times 4}{\pi D^2 \times c_g \times \sqrt{2g}} \quad ; L_2 = \frac{A_{basin} \times 4}{\pi D^2 \times c_g \times \sqrt{2g}}$$

$$H_1 = gravel + soil\ media\ depth$$

$$H_2 = surface\ ponding + gravel + soil\ media\ depth$$

Low Orifice Equations for Dry-time Calculations

Darcy's Law & Orifice Discharge

$$Q = \frac{f \times A}{43200} \times \frac{\Delta H}{Hmedia} = \frac{\pi D^2 \times c_g \times \sqrt{2g(H - \Delta H - \frac{D}{24})}}{576}$$

$$\Delta H = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

$$a = 1 \qquad b = \frac{11250\pi^2 D^4 \times c_g^2 \times g \times Hmedia^2}{f^2 \times A^2}$$

$$c = b(\frac{D}{24} - H)$$

Units
D: in
H: ft
Q: cfs
f: in/hr
A: sq. ft.

BMP 1

Surface Storage

Freeboard Height (in)	Freeboard Height (ft)	Max Suface Storage Area (Sq. ft.)	Max Suface Storage Volume (Cu.ft.)
18	1.50	8540	12810

Subsurface Storage

Soil Layer	Depth (in)	Depth (ft)	Area (Sq. ft.)	Porosity	Volume (Cu. Ft.)
Amended	18	1.5	8540	0.4	5124
Gravel	39	3.25	8540	0.4	11102
		Total Subsurface Storage			**16226**

Total Basin Storage

	Volume (Cu. Ft.)
Volume Surface Storage	12810
Volume of Subsurface Void	16226
Total Storage Volume	**29036**

Drawdown time

Low Orifice	
Diameter (in)	1.80
# of orifices	1
coefficient (cg)	0.614

Other Parameters	
Hq (ft)	128.86
H1 (ft)	4.75
H2 (ft)	6.25
L1 (s/ft^1/2)	39231.43
L2 (s/ft^1/2)	98078.58

Drawdown time ponding (hr)	17.47
Drawdown time (hr)	**64.968**

BMP 2

Surface Storage

Freeboard Height (in)	Freeboard Height (ft)	Max Suface Storage Area (Sq. ft.)	Max Suface Storage Volume (Cu.ft.)
12	1.00	2560	2560

Subsurface Storage

Soil Layer	Depth (in)	Depth (ft)	Area (Sq. ft.)	Porosity	Volume (Cu. Ft.)
Amended	18	1.5	2560	0.4	1536
Gravel	18	1.5	2560	0.4	1536
		Total Subsurface Storage			**3072**

Total Basin Storage

	Volume (Cu. Ft.)
Volume Surface Storage	2560
Volume of Subsurface Void	3072
Total Storage Volume	**5632**

Drawdown time

Low Orifice	
Diameter (in)	1.25
# of orifices	1
coefficient (cg)	0.614

Other Parameters	
Hq (ft)	49.79
H1 (ft)	3.00
H2 (ft)	4.00
L1 (s/ft^1/2)	24386.04
L2 (s/ft^1/2)	60965.09

Drawdown time ponding (hr)	9.08
Drawdown time (hr)	**32.541**

BMP 3A

Surface Storage

Freeboard Height (in)	Freeboard Height (ft)	Max Suface Storage Area (Sq. ft.)	Max Suface Storage Volume (Cu.ft.)
12	1.00	2000	2000

Subsurface Storage

Soil Layer	Depth (in)	Depth (ft)	Area (Sq. ft.)	Porosity	Volume (Cu. Ft.)
Amended	18	1.5	2000	0.4	1200
Gravel	24	2	2000	0.4	1600
		Total Subsurface Storage			**2800**

Total Basin Storage

	Volume (Cu. Ft.)
Volume Surface Storage	2000
Volume of Subsurface Void	2800
Total Storage Volume	**4800**

Drawdown time

Low Orifice	
Diameter (in)	1.00
# of orifices	1
coefficient (cg)	0.614

Other Parameters	
Hq (ft)	74.19
H1 (ft)	3.50
H2 (ft)	4.50
L1 (s/ft^1/2)	29768.11
L2 (s/ft^1/2)	74420.28

Drawdown time ponding (hr)	10.36
Drawdown time (hr)	**41.296**

Surface Storage

Freeboard Height (in)	Freeboard Height (ft)	Max Suface Storage Area (Sq. ft.)	Max Suface Storage Volume (Cu.ft.)
12	1.00	1000	1000

Subsurface Storage

Soil Layer	Depth (in)	Depth (ft)	Area (Sq. ft.)	Porosity	Volume (Cu. Ft.)
Amended	18	1.5	1000	0.4	600
Gravel	24	2	1000	0.4	800
		Total Subsurface Storage			**1400**

Total Basin Storage

	Volume (Cu. Ft.)
Volume Surface Storage	1000
Volume of Subsurface Void	1400
Total Storage Volume	**2400**

Drawdown time

Low Orifice	
Diameter (in)	0.75
# of orifices	1
coefficient (cg)	0.614

Other Parameters	
Hq (ft)	58.62
H1 (ft)	3.50
H2 (ft)	4.50
L1 (s/ft^1/2)	26460.54
L2 (s/ft^1/2)	66151.36

Drawdown time ponding (hr)	9.21
Drawdown time (hr)	**36.708**

BMP 4

Surface Storage

Freeboard Height (in)	Freeboard Height (ft)	Max Suface Storage Area (Sq. ft.)	Max Suface Storage Volume (Cu.ft.)
6	0.50	175	87.5

→ 350 LF by 6" wide flat portion

Subsurface Storage

Soil Layer	Depth (in)	Depth (ft)	Area (Sq. ft.)	Porosity	Volume (Cu. Ft.)
Amended	18	1.5	175	0.4	105
Gravel	21	1.75	175	0.4	122.5
		Total Subsurface Storage			**227.5**

Total Basin Storage

	Volume (Cu. Ft.)
Volume Surface Storage	87.5
Volume of Subsurface Void	227.5
Total Storage Volume	**315**

Drawdown time

Low Orifice	
Diameter (in)	0.37
# of orifices	1
coefficient (cg)	0.614

Other Parameters	
Hq (ft)	32.00
H1 (ft)	3.25
H2 (ft)	3.75
L1 (s/ft^1/2)	19551.21
L2 (s/ft^1/2)	48878.02

Drawdown time ponding (hr)	3.63
Drawdown time (hr)	**23.212**

Surface Storage

Freeboard Height (in)	Freeboard Height (ft)	Max Suface Storage Area (Sq. ft.)	Max Suface Storage Volume (Cu.ft.)
6	0.50	175	87.5

→ 350 LF by 6" wide flat portion

Subsurface Storage

Soil Layer	Depth (in)	Depth (ft)	Area (Sq. ft.)	Porosity	Volume (Cu. Ft.)
Amended	18	1.5	175	0.4	105
Gravel	21	1.75	175	0.4	122.5
		Total Subsurface Storage			**227.5**

Total Basin Storage

	Volume (Cu. Ft.)
Volume Surface Storage	87.5
Volume of Subsurface Void	227.5
Total Storage Volume	**315**

Drawdown time

Low Orifice	
Diameter (in)	0.37
# of orifices	1
coefficient (cg)	0.614

Other Parameters	
Hq (ft)	32.00
H1 (ft)	3.25
H2 (ft)	3.75
L1 (s/ft^1/2)	19551.21
L2 (s/ft^1/2)	48878.02

Drawdown time ponding (hr)	3.63
Drawdown time (hr)	**23.212**

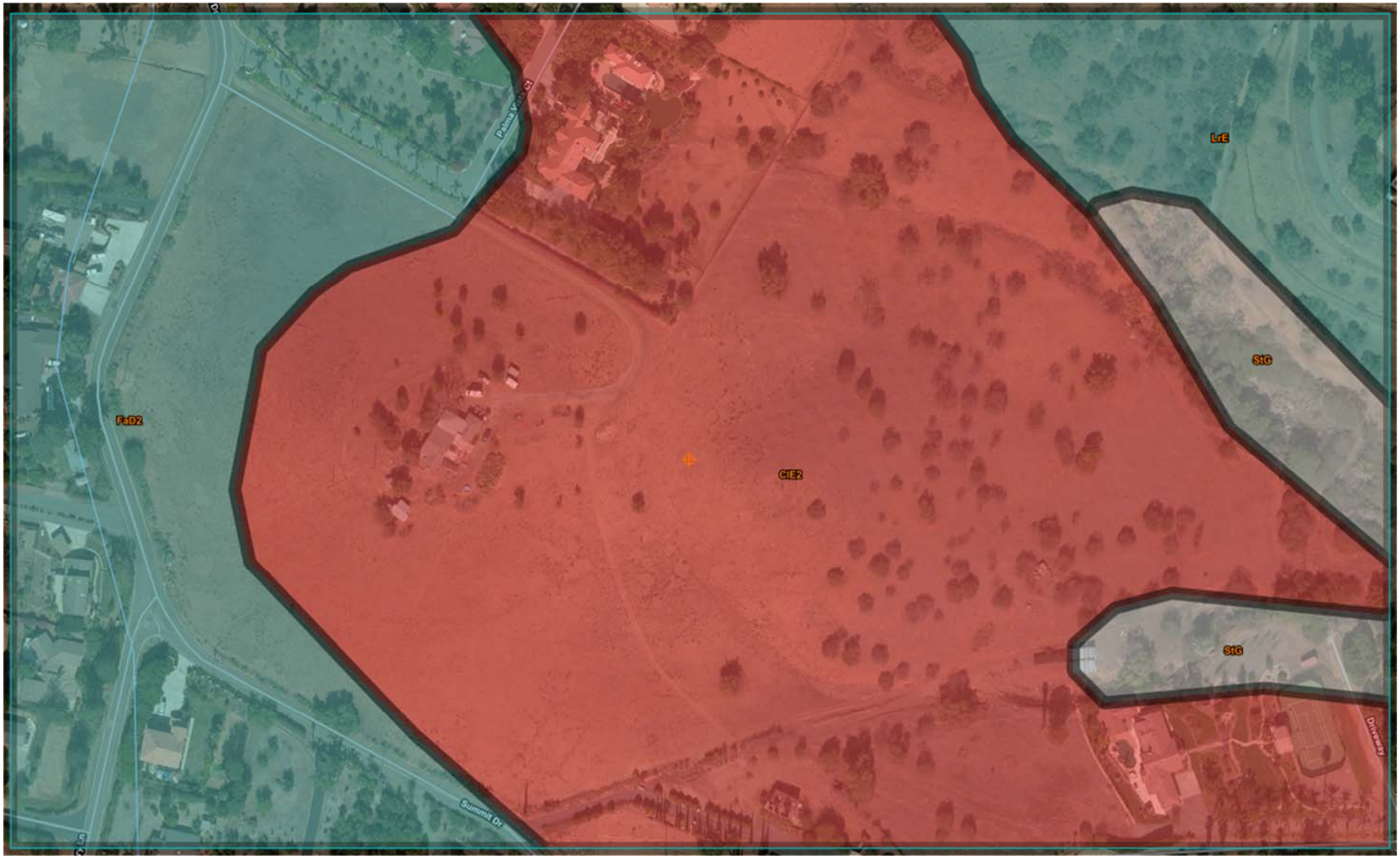
NRCS Web Soil Survey

Tables — Hydrologic Soil Group — Summary By Map Unit

Summary by Map Unit — San Diego County Area, California (CA638)

Summary by Map Unit — San Diego County Area, California (CA638)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ClE2	Cieneba coarse sandy loam, 15 to 30 percent slopes, eroded	D	25.9	59.4%
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	C	11.5	26.4%
LrE	Las Posas stony fine sandy loam, 9 to 30 percent slopes	C	3.5	8.1%
StG	Steep gullied land		2.7	6.2%
Totals for Area of Interest			**43.6**	**100.0%**



POC 2

SUMMIT DRIVE

E2
5.32
AC

E1
8.45
AC

E4
1.60
AC

E3
3.48
AC

E5
3.95
AC

PVT DRIVEWAY

POC 1

POC 4

POC 5

MARY LANE

SUMMIT DRIVE

POC 3

LEGEND

WATERSHED BOUNDARY . . . . . .

POINT OF COMPLIANCE . . . . . POC 1

FLOW PATH . . . . . .

BASIN INFORMATION . . . . . BASIN / AC

N

0 25 50 100 150

(IN FEET)
1 inch = 50 ft.

SUMMIT ESTATES
EXISTING DRAINAGE AREAS

SCALE: 1" = 50'
DRAWN BY: CM
DATE: 04/10/2020
CHECKED BY: GP
JOB NO.: 1599.10
SHEET: 1 OF 1

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

\\LA123-FS01\Engineering\1500\1599.10 - McNamara Ventures - 23 Acre Prelim Eng\Engineering\Reports\Water Quality\Attachment 02 - DMA Exhibit\Existing Conditions.dwg
4/9/2020 4:56:19 PM

8.2 Hydromodification Management Points of Compliance

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

POC name or #	Channel name or #	POC Description
1	Channel 1	Flows to natural channel east of project. Converges with Channel 2 500' downstream of site. Both eventually flow to Santa Ysabel Creek and then to Lake Hodges.
2	Kit Carson Creek	Flows to pipe beneath Summit Drive. Eventually flows to Kit Carson Creek and then to Lake Hodges.
3	Santa Ysabel Creek	Flows to Summit Drive and then southeast. Eventually flows to Santa Ysabel Creek and then to Lake Hodges.
4	Kit Carson Creek	Flows to pipe at Mary Lane. Eventually flows to Kit Carson Creek and then to Lake Hodges.
5	Channel 2	Flows to natural channel south of project. Converges with Channel 1 500' downstream of site. Both eventually flow to Santa Ysabel Creek and then to Lake Hodges.

9.0 General Requirements

- Complete the table below to indicate which compliance pathway was selected in PDP SWQMP Table 6. Include the corresponding sub-attachment with your SWQMP submittal. Other sub-attachments do not need to be included.
- See the BMPDM sections and appendices listed under "BMPDM Design Resources" for additional explanation of design requirements. Constructed features must fully satisfy the requirements described in these resources, and any other guidance identified by the County.
- DMA Exhibits and Construction Plans: CCSYAs and applicable BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.

Sub-attachments	BMPDM Design Resources
☐ **9.1: Documentation of Hydromodification Management Exemption**[1]	Section 1.6
☐ **9.2: Watershed Management Area Analysis (WMAA) Mapping**[1]	Appendix H.1.1.2
☒ **9.3: Resource Protection Ordinance (RPO) Methods**	Appendix H.1.1.1
☐ **9.4: No Net Impact Analysis**	Appendix H.4

[1] The San Diego County Regional comprehensive WMAA mapping data can be found on the Project Clean Water website here: http://www.projectcleanwater.org/download/wmaa_attc_data/

9.3 Resource Protection Ordinance (RPO) Methods (BMPDM Appendix H.1.1.1)

- Either of two Resource Protection Ordinance (RPO) methods may also be used to demonstrate compliance with CCSYA requirements. Select either option and document the selection below:

  ☒ **RPO Scenario 1: PDP is subject to and in compliance with RPO requirements**[5]

  - **Select** if the project requires one or more discretionary permits;
  - **Demonstrate** that onsite AND upstream offsite CCSYAs will be avoided and/or bypassed.

  ☐ **RPO Scenario 2: PDP is entirely exempt/not subject to RPO requirements**[6]

  - **Select** if the project does not require discretionary permits;
  - **Demonstrate** that all upstream offsite CCSYAs will be bypassed[7].

A. Mapping Results -- At a minimum, show as applicable: (1) the project footprint, (2) areas of proposed development, (3) locations of onsite and upstream offsite CCSYAs, and (4) bypass of all identified CCSYAs.

No RPO steep slopes on-site

[5] RPO applicability is normally confirmed during discretionary review. Check with your project manager if you're not sure of your status.
[6] Does not include PDPs utilizing exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3).
[7] This scenario does not impose requirements for onsite CCSYAs.

B. Explanation -- Provide documentation as needed to demonstrate that (1) onsite CCSYAs are avoided and bypassed [if applicable], and (2) upstream offsite CCYSAs are effectively bypassed. Add pages as necessary.

No RPO steep slopes existing on-site. Therefore, there are no PCCYSAs on-site.

There is no off-site drainage tributary to the project's limits of disturbance. Therefore, there are no upstream off-site PCCYSAs. Any off-site upstream PCCYSAs will be bypassed through the natural drainage channel that will be undisturbed.

This form must be accepted by the County prior to the release of construction permits or granting of occupancy for applicable portions of a Priority Development Project (PDP). Its purpose is to provide documentation of the final installation of permanent Best Management Practices (BMPs) used to satisfy Structural Performance Standards for the development project. Compliance with these standards reduces the discharge of pollutants and flows from the completed project site. Applicable standards may be satisfied using Structural BMPs (S-BMPs), Significant Site Design BMPs (SSD-BMPs), or both. Applicants are responsible for providing all requested information. Do not leave any fields blank; indicate *N/A* for any requested item that is not applicable.

PART 1 General Project and Applicant Information

Table 1: Project and Applicant Information

A. Project Summary Information	**ID No. IVF-20___-____ To be assigned by DPW-WPP**
Project Name	Summit Estates
Record ID (e.g. grading/improvement plan number, building permit)	Click here to enter text.
Project Address	2510 Summit Drive, Escondido, CA 92025
Assessor's Parcel Number(s) APN(s)	237-090-05
Project Watershed (complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Dieguito Hydrologic Unit Portion 905.21: Hodges HA/Del Dios HSA Portion 905.32: San Pasqual HA/Las Lomas Muertas HSA
B. Owner Information	
Name	2510 Summit, LLC
Address	19782 MacArthur Blvd, Suite 300, Irvine, CA 92612
Email Address	(949) 933-4103
Phone Number	oscar@img-cm.com

****THIS PAGE IS FOR PARTIAL RECORD PLAN VERIFICATIONS ONLY ****

If this is a partial Installation Verification Form submittal, list ALL DMAs and BMPs for the Priority Development Project in **Table 2**. Provide acceptance information where applicable.

Table 2: Information for Partial IVF Submittals

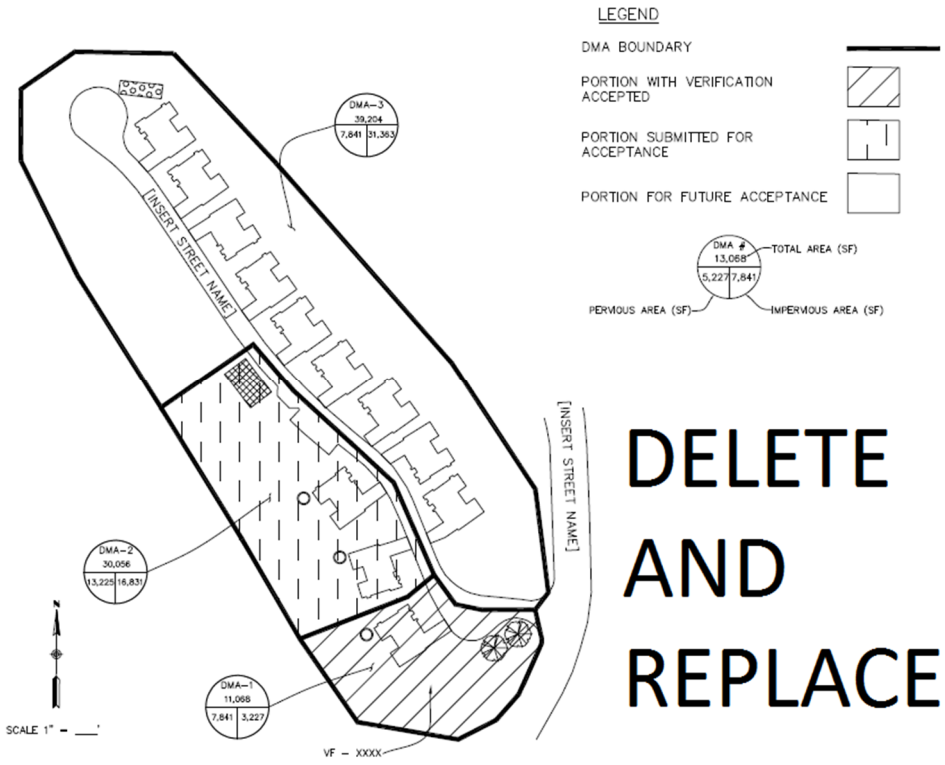
A: DMA and BMP Information

DMA #	Structural and Significant Site Design BMPs	WPP Acceptance Date	IVF ID No. (e.g. 2018-001)

B: DMA and BMP Map

Please attach a map showing (1) all DMAs for the project site, (2) the DMAs and/or lots accepted under previous Verification Forms, and (3) the locations of Structural BMPs and Significant Site Design BMPs previously accepted.

SAMPLE DMA MAP



PART 2 DMA and BMP Inventory Information

Use this table to document Structural BMPs (S-BMPs) and Significant Site Design BMPs (SSD-BMPs) for the PDP. All DMAs that are not self-mitigating or de minimis must have at least one Structural BMP or Significant Site Design BMP.

- In **Part A**, list all Structural BMPs (including both Pollutant Control and/or Hydromodification as applicable) by DMA.
- Complete **Part B** for all DMAs that contain only Significant Site Design BMPs. SSD-BMPs are Site Design BMPs (SD-BMPs) that are sized and constructed to satisfy Structural Performance Standards for a DMA.
- Documentation of SD-BMPs is not required in this table for any DMA that also contains S-BMPs.
- The information provided for each BMP in the table must match that provided in the Stormwater Quality Management Plan (SWQMP), construction plans, maintenance agreements, and other relevant project documentation.

Table 3: Required Information for Structural BMPs and Significant Site Design BMPs

DMA #	BMP Information			Maintenance Category	Maintenance Agreement or Maintenance Notification Recorded Doc. #	Construction Plan Sheet #	Landscape Plan # & Sheet # (For Vegetated BMPs Only)	FOR DPW-WPP USE ONLY *Reviewer concurs that the BMP(s) may be accepted into inventory (date and initial)*
	Quantity	Description/Type of Structural BMP	BMP ID #(s)					
Part A Structural BMPs (S-BMPs)								
1	1	Biofiltration	1	2		TM Sheet 5		
2	1	Biofiltration w/ partial retention	2	2		TM Sheet 5		
3A	1	Biofiltration w/ partial retention	3A	2		TM Sheet 5		
3B	1	Biofiltration w/ partial retention	3B	2		TM Sheet 5		
7	1	Biofiltration w/ partial retention	4	4		TM Sheet 5		
6	1	Biofiltration w/ partial retention	5	4		TM Sheet 5		
Part B Significant Site Design BMPs (SSD-BMPs)								
		Choose an item.		---	---			
		Choose an item.		---	---			

		Choose an item.		---	---			
Add rows as needed								

PART 3 Required Attachments for All BMPs Listed in Table 3

For ALL projects, submit the following to the County inspector (check all that are attached):

☐ Photographs: Labeled photographs illustrating proper construction of each S-BMP or SSD-BMP.

☐ Maintenance Agreements: Copies of all approved and recorded Storm Water Maintenance Agreements (SWMAs) or Maintenance Notifications (MNs) for all S-BMPs.

Note: All BMPs proposed for County ownership will remain the responsibility of the owner listed on **Page 1** until a signed Letter of Acceptance of Completion is received by the DPW Watershed Protection Program.

For Grading and Improvement projects only, ALSO submit:

☐ Construction Plans: An 11" X 17" copy of the most current applicable approved Construction Plan sheets:

- ☐ Grading Plans, AND/OR
- ☐ Improvement Plans, AND/OR
- ☐ Precise Grading Plan(s) (only for residential subdivisions with tract homes), AND/OR
- ☐ Other (Please specify) Click here to enter text.

Note: For each Construction Plan, the sheets submitted must incorporate all of the following:

- ☐ A BMP Table, AND
- ☐ A plan/cross-section of each verified as-built BMP, AND
- ☐ The location of each verified as-built BMP

☐ Landscape Plans: An 11" X 17" copy of the most current applicable Landscape Plan sheets where the BMPs are required to be vegetated, including:

- ☐ The Certification of Completion (Form 407), AND
- ☐ The Certificate of Approval from PDS Landscape Architect

Note: For each Landscape Plan, the sheets submitted must show the location of each verified as-built BMP.

Required only for Verifications for Partial Record Plans

☐ If this is a partial record plan verification, please include the following:

- ☐ A list of previously submitted Verification Forms (**Table 2, A**)
- ☐ A map of DMAs and BMPs (**Table 2, B**)

PART 4 Preparer's Certification

By signing below, I certify that the BMP(s) listed in Table 3 of this Verification Form have been constructed and all 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.

Note: Structural BMPs (Table 3, Part A) must be certified by a licensed professional engineer.

Please sign and, if applicable, provide your seal below.

Preparer's Printed Name:

____Giovanni Posillico_____

Email: _gio.posillico@latitude33.com_____

Phone Number: _(858) 751-0633_____

[ ]

Preparer's Signed Name:

_____

Date: _____

COUNTY - OFFICIAL USE ONLY:

For County Inspectors

County Department: _____

Date verification received from EOW: _____

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

Inspector Name: _____

Inspector's Signature: _____ Date: _____

For Building Division Only

Inspection Supervisor Name: _____

Inspector Supervisor's Signature: _____ Date: _____

PDCI & Building, along with the rest of this package, please provide to DPW WPP:

☐ A copy of the final accepted SWQMP and any accepted addendum

For Watershed Protection Program Only

Date Received: _____

WPP Reviewer: _____

WPP Reviewer concurs that the BMPs accepted in **Part 2** above may be entered into inventory.

WPP Reviewer's Signature: _____ Date: _____

11.0 Cover Sheet and General Requirements

- All Structural BMPs must have a plan and mechanism to ensure on-going maintenance. Use the table below to document the types of agreements to be submitted for the PDP and submit them under cover of this sheet.
- See BMPDM Section 7.3 for a description of maintenance categories and responsibilities. Note that since Category 3 and 4 BMPs are County-maintained, they do not require maintenance agreements.

a. Applicability of Maintenance Agreements

Check the boxes below to indicate which types of agreements are included with this attachment.

☐ Maintenance Notification (Category 1 BMPs)

- Exhibit A: Project Site Vicinity; Project Site Map; and a map for each BMP and its Drainage Management Area
- Exhibit B: BMP Maintenance Plan (see below)

☒ Stormwater Maintenance Agreement (Category 2 BMPs)

- Exhibit A: Legal Description of Property
- Exhibit B: BMP Maintenance Plan (see below)
- Exhibit C: Project Site Vicinity Map

Maintenance agreement templates and instructions are provided on the County's website:

www.sandiegocounty.gov/stormwater under the Development Resources tab.

PDP applicants contact County staff to ensure they have the most current forms.

b. Maintenance Plan Requirements

Use this checklist to confirm that each maintenance plan includes the following that as applicable.

☒ Specific **maintenance indicators and actions** for proposed structural BMP(s). These must be based on based on maintenance indicators presented in BMP Design Fact Sheets in Appendix E and enhanced to reflect actual proposed components of the structural BMP(s).

☒ **Access** to inspect and perform maintenance on the structural BMP(s).

☒ Features 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.

EXHIBIT 'A'

LEGAL DESCRIPTION OF PROPERTY

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF ESCONDIDO IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

LOT "F" IN BLOCK 275 OF RANCHO RINCON DEL DIABLO, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1676, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, ON OCTOBER 6, 1915.

ALSO THAT PORTION OF LOT "H" IN BLOCK 275 OF RANCHO RINCON DEL DIABLO, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1676, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 6, 1916, DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER COMMON TO LOTS "H", "F", "E", and "D" IN SAID BLOCK 275;

THENCE ALONG THE SOUTHERLY LINE OF SAID LOT "H" NORTH 59° 51' WEST, 274.5 FEET;

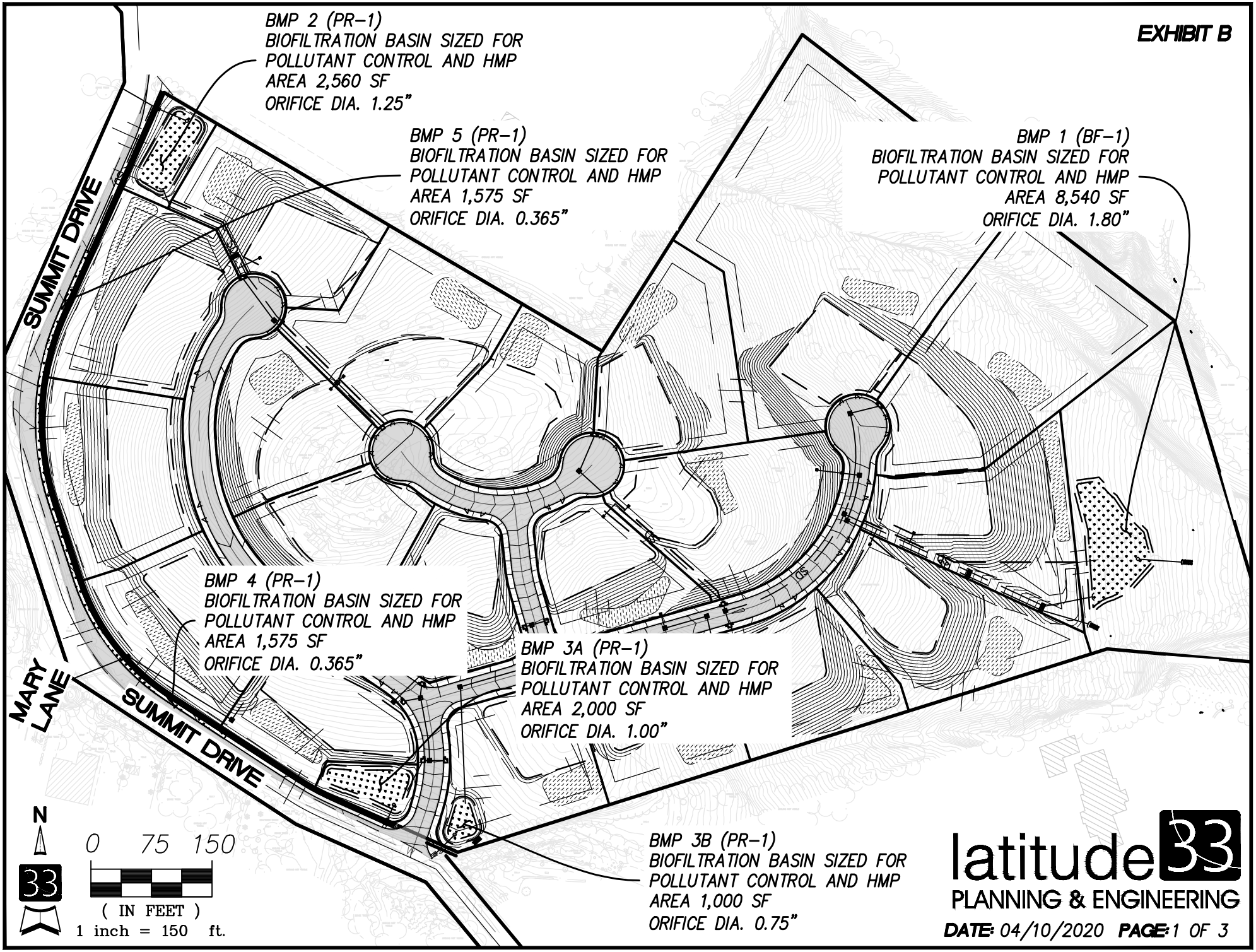
THENCE NORTH 31° 55' EAST, 466 FEET TO THE MOST WESTERLY CORNER OF THAT PARCEL OF LAND DESCRIBED IN DEED TO A. L. HOUGHTELIN, ET AL., RECORDED NOVEMBER 15, 1943 AS INSTRUMENT NO. 24975, IN BOOK 1589, PAGE 283 OF OFFICIAL RECORDS;

THENCE ALONG THE ALONG THE SOUTHWESTERLY LINE OF SAID HOUGHTELIN LAND SOUTH 52° 35' EAST, 579.7 FEET, AND SOUTH 17° 07' EAST, 444 FEET TO THE SOUTHERLY LINE OF SAID LOT "H";

THENCE ALONG SAID SOUTHERLY LINE NORTH 85° 25' WEST 211 FEET TO THE POINT OF BEGINNING.

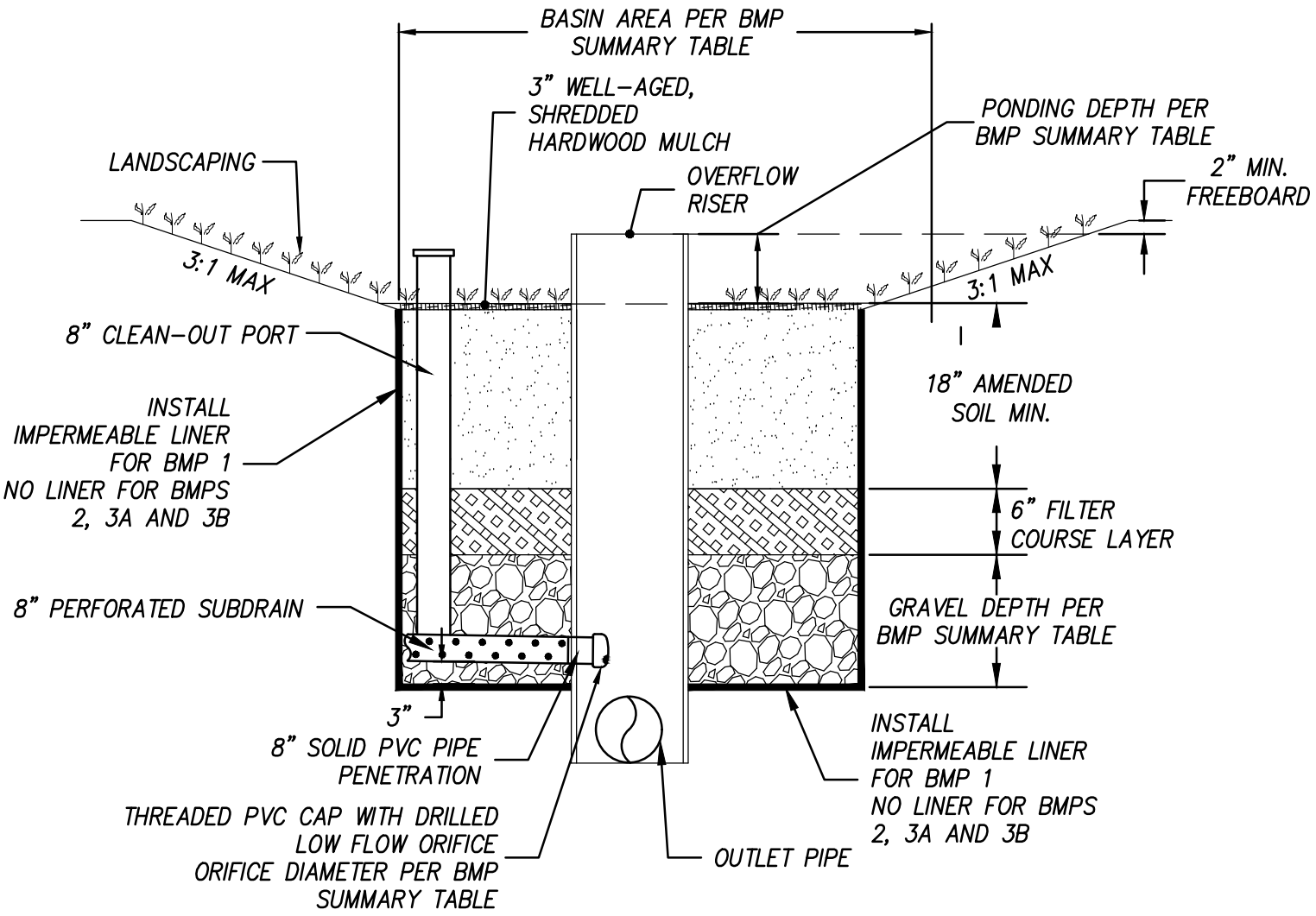
APN(s): 237-090-05-00

EXHIBIT B



latitude 33
PLANNING & ENGINEERING

DATE: 04/10/2020 **PAGE:** 1 OF 3



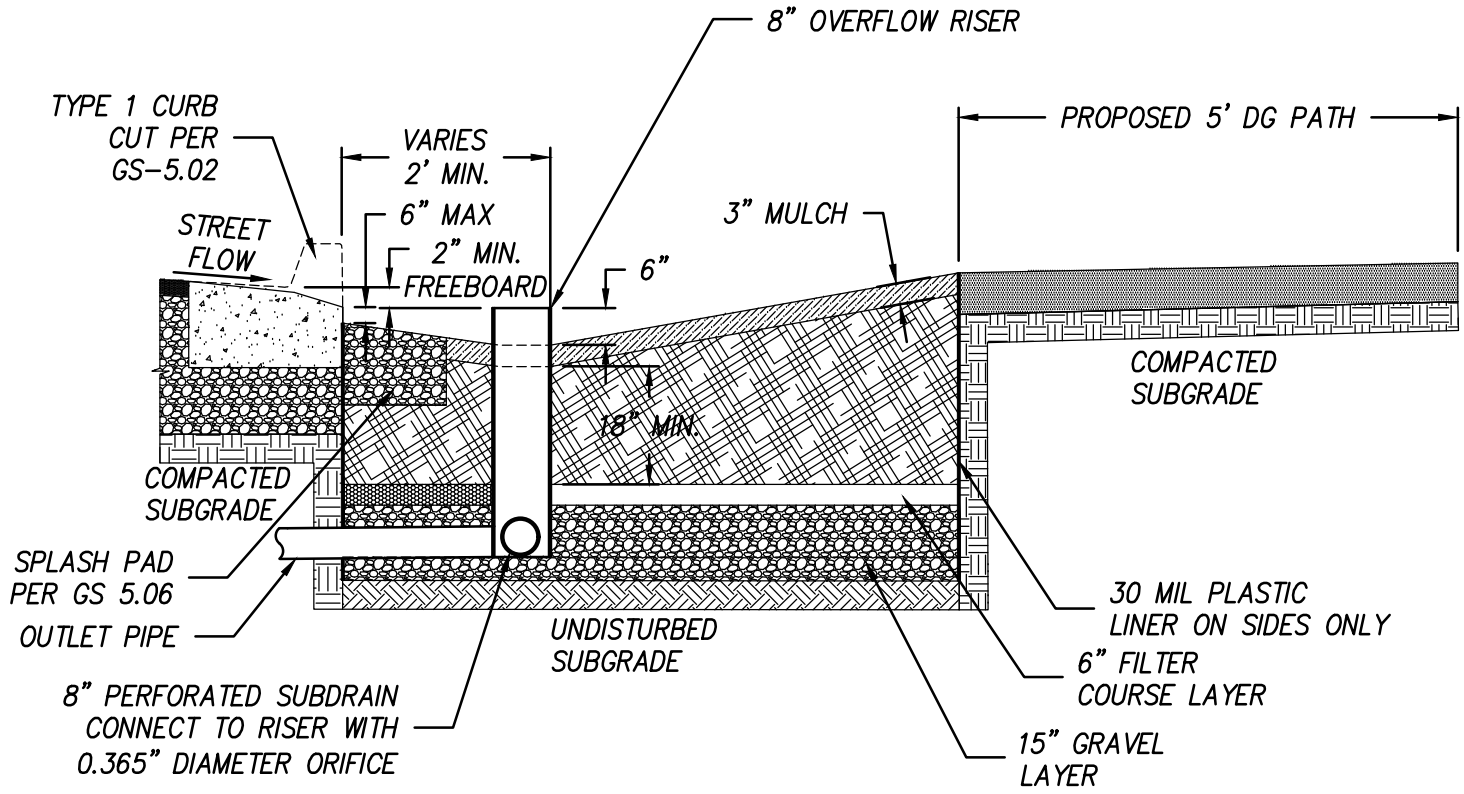
BIOFILTRATION BASIN SECTION (BMP 1, 2, 3A AND 3B)

NOT TO SCALE

latitude 33
PLANNING & ENGINEERING

NOTE

BMP 4 AND 5 SHALL
BOTH BE 350' LONG



BIOFILTRATION PLANTER BASIN SECTION
BMP 4 AND 5

(MODIFIED GS-3.01A)
NOT TO SCALE

latitude 33
PLANNING & ENGINEERING

DATE: 04/10/2020 **PAGE:** 3 OF 3

Summary of Standard Inspection and Maintenance

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

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

Threshold/Indicator	Maintenance Action	Inspection and 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. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintain when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	• Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	• Inspect monthly. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
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 County reviewer 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. • Maintain when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the County reviewer 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. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
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 County reviewer 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. • Maintain when needed.
Underdrain clogged	Clear blockage.	Inspect if standing water is observed for longer than 24-96 hours following a storm event. Maintain when needed.

"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

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.

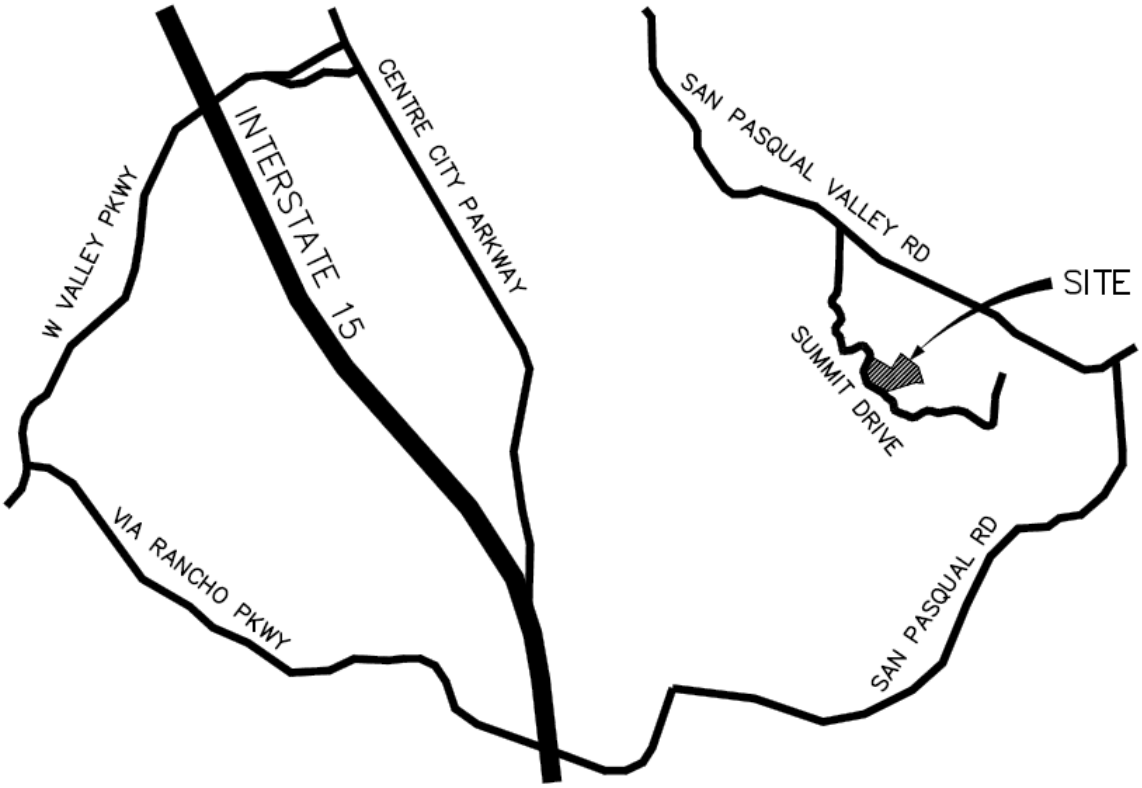
Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer.	• Inspect monthly. If the BMP is 25% full* or more in one month, 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. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintain when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	• Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	• Inspect monthly. • Maintain when needed.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the County reviewer 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. • Maintain when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the County reviewer shall be contacted prior to any additional repairs or reconstruction.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
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. • Maintain 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 County reviewer 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. • Maintain when needed.
Underdrain clogged	Clear blockage.	Inspect if standing water is observed for longer than 24-96 hours following a storm event. Maintain when needed.

EXHIBIT 'C'

PROJECT SITE VICINITY MAP



PRELIMINARY
GEOTECHNICAL INVESTIGATION

SUMMIT ESTATES
SAN DIEGO COUNTY, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

2510 SUMMIT, LLC
IRVINE, CALIFORNIA

JANUARY 11, 2019
PROJECT NO. G2279-42-01

Project No. G2279-42-01
January 11, 2019

2510 Summit, LLC
19782 MacArthur Boulevard, Suite 300
Irvine, California 92612

Attention: Mr. Oscar Uranga

Subject: PRELIMINARY GEOTECHNICAL INVESTIGATION
SUMMIT ESTATES
SAN DIEGO COUNTY, CALIFORNIA

Dear Mr. Uranga:

In accordance with your authorization and our proposal (LG-18-090 dated October 11, 2018) we herein submit our preliminary geotechnical investigation for the subject project. The accompanying report presents the findings, conclusions, and recommendations pertinent to the project. Based on the results of our study, it is our opinion that the subject site can be developed as proposed, provided the recommendations of this report are followed.

If you have any questions regarding this investigation, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Garry W. Cannon
RCE 56468
CEG 2201

PROFESSIONAL GEOLOGIST ★ STATE OF CALIFORNIA ★ GARRY WELLS CANNON NO. 2201 CERTIFIED ENGINEERING GEOLOGIST

Rodney C. Mikesell
GE 2533

REGISTERED PROFESSIONAL ENGINEER ★ STATE OF CALIFORNIA ★ GARRY WELLS CANNON No. C 056468 CIVIL

REGISTERED PROFESSIONAL ENGINEER ★ STATE OF CALIFORNIA ★ RODNEY C. MIKESELL No.2533 GEOTECHNICAL

GWC:RCM:dmc

(e-mail) Addressee

TABLE OF CONTENTS

TABLE OF CONTENTS (Concluded)

PRELIMINARY GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of a preliminary geotechnical investigation for the property located northeast of the intersection of Mary Lane and Summit Drive, San Diego County, California (see *Vicinity Map,* Figure 1). The purpose of this investigation was to evaluate site geology; observe and sample the prevailing soil conditions at the site; and to provide recommendations pertinent to the geotechnical aspects of constructing the proposed improvements.

The scope of our investigation included a review of relevant published reports, a site reconnaissance, a field investigation, laboratory testing, engineering analyses, and preparation of this report.

The field investigation was performed on December 7 and 13, 2018. The investigation consisted of drilling 10, air-percussion, borings and excavating fourteen, shallow, exploratory pits at the approximate locations shown on the *Site Plan,* Figure 2. Logs of the exploratory trenches, borings and other details of the field investigation are presented in Appendix A.

Laboratory tests were performed on selected soil samples obtained from the borings to evaluate their pertinent physical and chemical properties for engineering analyses. A discussion pertaining to the laboratory testing and results is presented in Appendix B.

Six infiltration tests were performed in general conformance with guidelines presented Geosyntec (2018) at the approximate locations shown on Figure 2. The results and conclusions of the infiltration testing are presented in Appendix C.

The recommendations presented herein are based on our analysis of the data obtained from the exploratory boring, laboratory tests and our experience with similar soil and geologic conditions.

2. SITE AND PROJECT DESCRIPTION

The site consists of approximately 22 acres of land currently occupied by one, single-family residence. The existing residence sits on a hill in the western portion of the property. Site elevations range from near 858 feet Mean Sea Level (MSL) at the top of the hill to near 780 feet MSL at the northwest corner, 790 feet MSL at the south side, and near 700 feet MSL at the southeast end of the property.

Based on preliminary concept plans, the site will be developed into 20, single-family, approximately 1-acre, lots. Cuts and fills up to approximately 15 feet are planned to construct individual building

pads and create roadways. Fill slopes up to 35 feet and cut slopes up to 25 feet are planned on the property. Cul-de-sac streets extending from Summit Drive into the property provide access to the residential lots. Storm water BMP basins are planned at three locations on the property. A pressurized drip disposal system is planned for the septic system.

3. SOIL AND GEOLOGIC CONDITIONS

Geology at the site consists of Cretaceous age granitic rock covered by up to topsoil. The upper portion of the granitic rock is moderately to highly weathered. Geologic cross sections are provided on Figure 3.

3.1 Topsoil (unmapped)

Topsoil was observed to depths of approximately 2 feet. The topsoil generally consisted of loose, silty, fine to medium sand. The topsoil, in its natural state, is not suitable for the support of settlement-sensitive structures or structural fill and should be removed and replaced as compacted fill in lots, slopes, and street improvement areas.

3.2 Weathered Granitic Rock (Kgr)

Deeper weathered Cretaceous age granitic rock was observed in the area near Trench T-2 and could be present at other areas. The weathered granitic rock excavated as silty sand. The highly weathered granitic rock is considered compressible and should be removed and replaced as compacted fill in areas of settlement-sensitive structures and structural fill.

3.3 Granitic Rock (Kgr)

Cretaceous age granitic rock was observed in all trenches. The upper portion of the granitic rock is moderately weathered and excavatable with conventional heavy-duty equipment. Weathering decreases with depth and the formation becomes non-rippable at depths around 10 feet below ground surface. The undisturbed granitic rock is suitable for the support of settlement-sensitive structures and structural fill.

4. GROUNDWATER

No groundwater was encountered during our investigation. Groundwater is not expected to significantly affect project development as presently proposed; however, it is not uncommon for groundwater or seepage conditions to develop where none previously existed. Proper surface drainage of irrigation and rainwater will be critical to future performance of the project.

5. GEOLOGIC HAZARDS

5.1 Ground Rupture

No evidence of faulting was observed during our investigation. The USGS (2016) shows that there are no mapped Quaternary faults crossing or trending toward the property. The site is not located within a currently established Alquist-Priolo Earthquake Fault Zone. The nearest active fault is the Elsinore Fault, which lies approximately 17 miles west of the site. The risk associated with ground rupture hazard is low.

5.2 Seismicity

We performed a deterministic seismic hazard analysis using Risk Engineering (2015). Seven known active faults were located within a search radius of 50 miles from the property. We used the 2008 USGS fault database, which provides several models and combinations of fault data, to evaluate the fault information. Based on this database, the Elsinore Fault, located approximately 16.7 miles northeast of the site, is the nearest known active fault and is the dominant source of potential ground motion. Earthquakes that might occur on the Elsinore Fault or other faults within the southern California and northern Baja California area are potential generators of significant ground motion at the site. The estimated maximum earthquake magnitude and peak ground acceleration for the Elsinore Fault are 7.85 and 0.21g, respectively. The table below lists the estimated maximum earthquake magnitude and peak ground acceleration for the most dominant faults in relation to the site. We calculated peak ground acceleration (PGA) using acceleration-attenuation relationships by: Boore and Atkinson (2008); Campbell and Bozorgnia (2008); and Chiou and Youngs (2008).

TABLE 5.2.1
DETERMINISTIC SPECTRA SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Peak Ground Acceleration		
			Boore-Atkinson 2008 (g)	Campbell-Bozorgnia 2008 (g)	Chiou-Youngs 2008 (g)
Elsinore	16.7	7.85	0.21	0.15	0.20
Newport-Inglewood/Rose Canyon	17.2	7.5	0.18	0.13	0.16
Rose Canyon	17.2	6.9	0.14	0.11	0.11
Earthquake Valley	27.0	6.8	0.10	0.07	0.06
Coronado Bank	32.0	7.4	0.11	0.08	0.09
Palos Verdes Connected	32.0	7.7	0.13	0.09	0.11
San Jacinto	38.6	7.88	0.12	0.08	0.10

In the event of a major earthquake on the referenced faults or other significant faults in the southern California and northern Baja California area, the site could be subjected to moderate to severe ground shaking. The risk at this site is comparable to others in the general vicinity with respect to seismic shaking hazard.

We performed a probabilistic seismic hazard analysis for the site using Risk Engineering (2015). The computer program assumes that the occurrence rate of earthquakes on each mapped Quaternary fault is proportional to the fault slip rate. The program accounts for earthquake magnitude as a function of fault rupture length, and site acceleration estimates are made using the earthquake magnitude and distance from the site to the rupture zone. The program also accounts for uncertainty in each of following: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from considered earthquake sources, the program calculates the total average annual expected number of occurrences of site acceleration greater than a specified value. We used acceleration-attenuation relationships suggested by Boore-Atkinson (2008), Campbell-Bozorgnia (2008), and Chiou-Youngs (2008) in the analysis. Table 5.2.2 presents the site-specific probabilistic seismic hazard parameters including acceleration-attenuation relationships and the probability of exceedence.

TABLE 5.2.2
PROBABILISTIC SEISMIC HAZARD PARAMETERS

Probability of Exceedence	Peak Ground Acceleration		
	Boore-Atkinson, 2008 (g)	Campbell-Bozorgnia, 2008 (g)	Chiou-Youngs, 2008 (g)
2% in a 50 Year Period	0.39	0.38	0.44
5% in a 50 Year Period	0.30	0.28	0.31
10% in a 50 Year Period	0.23	0.22	0.23

While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including frequency and duration of motion and soil conditions underlying the site. Seismic design of the structures should be evaluated in accordance with the California Building Code (CBC) guidelines.

5.3 Liquefaction and Seismically Induced Settlement

Due to the dense subsurface soils and the lack of permanent, near-surface groundwater, the risk associated with seismically induced soil liquefaction hazard is low.

5.4 Landslides

No evidence of landsliding was encountered at the site during the geotechnical investigation or in our review of historic, stereoscopic aerial photographs (USDA, 1953).

The risk associated with ground movement hazard due to landsliding is low.

5.5 Subsidence

Based on the subsurface soil conditions encountered during our field investigation, the risk associated with ground subsidence hazard is low.

5.6 Seiches and Tsunamis

The site is not located within a tsunami inundation zone as defined by California Geological Survey. Elevation at the site is approximately 700 feet MSL and higher. There are no lakes or reservoirs are located near the site. The risk associated with inundation hazard due to tsunamis or seiches is low.

5.7 Flooding

The Federal Emergency Management Agency (FEMA 2012) locates the site within a Flood Zone X area, indicating a minimal risk to inundation by 100-year and 500-year floods.

6. ROCK RIPPABILITY

To aid in evaluating the rippability characteristics of the rock in proposed cut areas, 6 air-percussion borings were performed using an Ingersoll Rand ECM 370 equipped with a 4-inch bit. Drill penetration rates were used to evaluate rock rippability and to estimate the depth at which difficult excavation will occur. Rock rippability is a function of natural weathering processes that can vary vertically and horizontally over short distances depending on jointing, fracturing, and/or mineralogic discontinuities within the bedrock.

A frequently used guideline to compare rock rippability to drill penetration rate is that a penetration rate of approximately 0 to 20 seconds per foot (spf) generally indicates rippable material, 20 to 25 spf indicates marginally to non-rippable material, and greater than 25 spf indicates non-rippable rock. These general guidelines are typically based on drill rates using a rotary percussion drill rig similar to an Ingersoll Rand ECM 360 with a 3½-inch drill bit. The penetration rates (recorded in seconds per foot) for each air-track boring are presented on the air-track logs in Appendix A.

The estimated thickness of rippable material for each air-track boring using 20 spf as the boundary between rippable and marginal to non-rippable rock is presented on the *Geologic Map*. The estimate is derived from a literal interpretation of the penetration rate from each boring log. Perspective contractors should use their own judgment to identify the penetration rate boundary between productive and non-productive ripping, and rippable and non-rippable rock.

Very difficult ripping and/or blasting may be required for excavations that extend beyond the rippable weathered mantle. Based on an air-track penetration rate of 20 spf, the thickness of the rippable rock mantle varies between 5 to 28 feet thick. Blasting techniques can be expected to generate oversized rock (rocks greater than 12-inches in dimension), which will necessitate typical hard rock handling and placement procedures during grading operations.

Estimates of the anticipated volume of hard rock materials generated from proposed excavations should be evaluated based on the information from each boring and drill penetration rate criteria acceptable to the contractor. Perspective contractors should evaluate the air-track and seismic refraction data and use their own judgment to identify the boundary between productive and non-productive ripping, and rippable and non-rippable rock. Roadway/utility corridors and lot undercutting criteria should also be considered when calculating the volume of hard rock. Proposed cuts in hard rock areas can be expected to generate oversized fragments.

Earthwork construction should be carefully planned to efficiently utilize available rock placement areas. Oversize materials should be placed in accordance with rock placement procedures presented in Appendix D of this report and governing jurisdictions.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 From a geotechnical standpoint, it is our opinion that the site is suitable for the proposed development, provided the recommendations presented herein are implemented in design and construction of the project.

7.1.2 Once an approved grading plan is available and the development plans are prepared, a final geotechnical investigation report should be prepared. Updated grading and foundation recommendations specific to the project can be provided at that time. Preliminary recommendations are provided in this report.

7.1.3 Subsurface conditions, as observed in our trenches, are expected to be relatively consistent across the site; however, variations in subsurface conditions are possible.

7.1.4 Our field investigation indicates that the site is underlain by topsoil, weathered granitic rock and granitic rock. Topsoil and highly weathered granitic rock are not adequate for support of settlement-sensitive structures and should be removed and replaced as compacted fill.

7.1.5 With the exception of the possibility of strong seismic shaking, no significant geologic hazards were observed or are known to exist at the site or other locations that could adversely affect the proposed project.

7.1.6 Based on our research, no active, potentially active, or activity unknown faults are known to cross the site or are trending toward the site.

7.1.7 It is our opinion that the proposed development will not destabilize or result in settlement of adjacent properties.

7.1.8 The risks associated with liquefaction, ground rupture, landslides, and flooding hazards are low.

7.1.9 The planned structures can be supported on a conventional, shallow-footing system founded on properly compacted fill.

7.1.10 In general, cut slopes composed of the granitic rock or properly compacted fill should have a factor of safety of at least 1.5 at inclinations of 2:1 (horizontal:vertical), or flatter.

7.1.11 Proper drainage should be maintained. Recommendations for site drainage are provided herein.

7.2 Soil and Excavation Characteristics

7.2.1 Excavation of the topsoil and weathered granitic rock should be possible with moderate to heavy effort using conventional heavy-duty equipment. Excavations beyond the weathered mantel in the granitic rock will require very heavy effort and possible blasting to excavate.

7.2.2 We expect on-site soil to be both "expansive" (expansion index [EI] greater than 20) and "non-expansive" (EI of 20 or less) as defined by 2016 California Building Code (CBC) Section 1803.5.3. Table 7.2 presents soil classifications based on the expansion index. The on-site soils possess a "very low" to "low" expansion potential.

TABLE 7.2
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	Expansion Classification	2016 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.3 We performed laboratory tests on samples of the site materials to evaluate the percentage of water-soluble sulfate content. Results from the laboratory water-soluble sulfate content tests are presented in Appendix B and indicate that the on-site materials at the locations tested possess "Not Applicable" and "S0" sulfate exposure to concrete structures as defined by 2016 CBC Section 1904 and ACI 318-08 Sections 4.2 and 4.3. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

7.2.4 Geocon Incorporated does not practice in the field of corrosion engineering. If improvements that could be susceptible to corrosion are planned, further evaluation by a corrosion engineer may be needed.

7.3 Preliminary Grading Recommendations

7.3.1 Grading should be performed in accordance with the *Recommended Grading Specifications* contained in Appendix D and the County of San Diego Grading Ordinance. The recommendations presented in this section take precedence over those presented in Appendix D.

7.3.2 Prior to commencing grading, a preconstruction conference should be held at the site with the city inspector, owner or developer, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

7.3.3 Earthwork should be observed and compacted fill tested by representatives of Geocon Incorporated.

7.3.4 Site preparation should begin with the removal of all deleterious material and vegetation. The depth of removal should be such that material exposed in cut areas or soils to be used as fill are relatively free of organic matter. Existing utilities and foundations should be abandoned and completely removed. Material generated during stripping and/or site demolition should be exported from the site.

7.3.5 All compressible soil deposits, including topsoil and weathered granitic rock within areas where structural improvements and/or structural fill are planned, should be removed to expose firm competent Granitic Rock and properly compacted prior to placing additional fill and/or structural loads. Deeper than normal benching and/or stripping operations for sloping ground surfaces will be required where the thickness of potentially compressible surficial deposits exceeds 3 feet. The actual extent of unsuitable soil removals will be determined in the field during grading by the geotechnical engineer and/or engineering geologist.

7.3.6 After removal of unsuitable materials is performed, the site should then be brought to final subgrade elevations with structural fill compacted in layers. In general, soils native to the site are suitable for re-use as fill if free from vegetation, debris and other deleterious material. Layers of fill should be no thicker than will allow for adequate bonding and

compaction. All fill, including backfill and scarified ground surfaces, should be compacted to at least 90 percent of maximum dry density at or above optimum moisture content, as determined in accordance with ASTM Test Procedure D1557. Fill materials below optimum moisture content will require additional moisture conditioning prior to placing additional fill.

7.3.7 Grading operations should be scheduled to permit the placement of oversize material in deeper fill areas and to cap building pads with granular materials having a "very low" to "low" expansive potential (EI of 50 or less).

7.3.8 The upper 3 feet of all building pads (cut or fill) should be comprised of soil with a "very low" to "low" expansion potential. Highly expansive fill soils should be placed in the deeper fill areas. Cobbles, rock fragments, and concretions greater than 6 inches in maximum dimension should not be placed within 3 feet of finish grade in building pad areas.

7.3.9 Cut pads exposing hard rock and cut/fill transition building pads should be undercut at least 3 feet and replaced with properly compacted "very low" to "low" expansive soil. The base of the undercuts should be sloped towards the down-gradient portion of the lot.

7.3.10 Undercutting of street areas and utilities should be performed in cut areas or areas where utilities will extend through the fill into non-rippable granitic rock to facilitate excavation of underground utilities. Undercuts should extend to at least 2 feet below the bottom of the utility. If subsurface improvements or landscape zones are planned outside these areas, consideration should be given to undercutting these areas as well.

7.3.11 The areas of the proposed on-site septic fields should be left in their natural condition. Grading or disturbance should be prohibited in these areas as it could invalidate the area for use as a pressurized drip disposal system.

7.3.12 Oversize material (defined as material greater than 12 inches in nominal dimension) may be generated during excavation of Granitic Rock. Placement of oversize material within fills should be conducted in accordance with the recommendations in Appendix D.

7.3.13 Capping material for building pads should be at least three feet thick. The capping material should consist of soil fill with an approximate maximum particle dimension of 6 inches with a minimum of 40 percent soil passing the ¾-inch sieve and should have at least 20 percent of the soil passing the No. 4 screen. Soils with an expansion potential (EI) greater

than 50 are not suitable for capping and should be placed in the deeper fill areas or at least 3 feet below design grade and 15 feet from the face of slopes. The grading contractor should take necessary steps to manage the available soils to cap the project.

7.3.14 Based on our field investigation, we expect the on-site surficial soils and decomposed granite from excavations within the weathered granitic rock mantel will be suitable for capping and use as wall backfill.

7.3.15 It is recommended that excavations be observed during grading by a representative of Geocon Incorporated to verify that soil and geologic conditions do not differ significantly from those anticipated.

7.3.16 It is the responsibility of the contractor to ensure that all excavations and trenches are properly shored and maintained in accordance with applicable OSHA rules and regulations in order to maintain safety and maintain the stability of adjacent existing improvements.

7.3.17 Imported materials should consist of "very low" to "low" expansive (Expansion Index of 50 or less) soils. Prior to importing the material, samples from proposed borrow areas should be obtained and subjected to laboratory testing to determine whether the material conforms to the recommended criteria. At least 5 working days should be allowed for laboratory testing of the soil prior to its importation. Import materials should be free of oversize rock and construction debris.

7.4 Slopes

7.4.1 Slope stability analyses were performed for proposed fill slopes utilizing shear strength parameters based on laboratory testing performed for this investigation. These analyses indicate that the proposed 2:1 fill slopes should have calculated factor of safety of at least 1.5 under static conditions for both deep-seated failure and shallow sloughing conditions to proposed maximum project fill slope height of 35 feet. Slope stability calculations and graphical printouts for both deep-seated and surficial slope stability for fill slopes are presented on Figures 4 and 5.

7.4.2 Cut slopes in rock materials do not lend themselves to conventional slope stability analyses. However, Figure 6 summarizes a slope stability analysis assuming soil shear strength parameters for the rock. The strength parameters used are considered conservative for Granitic Rock. Based on our analysis and experience with similar rock conditions, 2:1

cut slopes to the planned heights of up to 25 feet possess a factor of safety of at least 1.5 with respect to global stability, if free of adversely oriented joints or fractures.

7.4.3 All cut slope excavations should be observed during grading by an engineering geologist to check that soil and geologic conditions do not differ significantly from those anticipated. In the event that adverse conditions are observed during grading such as intersecting faults planes or clay filled joints/fractures dipping out of slope, stabilization recommendations can be provided.

7.4.4 The outer 15 feet of fill slopes, measure horizontal to the slope face, should be composed of properly compacted granular "soil" fill (expansion index of 50 or less) to reduce the potential for surface sloughing.

7.4.5 Fill slopes should be compacted by backrolling with a loaded sheepsfoot roller at vertical intervals not to exceed 4 feet and should be track-walked at the completion of each slope such that the fill soils are uniformly compacted to at least 90 percent relative compaction to the face of the finished sloped. Alternatively, the fill slope may be over-built at least 3 feet and cut back to yield a properly compacted slope face.

7.4.6 All slopes should be landscaped with drought-tolerant vegetation, having variable root depths and requiring minimal landscape irrigation. In addition, all slopes should be drained and properly maintained to reduce erosion.

7.5 Seismic Design Criteria

7.5.1 We used SEAOC (2018) to summarize site-specific design criteria obtained (Table 7.5.1) from the 2016 California Building Code (CBC; Based on the 2012 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The short spectral response uses a period of 0.2 second. Building pads underlain by 15 feet of fill or less should be designed using a Site Class C. Building pads underlain by fills thicker than 15 feet should be designed using a Site Class D. We evaluated the Site Class based our experience for the site subsurface soils and exploratory boring information in accordance with Section 1613.3.2 of the 2016 CBC, and Table 20.3-1 of ASCE 7-10. The values presented in Table 7.5.1 are for the risk-targeted maximum considered earthquake (MCE_R).

TABLE 7.5.1
2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value		2016 CBC Reference
Site Class	C	D	Table 1613.3.2
Fill Thickness, T (feet)	T≤15	T>15	--
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.021	1.021	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.392	0.392	Figure 1613.3.1(2)
Site Coefficient, F_A	1.000	1.091	Table 1613.3.3(1)
Site Coefficient, F_V	1.408	1.615	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.021	1.115	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.552	0.634	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.681	0.743	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.368	0.423	Section 1613.3.4 (Eqn 16-40)

7.5.2 Table 7.5.2 presents additional seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-10 for the mapped maximum considered geometric mean (MCE_G).

TABLE 7.5.2
2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Site Class C	Site Class D	ASCE 7-10 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.381	0.381	Figure 22-7
Site Coefficient, F_{PGA}	1.019	1.119	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.388	0.426	Section 11.8.3 (Eqn 11.8-1)

7.5.3 Conformance to the criteria in Table 7.5.1 and 7.5.2 does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.6 Preliminary Foundation Recommendations

7.6.1 The preliminary foundation recommendations that follow are for one- to three-story residential structures and are separated into categories dependent on the thickness and geometry of the underlying fill soils as well as the expansion index of the prevailing subgrade soils. Final foundation categories should be determined for each lot after grading and finish pads have been established and laboratory expansion index testing performed.

TABLE 7.6.1
FOUNDATION CATEGORY CRITERIA

Foundation Category	Maximum Fill Thickness, T (feet)	Differential Fill Thickness, D (feet)	Expansion Index (EI)
I	$T<20$	--	$EI \leq 50$
II	$20 \leq T<50$	$10 \leq D<20$	$50<EI \leq 90$
III	$T \geq 50$	$D \geq 20$	$90<EI \leq 130$

7.6.2 Table 7.6.2 presents minimum foundation and interior concrete slab design criteria for conventional foundation systems.

TABLE 7.6.2
CONVENTIONAL FOUNDATION RECOMMENDATIONS BY CATEGORY

Foundation Category	Minimum Footing Embedment Depth (inches)	Continuous Footing Reinforcement	Interior Slab Reinforcement
I	12	Two No. 4 bars, one top and one bottom	6x6-10/10 welded wire mesh at slab mid-point
II	18	Four No. 4 bars, two top and two bottom	No. 3 bars at 24 inches on center, both directions
III	24	Four No. 5 bars, two top and two bottom	No. 3 bars at 18 inches on center, both directions

7.6.3 The embedment depths presented in Table 7.6.2 should be measured from the lowest adjacent pad grade for both interior and exterior footings. The conventional foundations should have a minimum width of 12 inches and 24 inches for continuous and isolated footings, respectively. Figure 7 presents a wall/column footing dimension detail.

7.6.4 The concrete slab-on-grade should be a minimum of 4 inches thick for Foundation Categories I and II and 5 inches thick for Foundation Category III.

7.6.5 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements, and in a manner that prevents puncture. The project architect or developer should specify the vapor retarder based on the type of floor covering that will be installed and if the structure will possess a humidity-controlled environment.

7.6.6 The project foundation engineer, architect, and/or developer should determine the thickness of bedding sand below the slab. In general, 3 to 4 inches of sand bedding is typically used. Geocon should be contacted to provide recommendations if the bedding sand is thicker than 6 inches.

7.6.7 The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. The foundation design engineer should specify the concrete mix design and proper curing methods on the foundation plan. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plan.

7.6.8 As an alternative to the conventional foundation recommendations, consideration should be given to the use of post-tensioned concrete slab and foundation systems for the support of the proposed structures. The 2016 CBC has updated the design requirements for post-tensioned foundation systems. The post-tensioned systems should be designed by a structural engineer experienced in post-tensioned slab design and design criteria of the Post-Tensioning Institute (PTI), Third Edition, as required by the 2016 CBC (Section 1805.8). Although this procedure was developed for expansive soil conditions, we understand it can also be used to reduce the potential for foundation distress due to differential fill settlement. The post-tensioned design should incorporate the geotechnical parameters presented in Table 7.6.3 for the particular Foundation Category designated. The parameters presented in Table 7.6.3 are based on the guidelines presented in the PTI, Third Edition design manual.

TABLE 7.6.3
POST-TENSIONED FOUNDATION SYSTEM DESIGN PARAMETERS

Post-Tensioning Institute (PTI) Third Edition Design Parameters	Foundation Category		
	I	II	III
Thornthwaite Index	-20	-20	-20
Equilibrium Suction	3.9	3.9	3.9
Edge Lift Moisture Variation Distance, e_M (feet)	5.3	5.1	4.9
Edge Lift, y_M (inches)	0.61	1.10	1.58
Center Lift Moisture Variation Distance, e_M (feet)	9.0	9.0	9.0
Center Lift, y_M (inches)	0.30	0.47	0.66

7.6.9 If the structural engineer proposes a post-tensioned foundation design method other than the 2016 CBC:

- The criteria presented in Table 7.6.3 are still applicable.
- Interior stiffener beams should be used for Foundation Categories II and III.
- The width of the perimeter foundations should be at least 12 inches.
- The perimeter footing embedment depths should be at least 12 inches, 18 inches and 24 inches for foundation categories I, II, and III, respectively. The embedment depths should be measured from the lowest adjacent pad grade.

7.6.10 The foundations for the post-tensioned slabs should be embedded in accordance with the recommendations of the structural engineer. If a post-tensioned mat foundation system is planned, the slab should possess a thickened edge with a minimum width of 12 inches and extend at least 6 inches below the clean sand or crushed rock layer.

7.6.11 Our experience indicates post-tensioned slabs are susceptible to excessive edge lift, regardless of the underlying soil conditions. Placing reinforcing steel at the bottom of the perimeter footings and the interior stiffener beams may mitigate this potential. Current PTI design procedures primarily address the potential center lift of slabs but, because of the placement of the reinforcing tendons in the top of the slab, the resulting eccentricity after tensioning reduces the ability of the system to mitigate edge lift. The structural engineer should design the foundation system to reduce the potential of edge lift occurring for the proposed structures.

7.6.12 During the construction of the post-tension foundation system, the concrete should be placed monolithically. Under no circumstances should cold joints form between the

footings/ grade beams and the slab during the construction of the post-tension foundation system.

7.6.13 Category I, II, or III foundations may be designed for an allowable soil bearing pressure of 2,000 pounds per square foot (psf) (dead plus live load). This bearing pressure may be increased by one-third for transient loads due to wind or seismic forces. The estimated maximum total and differential settlement for the planned structures due to foundation loads is 1- inch and ½-inch, respectively. Differential settlement is estimated to occur over a span of 40 feet.

7.6.14 Isolated footings, including PT foundation systems where footings are not reinforced with PT cables, should have the minimum embedment depth and width recommended for conventional foundations (see Section 7.6.1 through 7.6.3) for a particular foundation category. The use of isolated footings, which are located beyond the perimeter of the building and support structural elements connected to the building, are not recommended for Category III. Where this condition cannot be avoided, the isolated footings should be connected to the building foundation system with grade beams.

7.6.15 For Foundation Category III, consideration should be given to using interior stiffening beams and connecting isolated footings and/or increasing the slab thickness. In addition, consideration should be given to connecting patio slabs, which exceed five feet in width, to the building foundation to reduce the potential for future separation to occur.

7.6.16 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation- and slab-subgrade soil should be moisture conditioned, as necessary, to maintain a moist condition as would be appropriate in any such concrete placement.

7.6.17 Where buildings or other improvements are planned near the top of a slope steeper than 3:1 (horizontal:vertical), special foundations and/or design considerations are recommended due to the tendency for lateral soil movement to occur.

- For fill slopes less than 20 feet high or cut slopes regardless of height, footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

- For fill slopes greater than 20 feet high, foundations should be extended to a depth where the minimum horizontal distance is equal to H/3 (where H equals the vertical distance from the top of the fill slope to the base of the fill soil) with a minimum of 7 feet but need not exceed 40 feet. The horizontal distance is measured from the outer, deepest edge of the footing to the face of the slope. A

post-tensioned slab and foundation system or mat foundation system can be used to help reduce potential foundation distress associated with slope creep and lateral fill extension. Specific design parameters or recommendations for either of these alternatives can be provided once the building location and fill slope geometry have been determined.

- If swimming pools are planned, Geocon Incorporated should be contacted for a review of specific site conditions.

- Swimming pools located within 7 feet of the top of cut or fill slopes are not recommended. Where such a condition cannot be avoided, the portion of the swimming pool wall within 7 feet of the slope face be designed assuming that the adjacent soil provides no lateral support. This recommendation applies to fill slopes up to 30 feet in height, and cut slopes regardless of height. For swimming pools located near the top of fill slopes greater than 30 feet in height, additional recommendations may be required and Geocon Incorporated should be contacted for a review of specific site conditions.

- Although other improvements that are relatively rigid or brittle, such as concrete flatwork or masonry walls, may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures that would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.

7.6.18 The exterior flatwork recommendations provided herein assumes that the near surface soils are very low to low expansive (EI $\leq$50). Exterior slabs not subjected to vehicular traffic should be a minimum of four inches thick, and when panels are in excess of 8 feet wide, reinforced with 6 x 6-6/6 welded wire mesh. The mesh should be placed in the middle of the slab. Proper mesh positioning is critical to future performance of the slabs. The contractor should take extra measures to provide proper mesh placement. Prior to construction of slabs, the upper 12 inches of subgrade soils should be moisture conditioned at or slightly above optimum moisture content and compacted to at least 90 percent of the laboratory maximum dry density per ASTM 1557.

7.6.19 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. The occurrence may be reduced and/or controlled by: (1) limiting the slump of the concrete, (2) proper concrete placement and curing, and by (3) the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.6.20 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

7.7 Retaining Walls and Lateral Loads

7.7.1 Retaining walls that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid density of 35 pcf. Where the backfill will be inclined at 2:1 (horizontal:vertical), an active soil pressure of 50 pcf is recommended. Expansive soil should not be used as backfill material behind retaining walls. Soil placed for retaining wall backfill should have an Expansion Index less than 50.

7.7.2 Where walls are restrained from movement at the top, an additional uniform pressure of 8H psf (where H equals the height of the retaining wall portion of the wall in feet) should be added to the active soil pressure where the wall possesses a height of 8 feet or less and 12H where the wall is greater than 8 feet. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to two feet of fill soil should be added.

7.7.3 Soil to be used as backfill should be stockpiled and samples obtained for laboratory testing to evaluate its suitability for use as wall backfill. Modified lateral earth pressures will be required if backfill soils do not meet the required expansion index. County standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. On-site soils might not meet the design values used for County standard wall design. Geocon Incorporated should be consulted if County standard wall designs will be used to assess the suitability of on-site soil for use as wall backfill.

7.7.4 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The wall designer should provide appropriate lateral deflection quantities for planned retaining walls structures, if applicable. These lateral values should be considered when planning types of improvements above retaining wall structures.

7.7.5 Retaining walls should be provided with a drainage system adequate to prevent the buildup of hydrostatic forces and should be waterproofed as required by the project architect. The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent

to the base of the wall. The above recommendations assume a properly compacted granular (EI of less than 50) free-draining backfill material with no hydrostatic forces or imposed surcharge load. A typical retaining wall drainage detail is presented on Figure 8. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

7.7.6 In general, wall foundations having a minimum depth and width of 1 foot may be designed for an allowable soil bearing pressure of 2,000 psf, provided the soil within 3 feet below the base of the wall has an Expansion Index of less than 90. The recommended allowable soil bearing pressures may be increased by 300 psf and 500 psf for each additional foot of foundation width and depth, respectively, up to a maximum allowable soil bearing pressure of 4,000 psf. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, Geocon Incorporated should be consulted where such a condition is expected.

7.7.7 The structural engineer should determine the seismic design category for the project in accordance with Section 1613 of the CBC. If the project possesses a seismic design category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 18.3.5.12 of the 2016 CBC. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall. A seismic load of 15H should be used for design. We used the peak ground acceleration adjusted for Site Class effects, PGA_M, of 0.426 g calculated from ASCE 7-10 Section 11.8.3 and applied a pseudo-static coefficient of 0.33.

7.7.8 For resistance to lateral loads, an allowable passive earth pressure equivalent to a fluid density of 300 pcf is recommended for footings or shear keys poured neat against properly compacted granular fill soils or undisturbed formation materials. The allowable passive pressure assumes a horizontal surface extending away from the base of the wall at least 5 feet or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material not protected by floor slabs or pavement should not be included in the design for lateral resistance. Where walls are planned adjacent to and/or on descending slopes, a passive pressure of 150 pcf should be used in design.

7.7.9 An allowable friction coefficient of 0.4 may be used for resistance to sliding between soil and concrete. This friction coefficient may be combined with the allowable passive earth pressure when determining resistance to lateral loads.

7.7.10 The recommendations presented above are generally applicable to the design of rigid concrete or masonry retaining walls having a maximum height of eight feet. In the event that walls higher than eight feet or other types of walls (i.e., soil nail, MSE walls) are planned, Geocon Incorporated should be consulted for additional recommendations.

7.8 Preliminary Pavement Recommendations

7.8.1 The following preliminary pavement design sections are based on our experience with soil conditions within the surrounding area and preliminary R-value test results. The preliminary sections presented herein are for budgetary estimating purposes only and are not for construction. Final pavement sections should be determined after the grading operations are completed, subgrade soils are exposed, and additional R-Value tests are performed on actual pavement subgrade samples. For preliminary design, we used a resistance value (R-Value) of 40 for subgrade soils and 78 for aggregate base.

7.8.2 Asphalt concrete pavement thicknesses were determined following procedures outlined in the *California Highway Design Manual* (Caltrans).

7.8.3 The project civil engineer or traffic engineer should determine the actual road classification and the appropriate Traffic Index (TI) for the project. Table 7.8 provides preliminary pavement design sections for a residential road.

TABLE 7.8
PRELIMINARY ASPHALT CONCRETE PAVEMENT SECTIONS

Road Classification	Traffic Index	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
Residential Road	5	3	4

7.8.4 Class 2 aggregate base materials should conform to Section 26-1.02B of the *Standard Specifications of the State of California, Department of Transportation* (Caltrans) or Sections 400-2 and 203-6 of the *Standard Specifications for Public Works Construction (Greenbook)*. The aggregate base specifications are found in the *Regional Supplemental to Greenbook*.

7.8.5 Pavement subgrade soils should be scarified, moisture conditioned as necessary, and compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM D 1557. The

depth of compaction should be at least 12 inches. Base course material should be moisture conditioned near to slightly above optimum moisture content and compacted to a dry density of at least 95 percent of the laboratory maximum dry density. Asphalt concrete pavement should be compacted to at least 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.

7.8.6 The performance of pavements is highly dependent upon providing positive surface drainage away from the edge of pavements. Allowing water to pond on or adjacent to the pavement will likely result in saturation of the subgrade materials and subsequent pavement distress. Where landscape or planter islands are planned adjacent to pavement surfaces, the perimeter curb should extend at least 6 inches below the bottom of the Class 2 aggregate base and into the underlying subgrade. Drainage from landscaped areas should be directed to controlled drainage structures.

7.9 Storm Water Management

7.9.1 If storm water management devices are not properly designed and constructed, there is a risk for distress to improvements and property located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water being detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff into the subsurface occurs, downstream improvements may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

7.9.2 We performed an infiltration study on the property. A summary of our study and storm water management recommendations are provided in Appendix C.

7.10 Site Drainage and Moisture Protection

7.10.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2016 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

7.10.2 In the case of basement walls or building walls retaining landscaping areas, a water-proofing system should be used on the wall and joints, and a Miradrain drainage panel (or similar) should be placed over the waterproofing. The project architect or civil engineer should provide detailed specifications on the plans for all waterproofing and drainage.

7.10.3 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

7.10.4 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes can be used. In addition, where landscaping is planned adjacent to the pavement, construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material should be considered.

7.11 Slope Maintenance

7.11.1 Slopes that are steeper than 3:1 (horizontal:vertical) may, under conditions that are both difficult to prevent and predict, be susceptible to near-surface (surficial) slope instability. The instability is typically limited to the outer 3 feet of a portion of the slope and usually does not directly impact the improvements on the pad areas above or below the slope. The occurrence of surficial instability is more prevalent on fill slopes and is generally preceded by a period of heavy rainfall, excessive irrigation, or the migration of subsurface seepage. The disturbance and/or loosening of the surficial soils, as might result from root growth, soil expansion, or excavation for irrigation lines and slope planting, may also be a significant contributing factor to surficial instability. It is therefore recommended that, to the maximum extent practical: (a) disturbed/loosened surficial soils be either removed or properly recompacted, (b) irrigation systems be periodically inspected and maintained to eliminate leaks and excessive irrigation, and (c) surface drains on and adjacent to slopes be periodically maintained to preclude ponding or erosion. Although the incorporation of the above recommendations should reduce the potential for surficial slope instability, it will not eliminate the possibility and, therefore, it may be necessary to rebuild or repair a portion of the project's slopes in the future.

7.12 Grading and Foundation Plan Review

7.12.1 Geocon Incorporated should review the final grading and foundation plans for the project prior to final design submittal to evaluate if additional analysis and/or recommendations are required.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

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NO SCALE

VICINITY MAP

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RM / AML		DSK/GTYPD

SUMMER ESTATES
SAN DIEGO COUNTY, CALIFORNIA

DATE 01 - 11 - 2019	PROJECT NO. G2279 - 42 - 01	FIG. 1

Plotted:01/11/2019 8:23AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2279-42-01 (The Summit)\DETAILS\G2279-42-01 Vic Map.dwg

DEDICATE AND WIDEN SUMMIT DRIVE PER COUNTY OF SAN DIEGO PUBLIC ROAD STANDARDS (10' R/W DEDICATION)

PROPOSED BMP BASIN 2
785 PAD

A-1
A-2

LOT 20
809 PAD
1.12 AC
(48,875 SF LOT)
(8,326 SF PAD)

T-10
T-10A

LOT 19
810 PAD
0.85 AC
(36,940 SF LOT)
(7,990 SF PAD)

LOT 18
816 PAD
0.78 AC
(34,110 SF LOT)
(8,700 SF PAD)

T-8

LOT 17
815 PAD
1.50 AC
(34,860 SF LOT)
(8,520 SF PAD)

T-6

LOT 16
808 PAD
0.95 AC
(41,450 SF LOT)
(9,520 SF PAD)

LOT 4
844 PAD
0.80 AC
(34,990 SF LOT)
(10,463 SF PAD)

LOT 3
844 PAD
0.92 AC
(40,070 SF LOT)
(8,456 SF PAD)

LOT 2
844 PAD
0.74 AC
(32,160 SF LOT)
(11,120 SF PAD)

LOT 1
844 PAD
0.85 AC
(36,890 SF LOT)
(12,580 SF PAD)

LOT 5
820 PAD
0.84 AC
(36,370 SF LOT)
(6,550 SF PAD)

LOT 6
820 PAD
1.22 AC
(53,110 SF LOT)
(11,000 SF PAD)

LOT 7
824 PAD
1.08 AC
(47,100 SF LOT)
(8,280 SF PAD)

LOT 8
784 PAD
1.35 AC
(58,930 SF LOT)
(6,440 SF PAD)

LOT 9
785 PAD
1.32 AC
(57,480 SF LOT)
(7,400 SF PAD)

LOT 10
754 PAD
1.21 AC
(52,830 SF PAD)
(...390 SF LOT)

LOT 11
754 PAD
2.25 AC
98,130 SF LOT)
8,680 SF PAD)

LOT 12
760 PAD
0.95 AC
(41,520 SF LOT)
(8,200 SF PAD)

LOT 13
780 PAD
0.64 AC
(28,040 SF LOT)
(7,900 SF PAD)

LOT 14
800 PAD
0.79 AC
(34,270 SF LOT)
(8,160 SF PAD)

LOT 15
808 PAD
0.82 AC
(35,920 SF LOT)
(9,540 SF PAD)

PROP SEPTIC FIELD ~2,500 SF

Kgr

AT-1 (12')
AT-2 (12')
AT-3 (18')
AT-4 (5')
AT-5 (27')
AT-6 (9')
AT-7 (12')
AT-8 (17')
AT-9 (15')
AT-10 (28')

T-1
T-2
T-3
T-4
T-5
T-7
T-9
T-11
T-12
T-13
T-14

A-3
A-4
A-5
A-6

A
A'
B
B'
C
C'

GRAPHIC SCALE
0' 30' 60' 90' 120' 180' 240'
SCALE 1"=60' (on 36x24)

GEOCON LEGEND

Kgr .....GRANITIC ROCK
T-14 .....APPROX. LOCATION OF TRENCH
AT-10 .....APPROX. LOCATION OF AIR TRACK BORING
(12') .....APPROX. DEPTH TO 2D SPE BOUNDARY (In Feet)
A-6 .....APPROX. LOCATION OF INFILTRATION TEST

GEOLOGIC MAP

SUMMIT ESTATES
SAN DIEGO COUNTY, CALIFORNIA

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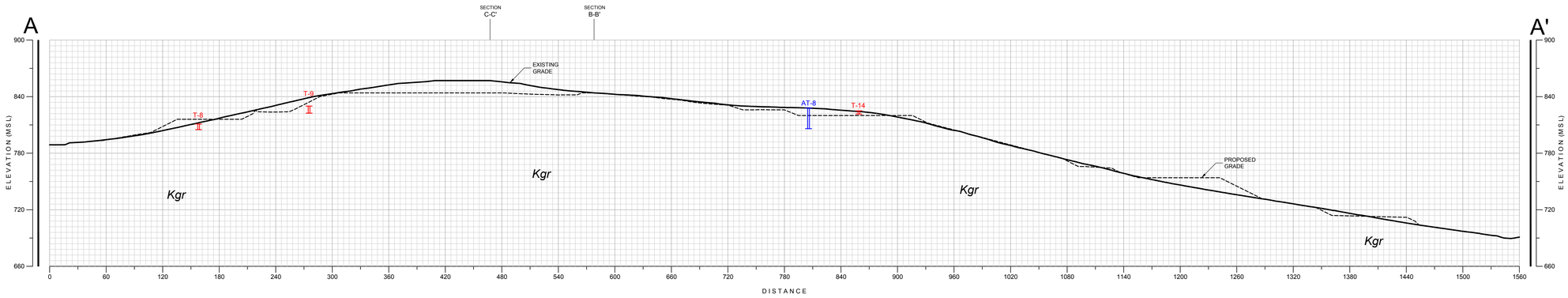
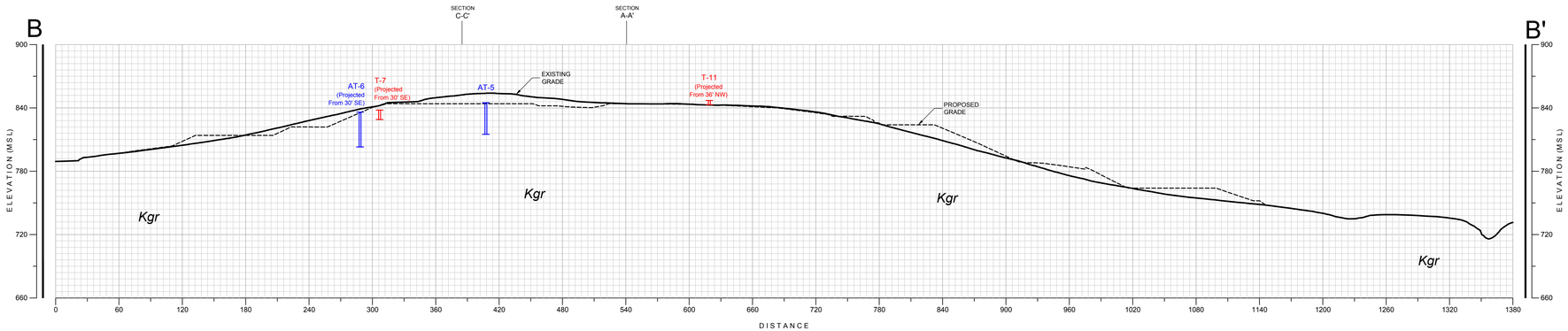
SCALE	1" = 60'
DATE	01 - 11 - 2019
PROJECT NO.	G2279 - 42 - 01
FIGURE	2
SHEET	1 OF 1

Plotted:01/10/2019 2:24PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2279-42-01 (The Summit)\SHEETS\G2279-42-01 Geo Map.dwg



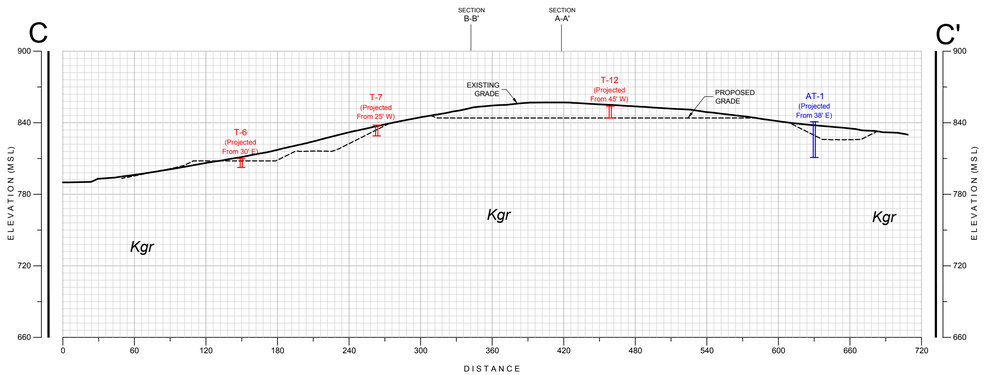
GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 60' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION B-B'

SCALE: 1" = 60' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION C-C'

SCALE: 1" = 60' (Vert. = Horiz.)

GEOCON LEGEND

Kgr.....GRANITIC ROCK

T-14.....APPROX. LOCATION OF TRENCH

AT-8.....APPROX. LOCATION OF AIR TRACK BORING

GEOLOGIC CROSS SECTION

SUMMIT ESTATES
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SCALE	1" = 60'
DATE	01 - 11 - 2019
PROJECT NO.	G2279 - 42 - 01
FIGURE	3
SHEET	1 OF 1

Plotted:01/10/2019 2:28PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2279-42-01 (The Summit)\SHEETS\G2279-42-01 XSections.dwg

ASSUMED CONDITIONS :

SLOPE HEIGHT	H	=	35 feet
SLOPE INCLINATION	2 : 1	(Horizontal : Vertical)	
TOTAL UNIT WEIGHT OF SOIL	γ_t	=	130 pounds per cubic foot
ANGLE OF INTERNAL FRICTION	ϕ	=	30 degrees
APPARENT COHESION	C	=	200 pounds per square foot
NO SEEPAGE FORCES			

ANALYSIS :

$\lambda_{c\phi}$	=	$\frac{\gamma_t H \tan\phi}{C}$	EQUATION (3-3), REFERENCE 1
FS	=	$\frac{NcfC}{\gamma_t H}$	EQUATION (3-2), REFERENCE 1
$\lambda_{c\phi}$	=	13.1	CALCULATED USING EQ. (3-3)
Ncf	=	38	DETERMINED USING FIGURE 10, REFERENCE 2
FS	=	1.7	FACTOR OF SAFETY CALCULATED USING EQ. (3-2)

REFERENCES :

1.....Janbu, N., Stability Analysis of Slopes with Dimensionless Parameters, Harvard Soil Mechanics, Series No. 46, 1954

2.....Janbu, N., Discussion of J.M. Bell, Dimensionless Parameters for Homogeneous Earth Slopes, Journal of Soil Mechanics and Foundation Design, No. SM6, November 1967.

SLOPE STABILITY ANALYSIS - FILL SLOPES

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SUMMER ESTATES
SAN DIEGO COUNTY, CALIFORNIA

RM / AML		DSK/GTYPD	DATE 01 - 11 - 2019	PROJECT NO. G2279 - 42 - 01	FIG. 4

Plotted:01/11/2019 8:21AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2279-42-01 (The Summit)\DETAILS\Slope Stability Analyses-Fill (SSA-F).dwg

ASSUMED CONDITIONS :

SLOPE HEIGHT	H	=	Infinite
DEPTH OF SATURATION	Z	=	3 feet
SLOPE INCLINATION	2 : 1		(Horizontal : Vertical)
SLOPE ANGLE	i	=	26.6 degrees
UNIT WEIGHT OF WATER	γ_w	=	62.4 pounds per cubic foot
TOTAL UNIT WEIGHT OF SOIL	γ_t	=	130 pounds per cubic foot
ANGLE OF INTERNAL FRICTION	ϕ	=	30 degrees
APPARENT COHESION	C	=	300 pounds per square foot

SLOPE SATURATED TO VERTICAL DEPTH Z BELOW SLOPE FACE

SEEPAGE FORCES PARALLEL TO SLOPE FACE

ANALYSIS :

$$FS = \frac{C + (\gamma_t - \gamma_w)\ Z\ cos^2\ i\ tan\ \phi}{\gamma_t\ Z\ sin\ i\ cos\ i} = 1.9$$

REFERENCES :

1.....Haefeli, R. *The Stability of Slopes Acted Upon by Parallel Seepage*, Proc. Second International Conference, SMFE, Rotterdam, 1948, 1, 57-62

2.....Skempton, A. W., and F.A. Delory, *Stability of Natural Slopes in London Clay*, Proc. Fourth International Conference, SMFE, London, 1957, 2, 378-81

SURFICIAL SLOPE STABILITY ANALYSIS

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SUMMER ESTATES

SAN DIEGO COUNTY, CALIFORNIA

RM / AML		DSK/GTYPD	DATE 01 - 11 - 2019	PROJECT NO. G2279 - 42 - 01	FIG. 5

Plotted:01/11/2019 8:18AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2279-42-01 (The Summit)\DETAILS\Slope Stability Analyses-Surficial (SSAS).dwg

ASSUMED CONDITIONS :

SLOPE HEIGHT	H	=	25 feet
SLOPE INCLINATION	2 : 1	(Horizontal : Vertical)	
TOTAL UNIT WEIGHT OF SOIL	γ_t	=	135 pounds per cubic foot
ANGLE OF INTERNAL FRICTION	ϕ	=	40 degrees
APPARENT COHESION	C	=	100 pounds per square foot
NO SEEPAGE FORCES			

ANALYSIS :

$\lambda_{c\phi}$	=	$\frac{\gamma_t H \tan\phi}{C}$	EQUATION (3-3), REFERENCE 1
FS	=	$\frac{NcfC}{\gamma_t H}$	EQUATION (3-2), REFERENCE 1
$\lambda_{c\phi}$	=	28	CALCULATED USING EQ. (3-3)
Ncf	=	70	DETERMINED USING FIGURE 10, REFERENCE 2
FS	=	2.1	FACTOR OF SAFETY CALCULATED USING EQ. (3-2)

REFERENCES :

1.....Janbu, N., Stability Analysis of Slopes with Dimensionless Parameters, Harvard Soil Mechanics, Series No. 46, 1954

2.....Janbu, N., Discussion of J.M. Bell, Dimensionless Parameters for Homogeneous Earth Slopes, Journal of Soil Mechanics and Foundation Design, No. SM6, November 1967.

SLOPE STABILITY ANALYSIS - CUT SLOPES

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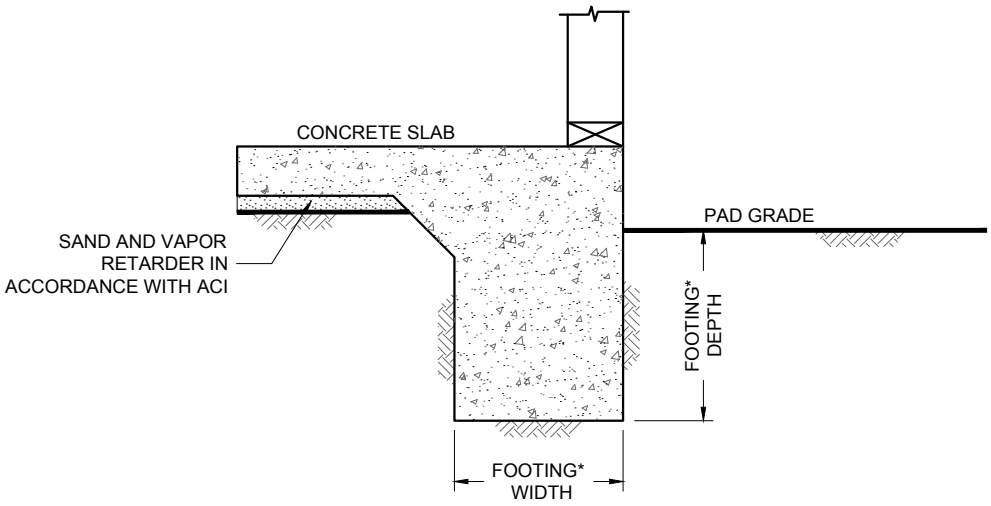
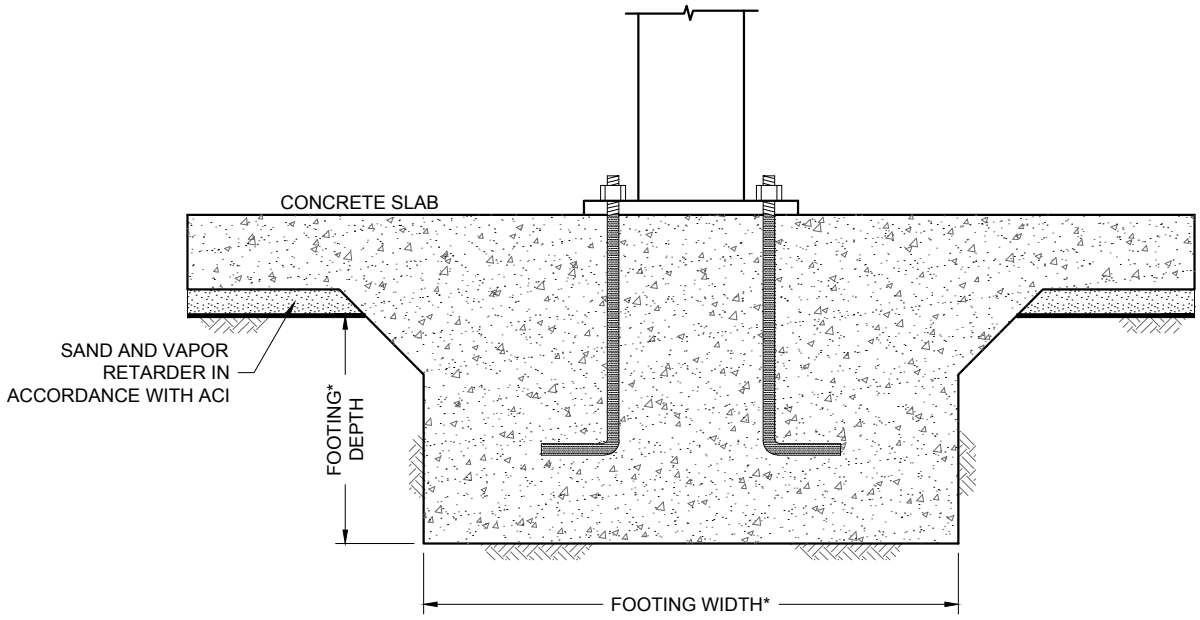
SUMMER ESTATES

SAN DIEGO COUNTY, CALIFORNIA

RM / AML		DSK/GTYPD	DATE 01 - 11 - 2019	PROJECT NO. G2279 - 42 - 01	FIG. 6

Plotted:01/11/2019 8:21AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2279-42-01 (The Summit)\DETAILS\Slope Stability Analyses-Cut (SSA-C).dwg





*....SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION

NO SCALE

WALL / COLUMN FOOTING DIMENSION DETAIL

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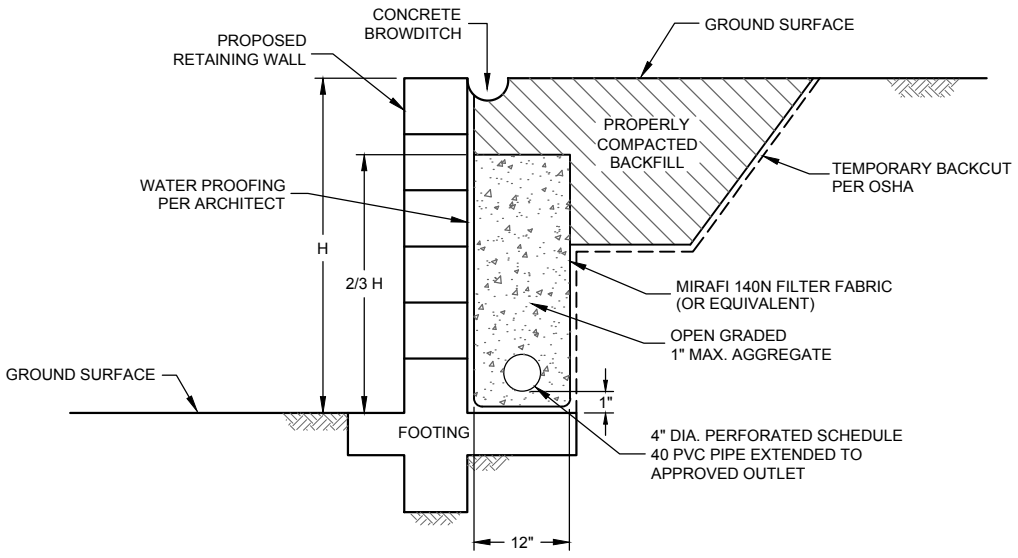
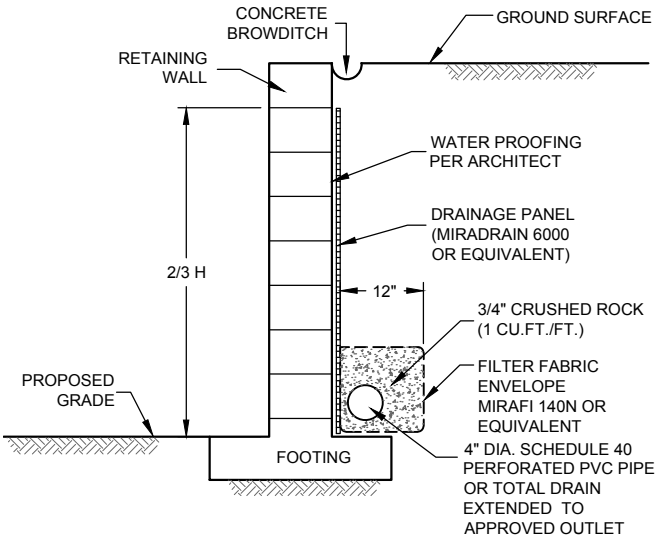
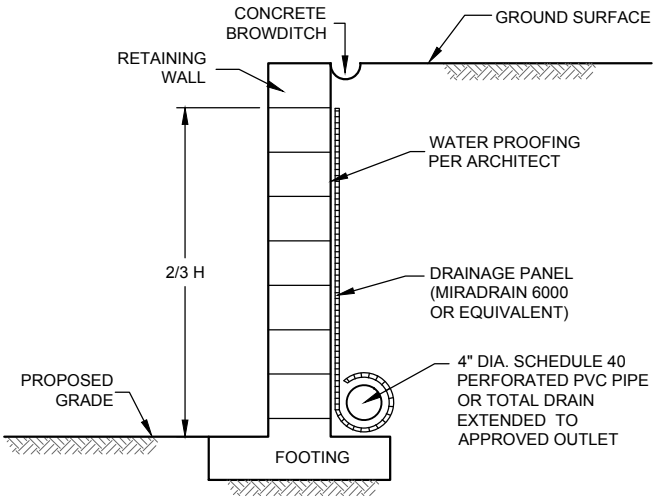
SUMMER ESTATES
SAN DIEGO COUNTY, CALIFORNIA

RM / AML		DSK/GTYPD	DATE 01 - 11 - 2019	PROJECT NO. G2279 - 42 - 01	FIG. 7

Plotted:01/11/2019 8:22AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2279-42-01 (The Summit)\DETAILS\Wall-Column Footing Dimension Detail (COLFOOT2).dwg







NOTE :

DRAIN SHOULD BE UNIFORMLY SLOPED TO GRAVITY OUTLET
OR TO A SUMP WHERE WATER CAN BE REMOVED BY PUMPING

NO SCALE

TYPICAL RETAINING WALL DRAIN DETAIL

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SUMMER ESTATES
SAN DIEGO COUNTY, CALIFORNIA

RM / AML		DSK/GTYPD

DATE 01 - 11 - 2019	PROJECT NO. G2279 - 42 - 01	FIG. 8

Plotted:01/11/2019 8:22AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2279-42-01 (The Summit)\DETAILS\Typical Retaining Wall Drainage Detail (RWDD7A).dwg

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

The field investigation was performed on December 7 and 13, 2018. The investigation consisted of drilling 10, air-percussion, borings and excavating fourteen, shallow, exploratory pits at the approximate locations shown on the *Site Plan,* Figure 2. The soil conditions encountered in the trenches were visually examined, classified and logged in general conformance with the American Society for Testing and Materials (ASTM) Practice for Description and Identification of Soils (Visual-Manual Procedure D2488). The log of the exploratory test pits are presented on Figures A-1 through A-14. The log depicts the various soil types encountered and indicate the depths at which samples were taken. Logs of the air-track percussion borings are shown on Figures A-15 through A-24.

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 1 ELEV. (MSL.) 790' DATE COMPLETED 12-13-2018 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T1-1				**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND; few cobble; trace boulder up to 10-inch diameter			
2	T1-2				**GRANITIC ROCK** Moderately weathered, weak, damp, yellowish brown, GRANITIC ROCK; excavates as Silty, fine to medium SAND			
4	T1-3				-Becomes weathered, moderately weak, orange brown			
6					TRENCH TERMINATED AT 6 FEET Groundwater not encountered			

Figure A-1,
Log of Trench T 1, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 2 ELEV. (MSL.) 747' DATE COMPLETED 12-13-2018 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND; trace gravel			
2	T2-1				**WEATHERED GRANITIC ROCK** Weak, damp, olive brown, Silty, fine to medium SAND; excavates with chunks of granitic rock			
4								
6								
8					**GRANITIC ROCK** Moderately weathered, weak, damp, yellowish brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
10					TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-2,
Log of Trench T 2, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 3 ELEV. (MSL.) 754' DATE COMPLETED 12-13-2018 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK** Moderately weathered, weak, damp, reddish brown and yellowish brown, GRANITIC ROCK; excavates as Silty SAND			
4					-Harder digging below 5 feet			
6								
					TRENCH TERMINATED AT 7 FEET Groundwater not encountered			

Figure A-3,
Log of Trench T 3, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 4 ELEV. (MSL.) 796' DATE COMPLETED 12-13-2018 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, moist, dark brown, Sitly, fine to medium SAND; few cobble up to 12-inch diameter			
2								
					GRANITIC ROCK Moderately weathered, moderately weak, damp, light reddish brown and brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
4					REFUSAL AT 4 FEET Groundwater not encountered			

Figure A-4,
Log of Trench T 4, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 5 ELEV. (MSL.) **806'** DATE COMPLETED **12-13-2018** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND; trace gravel			
2								
	T5-1				**GRANITIC ROCK** Moderately weathered, weak, dry, light reddish brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
4					-Becomes olive brown			
6					REFUSAL AT 6 FEET Groundwater not encountered			

Figure A-5,
Log of Trench T 5, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 6 ELEV. (MSL.) **810'** DATE COMPLETED **12-13-2018** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND; trace gravel			
2					**GRANITIC ROCK** Moderately weathered, weak, damp, reddish brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
4					-Becomes yellowish brown and reddish brown			
6					-Hard digging below 5.5 feet			
					TRENCH TERMINATED AT 7.5 FEET Groundwater not encountered			

Figure A-6,
Log of Trench T 6, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 7 ELEV. (MSL.) 838' DATE COMPLETED 12-13-2018 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, damp to moist, dark brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK** Moderately weathered, weak, damp, reddish brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
4					-Becomes yellowish brown			
6					-Hard digging below 7 feet			
8								
					PRACTICAL REFUSAL AT 9 FEET Groundwater not encountered			

Figure A-7,
Log of Trench T 7, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 8** ELEV. (MSL.) **811'** DATE COMPLETED **12-13-2018** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T8-1				**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND; trace gravel			
2					**GRANITIC ROCK** Moderately weathered, weak, damp, yellowish brown to brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
4	T8-2				-Becomes light brown; hard digging			
6					TRENCH TERMINATED AT 6 FEET Groundwater not encountered			

Figure A-8,
Log of Trench T 8, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 9** ELEV. (MSL.) **830'** DATE COMPLETED **12-13-2018** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND; trace gravel			
2					**GRANITIC ROCK** Moderately, weak, damp, light brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
4					-Becomes olive brown			
6					-Hard digging at 7 feet			
					TRENCH TERMINATED AT 7.5 FEET Groundwater not encountered			

Figure A-9,
Log of Trench T 9, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 10 ELEV. (MSL.) 811' DATE COMPLETED 12-13-2018 EQUIPMENT JD 410 BACKHOE BY: N. BORJA MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND; trace gravel			
2					**GRANITIC ROCK** Moderately weak to strong, damp, light grayish brown, GRANITIC ROCK REFUSAL AT 2.5 FEET Groundwater not encountered			

Figure A-10,
Log of Trench T 10, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 10A** ELEV. (MSL.) **812'** DATE COMPLETED **12-13-2018** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK** Moderately weathered, weak, light brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND -Becomes olive brown, fine- to medium-grained			
4								
6					TRENCH TERMINATED AT 6 FEET Groundwater not encountered			

Figure A-11,
Log of Trench T 10A, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 11 ELEV. (MSL.) **847'** DATE COMPLETED **12-13-2018** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, damp to moist, dark brown, Silty, fine to medium SAND			
2					-Becomes dry; porous			
					GRANITIC ROCK Moderately, weak to strong, dry, light brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
4					REFUSAL AT 4 FEET Groundwater not encountered			

Figure A-12,
Log of Trench T 11, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 12 ELEV. (MSL.) **854'** DATE COMPLETED **12-13-2018** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T11-1				**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK** Moderately weathered, weak, damp, yellowish brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
4	T11-2							
6								
8					-Becomes gray to light gray			
10					PRACTICAL REFUSAL AT 10 FEET Groundwater not encountered			

Figure A-13,
Log of Trench T 12, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 13** ELEV. (MSL.) **822'** DATE COMPLETED **12-13-2018** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND; trace gravel			
2					**GRANITIC ROCK** Moderately weathered, weak to moderately weak, damp, light brown and gray, GRANITIC ROCK; excavates as Silty, fine to coarse SAND; some gravel			
4					TRENCH TERMINATED AT 4 FEET Groundwater not encountered			

Figure A-14,
Log of Trench T 13, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2279-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 14 ELEV. (MSL.) **824'** DATE COMPLETED **12-13-2018** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK** Moderately weathered, weak, damp, light brown to yellowish brown, GRANITIC ROCK; excavates as Silty, fine to coarse SAND			
					TRENCH TERMINATED AT 3.5 FEET Groundwater not encountered			

Figure A-15,
Log of Trench T 14, Page 1 of 1

G2279-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

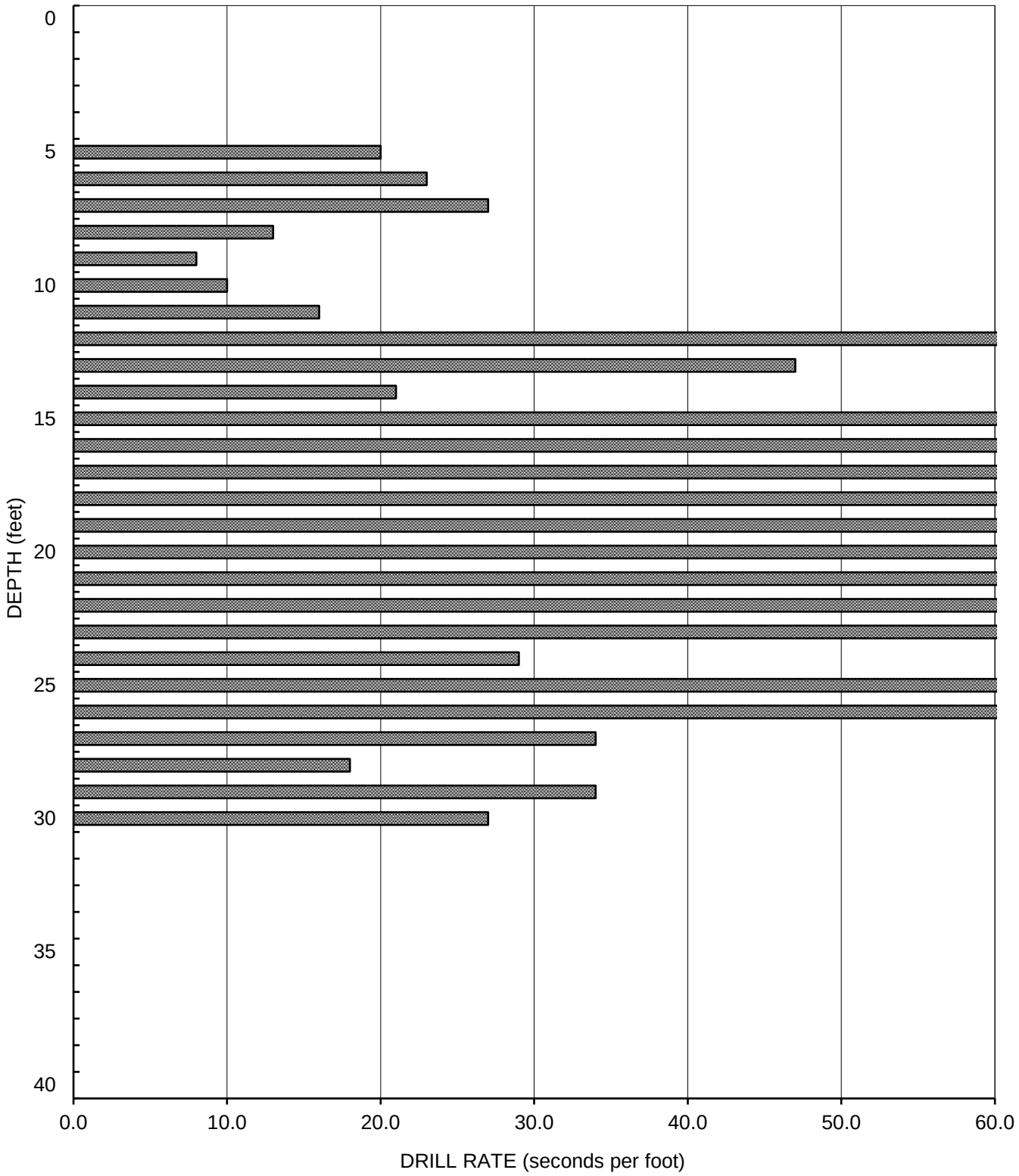
PROJECT NO. G2279-42-01

SUMMIT ESTATES

AIR TRACK BORING AT-1

Elevation - 841 Feet (MSL)

Date 12-07-2018 - Equipment: ECM 370



AT001.xls

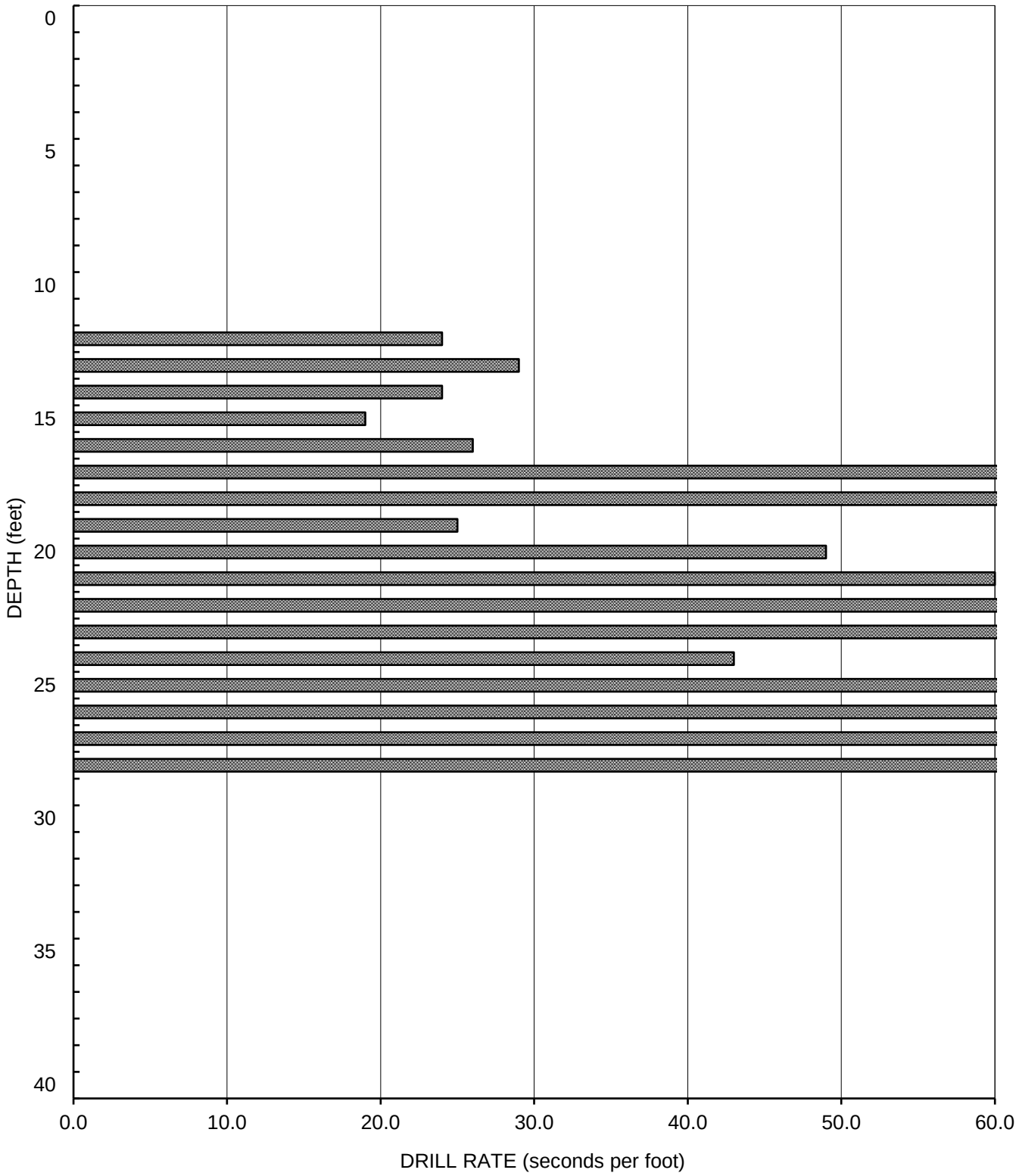
FIGURE A-15

PROJECT NO. G2279-42-01

SUMMIT ESTATES

AIR TRACK BORING AT-2
Elevation - 849 Feet (MSL)
Date 12-07-2018 - Equipment: ECM 370

GEOCON INCORPORATED



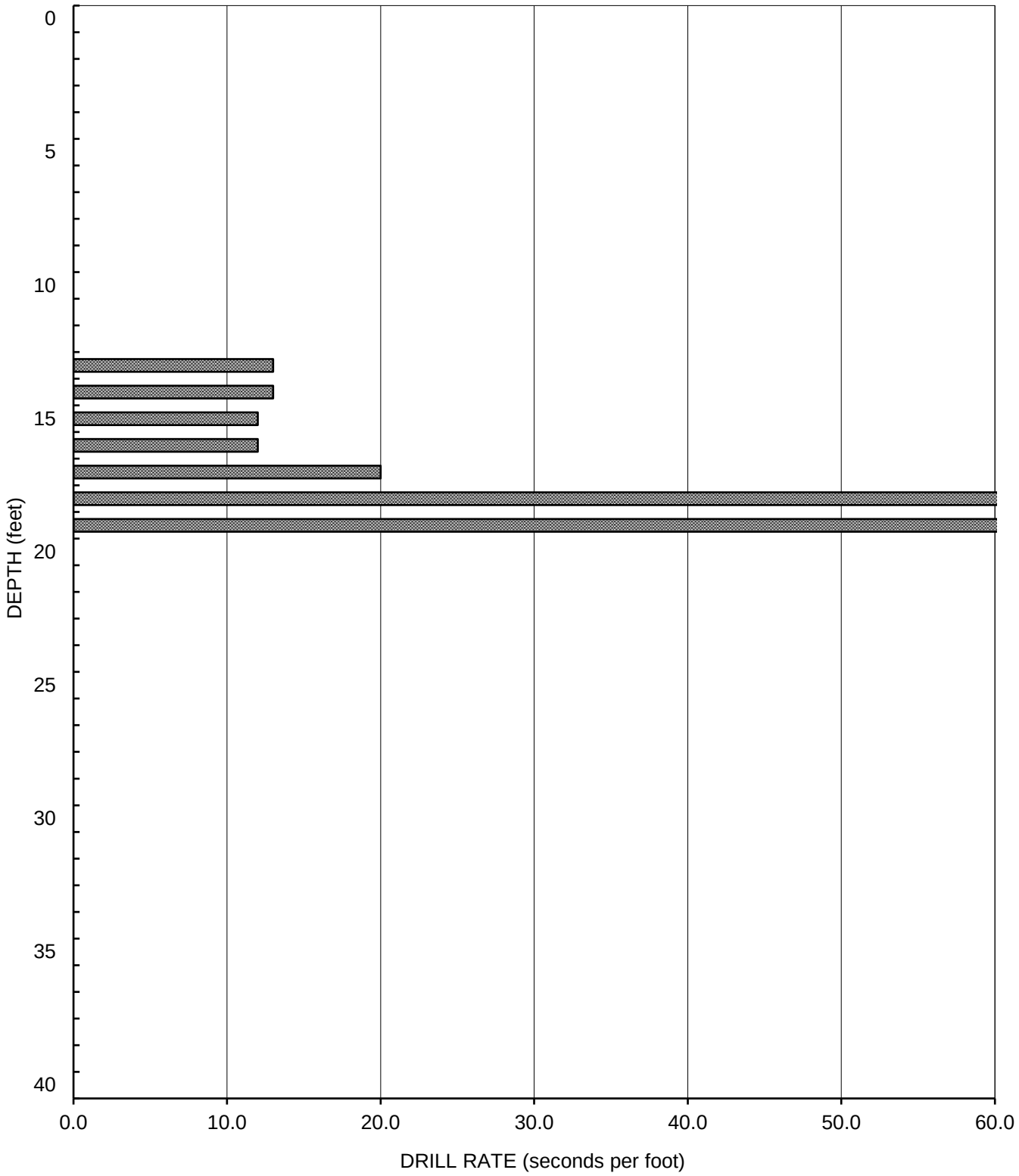
AT002.xls

FIGURE A-16

PROJECT NO. G2279-42-01

SUMMIT ESTATES

AIR TRACK BORING AT-3
Elevation - 852 Feet (MSL)
Date 12-07-2018 - Equipment: ECM 370



AT003.xls

FIGURE A-17

PROJECT NO. G2279-42-01

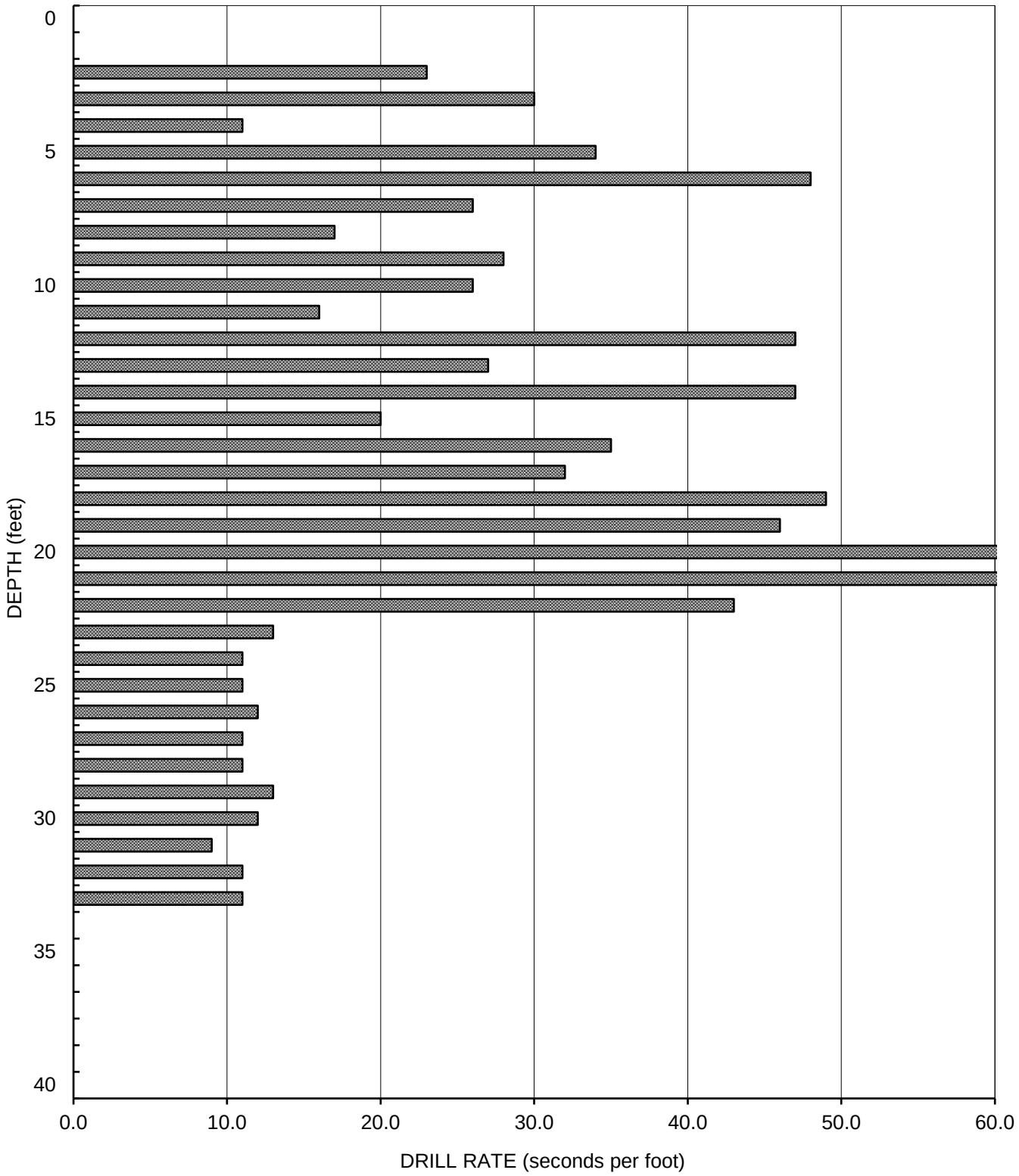
SUMMIT ESTATES

AIR TRACK BORING AT-4

Elevation - 830 Feet (MSL)

Date 12-07-2018 - Equipment: ECM 370

GEOCON INCORPORATED



AT004.xls

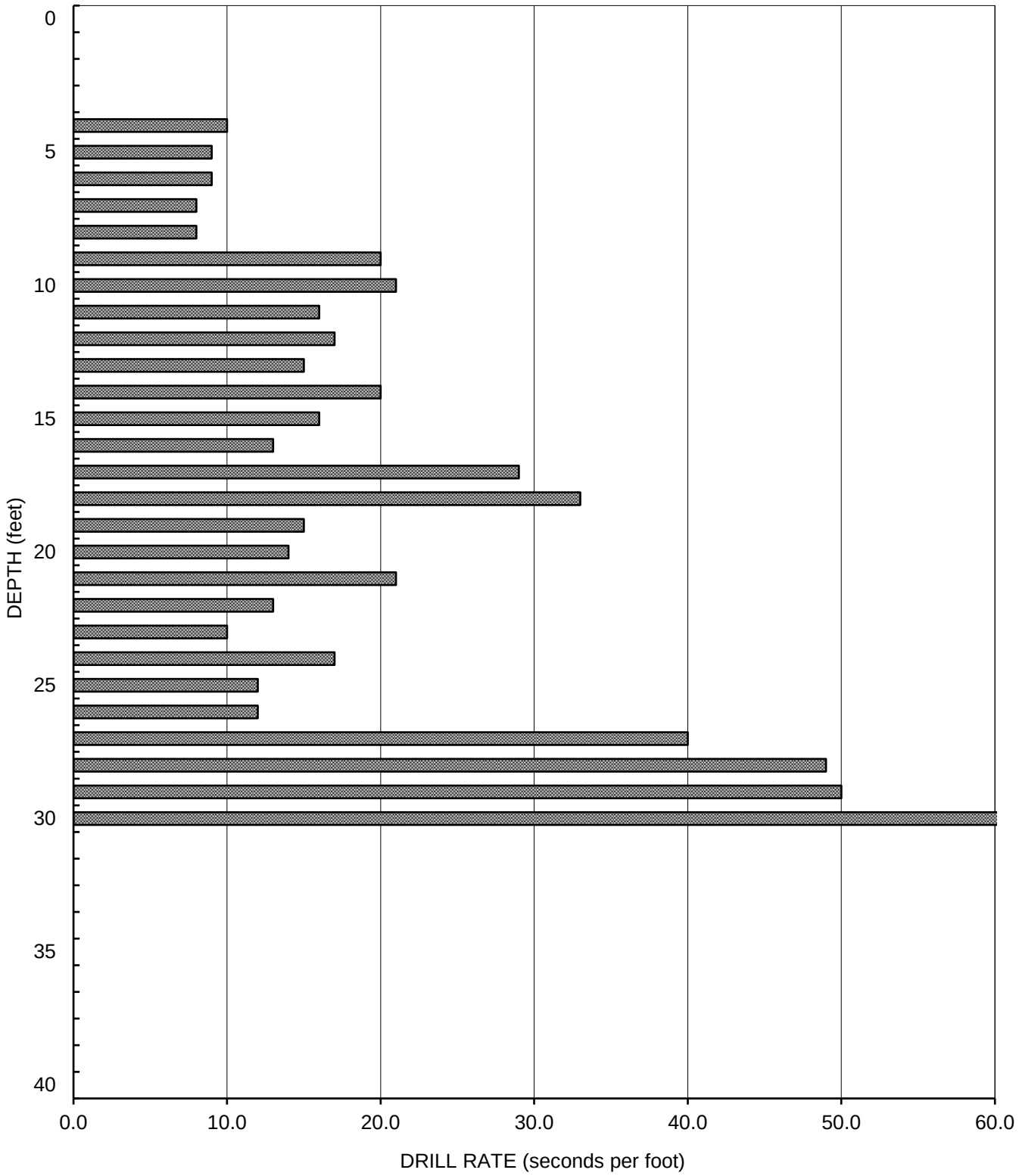
FIGURE A-18

PROJECT NO. G2279-42-01

SUMMIT ESTATES

AIR TRACK BORING AT-5
Elevation - 845 Feet (MSL)
Date 12-07-2018 - Equipment: ECM 370

GEOCON INCORPORATED



AT005.xls

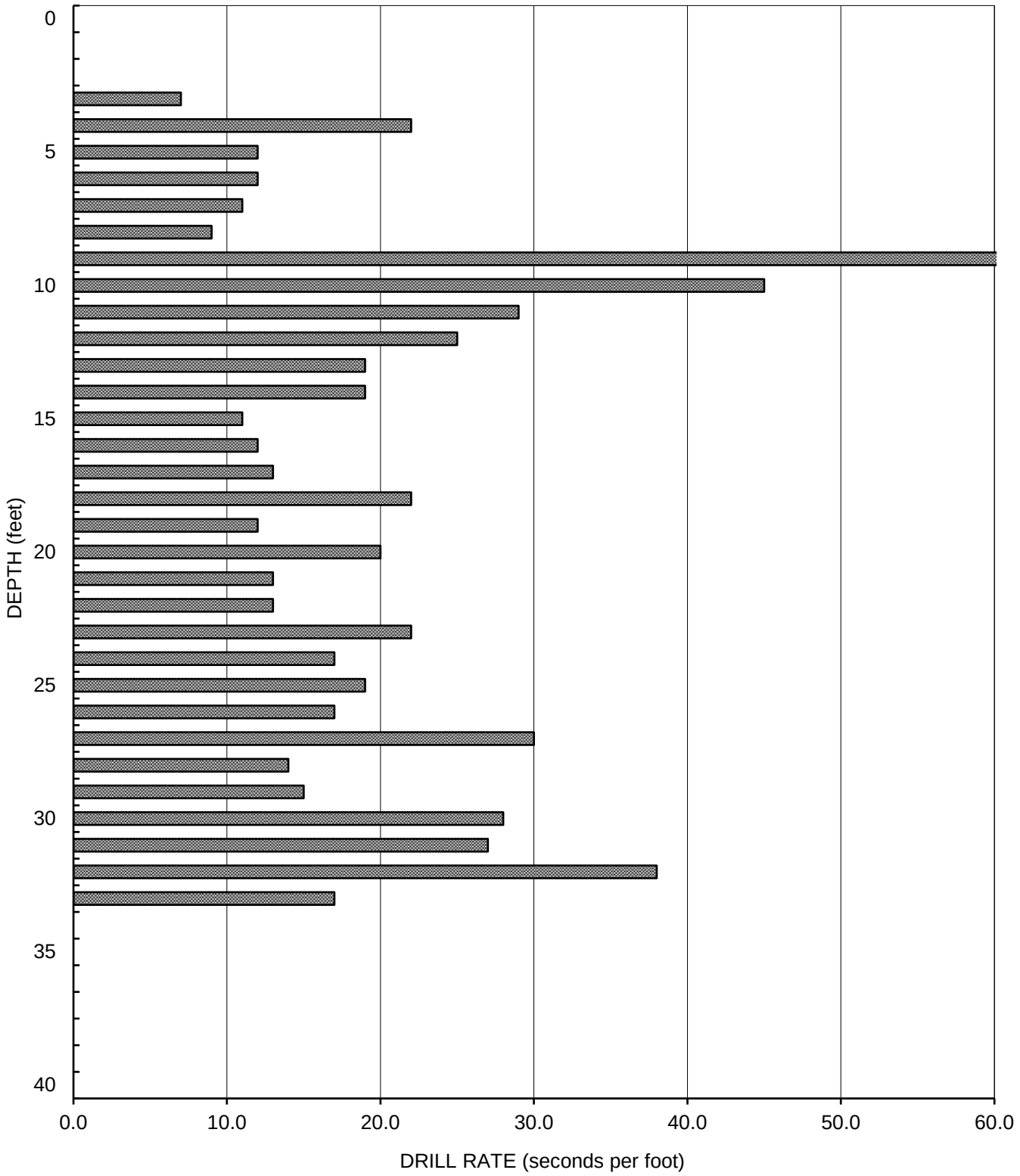
FIGURE A-19

PROJECT NO. G2279-42-01

SUMMIT ESTATES

AIR TRACK BORING AT-6
Elevation - 836 Feet (MSL)
Date 12-07-2018 - Equipment: ECM 370

GEOCON INCORPORATED



AT006.xls

FIGURE A-20

PROJECT NO. G2279-42-01

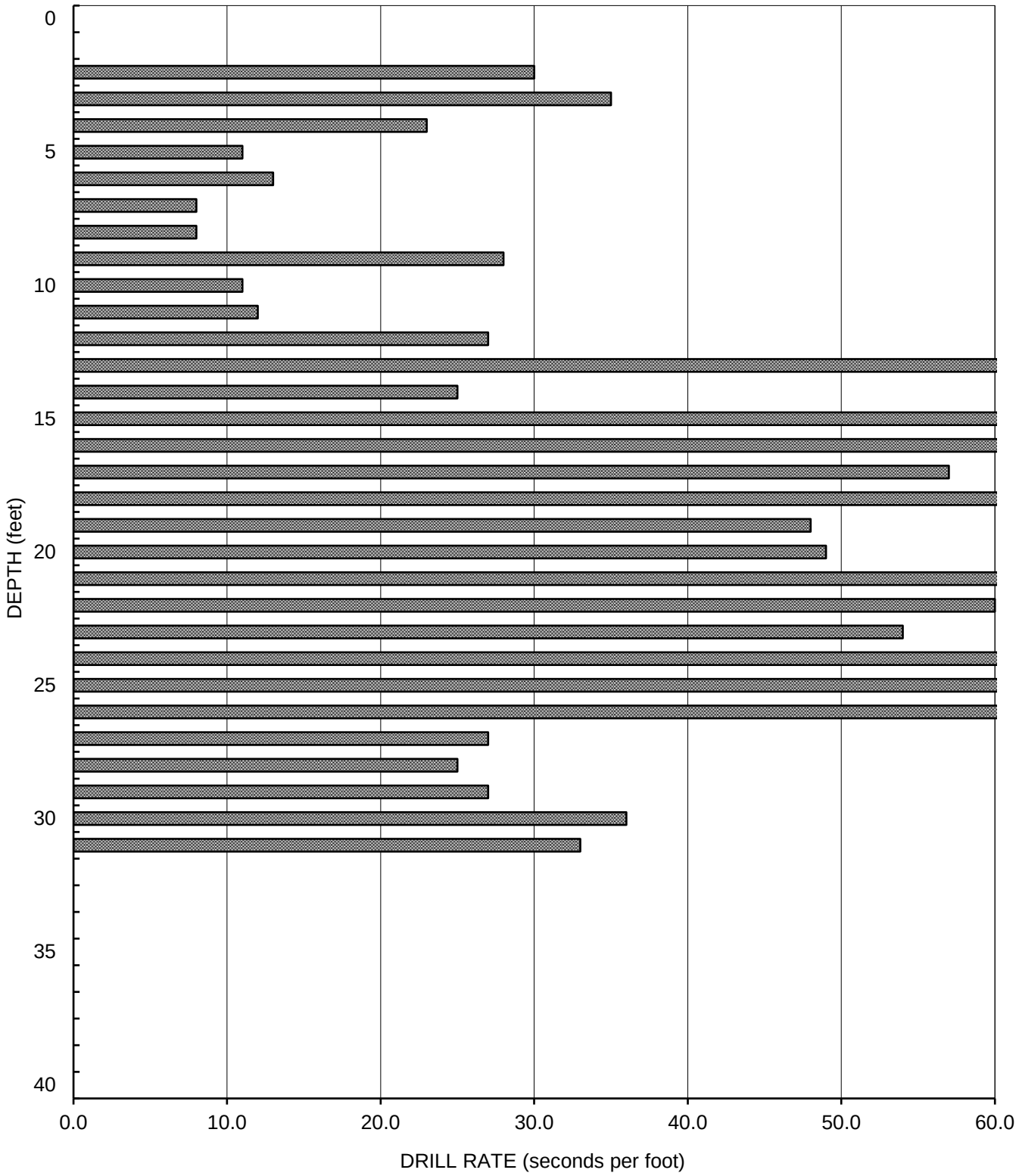
SUMMIT ESTATES

AIR TRACK BORING AT-7

Elevation - 831 Feet (MSL)

Date 12-07-2018 - Equipment: ECM 370

GEOCON INCORPORATED



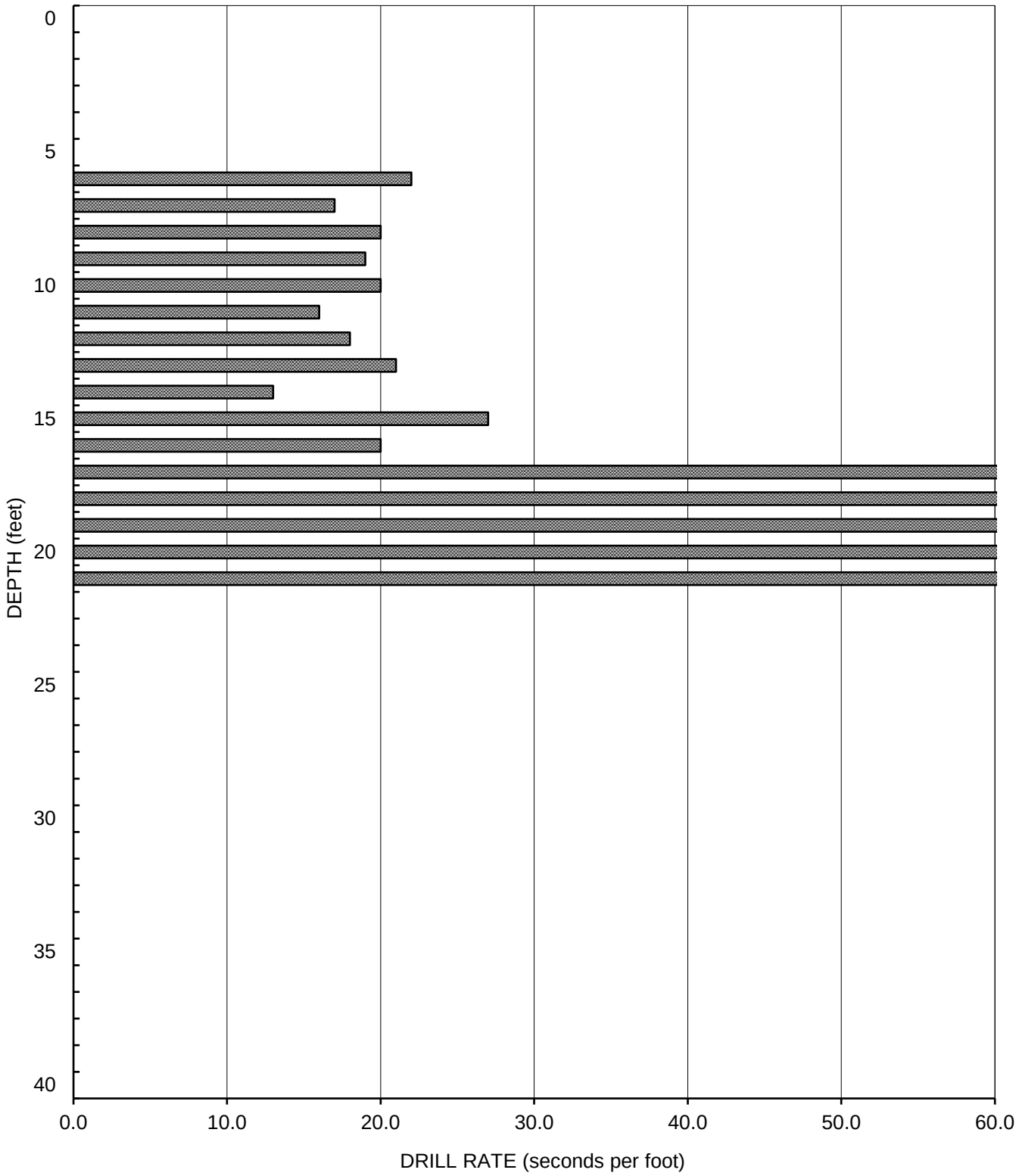
AT007.xls

FIGURE A-21

PROJECT NO. G2279-42-01

SUMMIT ESTATES

AIR TRACK BORING AT-8
Elevation - 828 Feet (MSL)
Date 12-07-2018 - Equipment: ECM 370



AT008.xls

FIGURE A-22

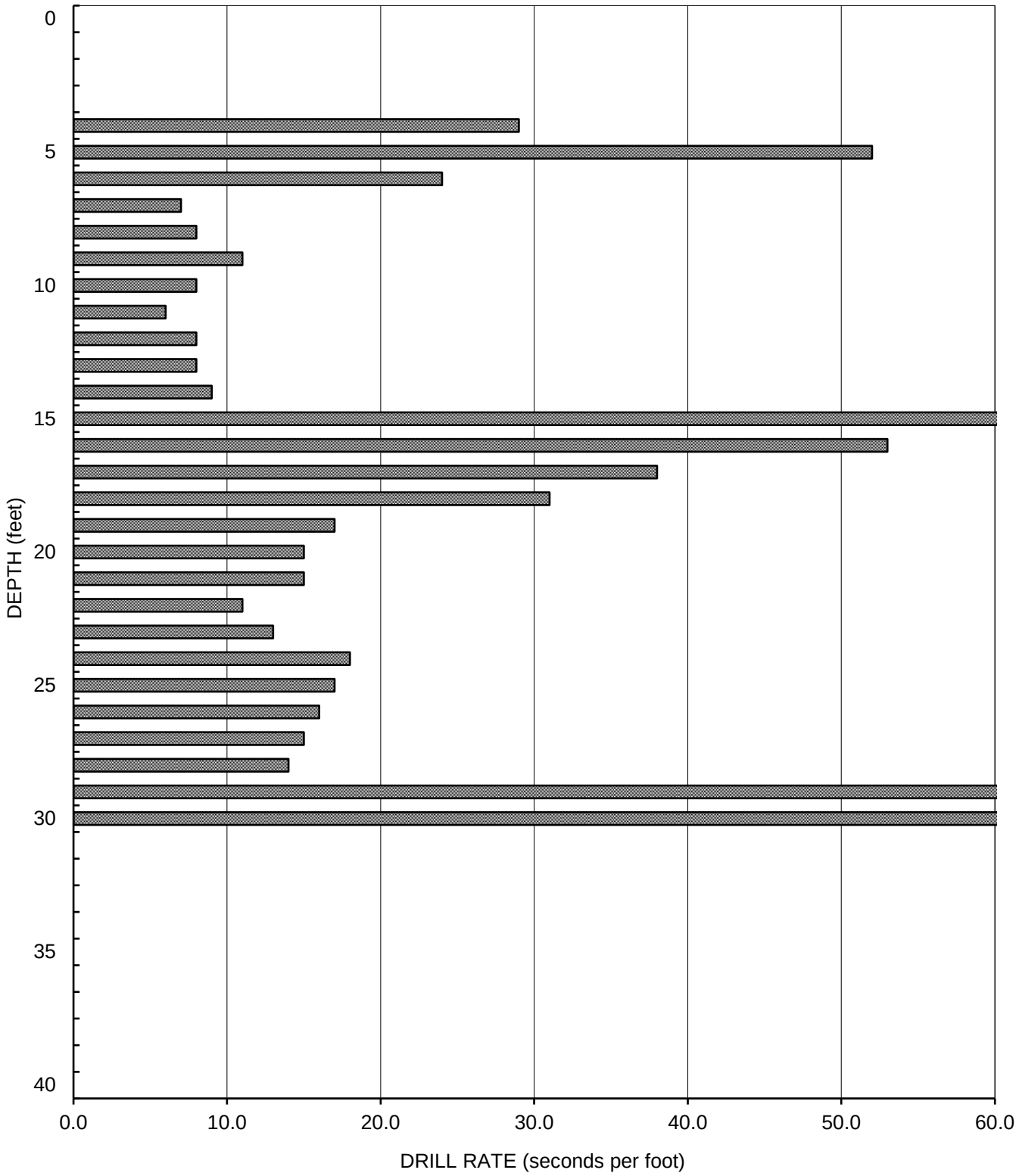
PROJECT NO. G2279-42-01

SUMMIT ESTATES

AIR TRACK BORING AT-9

Elevation - 801 Feet (MSL)

Date 12-07-2018 - Equipment: ECM 370



AT009.xls

FIGURE A-23

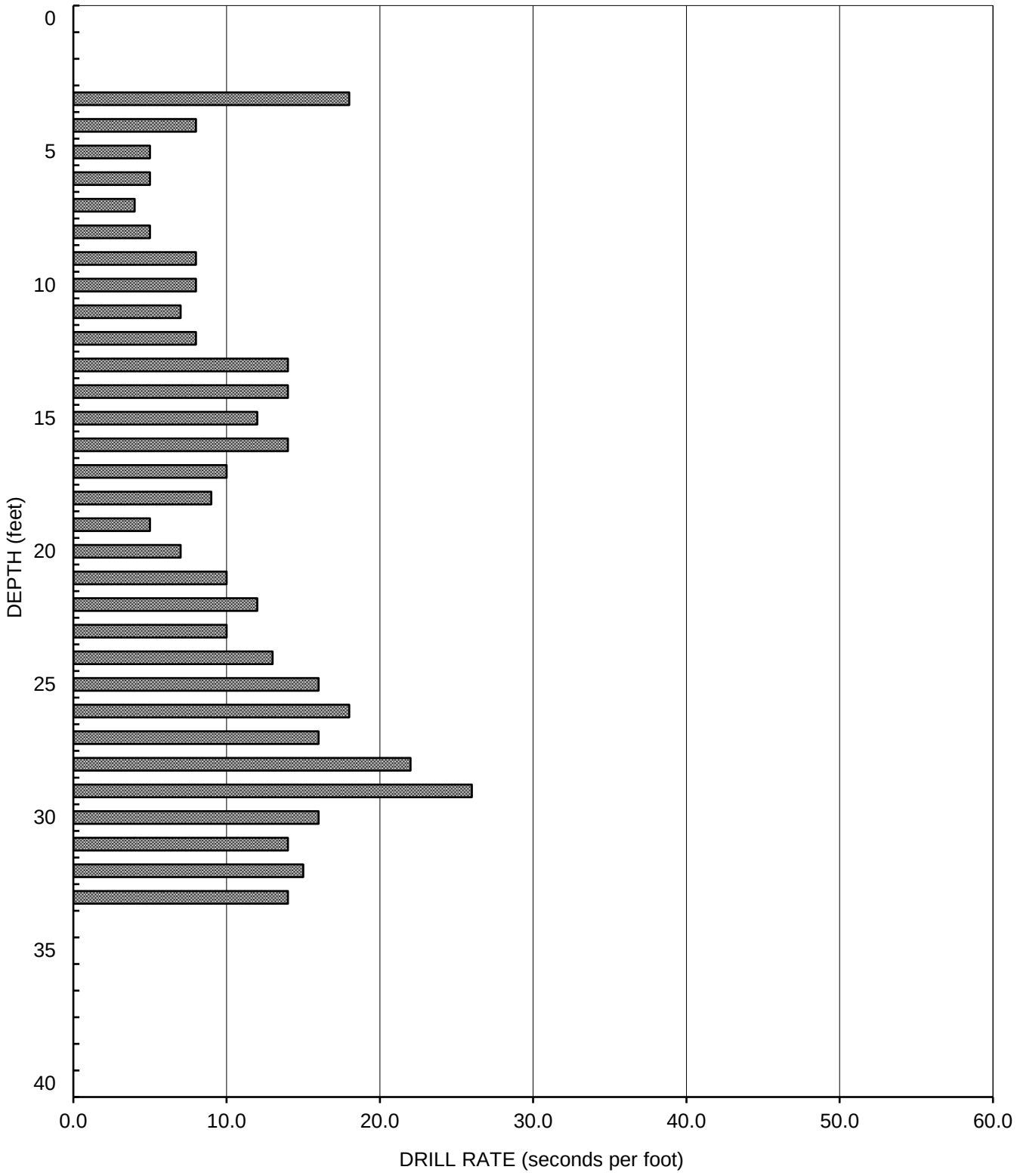
PROJECT NO. G2279-42-01

SUMMIT ESTATES

AIR TRACK BORING AT-10

Elevation - 812 Feet (MSL)

Date 12-07-2018 - Equipment: ECM 370



AT010.xls

FIGURE A-24

APPENDIX B

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were tested for: maximum dry density and optimum moisture content; shear-strength; expansion index; water-soluble sulfate content; chloride ion content; resistance value; and grain size distribution. The results of our laboratory tests are presented on the following tables and Figures.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
T5-1	Brown, silty, fine to coarse SAND	133.2	8.2
T12-2	Brown, silty, fine to coarse SAND	130.4	10.3

TABLE B-II
SUMMARY OF LABORATORY REMOLDED DIRECT SHEAR TEST RESULTS
ASTM D3080-98

*Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
T5-1	120.1	7.8	660	30
T12-2	118.9	8.5	350	42

*Samples remolded to approximately 90 percent relative compaction near optimum moisture content.

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D4829-95

Sample No.	Moisture Content		Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
T12-1	8.1	15.2	118.3	8

TABLE B-IV
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE CONTENT TEST RESULTS
CALIFORNIA TEST METHOD NO. 417

Sample No.	Water Soluble Sulfate %	Sulfate Exposure
T12-1	0.002	S0
T12-2	0.001	S0

TABLE B-V
SUMMARY OF LABORATORY CHLORIDE ION CONTENT TEST RESULTS
AASHTO T291

Sample No.	Chloride Ion Content %	PPM
T5-1	0.009	91
T12-2	0.009	92

TABLE B-VI
SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS

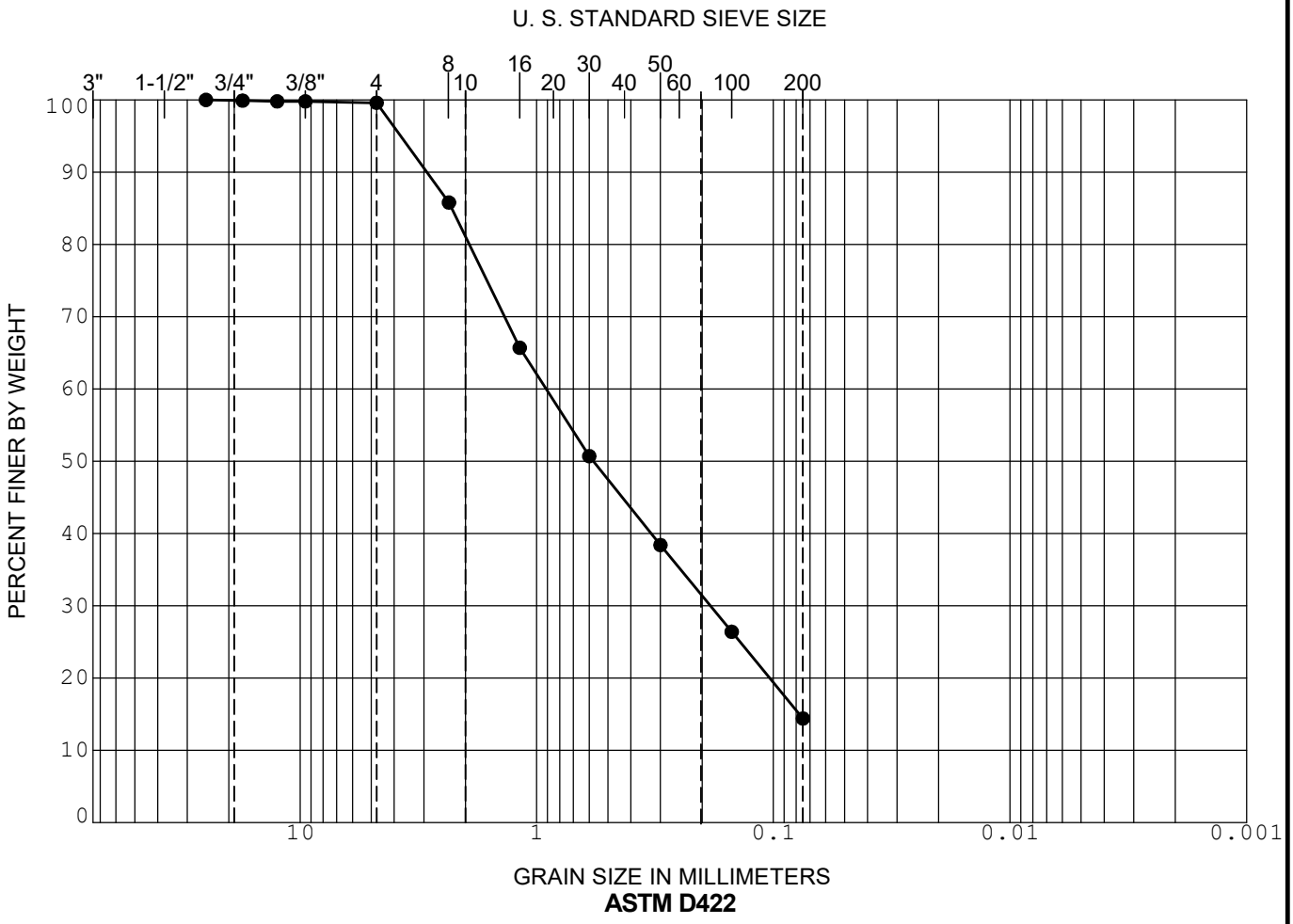
Sample No.	R-Value
T12-2	67

TABLE B-VII
SUMMARY OF LABORATORY SAND EQUIVALENT TEST RESULTS
ASTM 2419

Sample No.	San Equivalent
T5-1	24

PROJECT NO. G2279-42-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



ASTM D422

	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	T5-1	3.0	SM - Silty SAND				
⊠							
▲							

GRADATION CURVE

SUMMIT ESTATES

SAN DIEGO COUNTY, CALIFIORNIA

G2279-42-01.GPJ

Figure B-1

GEOCON

APPENDIX C

APPENDIX C

STORM WATER MANAGEMENT INVESTIGATION

We understand storm water management devices are being proposed in accordance with the *2016 City of County of San Diego Design Manual*. If not properly constructed, there is a potential for distress to improvements and properties located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water to be detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff occurs, downstream properties may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

Hydrologic Soil Group

The United States Department of Agriculture (USDA), Natural Resources Conservation Services, provides general information regarding the existing soil conditions for areas within the United States. The USDA website also provides the Hydrologic Soil Group. Table C-1 presents the descriptions of the hydrologic soil groups.

TABLE C-1
HYDROLOGIC SOIL GROUP DEFINITIONS

Soil Group	Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The property is underlain by granitic rock. Table C-2 presents the information from the USDA website for the subject property.

TABLE C-2
USDA WEB SOIL SURVEY – HYDROLOGIC SOIL GROUP

Map Unit Name	Map Unit Symbol	Approximate Percentage of Property	Hydrologic Soil Group
Cieneba coarse sandy loam, 15 to 30 percent slopes, eroded	CIE2	82	D
Fallbrook sandy loam, 9 to 15 percent slopes, eroded	FaD2	16	C
Steep gullied land	StG	2	NA

In-Situ Testing

We performed 6 borehole infiltration tests at the locations presented on the Figure 2. Table C-3 presents the results of the saturated hydraulic conductivity testing.

TABLE C-3
UNFACTORED, FIELD-SATURATED, INFILTRATION TEST RESULTS USING THE SOILMOISTURE CORP AARDVARK PERMEAMETER

Test No.	Depth (inches)	Surficial Soil or Geologic Unit	Field Infiltration Rate, I (in/hr)	Factored* Field Infiltration Rate, I (in/hr)
A-1	50	Kgr	0.007	0.0035
A-2	52	Kgr	0.17	0.085
A-3	61	Kgr	0.34	0.17
A-4	59	Kgr	0.007	0.0035
A-5	49	Kgr	0.053	0.03
A-6	51	Kgr	0.045	0.023

*Factor of Safety of 2.0 for feasibility determination.

Soil permeability values from in-situ tests can vary significantly from one location to another due to the non-homogeneous characteristics inherent to most soil For this project and for storm water purposes, the test results presented herein should be considered approximate values.

STORM WATER MANAGEMENT CONCLUSIONS

Soil Types

Granitic Bedrock – Granitic Bedrock underlies the site. The Granitic Bedrock encountered during our investigation was weathered and excavates as silty, fine to coarse sand.

Groundwater Elevations

We did not encountered groundwater during our field investigation. Groundwater is expected to be at depths in excess of 10 feet below the bottom of basins.

Soil or Groundwater Contamination

We are unaware of contaminated soil or groundwater on the property. Therefore, infiltration associated with this risk is considered feasible.

Existing and Proposed Utilities

There are existing utilities that serve the existing residence. However, we expect these utilities to be abandoned during grading. Based on the current site plan, we do not expect new utilities will be present within 10 feet of the proposed BMP basins.

Existing and Planned Structures

Water should not be allowed to infiltrate in areas where it could affect the neighboring properties and existing adjacent structures, improvements and roadway. Based on the site plan, we do not expect existing or planned structures will be located within 10 feet of the proposed BMP basins. Water infiltration should not be allowed within a lateral distance of 10 feet from new or existing structures.

Slopes

A slope is planned adjacent to the easternmost basin. Other than side slopes constructed for the basins, no slopes are planned adjacent to the western basins.

Storm Water Management Devices

Liners and subdrains should be incorporated into the design and construction of the planned storm water devices. The liners should be impermeable (e.g. High-density polyethylene, HDPE, with a thickness of about 30 mil or equivalent Polyvinyl Chloride**,** PVC) to prevent lateral water migration. The subdrains should be perforated within the liner area, installed at the base and above the liner, be at least 3 inches in diameter and consist of Schedule 40 PVC pipe. The subdrains outside of the liner should consist of solid pipe. The penetration of the liners at the subdrains should be properly waterproofed. The subdrains should be connected to a proper outlet. The devices should also be installed in accordance with the manufacturer's recommendations.

Storm Water Standard Worksheets

We have evaluated the proposed basins with respect to the infiltration restrictions contained in Table C.1-1 in Appendix C of the County of San Diego BMP Design Manual (DRAFT). Table C-4 below provides the information.

TABLE C-4
INFILTRATION RESTRICTIONS FOR BASIC INFILTRATION ANALYSIS
(TABLE C.1-1 OF APPENDIX C DRAFT)

Restriction Element		Is Element Applicable? (Yes/No)
Mandatory Considerations	BMP is within 100' of Contaminated Soils	No
	BMP is within 100' of Industrial Activities Lacking Source Control	No
	BMP is within 100' of Well/Groundwater Basin	No
	BMP is within 50' of Septic Tanks/Leach Fields	Yes
	BMP is within 10' of Structures/Tanks/Walls	No
	BMP is within 10' of Sewer Utilities	No
	BMP is within 10' of Seasonal High Groundwater	No
	BMP is within Hydric Soils	No
	BMP is within Highly Liquefiable Soils and has Connectivity to Structures	No
	BMP is within 1.5 Times the Height of Adjacent Steep Slopes (≥25%)	Yes (East Basin) No (West and South Basins)
	County Staff has Assigned "Restricted" Infiltration Category	No
Optional Considerations	BMP is within Predominantly Type D Soil	Yes
	BMP is within 5' of Property Line	No
	BMP is within Fill Depths of ≥5' (Existing or Proposed)	Yes (East Basin) No (West and South Basins)
	BMP is within 10' of Underground Utilities	No
	BMP is within 250' of Ephemeral Stream	No
Result	Based on examination of the best available information, I have **not identified any restrictions** above.	
	Based on examination of the best available information, I have **identified one or more restrictions** above.	**Restricted**

Based on the information in Table C-4, BMP Basins should be considered "Restricted" due to the presence of Type D soils, adjacent proposed septic fields, and proposed compacted fill.

Using Section C.1-2 of the County Draft Guidelines, the basins should be designed for minimal retention. The average infiltration rate for each basin is provided in Table C-5. Due to the proposed fill, the eastern basin should be fully lined.

TABLE C-5
FIELD-SATURATED, INFILTRATION TEST RESULTS

Basin Location	Average Field Infiltration Rate, I (in/hr)	Average Factored* Field Infiltration Rate, I (in/hr)
West Basin (Infiltration Tests A-1 and A-2)	0.09	0.045
Southern Basin (Infiltration Tests A-3 and A-4)	0.17	0.09
Eastern Basin (Infiltration Tests A-5 and A-6)	0.05	0.025

*Factor of Safety of 2.0 for feasibility determination.

The SWS requests the geotechnical engineer complete the *Categorization of Infiltration Feasibility Condition* (Worksheet C.4-1 or I-8) worksheet information to help evaluate the potential for infiltration on the property. Worksheets C.4-1 have been attached. A separate worksheet has been prepared for the eastern basin where a full liner is recommended.

CONCLUSIONS AND RECOMMENDATIONS

It is our opinion that partial infiltration is feasible for the western and southern basins. A "no infiltration" condition should be used for the eastern basin. Our evaluation included the soil and geologic conditions, settlement and volume change of the underlying soil, slope stability, utility considerations, groundwater mounding, structures and foundations, and estimated groundwater elevations.

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

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

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

WESTERN AND SOUTHERN BASINS

The average results of the field infiltration tests for each basin are:

West Basin: 0.09 in/hr (0.045 in/hr using a factor of 2.0 for screening purposes)
South Basin: 0.17 in/hr (0.09 in/hr using a factor of 2.0 for screening purposes)

The rates are less than 0.5 inches/hour. Therefore, full infiltration is not feasible.

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

Provide basis:

WESTERN AND SOUTHERN BASINS

We do not believe slope stability, groundwater mounting, or impacts to existing utilities or improvements would occur if infiltration greater than 0.5 inches per hour was allowed considering the location of the proposed basins with respect to site soil and geologic conditions.

Worksheet I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
WESTERN AND SOUTHERN BASINS Groundwater was not encountered in any of our trenches or borings. The groundwater elevation is assumed to be in excess of 10 feet below proposed basins grades. It is our opinion that there is not a significant increase in risk of groundwater contamination due to infiltration.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
WESTERN AND SOUTHERN BASINS We do not expect infiltration will cause water balance issues such as seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters.			
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

Worksheet I-8 Page 3 of 4

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

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

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

WESTERN AND SOUTHERN BASINS

The average results of the field infiltration tests for each basin are:

West Basin: 0.09 in/hr (0.045 in/hr using a factor of 2.0 for screening purposes)
South Basin: 0.17 in/hr (0.09 in/hr using a factor of 2.0 for screening purposes)

The soil conditions allow for an appreciable rate.

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

WESTERN AND SOUTHERN BASINS

We do not believe slope stability, groundwater mounting, or impacts to existing utilities or improvements would occur if an appreciable quantity of infiltration was allowed considering the location of the proposed basins with respect to site soil and geologic conditions.

Worksheet I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
WESTERN AND SOUTHERN BASINS Groundwater was not encountered in any of our trenches or borings. The groundwater elevation is assumed to be in excess of 10 feet below proposed basins grades. It is our opinion infiltration should not pose a significant risk for groundwater related concerns.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
WESTERN AND SOUTHERN BASINS We did not provide a study regarding water rights. However, for a partial infiltration condition, violation of downstream water rights is not anticipated.			
Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative			
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 Feasible

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

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

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

EASTERN BASIN

The average results of the field infiltration tests for the basin are:

Eastern Basin: 0.05 in/hr (0.025 in/hr using a factor of 2.0 for screening purposes)

The rates are less than 0.5 inches/hour. Therefore, full infiltration is not feasible.

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

Provide basis:

EASTERN BASIN

Proposed grading will create a fill slope along the southern side of the basin. Additionally, a portion of the basin is underlain by compacted fill. Infiltration into the fill could cause settlement and daylight seepage to the slope..

Worksheet I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
EASTERN BASIN Groundwater was not encountered in any of our trenches or borings. The groundwater elevation is assumed to be in excess of 10 feet below proposed basins grades. It is our opinion that there is not a significant increase in risk of groundwater contamination due to infiltration.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
EASTERN BASIN We do not expect infiltration will cause water balance issues such as seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters.			
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

Worksheet I-8 Page 3 of 4

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

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

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

EASTERN BASIN

The average results of the field infiltration tests for the basin are:

Eastern Basin: 0.05 in/hr (0.025 in/hr using a factor of 2.0 for screening purposes)

The factored rate is less than 0.05 inches/hour. Therefore, partial infiltration is not feasible.

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

EASTERN BASIN

Proposed grading will create a fill slope along the southern side of the basin. Additionally, a portion of the basin is underlain by compacted fill. Infiltration into the fill could cause settlement and daylight seepage to the slope..

Worksheet I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
EASTERN BASIN Groundwater was not encountered in any of our trenches or borings. The groundwater elevation is assumed to be in excess of 10 feet below proposed basins grades. It is our opinion infiltration should not pose a significant risk for groundwater related concerns.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
EASTERN BASIN We did not provide a study regarding water rights. However, violation of downstream water rights is not anticipated. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**		No Infiltration

APPENDIX D

APPENDIX D

RECOMMENDED GRADING SPECIFICATIONS

FOR

SUMMIT ESTATES
SAN DIEGO COUNTY, CALIFORNIA

PROJECT NO. G2279-42-01

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

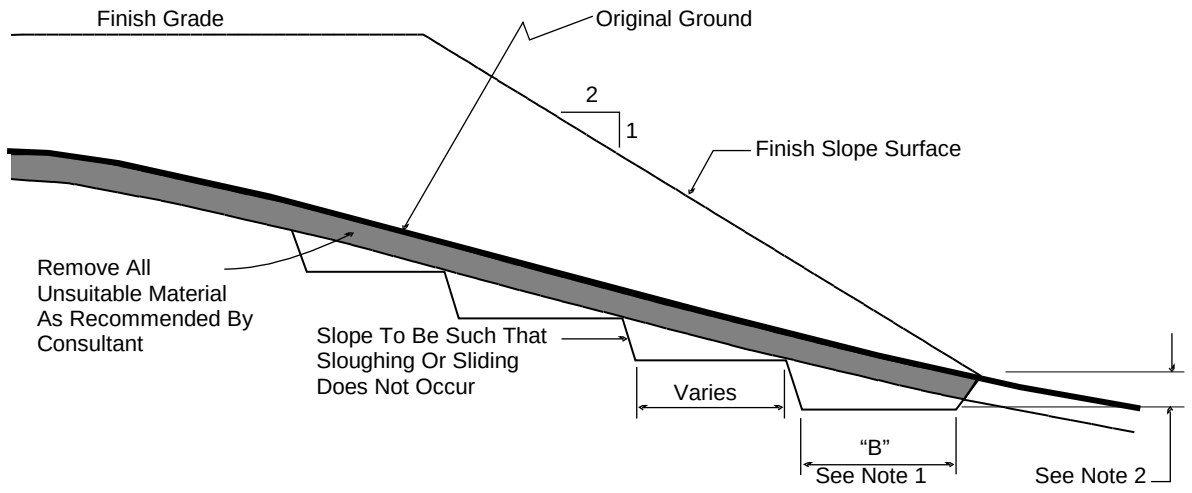
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

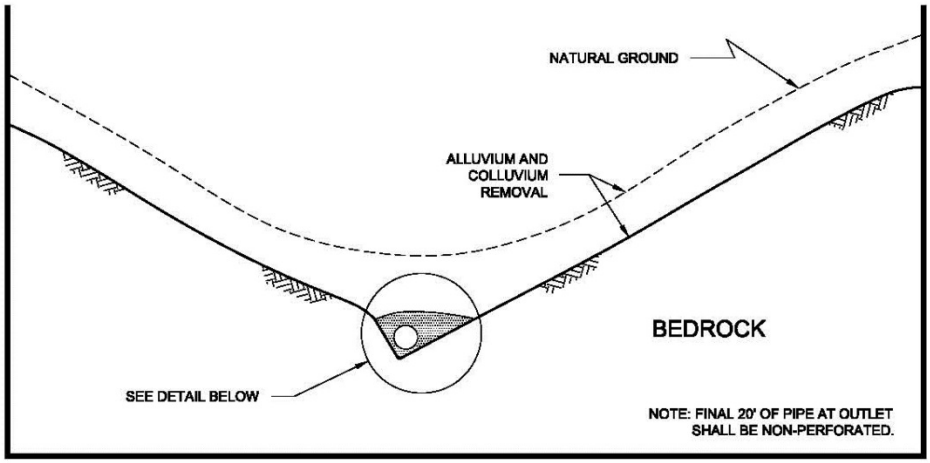
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

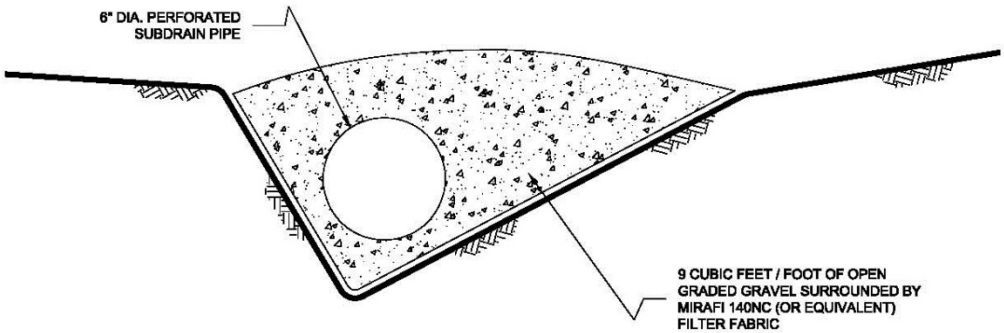
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

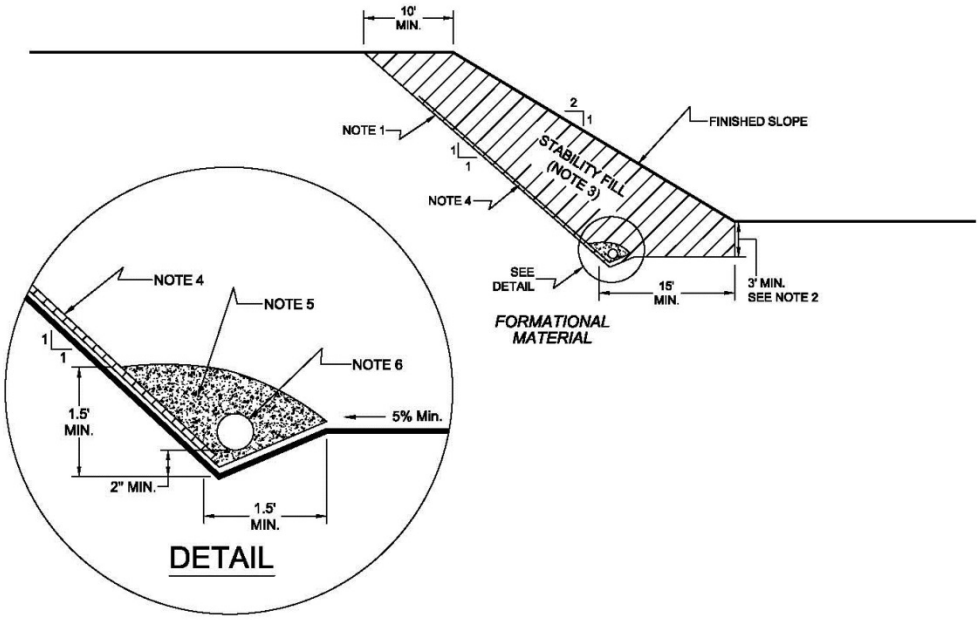
1.....6-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS
IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS
LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

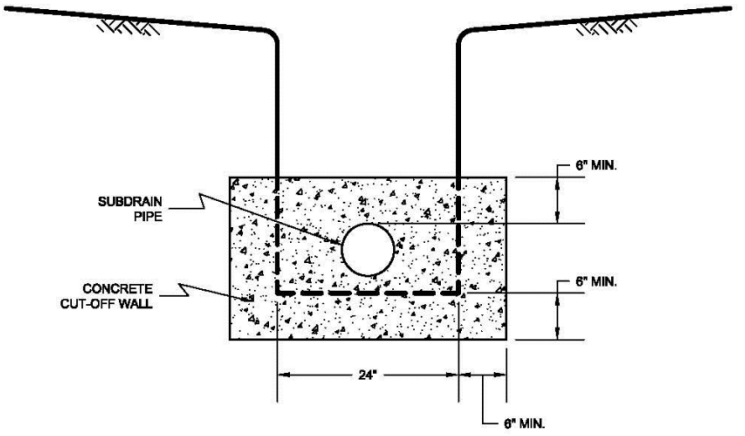
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

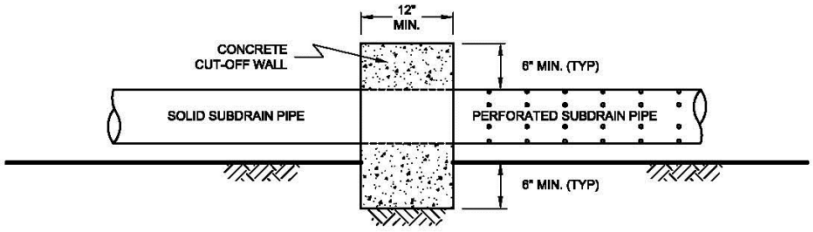
TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW

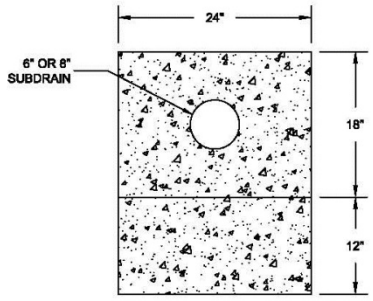


NO SCALE

7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

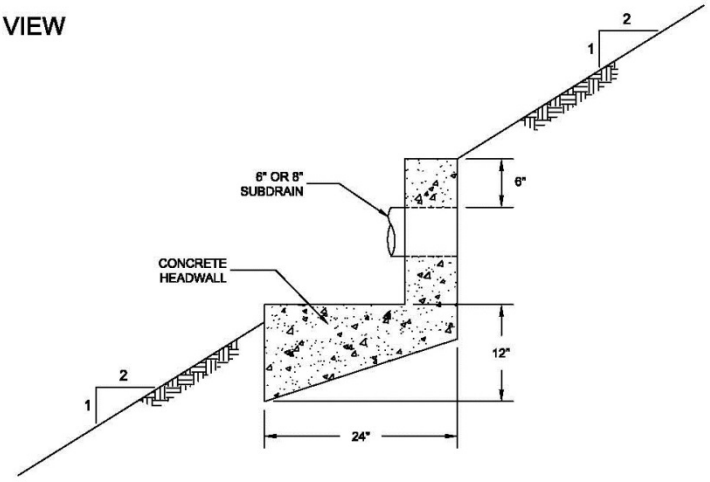
TYPICAL HEADWALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an “as-built” map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

L2IST OF REFERENCES

FEMA (2012), *Flood Insurance Rate Map (FIRM) Map Number 06073C1081G*, http://www.fema.gov, accessed January 8, 2019;

Risk Engineering (2011), *EZ-FRISK (version 7.62)*, software package used to perform site-specific earthquake hazard analyses. Accessed January 8, 2019;

SEAOCC (2018), *Seismic Design Maps*, website interface that queries the U.S. Geological Survey (USGS) web servers and retrieves the seismic design variables using ASCE 7-16, ASCE 7-10, ASCE 41-13, ASCE 41-17, IBC 2015, IBC 2012, NEHRP-2015, and NEHRP 2009 seismic design map data, http://seismicmaps.org, accessed January 7, 2019;

Tan, S.S. and Kennedy, M.P. (1999), Geologic Map of the Escondido 7.5' Quadrangle, San Diego County, California;

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