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	**Development type** ☐ New development ☒ Redevelopment	
Project Name	Ridgeway A	
Project Address	2542 Ridgeway Drive, National City, CA 91950	
Assessor's Parcel # (APN)	564-040-02, 21, 23 & 563-184-44	
Permit # / Record ID	PDS2020-LDGRMJ-30273	
Project category (select one)	☐ Commercial	☐ Minor subdivision*
	☐ Industrial	☐ Major subdivision*
	☐ Single family residential lot	☒ Multi-family residential*
	*If residential, is a Homeowners Association (HOA) proposed? ☐ Yes ☐ No	

Project Applicant / Project Proponent		
Name	BC Euclid, LLC	
Address	8445 Camino Santa Fe, Suite 102, San Diego, CA 92121	
Phone	858-427-1450	**Email:** abraham.edid@bluecenturionhomes.com

SWQMP Preparer		
Name	William Lundstrom	
Company (if applicable)	Lundstrom Engineering & Surveying, Inc.	
Address	5333 Mission Center Rd #115, San Diego, CA 92108	
Phone	619-814-1220	**Email:** bill@lundstrom.cc
PE Number (if applicable)	61630	

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 23, 2022

COUNTY ACCEPTED

SWQMP Approved By: *Approval Date:*

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

Scope of SWQMP Submittal (Required)

Select the option 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***	Identify below 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.):

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	1/24/2020	Initial Submittal
2	Date	Summary of Change
3	Date	Summary of Change
No.	Date	Summary of Change
Final Design		
1	9/15/2021	Initial Submittal
2	Date	Summary of Change
3	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
No.	Date	Summary of Change

General Directions

Note: These directions may be omitted from the print version of the SWQMP submittal.

① Scope of SWQMP Submittal and Submittal Record (inside front cover)

Use the ***Submittal Scope*** table to document the scope of activities covered under this SWQMP Form. Select one of the three options presented.

- ***SWQMP addresses the entire project***. If this SWQMP form addresses the entire project from start to finish, additional documentation of the project scope is not required.
- ***SWQMP implements requirements of an earlier master SWQMP submittal***. If this SWQMP Form implements requirements identified in an earlier master SWQMP Form, documentation of those earlier requirements must be provided. Include a copy of the previous submittal as **Attachment 4**.
- ***First of multiple SWQMP submittals***. If this is the first of multiple SWQMP submittals, use the spaces provided under Part c to identify and briefly describe which project elements are addressed in this submittal and which ones will be addressed in future submittals. For example, this PDP addresses only streets and roads, but individual lots will be documented in future submittals.

Use the ***Submittal Record*** table to list the dates of any updates to the SWQMP or construction plans. Briefly describe key changes from previous versions. If responding to plan check comments, note this in the entry and attach the responses as applicable.

② PDP SWQMP Submittal Checklist

The checklist on Page 1 summarizes the tables and attachments to be included with this PDP SWQMP submittal. It should be filled out after completing the remainder of the form. Tables and attachments with boxes already checked (☒) are required for all projects. All tables are required. The applicability of attachments not already checked will be identified during the completion of this form.

③ Attachment 1: Stormwater Intake Form

Submit a copy of your completed ***Storm Water Intake Form*** as **Attachment 1**.

④ Tables 1, 2, and 3: Baseline Site Design and Source Control BMPs

Table 1 Completion: Complete **Table 1** to document existing and proposed site features and the BMPs to be implemented for them. All BMPs must be implemented ***where applicable and feasible***. Applicability is generally assumed if a feature exists or is proposed.

Table 2 Completion: Table 2 is not required for Small Residential Projects. Applicants should check the box at the top of the table to confirm it does not apply.

> *Small Residential Projects* are those requiring *either:* a Building Permit, Minor Residential Grading Permit, or Site Plan Permit for a single family home; *or* a Tentative Parcel Map Permit for up to 4 single family homes and a remainder parcel.

All other projects must complete **Table 2** to identify applicable requirements for documenting pollutant-generating sources/ features and source control BMPs.

BMPs must be implemented for **Table 1** and **2** features ***where feasible***. Leaving the box for a BMP unchecked means it will not be implemented (either partially or fully) either because it is inapplicable or infeasible. Explanations must be provided in **Table 3**. Tables 1 and 2 both provide specific instructions on when explanations are required.

⑤ Attachment 5: Existing Site and Drainage Description

Complete **Attachment 5** to provide a description of (1) the existing pre-development condition of the site, and (2) existing and proposed drainage conditions for the site. If required, include a copy of the site Drainage Study with Attachment 5.

⑥ Structural Performance Standards

Determine which Structural Performance Standards apply to the PDP, where they apply, and which compliance strategies you will use to satisfy them. Record your selections in **Table 4** as follows.

Table 4, Part A.1, Selection of Standards: First select the standards that apply to the project.

- *Pollutant control plus hydromodification* — Select if the PDP is not exempt from hydromodification management requirements. It must satisfy both the Pollutant Control Performance Standard (BMPDM Section 2.2) and the Hydromodification Management Performance Standard (BMPDM Section 2.3).
- *Pollutant control only* — Select if the PDP is exempt from hydromodification management requirements per BMPDM Section 6.1. Document the exemption in **Attachment 9**.

Table 4, Part A.2, Application of Standards: Next indicate where on the site the standards apply.

- If this is a **New Development Project**, the standards apply to all impervious surfaces on the site.
- If this is a **Redevelopment Project**, their applicability will depend on the ratio of created or replaced impervious areas to existing impervious areas (see BMPDM Section 1.7). Complete the calculations in the table to determine your obligation. The **percent (%) impervious created or replaced (c)** is determined by dividing the **impervious area created or replaced (b)** by the **existing impervious area (a)** and multiplying the result by 100.
  - **If c is 50% or more**: The standards apply to all impervious surfaces on the site (a + b).
  - **If c is less than 50%**: The standards apply only to created or replaced impervious surfaces (b only).

Table 4, Part B.1: Summary of Required Attachments (1 through 5)

Use this part of the table to summarize which of Attachments 1 through 5 will be included with the SWQMP submittal. If you are completing an **electronic version** of this form, your selections will be automatically recorded based on your previous input. If you are completing a **hard copy** of this form, you must manually select Attachments 3 and 4 as applicable (see pages 4 and 6). Note that Attachments 1,2, and 5 are required for all projects.

Table 4, Part B.2: Selection of Compliance Strategies

Complete Part B.2 to document which compliance options will be used to satisfy the applicable standards for the site. Before doing so, you must determine which option will be used for each DMA. The following four potential design options are presented in detail in BMPDM Chapters 5 and 6.

1. **Self-mitigating DMAs** (BMPDM Section 5.2.1)
2. **De Minimis DMAs** (BMPDM Section 5.2.2)
3. **Self-retaining DMAs** (BMPDM Section 5.2.3)
4. **Structural BMPs**
   - Pollutant Control BMPs (BMPDM Sections 5.4)
   - Hydromodification BMPs (BMPDM Chapter 6)
   - Alternative Compliance Project (BMPDM Section 1.8)

Only one compliance option may be used per individual DMA. Regardless of which option is selected for any DMA, it must fully satisfy the applicable standard(s) determined in Part A.1.

On the left side of Part B, check the applicable boxes for each compliance option to be used.

⑦ Summary of Additional Required Attachments (6 through 12)

You must complete and submit each attachment identified for the compliance options selected. Applicable attachments are listed to the right of each compliance option. If you are completing an **electronic version** of this form, the required attachments for each design option will automatically be selected when you choose the compliance option. As noted above, these selections will also be recorded on the PDP SWQMP Submittal Checklist (Page 1). If you are completing a **hard copy** of this form, you will need to manually check the boxes for each applicable attachment on both pages.

Note that Attachment 9 (Critical Coarse Sediment Yield Areas) is required for all PDPs. If the PDP is exempt from hydromodification requirements, the exemption must be documented in Attachment 9.

⑧ Table 5: Critical Coarse Sediment Yield Area Requirements

Complete **Table 5** to select a compliance pathway for addressing Critical Coarse Sediment Yield Area (CCSYA) requirements for the PDP. See BMPDM Appendix H for additional description of requirements and options. Document Table 5 selections, including hydromodification management exemptions, in **Attachment 9**.

⑨ Tables 6 and 7: Temporary Construction Phase BMPs

Complete **Table 6** to document the minimum construction BMPs to be implemented for the project. Each BMP must be implemented ***where applicable and feasible***. At least one BMP must be selected for each construction activity listed in the table (except Erosion Control for Disturbed Slopes, which requires one BMP per season).

If applicable, use **Table 7** to describe why BMPs not selected in Table 6 are either infeasible or are only partially feasible. Justifications must be provided for all construction activity types for which NO BMPs were selected. If requested by County staff, also justify why specific individual BMPs were not selected.

⑩ Attachment 2: DMA Exhibits and Construction Plans

Exhibits and construction plan sets incorporating all applicable site features, activities, and BMPs identified in **Tables 1, 2, and 6** must be submitted as **Attachment 2 (DMA Exhibits and Construction Plan Sheets)**. See the Attachment 2 cover sheet for additional instructions.

PDP SWQMP Submittal Checklist

SWQMP Tables: All of the 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: Reserved for Future Use

☐ 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: BMP 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, Submittal Templates.

Table 1 – Baseline BMPs for Existing and Proposed Site Features

A. BMPs for Existing Natural Site Features (See Fact Sheet BL-1)

1. Check the boxes below for each existing feature on the site.

2. Select the BMPs to be implemented for each identified feature. Explain why any BMP not selected is infeasible in Table 3.

	Conserve natural features (SD-G)	Provide buffers around waterbodies (SD-H)
☐ Natural waterbodies	☐	☐
☐ Natural storage reservoirs & drainage corridors	☐	---
☒ Natural areas, soils, & vegetation (incl. trees)	☒	---

B. BMPs for Common Impervious Outdoor Site Features (See Fact Sheet BL-2)

1. Check the boxes below for each proposed feature.

*2. Select the BMPs to be implemented for each proposed feature. If neither BMP **SD-B** nor **SD-I** is selected for a feature, explain why both BMPs are infeasible in Table 3.*

	a. Direct runoff to pervious areas (SD-B)	b. Construct surfaces from permeable materials (SD-I)	c. Minimize the size of impervious areas
☒ Streets and roads	☒	☐	☐ *Check this box to confirm that all impervious areas on the site will be minimized where feasible.*
☒ Sidewalks & walkways	☒	☐	
☒ Parking areas & lots	☒	☐	
☒ Driveways	☒	☐	*If this box is not checked, identify the surfaces that cannot be minimized in Table 3, and explain why it is infeasible to do so.*
☒ Patios, decks, & courtyards	☒	☐	
☐ Hardcourt recreation areas	☐	☐	
☐ Other:	☐	☐	

C. ☒ **BMPs for Rooftop Areas:** *Check this box if rooftop areas are proposed and select at least one BMP below.* **(See Fact Sheet BL-3)**

If no BMPs are selected, explain why they are infeasible in Table 3.

1. Direct runoff to pervious areas (SD-B)	2. Install green roofs (SD-C)	3. Install rain barrels (SD-E)
☒	☐	☐

D. ☒ **BMPs for Landscaped Areas:** *Check this box if landscaping is proposed and select at least one BMP below.* **(See Fact Sheet BL-4)**

If no BMPs are selected, explain why they are infeasible in Table 3.

1. Sustainable Landscaping (SD-K)
☒

Note: All features and BMPs must be shown on applicable construction plans. See applicable Fact Sheets in Appendix C of the BMP Design Manual for additional information.

Note: Use Table 3 to explain BMP infeasibility or inapplicability, or to describe features or BMPs not listed in this table. Additional explanation may be required by the County.

Table 2 – Baseline BMPs for Pollutant-generating Sources

☐ If this is a **Small Residential Project**, check this box and skip the rest of this table.

A. Management of Stormwater Discharges

1. Identify all proposed outdoor work areas below (☐ *Check here if none are proposed*)	**2. Which BMPs will be used to prevent materials from contacting rainfall or runoff?** (See Fact Sheet BL-5) *(Select all feasible BMPs for each work area[2])*			**3. Where will runoff from the work area be routed?** (See Fact Sheet BL-6) *(Select one or more option for each work area)*			
	Overhead covering (rooftops, etc.) (SC-A)	**Separation of flows from adjacent areas (berms, etc.) (SC-B)**	**Wind protection (screens, etc.) (SC-C)**	**Sanitary sewer[3] (SC-D)**	**Containment system (SC-E)**	**Stormwater S-BMP or SSD-BMP[4]**	**Other[5]**
☒ Trash & Refuse Storage	☒	☒	☒	☐	☒	☐	☐
☐ Materials & Equipment Storage	☐	☐	☐	☐	☐	☐	☐
☐ Loading & Unloading	☐	☐	---	☐	☐	☐	☐
☐ Fueling	☐	☐	---	☐	☐	☐	☐
☐ Maintenance & Repair	☐	☐	---	☐	☐	☐	☐
☐ Vehicle & Equipment Cleaning	☐	☐	---	☐	☐	☐	☐
☐ Other:	☐	☐	---	☐	☐	☐	☐

B. Prevention of Non-stormwater Discharges (See Fact Sheet BL-7)

Select one option for each feature below:

• **Storm drain inlets and catch basins …**	☐ are not proposed	☒ will be labeled with stenciling or signage to discourage dumping **(SC-F)**
• **Educational BMP Signage …**	☐ are not proposed	☒ will be labeled with educational signage for BMP **(SC-G)**
• **Interior work surfaces, floor drains, & sumps …**	☐ are not proposed	☒ will not discharge directly or indirectly to the MS4 or receiving waters
• **Drain lines (e.g., air conditioning, boiler, etc.) …**	☐ are not proposed	☒ will not discharge directly or indirectly to the MS4 or receiving waters
• **Fire sprinkler test water …**	☐ are not proposed	☒ will not discharge directly or indirectly to the MS4 or receiving waters

Note: All outdoor features and BMPs in this table must be shown on applicable construction plans. See applicable Fact Sheets in Appendix C of the BMP Design Manual for additional information.

Note: Use Table 3 to explain BMP infeasibility or inapplicability, or to describe features or BMPs not listed in this table. Additional explanation may be required by the County.

[2] Each BMP is required where feasible. If none are selected for any feature, explain why they are infeasible in Table 3.

[3] Separate wastewater agency approvals may be required.

[4] Structural Treatment Control BMPs (S-BMPs) and Significant Site Design BMPs (SSD-BMPs) may not receive discharges from work areas that concentrate pollutants in a manner that will impair their functioning. Discharges from the proposed work area must also be included in DCV calculations for the applicable BMP.

[5] Describe other proposed options for managing stormwater discharges in Table 3.

Table 3 – Explanations and Justifications for Table 1 and 2 Baseline BMPs

☒ **Check here if no explanations or justifications for Table 1 or 2 BMPs are required.**

- **Required Justifications**: Provide explanations of BMP inapplicability and/or infeasibility as indicated per Tables 1 and 2.
- **If Requested**: Justify why specific BMPs will not be implemented or will only be partially implemented.
- **Additional Explanation**: Describe any proposed features and/or BMPs not listed in Tables 1 or 2.

BMP-Feature Combination		**Explanation**
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	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	

Table 4: 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]
11,000	59,300	536%

☒ *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 ☒	N/A ☐	Previous SWQMP Submittals (see inside cover) ☐	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 BMP 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 Control 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 5: 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**[6]

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**

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

Table 6 –Minimum Construction Stormwater BMPs

Minimum Required BMPs by Activity Type Select all applicable activities and at least one BMP for each.	References Caltrans[7]	 County of San Diego	
☒ **Erosion Control for Disturbed Slopes** (choose at least 1 per season)			
☐ Vegetation Stabilization Planting[8] (Summer)	SS-2, SS-4		
☒ Hydraulic Stabilization Hydroseeding (Summer)	SS-4		
☒ Bonded Fiber Matrix or Stabilized Fiber Matrix[9] (Winter)	SS-3		
☐ Physical Stabilization Erosion Control Blanket (Winter)	SS-7		
☒ **Erosion control for disturbed flat areas (slope < 5%)**			
☐ County Standard Lot Perimeter Protection Detail	SC-2	PDS 659[10]	
☒ 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[11]	
☐ 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[12]	
☒ **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[13]**			
☒ Waste Management Concrete Waste Management	WM-8		
☒ Solid Waste Management	WM-5		
☒ Sanitary Waste Management	WM-9		
☒ Hazardous Waste Management	WM-6		

[7] See Caltrans 2017 Construction Site Best Management Practices (BMP) Manual available at: https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control/manuals-and-handbooks
[8] 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.
[9] All slopes over three feet must have established vegetative cover prior to final permit approval.
[10] County PDS 659. Standard Lot Perimeter Protection Design System (Bldg. Division)
[11] County PDS 660. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Bldg. Division
[12] Regional Standard Drawing D-40 – Rip Rap Energy Dissipater (also acceptable for velocity reduction)
[13] Applicants are responsible to apply appropriate BMPs for specific wastes (e.g., BMP WM-8 for concrete).

Table 7 – Explanations and Justifications for Construction Phase BMPs

☒ **Check here if no explanations or justifications for Table 6 BMPs are required.**		
Justifications for Table 6 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 6.		
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:	Ridgeway A
Record ID (Permit) No(s):	PDS2020-LDGRMJ-30273
Assessor's Parcel No(s):	564-040-02, 21, 23 & 563-184-44
Street Address (or Intersection):	2542 Ridgeway Dr
City, State, Zip:	National City, CA 91950
Part 2. Applicant / Project Proponent Information	
Name:	Abraham Edid
Company:	BC Euclid, LLC.
Street Address:	8445 Camino Santa Fe, Suite 102
City, State, Zip:	San Diego, CA 92121
Phone Number	858-427-1450
Email:	abraham.edid@bluecenturionhomes.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)**
9,400	59,300	95,230 sf

Ⓑ ☒ 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: 11/07/2022

- ***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.

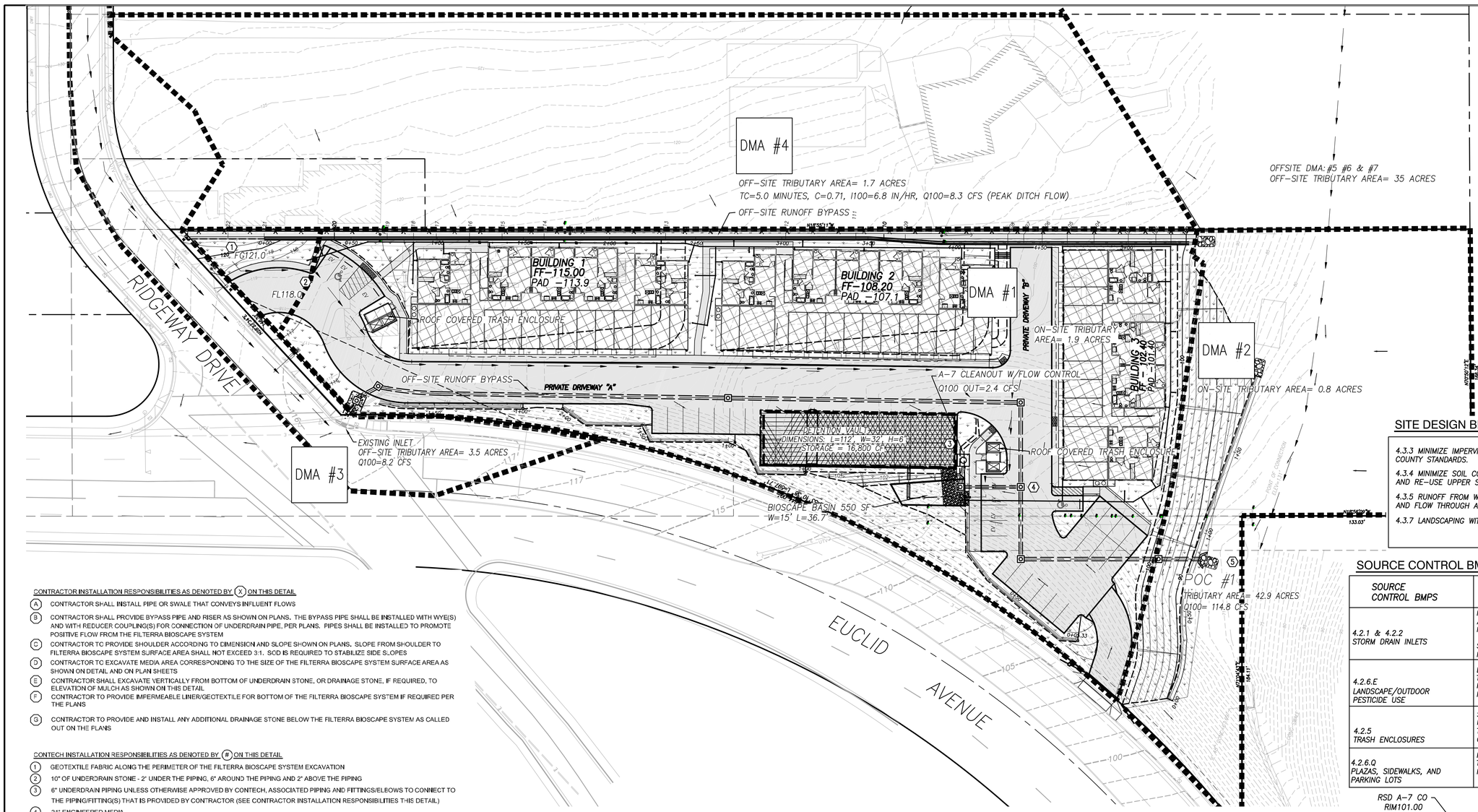
Sub-attachments	Requirement
☒ **2.1: DMA Exhibits**	All PDPs
☒ **2.2: Individual Structural BMP DMA Mapbook**	PDPs with structural BMPs
☒ **2.3: Construction Plan Sets**	All projects

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 #:	**PDS2020-LDGRMJ-30273, SHEET 12 – POST CONSTRUCTION BMP PLAN SHEET**	
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.



SITE DESIGN BMPS

4.3.3 MINIMIZE IMPERVIOUS AREA: RESIDENTIAL STREETS ARE AT THE MINIMUM REQUIRED WIDTH PER COUNTY STANDARDS.

4.3.4 MINIMIZE SOIL COMPACTION: RE-TILL SOILS COMPACTED BY CONSTRUCTION VEHICLES. COLLECT AND RE-USE UPPER SOIL LAYERS DEVELOPMENT SITE CONTAINING ORGANIC MATERIALS.

4.3.5 RUNOFF FROM WALKS AND ROOF DRAIN DOWNSPOUTS SHALL DISCHARGE ONTO SPLASH BLOCKS AND FLOW THROUGH ADJACENT LANDSCAPE AREA BEFORE ENTERING BIORETENTION BASINS

4.3.7 LANDSCAPING WITH DROUGHT TOLERANT SPECIES

SOURCE CONTROL BMPs

SOURCE CONTROL BMPS	PROJECT IMPLEMENTATION
4.2.1 & 4.2.2 STORM DRAIN INLETS	MARK ALL INLETS WITH THE WORDS "NO DUMPING! DRAINS TO WATERWAYS" IN ENGLISH AND "NO CONTAMINE" IN SPANISH. MAINTAIN AND PERIODICALLY REPLACE INLET MARKINGS. SEE APPLICABLE OPERATIONAL BMPS IN CASQA FACT SHEET SC-44, "DRAINAGE SYSTEM MAINTENANCE."
4.2.6.E LANDSCAPE/OUTDOOR PESTICIDE USE	LANDSCAPE HAS BEEN DESIGNED PER CITY OF SAN SAN DIEGO LANDSCAPE STANDARDS TO MINIMIZE IRRIGATION AND RUNOFF, AND TO MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES THAT CAN CONTRIBUTE TO STORMWATER POLLUTION. SEE APPLICABLE BMPS IN CASQA FACT SHEETS SC-41, "BUILDING AND GROUNDS MAINTENANCE."
4.2.5 TRASH ENCLOSURES	STORAGE AREA IS PAVED WITH CONCRETE AND DESIGN NOT TO ALLOW RUN-ON FROM ADJOINING AREAS, WALLED AND CONTAINS A ROOF. SIGNS ON DUMPSTER WITH THE WORDS "DO NOT DUMP HAZARDOUS MATERIAL HERE" OR SIMILAR APPROVED BY CITY. SEE CASQA FACT SHEET SC-34, "WASTE HANDLING AND DISPOSAL."
4.2.6.Q PLAZAS, SIDEWALKS, AND PARKING LOTS	PLAZAS, SIDEWALKS, AND PARKING LOTS SHALL BE SWEPT REGULARLY AND ONCE PRIOR TO OCTOBER 1ST TO PREVENT THE ACCUMULATION OF LITTER AND DEBRIS. SEE CASQA FACT SHEET SC-41, "BUILDING AND GROUNDS MAINTENANCE."

CONTRACTOR INSTALLATION RESPONSIBILITIES AS DENOTED BY (X) ON THIS DETAIL

(A) CONTRACTOR SHALL INSTALL PIPE OR SWALE THAT CONVEYS INFLUENT FLOWS

(B) CONTRACTOR SHALL PROVIDE BYPASS PIPE AND RISER AS SHOWN ON PLANS. THE BYPASS PIPE SHALL BE INSTALLED WITH WYE(S) AND WITH REDUCER COUPLING(S) FOR CONNECTION OF UNDERDRAIN PIPE, PER PLANS. PIPES SHALL BE INSTALLED TO PROMOTE POSITIVE FLOW FROM THE FILTERRA BIOSCAPE SYSTEM

(C) CONTRACTOR TC PROVIDE SHOULDER ACCORDING TO DIMENSION AND SLOPE SHOWN ON PLANS. SLOPE FROM SHOULDER TO FILTERRA BIOSCAPE SYSTEM SURFACE AREA SHALL NOT EXCEED 3:1. SOD IS REQUIRED TO STABILIZE SIDE SLOPES

(D) CONTRACTOR TC EXCAVATE MEDIA AREA CORRESPONDING TO THE SIZE OF THE FILTERRA BIOSCAPE SYSTEM SURFACE AREA AS SHOWN ON DETAIL AND ON PLAN SHEETS

(E) CONTRACTOR SHALL EXCAVATE VERTICALLY FROM BOTTOM OF UNDERDRAIN STONE, OR DRAINAGE STONE, IF REQUIRED, TO ELEVATION OF MULCH AS SHOWN ON THIS DETAIL

(F) CONTRACTOR TO PROVIDE IMPERMEABLE LINER/GEOTEXTILE FOR BOTTOM OF THE FILTERRA BIOSCAPE SYSTEM IF REQUIRED PER THE PLANS

(G) CONTRACTOR TO PROVIDE AND INSTALL ANY ADDITIONAL DRAINAGE STONE BELOW THE FILTERRA BIOSCAPE SYSTEM AS CALLED OUT ON THE PLANS

CONTECH INSTALLATION RESPONSIBILITIES AS DENOTED BY (#) ON THIS DETAIL

(1) GEOTEXTILE FABRIC ALONG THE PERIMETER OF THE FILTERRA BIOSCAPE SYSTEM EXCAVATION

(2) 10" OF UNDERDRAIN STONE - 2' UNDER THE PIPING, 6" AROUND THE PIPING AND 2" ABOVE THE PIPING

(3) 6" UNDERDRAIN PIPING UNLESS OTHERWISE APPROVED BY CONTECH, ASSOCIATED PIPING AND FITTINGS/ELEOWS TO CONNECT TO THE PIPING/FITTING(S) THAT IS PROVIDED BY CONTRACTOR (SEE CONTRACTOR INSTALLATION RESPONSIBILITIES THIS DETAIL)

(4) 21" ENGINEERED MEDIA

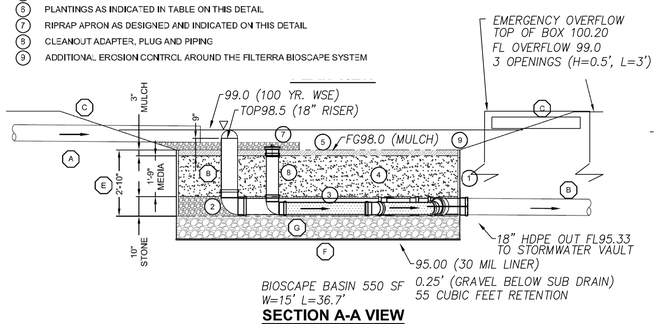
(5) 3" DOUBLESHREDDED HARDWOOD MULCH OVER ENTIRE FILTERRA BIOSCAPE SYSTEM SURFACE AREA

(6) PLANTINGS AS INDICATED IN TABLE ON THIS DETAIL

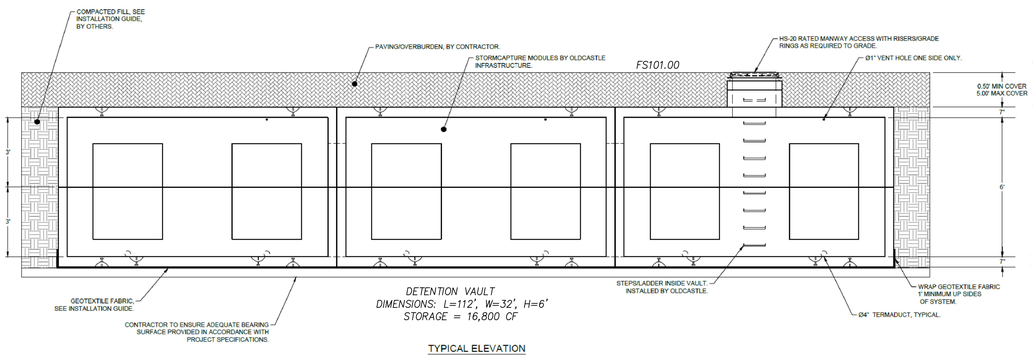
(7) RIPRAP APRON AS DESIGNED AND INDICATED ON THIS DETAIL

(8) CLEANOUT ADAPTER, PLUG AND PIPING

(9) ADDITIONAL EROSION CONTRCL AROUND THE FILTERRA BIOSCAPE SYSTEM



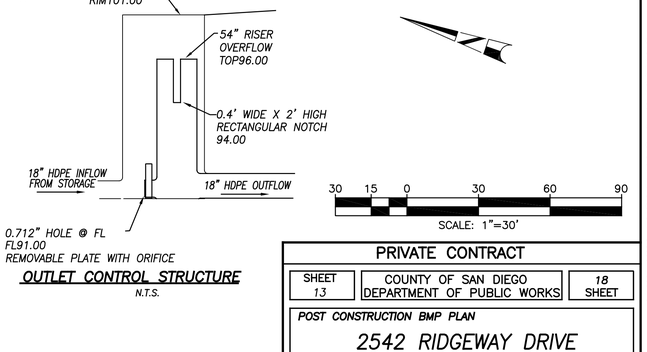
SECTION A-A VIEW



DETENTION VAULT
DIMENSIONS: L=112', W=32', H=6'
STORAGE = 16,800 CF

TYPICAL ELEVATION
NTS

STORMCAPTURE ®
DETENTION SYSTEM



OUTLET CONTROL STRUCTURE
N.T.S.

COUNTY APPROVED CHANGES

NO.	DESCRIPTION	APPROVED BY	DATE

BENCHMARK

DESCRIPTION: CITY OF SAN DIEGO BENCHMARK NO. 16070
LOCATION: BRASS PLUG IN TOP OF NORTHEAST CURB RETURN AT INTERSECTION OF RACHEL AVE. AND ROANOKE ST.
RECORD FROM: CITY OF SAN DIEGO
ELEVATION: 167.361 DATUM: NGVD-29

PRIVATE CONTRACT

SHEET 13 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 18 SHEET

POST CONSTRUCTION BMP PLAN

2542 RIDGEWAY DRIVE NATIONAL CITY, CA 91950

CALIFORNIA COORDINATE INDEX 182-1743

APPROVED FOR: WILLIAM P. MORGAN COUNTY ENGINEER
BY:
DATE:

ENGINEER OF WORK: WILLIAM LUNDSTROM
EXP. 6-30-23 R.C.E. 61630

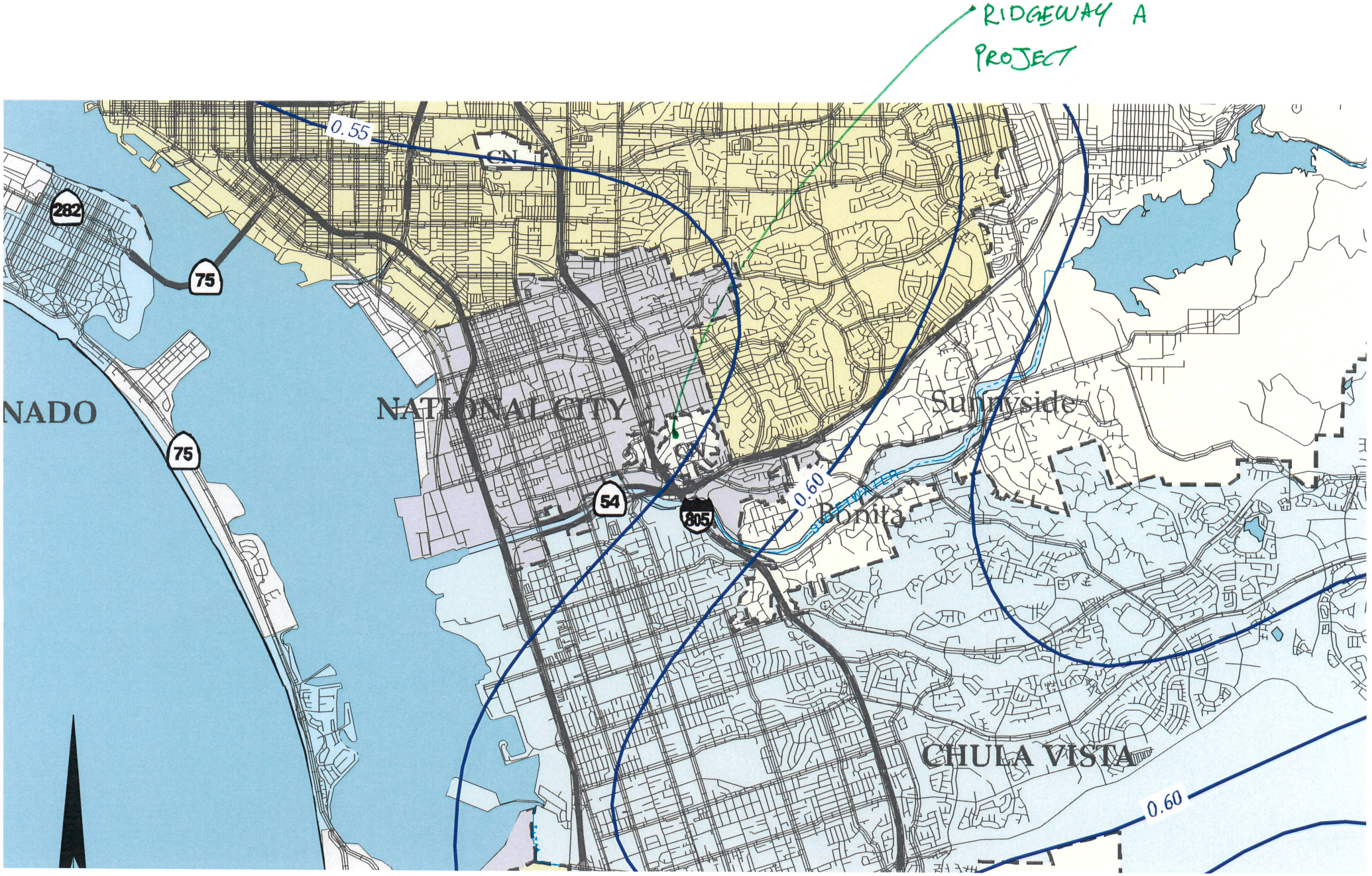
GRADING PERMIT NO. PDS2020-LDGRMJ-30273

Lundstrom
Engineering and Surveying, Inc.
3333 Camino del Rio South, #330 • San Diego, CA 92108
Phone (619) 814-1220 • Fax (619) 641-5910

ENGINEER'S NAME: LUNDSTROM ENGINEERING & SURVEYING
PHONE NO. (619) 814-1220

Drawing: z:\proj\L209-04\dwg\gp\L209-04 gp-13 post construction bmp.dwg Plot Date: 11/29/2022 2:02 PM

DPW2021-WWSWCP-00064 J.N. L209-04


RIDGEWAY A
PROJECT
0.55
CN
282
75
NADO
NATIONAL CITY
75
54
805
0.60
Sunnyside
Bonita
CHULA VISTA
0.60
95th Percentile

CHRISTIAN WHEELER
ENGINEERING

December 17, 2021

BC Euclid LLC
8445 Camino Santa Fe, #102
San Diego, California 92121
Attention: Mr. Abraham Edid

CWE 2210655.01R

Subject: Change of Geotechnical Engineer of Record and Update
Apartment Project, 2532-2542 Ridgeway Drive, National City, California

Ladies and Gentlemen:

This letter has been prepared to confirm that Christian Wheeler Engineering will assume the duties of the Geotechnical Engineer of Record for the construction phase of the subject project, including the planned Anchor Block retaining wall. As such, we will assume the full responsibility for the geotechnical aspects of the project. In addition, it is our opinion that the geotechnical data contained in the geotechnical documents referenced in the following section are representative of the site conditions and we concur with the recommendations and conclusions presented in the referenced report except as modified herein. It is also our opinion that the recommendations and conclusions contained in the referenced report, except as modified herein, are still valid for the referenced grading plans.

REFERENCES

Krazan & Associates, Inc., Updated Geotechnical Engineering Investigation, Proposed Residential Development, 2542 Ridgeway Drive, National City, California, dated February 24, 2020.

Krazan & Associates, Inc., Review of Plans and Specifications, Proposed Residential Development, 2542 Ridgeway Drive, National City, California, dated September 21, 2021.

Krazan & Associates, Inc., Updated Geotechnical Engineering Investigation, Proposed Residential Development, 2542 Ridgeway Drive, National City, California, dated September 21, 2021.

Krazan & Associates, Inc., Response to Comments Letter, Proposed Ridgeway Apartments, 2542 Ridgeway Drive, National City, California, dated September 21, 2021.

Krazan & Associates, Inc., Response to Comments Letter No. 2, Proposed Ridgeway Apartments, 2542 Ridgeway Drive, National City, California, dated October 25, 2021.

Krazan & Associates, Inc., Retaining Wall Global Stability Analysis, Proposed Ridgeway Apartments, 2542 Ridgeway Drive, National City, California, dated October 25, 2021.

Krazan & Associates, Inc., Updated Geotechnical Engineering Investigation, Proposed Residential Development, 2542 Ridgeway Drive, National City, California, dated October 25, 2021.

Lundstrom Engineering and Surveying, Inc., Grading and Private Improvement Plans for: 2542 Ridgeway Drive, County of San Diego, Grading Permit No. PDS2021-LDGMJ-30273, plot date October 28, 2021.

SITE AND PROJECT DESCRIPTIONS

The subject site is an irregular-shaped project area that is comprised of four lots, identified as Assessor's Parcel Numbers 563-184-44, 564-040-02, -21 and -23. The lots are located southeast of the intersection of Ridgeway Drive and Euclid Avenue. The site currently supports two single-family residences that have the addresses of 2532 and 2542 Ridgeway Drive in the National City area of San Diego County. Topographically, the site is generally situated in a natural, tributary drainage canyon that empties into a larger drainage to the south. Elevations range from a low of about 73 feet at the canyon bottom along the southern boundary of the project to a high of about 120 at the northeastern corner. Along the western boundary of the site, adjacent to Euclid Avenue, there is a fill slope up to about 25 feet high that is constructed at an approximate inclination of 2:1 (H:V). Based on our review of historical photographs, it appears that this fill was placed during the construction of Euclid Avenue sometime during the mid-1970's.

We understand that it is proposed to construct an apartment complex on the property. The complex will include three buildings (76 units) and associated street and utility improvements. The buildings are expected to consist of three stories of wood-frame construction with shallow foundations and on-grade concrete floor slabs. Planned grading will typically include small cuts in the uphill sides of the site along the western and eastern boundaries and relatively deep fills in the central, natural drainage portion. Cuts and fills up to about 5 and 26 feet, respectively, from the existing site grades are planned. The grading will result in roughly 2,700 and 14,300 cubic yards of cut and fill, respectively, with approximately 11,600 cubic yards of import. The site

grading also includes an Anchor Block retaining wall at the southern end of the site that is up to about 20 feet tall and several small masonry retaining walls, less than about 6 feet in retained height, along the eastern and western sides of the site.

SITE GEOLOGY

The subject site is located in the Coastal Plains Physiographic Province of San Diego County. Based on our review of the referenced geotechnical report, available geotechnical literature, and our experience within the vicinity of the site, we expect that the subject site is underlain by Quaternary-age very old paralic deposits that are overlain by artificial fill associated with the construction of Euclid Avenue along the western boundary and by surficial soils within the lower portions of the existing canyon. The surficial soil consists of both natural alluvium at the bottom of the canyon as well as stockpiled soils that have been imported from off-site. The estimated geologic contacts are shown on the Site Plan and Geotechnical Map provided herewith as Plate No. 1 and Geologic Cross-Section A-A' presented as Plate No. 2.

CONCLUSIONS AND RECOMMENDATIONS

Based on our review of the referenced documents, it is our opinion that the project site is suitable for the proposed development. We offer the conclusions listed below regarding the planned construction.

- Based on the planned grading there will be a sharp transition between cut (or shallow fill) and deeper fills below Building C. In order to mitigate the potential for differential settlement and provide uniform bearing conditions beneath the structure, the uphill side of the pad should be undercut to a depth of 10 feet below the finish pad grade and be replaced as uniformly compacted, structural fill material. Laterally, the undercut should extend at least 10 feet outside the building perimeter. The undercut area should be sloped at an inclination of at least two percent towards the fill side of the pad, in such a manner that water does not become trapped in the undercut zone.
- Steepened, temporary excavations for the undercut may need to be performed near the eastern property line. In this case, steepened temporary excavations can be made during the undercut provided that they are backfilled on the same day.
- Although geologic units are not identified on the boring logs by Krazan, blow counts and descriptions apparently in the fill prism associated with Euclid Avenue indicate typically dense material. We anticipate that the existing fill will be suitable to support the planned additional fill.

- All surficial soils, including the stockpiled material, will need to be removed to the contact with competent very old paralic deposits or existing, competent fill prior to placing fill or constructing improvements.
- A subdrain should be placed at the invert of the existing canyon after the surficial soils have been removed to the contact with competent very old paralic deposits. The subdrain should be extended along the bottom to the point where the planned fill thickness is 10 feet or less. Typical subdrain designs for canyon drains are detailed on the attached Figure 1. Subdrains should be outletted into storm drain pipes or into controlled drainage areas. Subdrains outletted into controlled drainage areas should have a head wall installed at the end of the drain.
- Where the existing ground has a slope of 5:1 (horizontal to vertical) or steeper, it should be benched into as the fill extends upward from the keyways. The benching should remove all loose surficial soils and should create level areas on which to place the fill material.
- Compaction of fill slopes should be performed by back-rolling with a sheepsfoot compactor at vertical intervals of four feet or less as the fill is being placed, and track-walking the face of the slope when the slope is completed. As an alternative, the fill slopes may be overfilled by at least 3 feet and then cut back to the compacted core at the design line and grade.
- The presence of cohesionless soils at the face of slopes should be avoided. Slopes should be planted as soon as feasible after grading. Sloughing, deep rilling and slumping of surficial soils may be anticipated if slopes are left unplanted or without erosion control, especially during the rainy season. Irrigation of slopes should be carefully monitored to insure that only the minimum amount necessary to sustain plant life is used. Over-irrigating could be extremely erosive and should be avoided.
- Foundations for Building C should have a minimum horizontal setback of 10 feet from the bottom, outside edge to the adjacent slope face.

If you have any questions after reviewing this report, please do not hesitate to contact our office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,

CHRISTIAN WHEELER ENGINEERING

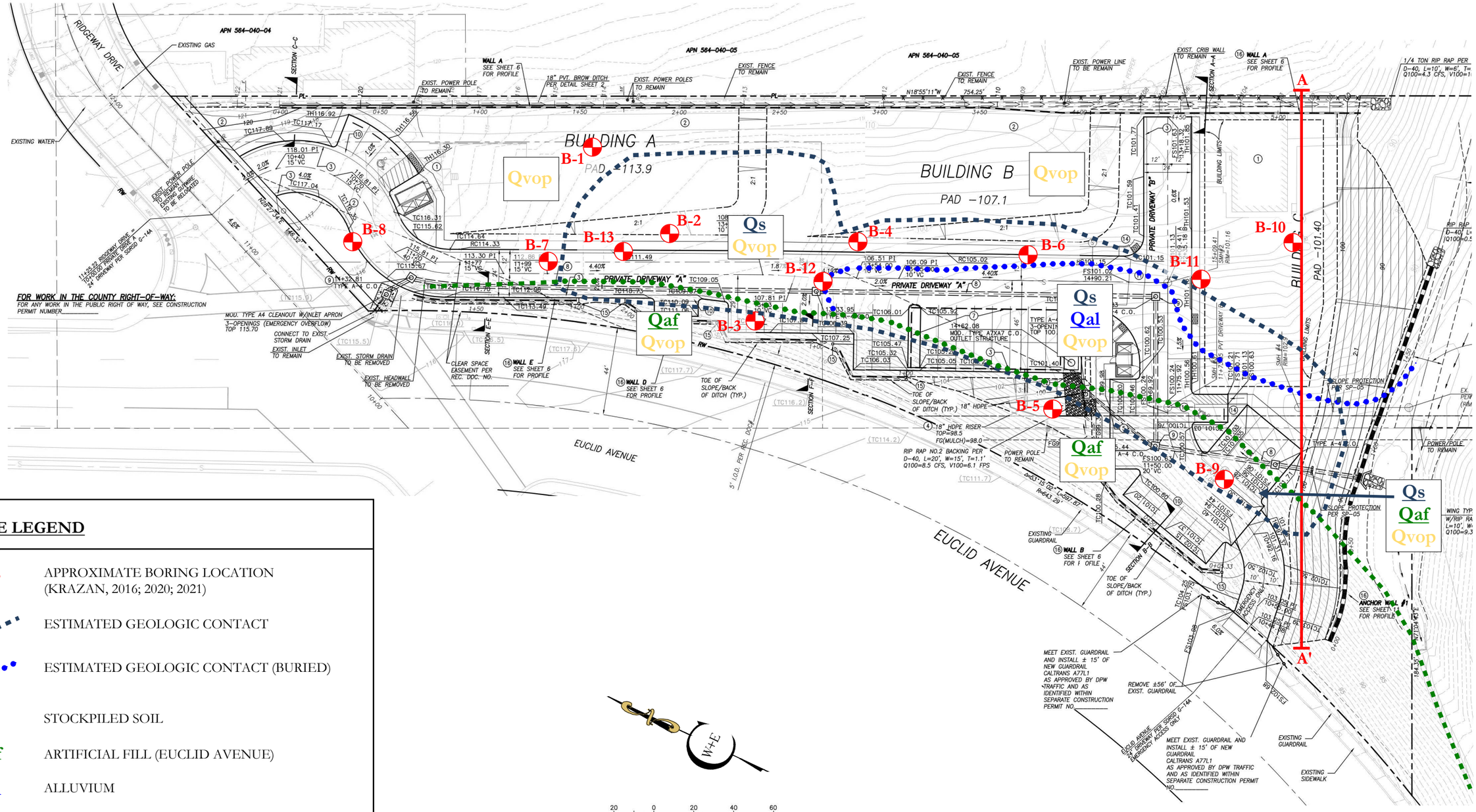
Shawn C. Caya, R.G.E #2748

David R. Russell, C.E.G #2115

SCC:scc:drr

Attachments: Plate 1 Site Plan and Geotechnical Map
Plate 2 Cross-section A-A'
Plate 3 Canyon Subdrain Details

Distribution: Abraham Edid; Shawn Fitzpatrick via email



CWE LEGEND

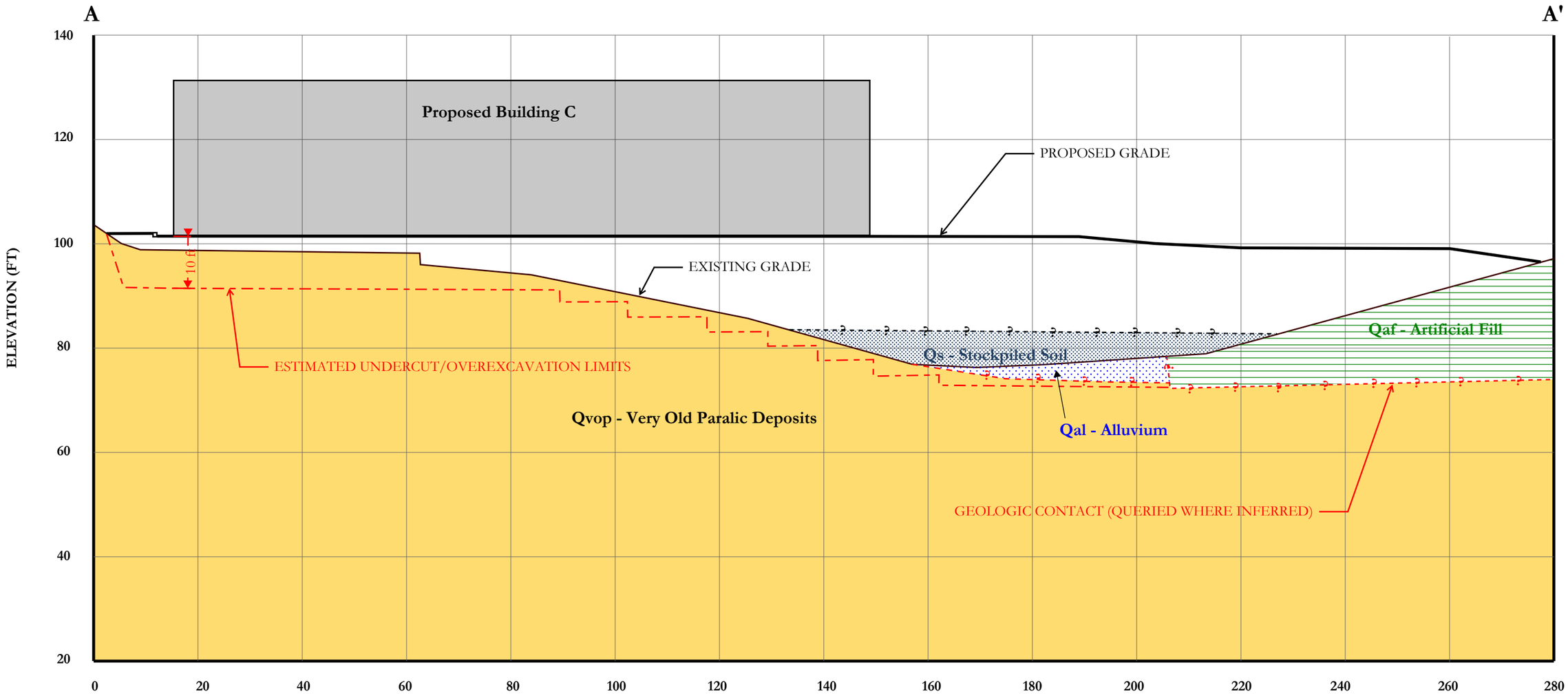
B-13	APPROXIMATE BORING LOCATION (KRAZAN, 2016; 2020; 2021)
	ESTIMATED GEOLOGIC CONTACT
	ESTIMATED GEOLOGIC CONTACT (BURIED)
Qs	STOCKPILED SOIL
Qaf	ARTIFICIAL FILL (EUCLID AVENUE)
Qal	ALLUVIUM
Qvop	VERY OLD PARALIC DEPOSITS

SITE PLAN AND GEOTECHNICAL MAP

RIDGEWAY APARTMENTS
2532-2542 RIDGEWAY DRIVE, NATIONAL CITY, CA

DATE: DECEMBER 2021	REPORT NO.: 2210655.01
BY: SCC	PLATE NO.: 1

CHRISTIAN WHEELER ENGINEERING



SCALE: 1" = 20'

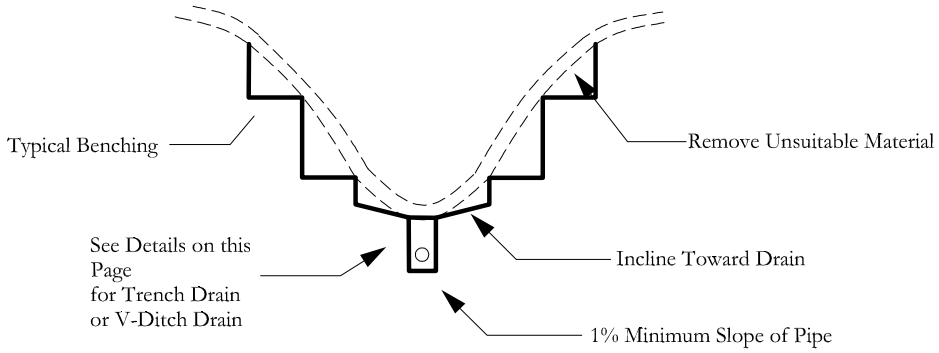
GEOLOGIG CROSS-SECTION A-A'

RIDGEWAY APARTMENTS
2532-2542 RIDGEWAY DRIVE, NATIONAL CITY, CA

DATE: DECEMBER 2021	REPORT NO.: 2210655.01
BY: SCC	PLATE NO.: 2

CHRISTIAN WHEELER ENGINEERING

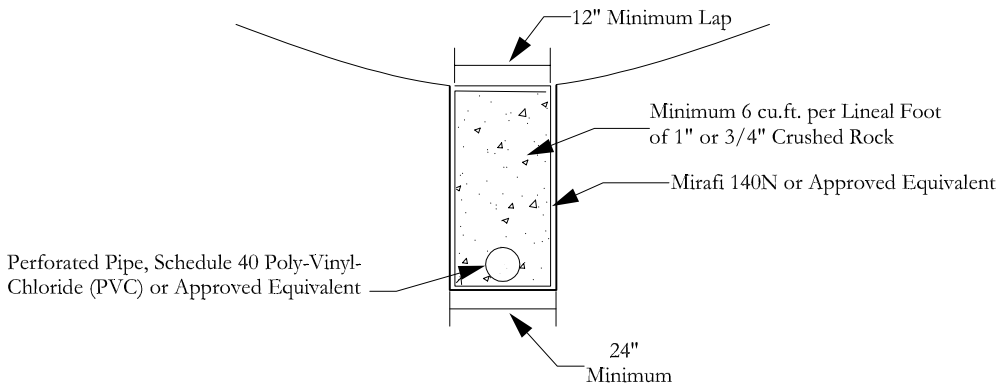
CANYON SUBDRAIN DETAIL



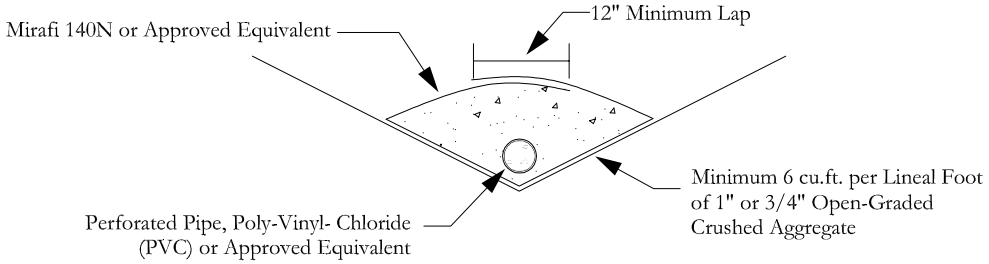
NOTE:

A. 6-inch diameter, Schedule 40 PVC perforated pipe for fill of less than 80 feet.
B. 8-inch diameter, Schedule 40 PVC perforated pipe for fills of more than 80 feet or pipe length greater than 500 feet.
C. Final 10 feet of pipe at outlet to be non-perforated. Concrete cut-off wall at the perforated/non-perforated pipe junction is recommended.

TRENCH DETAIL



V-DITCH DETAIL



NO SCALE

CHRISTIAN WHEELER ENGINEERING	**CANYON SUBDRAIN DETAILS**	PROJECT NO. 2210655
		DATE: DEC. 2021
	RIDGEWAY APARTMENTS 2532-2542 RIDGEWAY DRIVE, NATIONAL CITY, CA	PLATE NO. **3**

UPDATED GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
2542 RIDGEWAY DRIVE
NATIONAL CITY, CALIFORNIA

PROJECT NO. 112-20017
FEBRUARY 24, 2020

PREPARED FOR:

BLUE CENTURION HOMES
9265 ACTIVITY ROAD, SUITE 112
SAN DIEGO, CALIFORNIA 92126

ATTENTION: MR. ABRAHAM EDID

PREPARED BY:

KRAZAN & ASSOCIATES, INC.
1100 OLYMPIC DRIVE, SUITE 103
CORONA, CALIFORNIA 92881
(951) 273-1011

UPDATED GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
2542 RIDGEWAY DRIVE
NATIONAL CITY, CALIFORNIA

TABLE OF CONTENTS

February 24, 2020 KA Project No. 112-20017

UPDATED GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
2542 RIDGEWAY DRIVE
NATIONAL CITY, CALIFORNIA

INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed development that will include construction of a 25-unit multi-family residential development. It is understood that the proposed construction will include structures utilizing conventional shallow foundation systems and concrete slab-on-grade floors, underground utilities, paved parking and drive areas, and localized landscaped areas. Discussions regarding site conditions are presented herein, together with conclusions and recommendations pertaining to site preparation, grading, utility trench backfill, drainage and landscaping, foundations, concrete floor slabs and exterior concrete flatwork, retaining walls, and pavement design.

A Vicinity Map showing the location of the site is presented on Figure 1. A Site Plan showing the approximate boring and bulk sample locations is presented on Figure 2. Descriptions of the field and laboratory investigations, boring log legend and boring logs are presented in Appendix A. Appendix A also contains a description of the laboratory-testing phase of this study, along with the laboratory test results. Appendices B and C contain guide specifications for earthwork and flexible pavements, respectively. If conflicts in the text of the report occur with the general specifications in the appendices, the recommendations in the text of the report have precedence.

PURPOSE AND SCOPE OF SERVICES

This geotechnical investigation was conducted to evaluate subsurface soil and groundwater conditions at the project site. Engineering analysis of the field and laboratory data was performed for the purpose of developing and providing geotechnical recommendations for use in the design and construction of the earthwork, foundation and pavement aspects of the project.

Our scope of services was outlined in our proposal dated January 23, 2020 (KA Proposal No. G20010CAC) and included the following:

- A site reconnaissance by a member of our engineering staff to evaluate the surface conditions at the project site.
- Review of selected published geologic maps, reports and literature pertinent to the site and surrounding area.

- A field investigation consisting of drilling three (3) borings to a depth of approximately 20 feet below the existing ground surface for evaluation of the subsurface conditions at the project site.

- Performance of two (2) infiltration tests at the subject site in order to determine an estimated infiltration rate for the near surface soil conditions.

- Performance of laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.

- Evaluation of the data obtained from the investigation, previous investigations and engineering analyses of the data with respect to the geotechnical aspects of structural design, site grading and paving.

- Preparation of this report summarizing the findings, results, conclusions and recommendations of our investigation.

Environmental services, such as a chemical analysis of soil and groundwater for possible environmental contaminates, were not in our scope of services.

PROPOSED CONSTRUCTION

Based on our review of the site plan and our discussions with the project representative, we understand that the proposed development will include construction of a 25-unit multi-family residential development. It is understood that the proposed construction will include structures utilizing conventional shallow foundation systems and concrete slab-on-grade floors. The proposed structures are understood to be three-stories in height. No subterranean construction is anticipated as part of the proposed development. It is anticipated that the proposed development will include underground utilities, paved parking and drive areas, and localized landscaped areas. The majority of the site is flat and level, except for the slopes along the western perimeter of the parcel. Slopes appear to range from 5:1 to 2:1. It is anticipated that cuts and fills may be up to 4 to 5 feet.

In the event these structural or grading details are inconsistent with the final design criteria, we should be notified so that we can evaluate the potential impacts of the changes on the recommendations presented in this report and provide an updated report as necessary.

SITE LOCATION AND SITE DESCRIPTION

The site is accessible from a driveway that is located on Ridgeway Drive near Euclid Avenue. The subject site is a roughly trapezoidal shape corner lot. The overall site occupies approximately 2.1 acres. The site is located east of Euclid Avenue and south of Ridgeway Drive, in the city of National City, California (see Vicinity Map, Figure 1). The site is bound to the north, west & east by residential developments, and to the south by undeveloped land. The majority of the site is flat and level except for slopes situated along the western portion of the perimeter of the parcel. Slopes appear to range from 5:1 to 2:1 (H:V). It is anticipated that cuts and fills will vary from approximately 4 to 5 feet. Elevations at the subject site range from approximately 75.0 to 105.0 above mean sea level. The site is currently occupied by a single-family residential structure located in the front of the site and a second single-family

residential structure located at the rear of the site. A localized crib style landscape wall is located along the property line at the rear of the property. Ground cover in the remaining portions of the site consist of localized asphaltic concrete pavement, landscaping, and weed and tree growth.

PREVIOUS STUDIES

The site was previously investigated by our firm. Krazan and Associates, Inc. performed a Geotechnical Site Investigation in October 16, 2017 for the Ridgeway Residential Development, which includes the subject site. The area investigated by our firm consisted of approximately 2.1 acres, which include the subject site being addressed by this report. As part of the previous Geotechnical Engineering Investigation Report, six (6) boring were drilled to depths ranging from 20 to 50 feet below existing site grades. Conditions encountered during the most recent subsurface investigation were found to be similar to those discussed in the previous Geotechnical Engineering Investigation Report. As part of the current investigation performed by our firm, three additional borings were drilled on the subject site and two shallow infiltration tests were conducted in the area of the proposed infiltration system.

GEOLOGIC SETTING

The subject site is located in the San Diego region within the Peninsular Range Geomorphic Province. The Peninsular Range Geomorphic Province is characterized by northwest trending mountain ranges, separated by subparallel fault zones. The mountain ranges are underlain by basement rocks, consisting of Jurassic metavolcanic and metasedimentary rocks and Cretaceous igneous rocks of the southern California batholith. Late Cretaceous, Tertiary, and Quaternary sediments flank the mountain ranges to the northeast and southwest. Subsurface lithologies at the subject site are generally composed of artificial fill, alluvium, and formational materials. The project site is not located within a State of California Earthquake Fault Zone.

Deposits encountered on the subject site during exploratory drilling are consistent with those mapped in the area and are discussed in detail in this report. The site is located in a seismically active area of Southern California. The area in consideration shows no mapped faults on-site according to maps prepared by the California Geologic Survey and published by the International Conference of Building Officials (ICBO).

FAULT RUPTURE HAZARD ZONES

The Alquist-Priolo Geologic Hazards Zones Act went into effect in March, 1973. Since that time, the Act has been amended 11 times (Hart, 2007). The purpose of the Act, as provided in California Geologic Survey (CGS) Special Publication 42 (SP 42), is to prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture". The Act was renamed the Alquist-Priolo Earthquake Fault Zoning Act in 1994, and at that time, the originally designated "Special Studies Zones" was renamed the "Earthquake Fault Zones."

The area of the subject site is not included on an Earthquake Fault Zones Map prepared by the CGS. The site is not within a Fault-Rupture Hazard Zone. The Rose Canyon and Palos Verdes Fault Zones are the nearest active fault zones to the site and are each located approximately 5.3 miles from the site.

SEISMIC HAZARDS ZONES

In 1990, the California State Legislature passed the Seismic Hazard Mapping Act to protect public safety from the effects of strong shaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes. The Act requires that the State Geologist delineate various seismic hazards zones on Seismic Hazards Zones Maps. Specifically, the maps identify areas where soil liquefaction and earthquake-induced landslides are most likely to occur. A site-specific geotechnical evaluation is required prior to permitting most urban developments within the mapped zones. The Act also requires sellers of real property within the zones to disclose this fact to potential buyers. A State of California, Special Studies Zone Map has not been prepared for the subject site. As such, the subject site is not located in an area designated as a Liquefaction Hazard Zone by the State of California.

OTHER HAZARDS

Rockfall, Landslide, Slope Instability, Debris Flow: The majority of the subject site is relatively flat and level, except for the slopes along the western perimeter of the parcel. It is our understanding that there are no significant slopes proposed as part of the proposed development. Provided the recommendations presented in this report are implemented into the design and construction of the anticipated development, rockfalls, landslides, slope instability, and debris flows are not anticipated to pose a hazard to the subject site.

Seiches: Seiches are large waves generated within enclosed bodies of water. The site is not located in close proximity to any lakes or reservoirs. As such, seiches are not anticipated to pose a hazard to the subject site.

Hydroconsolidation: The near surface soils encountered at the subject site were found to be loose to medium dense. Provided remedial grading recommendations presented in this report are incorporated in the design and construction, hydroconsolidation is not anticipated to be a significant concern for the subject site.

SITE COEFFICIENT

The site class, per Table 1613.5.2, 2019 CBC, is based upon the site soil conditions. It is our opinion that a Site Class D is appropriate for building design at this site. For seismic design of the structures, in accordance with the seismic provisions of the 2019 CBC, we recommend the following parameters with the assumption that Equivalent Lateral Force Method would be used for calculating the seismic forces by the Structural Engineer. If other method is prefer over the ELF, a Site Specific study would be required:

2019 CALIFORNIA BUILDING CODE		
Seismic Item	**Value**	**CBC Reference**
Site Class	D	Table 1613.5.2
Fa	1.077	Table 1613.5.3 (1)
Ss	1.058	Figure 1613.5 (3)
SMS	1.139	Section 1613.5.3
SDS	0.759	Section 1613.5.4
Fv	1.939	Table 1613.5.3 (2)
S1	0.361	Figure 1613.5 (4)
SM1	0.700	Section 1613.5.3
SD1	0.467	Section 1613.5.4
Peak Horizontal Acceleration	0.531 g	
Ts	0.615	

FIELD AND LABORATORY INVESTIGATIONS

As previously noted, six (6) borings were drilled at the subject site as part of a previous Geotechnical Engineering Investigation Report. These boring were drilled to depths ranging from 20 to 50 feet below existing site grades. As part of this investigation, subsurface soil conditions were explored by drilling three (3) additional borings using a truck-mounted drill rig to a depth of approximately 20 feet below existing site grade. The borings were drilled using hollow stem augering equipment. In addition, bulk subgrade soil samples were also obtained for laboratory testing. The approximate boring and bulk sample locations are shown on the Site Plan, Figure 2. These approximate boring and sample locations were estimated in the field based on pacing and measuring from the limits of existing site features. During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsurface soils. Soil samples were retained for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System. A more detailed description of the field investigation is presented in Appendix A.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory-testing program was formulated with emphasis on the evaluation of natural in-situ moisture and density, gradation, R-Value, maximum dry density, resistivity, pH value, sulfate and chloride contents of the materials encountered. Details of the laboratory-testing program are discussed in Appendix A. The results of the laboratory tests are presented on the boring logs or on the test reports, which are also included in Appendix A. This information, along with the field observations, was used to prepare the final boring logs in Appendix A.

SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on the previous studies conducted on the subject site as well as conditions encountered during the recent site investigation, the subsurface soil conditions encountered at the boring locations consisted of interbeded layers of medium dense to very dense silty sand with varying gravel content to depths of up to 47 feet below existing site grades. Very dense gravelly sand was encountered from a depth of approximately 47 feet to the maximum depth explored, 50 feet below existing site grade. Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. Penetration resistance, measured by the number of blows required to drive a Modified California sampler or a Standard Penetration Test (SPT) sampler, ranged from 13 blows per foot to greater than 50 blows per foot. Dry densities ranged from approximately 116 to 127 pcf. Representative samples of the near surface soil were tested and found to have angles of internal friction of 30 and 31 degrees.

The above is a general description of soil conditions encountered at the site in the borings drilled for this investigation. For a more detailed description of the soil conditions encountered, please refer to the boring logs in Appendix A.

GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Free groundwater was not encountered in any of the borings drilled as part of this investigation. Groundwater is anticipated to exist at depths in excess of 50 feet below site grades.

It should be recognized that water table elevation might fluctuate with time. The depth to groundwater can be expected to fluctuate both seasonally and from year to year. Fluctuations in the groundwater level may occur due to variations in precipitation, irrigation practices at the site and in the surrounding areas, climatic conditions, flow in adjacent or nearby canals, pumping from wells and possibly as the result of other factors that were not evident at the time of our investigation. Therefore, water level observations at the time of our field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report. Long-term monitoring in observation wells, sealed from the influence of surface water, is often required to more accurately define the potential range of groundwater conditions on a site.

SOIL CORROSIVITY

Corrosion tests were performed to evaluate the soil corrosivity to the buried structures. The test results consisted of qualified very corrosive soil with minimum sulfate and chloride contents. A qualified corrosion engineer should review the results. The results are provided below:

Parameter	Results	Test Method
pH Value	7.0	EPA 9045C
Resistivity	960 ohm-cm	CA 643

Sulfate	103 ppm	CA 417
Chloride	307 ppm	CA 422

INFILTRATION TESTING

Estimated infiltration rates were determined using the results of open borehole percolation testing performed at the subject site. The percolation testing indicated that the near surface soils were found to have infiltration rates of approximately 0.30 and 0.51 inch per hour. The infiltration rates have been calculated to reflect vertical infiltration only.

In order to perform the infiltration tests, two borings were drilled to approximately five feet below existing site grades. Infiltration testing was performed at each of the two boring locations. Prior to infiltration testing, approximately four inches of gravel was placed at the bottom of each borehole. The boreholes were pre-soaked prior to testing using clean water. The depth of each borehole was measured at each reading to verify the overall depth. The depth of water in the borehole was measured using a water level indicator or well sounder. Infiltration rates have been calculated using the Inverse Borehole procedures.

Detailed results of the percolation test and resulting infiltration rate are attached in tabular format. The soil infiltration rate is based on tests conducted with clean water. The infiltration rates may vary with time as a result of soil clogging from water impurities.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of our field and laboratory investigations, along with previous geotechnical experience in the project area, the following is a summary of our evaluations, conclusions, and recommendations.

ADMINISTRATIVE SUMMARY

Based on the data collected during this investigation, and from a geologic and geotechnical engineering standpoint, it is our opinion that the proposed improvements may be made as anticipated provided that the recommendations presented in this report are considered in the design and construction of the project.

In brief, the subject site and soil conditions appear to be conducive to the development of the project.

The subsurface soil conditions encountered at the boring locations consisted of interbeded layers of medium dense to very dense silty sand with varying gravel content to depths of up to 47 feet below existing site grades. Very dense gravelly sand was encountered from a depth of approximately 47 feet to the maximum depth explored, 50 feet below existing site grade. Groundwater was not encountered in any of the borings drilled as part of this investigation.

To minimize post-construction soil movement and provide uniform support for the buildings, overexcavation and recompaction within the proposed building footprint areas should be performed to a minimum depth of three (3) feet below existing grades or one (1) foot below the bottom of any proposed foundation bearing grades. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The exposed subgrade at the base of the overexcavation should then be scarified, moisture-conditioned as necessary, and compacted. The overexcavation and recompaction should also extend laterally five feet (5') beyond edges of the proposed footings or building limits. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill.

The limit of grading and the proposed building footprint should be established in the field prior to construction. Additional remedial grading will be required if the building edges exceed the grading limit. The grading envelope should extend to at least five feet beyond the outer edges of the building footprint.

The exterior slabs should be at least 5 inches thick and reinforced with No. 3 rebars at 18 inches on-center, each way. The actual slab on foundation design should be determined by the project structural engineer.

GROUNDWATER INFLUENCE ON STRUCTURES/CONSTRUCTION

Based on our findings and historical records, it is not anticipated that groundwater will rise within the zone of structural influence or affect the construction of foundations and pavements for the project. However, if earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, "pump," or not respond to densification techniques. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product. Our firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

SEISMIC CONSIDERATIONS

Ground Shaking

Although ground rupture is not considered to be a major concern at the subject site, the site will likely be subject to at least one moderate to severe earthquake and associated seismic shaking during its lifetime, as well as periodic slight to moderate earthquakes. Some degree of structural damage due to stronger seismic shaking should be expected at the site, but the risk can be reduced through adherence to seismic design codes.

Soil Liquefaction

Soil liquefaction is a state of soil particle suspension caused by a complete loss of strength when the effective stress drops to zero. Liquefaction normally occurs under saturated conditions in soils such as sand in which the strength is purely frictional. However, liquefaction has occurred in soils other than clean sand. Liquefaction usually occurs under vibratory conditions such as those induced by seismic events. To evaluate the liquefaction potential of the site, the following items were evaluated:

1) Soil type
2) Groundwater depth
3) Relative density
4) Initial confining pressure
5) Intensity and duration of ground shaking

The site is not located in a liquefaction hazard zone as defined by the State of California. The subsurface conditions encountered at the site consisted of medium dense to very dense silty sand. In addition, groundwater was not encountered to depths of up to 50 feet below the existing site grades. Based on the encountered conditions, liquefaction is not considered to be a concern at the subject site.

One of the most common phenomena during seismic shaking accompanying any earthquake is the induced settlement of loose unconsolidated soils. Based on site subsurface conditions and the moderate to high seismicity of the region, any loose fill materials at the site could be vulnerable to this potential hazard. However, this hazard can be mitigated by following the design and construction recommendations of our Geotechnical Engineering Investigation (over-excavation and rework of the loose soils and/or fill). Based on the moderate penetration resistance measured, the native deposits underlying the surface materials do not appear to be subject to significant seismic settlement.

EARTHWORK

Site Preparation – Clearing and Stripping

General site clearing should include removal of vegetation and existing utilities, structures (footings and slabs); trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping should extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed. Deeper stripping may be required in localized areas. These materials will not be suitable for reuse as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Any excavations that result from clearing operations should be backfilled with Engineered Fill. Krazan & Associates' field staff should be present during site clearing operations to enable us to locate areas where depressions or disturbed soils are present and to allow our staff to observe and test the backfill as it is placed. If site clearing and backfilling operations occur without appropriate observation and testing by a qualified geotechnical consultant, there may be the need to over-excavate the building area to identify uncontrolled fills prior to mass grading of the building pad.

As with site clearing operations, any buried structures encountered during construction should be properly removed and backfilled. The resulting excavations should be backfilled with Engineered Fill.

Overexcavation and Recompaction

To reduce post-construction soil movement and provide uniform support for the proposed buildings, overexcavation and recompaction within the proposed building footprint area and any other shallow foundation bearing areas should be performed to a minimum depth of three (3) feet below existing grades or one (1) foot below the bottom of any proposed foundation bearing grades, whichever is deeper.

Overexcavation should be performed to remove and re-compact the existing fill soils present in the building area. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The exposed subgrade at the base of the overexcavation should then be scarified, moisture-conditioned as necessary, and compacted. The overexcavation and recompaction should also extend laterally five feet (5') beyond edges of the proposed footings or building limits. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill.

Within the proposed exterior flatwork and pavement areas, the overexcavation and recompaction should be performed to a depth of at least 12 inches below existing grade or finished subgrade, whichever is deeper. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation.

It is our understanding based on discussions with the project representatives, the landscape wall located at the rear of the site may be left in place and covered as part of the rough grading activities proposed at the subject site. In the event that the existing wall is left in place, near improvements should be set back from the zone of influence impacted be the existing wall. Based on review of the proposed conceptual site plans, however, it appears as though the existing wall could be removed as part of the rough grading activities.

Fill Placement

Prior to placement of fill soils, the upper 8 inches of native subgrade soils should be scarified, moisture-conditioned to slightly above optimum moisture-content, and recompacted to a minimum of 95 percent of the maximum dry density based on ASTM D1557 Test Method. Fill material should be compacted to a minimum of 95 percent of the maximum dry density based on ASTM D1557 Test Method.

The over-excavated native silty sand soils are generally suitable for use as Engineered Fill provided that they are free of organic material, debris and cobbles over 4 inches. Fill material should be compacted to a minimum of 95 percent of maximum dry density based on ASTM D1557 Test Method.

The upper soils, during wet winter months, may become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

ENGINEERED FILL

The organic-free, on-site, native soils are predominately silty sands. These soils will be suitable for reuse as Engineered Fill, provided they are cleared of excessive organics and debris.

The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the contractor, since he has complete control of the project site at that time.

Imported Fill material should be predominately non-expansive granular material. This material should be approved by the Geotechnical Engineer prior to use and should typically possess the following characteristics:

NON-EXPANSIVE FILL PROPERTIES	
Percent Passing No. 200 Sieve	10 to 50
Plasticity Index (PI)	12 maximum
Liquid Limit	35 maximum
UBC Standard 29-2 Expansion Index	20 maximum

Imported Fill should be free from rocks and clods greater than 4 inches in diameter. All Imported Fill material should be submitted to the Soils Engineer for approval at least 48 hours prior to delivery at the site. Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned to near optimum moisture-content, and compacted to achieve at least 95 percent of maximum dry density as determined by ASTM D1557 Test Method. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

FOUNDATION

The proposed structures may be supported on a shallow foundation system bearing on a minimum of one (1) foot of newly placed Engineered Fill. Spread and continuous footings can be designed for the following maximum allowable soil bearing pressures:

Load	Allowable Loading
Dead Load Only	1,750 psf
Dead-Plus-Live Load	2,300 psf
Total Load, including wind or seismic loads	3,000 psf

The footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is deeper. Minimum footing widths should be 15 inches for continuous footings and 24 inches for isolated footings. The footing excavations should not be allowed to dry out any time prior to pouring concrete.

It is recommended that the foundation for the proposed structure should be entirely within compacted fill materials or entirely within alluvium or bedrock. Footings shall not transition from one bearing material to another. It is recommended that all footings should be cleared of all loose soil and construction debris prior to pouring concrete.

It is recommended that all foundations should contain steel reinforcement of at least two (2) number four (#4) bars, one (1) top and one (1) bottom.

It is recommended that all foundations should be set back a minimum of five (5) feet from the top of all and all adjacent slopes or deepened to maintain at least five (5) feet between the bottom of the footing and

the slope face. Additionally, all footing set back criteria, except for the minimum set back prescribed above, should conform to 2019 CBC Section 1805.3.2 and Figure 1805.3.1.

SETTLEMENT

Provided the site is prepared as recommended and that the foundations are designed and constructed in accordance with our recommendations, the static settlement due to foundation loads is not expected to exceed 1 inch. The differential settlement is anticipated to be less than ½ inch in 30 feet. Most of the settlement is expected to occur during construction as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated.

LATERAL LOAD RESISTANCE

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.30 acting between the base of foundations and the supporting subgrade. Where a vapor barrier material is used below concrete slabs-on-grade, a coefficient of friction should be provided by the vapor barrier manufacturer. Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 250 pounds per cubic foot acting against the appropriate vertical footing faces. Where equivalent fluid pressure against the sides of the footings or embedded slab edge are to be used, the footing or slab edge must be cast directly against undisturbed soils or the soils surrounding the structure must be recompacted to the requirements for Engineered Fill presented above. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A one-third increase in the value above may be used for short duration, wind, or seismic loads.

FLOOR SLABS AND EXTERIOR FLATWORK

The interior slabs on grade minimum should be designed at least five inches (5") in thickness. It is recommended that the slabs should be reinforced with number three (#3) bars, eighteen inches (18") on center in both directions.

The exterior slabs on grade should be designed at least five inches (5") in thickness. It is recommended that the slabs should be reinforced with number three (#3) bars, eighteen inches (18") on center in both directions.

The exterior floors should be poured separately in order to act independently of the walls and foundation system. All fills required to bring the building pads to grade should be Engineered Fills.

It is recommended that the slabs should be underlain by a minimum of two inches (2") of clean sand on top of a minimum 15 mil polyolefin membrane vapor barrier (i.e. Stego Wrap or equivalent). The vapor barrier and sand should be placed on top of a minimum of six inches (6") of compacted aggregate base.

Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor can travel through the vapor membrane and penetrate the slab-on-grade. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To minimize moisture vapor intrusion, it is recommended that a vapor retarder be

installed in accordance with ASTM guidelines. It is recommended that the utility trenches within the structure be compacted, as specified in our report, to minimize the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the building is recommended. Positive drainage should be established away from the structure and should be maintained throughout the life of the structure. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed. In addition, ventilation of the structure (i.e. ventilation fans) is recommended to reduce the accumulation of interior moisture.

RETAINING WALLS

For retaining walls with level ground surface behind the walls, we recommend that retaining walls capable of deflecting a minimum of 0.1 percent of its height at the top be designed using an equivalent fluid active pressure of 40 pounds per square foot per foot of depth. Walls that are incapable of this deflection or walls that are fully constrained against deflection may be designed for an equivalent fluid at-rest pressure of 60 pounds per square foot per foot of depth. A passive lateral pressure of 240 pounds per square foot may be used to calculate sliding resistance. If walls are to be constructed above descending slopes, our office should be contacted to discuss further reduction in allowable passive pressures for resistance of lateral forces, and for overall retaining wall foundation design.

It is our understanding based on discussions with the project representatives, the landscape wall located at the rear of the site may be left in place and covered as part of the rough grading activities proposed at the subject site. In the event that the existing wall is left in place, near improvements should be set back from the zone of influence impacted be the existing wall. Proposed foundations should be set back at a projection of 1:1 from the proposed foundation to the existing wall left in place. In the event that improvement s are left in place, structural elements should not be planned above the improvements left in place. Based on review of the proposed conceptual site plans, however, it appears as though the existing wall could be removed as part of the rough grading activities.

The surcharge effect from loads adjacent to walls should be included in the wall design. The surcharge load for walls capable of deflecting (cantilever walls), we recommend applying a uniform surcharge pressure equal to one-third of the applied load over the full height of the wall. Where walls are restrained the surcharge load should be based on one-half of the applied load above the wall, also distributed over the full height of the wall. For other surcharges, such as from adjacent foundations, point loads or line loads, Krazan & Associates should be consulted.

A traffic surcharge of 250 psf is recommended for construction traffic adjacent to retaining structures. For the surcharge load for walls capable of deflecting (cantilever walls), we recommend applying a uniform surcharge pressure over the full height of the wall.

To simulate the effect of earthquake loading on retaining walls, the walls may be evaluated based on an active lateral soil pressure calculated using an equivalent fluid weight of 42 pounds per cubic foot plus a horizontal seismic surcharge line force of 36H pounds per square foot of wall. The resultant of the lateral soil pressure should be applied at H/3 above the wall base and the resultant of the seismic surcharge force should be applied

at a height of 0.6H above the wall base. For the purpose of this report, "H" is defined as the vertical height from the base of the wall to the ground surface above.

Expansive soils should not be used for backfill against walls. The zone of non-expansive backfill material should extend from the bottom of each retaining wall laterally back a distance equal to the height of the wall, to a maximum of five (5) feet.

The active and at-rest earth pressures do not include hydrostatic pressures. To reduce the build-up of hydrostatic pressures, drainage should be provided behind the retaining walls. Wall drains should consist of a minimum 12-inch wide zone of drainage material, such as ¾-inch by ½-inch drain rock wrapped in a non-woven polypropylene geotextile filter fabric such as Mirafi 140N or equivalent. Alternatively, drainage may be provided by the placement of a commercially produced composite drainage blanket, such as Miradrain, extending continuously up from the base of the wall. The drainage material should extend from the base of the wall to finished subgrade in paved areas and to within about 12 inches below the top of the wall in landscape areas. In landscape areas the top 12 inches should be backfilled with compacted native soil. A 4-inch minimum diameter, perforated, Schedule 40 PVC drain pipe should be placed with holes facing down in the lower portion of the wall drainage material, surrounded with drain rock wrapped in filter fabric. A solid drainpipe leading to a suitable discharge point should provide drainage outlet. As an alternative, weep holes may be used to provide drainage. If weep holes are used, the weep holes should be 3 inches in diameter and spaced about 8 feet on centers. The backside of the weep holes should be covered with a corrosion-resistant mesh to prevent loss of backfill and/or drainage material.

TEMPORARY EXCAVATION STABILITY

All excavations should comply with the current requirements of Occupational Safety and Health Administration (OSHA). All cuts greater than 5 feet in depth should be sloped or shored. Temporary excavations should be sloped at 1:1 (horizontal to vertical) or flatter, up to a maximum depth of 10 feet, and at 2:1 (horizontal to vertical) for depths greater than 10 feet. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within five feet of the top (edge) of the excavation. Where sloped excavations are not feasible due to site constraints, the excavations may require shoring. The design of the shoring system is normally the responsibility of the contractor or shoring designer, and therefore, is outside the scope of this report. The design of the temporary shoring should take into account lateral pressures exerted by the adjacent soil, and, where anticipated, surcharge loads due to adjacent buildings and any construction equipment or traffic expected to operate alongside the excavation.

The excavation/shoring recommendations provided herein are based on soil characteristics derived from our test borings within the area. Variations in soil conditions will likely be encountered during the excavations. Krazan & Associates, Inc. should be afforded the opportunity to provide field review to evaluate the actual conditions and account for field condition variations, not otherwise anticipated in the preparation of this recommendation.

UTILITY TRENCH LOCATION, CONSTRUCTION AND BACKFILL

To maintain the desired support for existing or new foundations, new utility trenches should be located such that the base of the trench excavation is located above an imaginary plane having an inclination of 1.0 horizontal to 1.0 vertical, extending downward from the bottom edge of the adjacent footing.

Utility trenches should be excavated according to accepted engineering practices following OSHA standards by a contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the contractor. Traffic and vibration adjacent to trench walls should be kept to a minimum; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation. For purposes of this section of the report, backfill is defined as material placed in a trench starting one foot above the pipe; bedding and shading (also referred to as initial backfill) is all material placed in a trench below the backfill. With the exception of specific requirements of the local utility companies or building department, pipe bedding and shading should consist of clean medium-grained sand. The sand should be placed in a damp state and should be compacted by mechanical means prior to the placement of backfill soils. Above the pipe zone, underground utility trenches may be backfilled with either free-draining sand, on-site soil or imported soil. The trench backfill should be compacted to at least 95 percent relative compaction.

COMPACTED MATERIAL ACCEPTANCE

Compaction specifications are not the only criteria for acceptance of the site grading or other such activities. However, the compaction test is the most universally recognized test method for assessing the performance of the Grading Contractor. The numerical test results from the compaction test cannot be solely used to predict the engineering performance of the compacted material. Therefore, the acceptance of compacted materials will also be dependent upon the moisture-content and the stability of that material. The Geotechnical Engineer has the option of rejecting any compacted material regardless of the degree of compaction if that material is considered to be too dry or excessively wet, unstable or if future instability is suspected. A specific example of rejection of fill material passing the required percent compaction is a fill which has been compacted with in-situ moisture-content significantly less than optimum moisture. Where expansive soils are present, heaving of the soils may occur with the introduction of water. Where the material is a lean clay or silt, this type of dry fill (brittle fill) is susceptible to future settlement if it becomes saturated or flooded.

SURFACE DRAINAGE AND LANDSCAPING

The ground surface should slope away from building pad and pavement areas toward appropriate drop inlets or other surface drainage devices. In accordance with Section 1804 of the 2019 California Building Code, it is recommended that the ground surface adjacent to foundations be sloped a minimum of 5 percent for a minimum distance of 10 feet away from structures, or to an approved alternative means of drainage conveyance. Swales used for conveyance of drainage and located within 10 feet of foundations should be sloped a minimum of 2 percent. Impervious surfaces, such as pavement and exterior concrete flatwork, within 10 feet of building foundations should be sloped a minimum of 2 percent away from the structure. Drainage gradients should be maintained to carry all surface water to collection facilities and off-site. These grades should be maintained for the life of the project.

PAVEMENT DESIGN

Based on the established standard practice of designing flexible pavements in accordance with State of California Department of Transportation (Caltrans) for projects within California, we have developed pavement sections in accordance with the procedure presented in Caltrans Standard Test Method 301. This pavement design procedure is based on the volume of traffic (Traffic Index) and the soil resistance "R" Value (R-Value).

Asphalt Concrete (Flexible) Pavements

One (1) near-surface soil sample was obtained from the soil borings at the project site for laboratory R-Value testing. The sample was tested in accordance with California Test 301. Results of the test are as follows:

R-VALUE TEST RESULTS			
Sample Number	**Sample Depth (ft)**	**Description**	**R-Value at Equilibrium**
RV #1(B-1)	0' – 5'	Silty Sand	30

Based on a review of the boring logs and the R-Value data presented above, the near surface soil of the site consists of mostly dense to very dense, medium to fine grained, silty sand. Based on the variability of the soil encountered, an R-Value of 30 has been used for flexible pavement design. If site grading exposes soil other than that assumed, we should perform additional tests to confirm or revise the recommended pavement sections for actual field conditions. Various alternative pavement sections based on the Caltrans Flexible Pavement Design Method are presented below:

ASPHALT CONCRETE (FLEXIBLE) PAVEMENTS Subgrade R-Value = 30			
Traffic Index	**Asphalt Concrete (inches)**	**Class 2 Aggregate Base (inches)**	**Depth of Compacted Subgrade (in)**
4.0	2.0	6.0	12.0
4.5	2.5	6.0	12.0
5.0	2.5	7.0	12.0
5.5	3.0	7.0	12.0
6.0	3.0	9.0	12.0
6.5	3.5	9.0	12.0
7.0	4.0	10.0	12.0
7.5	4.0	11.0	12.0
8.0	4.5	12.0	12.0

We recommend that the subgrade soil be prepared as discussed in this report. The compacted subgrade should be non-yielding when proof-rolled with a loaded ten-wheel truck, such as a water truck or dump truck, prior to pavement construction. Subgrade preparation should extend a minimum of 2 feet laterally behind the edge of pavement or back of curbs.

Pavement areas should be sloped and drainage gradients maintained to carry all surface water off the site. A cross slope of 2 percent is recommended in asphalt concrete pavement areas to provide good surface drainage and to reduce the potential for water to penetrate into the pavement structure.

Unless otherwise required by local jurisdictions, paving materials should comply with the materials specifications presented in the Caltrans Standard Specifications Section. Class 2 Aggregate should comply with the materials requirements for Class 2 Base found in Section 26.

The mineral aggregate shall be Type B, ½-inch or ¾-inch maximum, medium grading, for the wearing course and ¾-inch maximum, medium grading for the base course, and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The asphalt concrete materials should comply with and be placed in accordance with the specifications presented in Section 39 of the Caltrans Standard Specifications, latest edition. Asphalt concrete should be compacted to a minimum of 95 percent of the maximum laboratory compacted (kneading compactor) unit weight.

ASTM Test procedures and should be used to assess the percent relative compaction of soils, aggregate base and asphalt concrete. Aggregate base and sub-base, and the upper 12 inches of subgrade should be compacted to at least 95 percent based on the Modified Proctor maximum compacted unit weight obtained in accordance with ASTM Test Method D1557. Compacted aggregate base should also be stable and unyielding when proof-rolled with a loaded ten-wheel water truck or dump truck.

Portland Cement Concrete (Rigid) Pavement

A five-inch layer of compacted Class 2 Aggregate Base should be placed over the prepared subgrade prior to placement of the concrete. With the addition of the aggregate base material, we recommend that in the rigid pavement is to be designed by a Structural Engineer.

RIGID PAVEMENT			
Traffic Index	**Portland Cement Concrete (inches)**	**Class 2 Aggregate Base (inches)**	**Compacted Subgrade (inches)**
5.0	5.0	6.0	12.0
7.0	6.0	6.0	12.0

The concrete pavements should be designed with both longitudinal and transverse joints. The saw-cut or formed joints should extend to a minimum depth on one-fourth of the pavement thickness plus ¼ inch. Joint spacing should not exceed 15 feet. Steel reinforcement of all rigid pavements is recommended to keep the joints tight and to control temperature cracking.

Keyed joints are recommended at all construction joints to transfer loads across the joints. Joints should be reinforced with a minimum of ½ inch diameter by 48-inch long deformed reinforcing steel placed at mid-slab depth on 18-inch center-to-center spacing to keep the joints tight for load transfer. The joints should be filled with a flexible sealer. Expansion joints should be constructed only where the pavements abut structures or fixed objects.

Smooth bar dowels, with a diameter of d/8, where d equals the thickness of the concrete, at least 14 inches in length, placed at a spacing of 12 inches on centers, may also be considered for construction joints to transfer loads across the joints. The dowels should be centered across the joints with one side of the dowel lubricated to reduce the bond strength between the dowel and the concrete and fitted with a plastic cap to allow for bar expansion.

SOIL CORROSIVITY

Corrosion tests were performed to evaluate the soil corrosivity to the buried structures. Excessive sulfate or chloride in either the soil or native water may result in an adverse reaction between the cement in concrete and the soil. California Building Code has developed criteria for evaluation of sulfate and chloride levels and how they relate to cement reactivity with soil and/or water. Based on these test results no specific recommendations are considered warranted in order to compensate for sulfate reactivity with the cement. A qualified corrosion engineer should be consulted regarding the corrosion effects of the onsite soils on underground metal utilities.

INFILTRATION TESTING

Infiltration testing was performed at two (2) locations within the proposed infiltration areas located at the subject site. The approximate test locations are identified on the attached site plan. In order to perform these tests, two (2) borings were drilled to a depth of approximately five (5) feet below existing site grades. Infiltration testing has been performed at each of the boring locations. Infiltration testing has been performed using open borehole percolation testing. The infiltration rates have been calculated using the Inverse Borehole procedures.

Prior to infiltration testing, approximately four inches of gravel was placed at the bottom of each borehole. The borehole was pre-soaked prior to testing using clean water. The depth of the borehole was measured at each reading to verify the overall depth. The depth of water in the borehole was measured using a water level indicator or well sounder.

The estimated infiltration rates were determined using the results of open borehole percolation testing at two (2) locations at the subject site. In accordance with the County of San Diego, Infiltration Rate Assessment Methods, infiltration rates have been calculated using the Inverse Borehole procedures. The infiltration rates have been adjusted to reflect vertical flow.

The infiltration testing performed in the near surfaces silty sands of the site indicate infiltration rates of approximately 0.30 and 0.51 inch per hour at a depth of approximately five (5) feet below site grades.

Detailed results of the infiltration testing are included as an attachment to this report. The soil infiltration rates are based on tests conducted with clean water. The infiltration rates may vary with time as a result of soil clogging from water impurities. A factor of safety should be incorporated into the design of the infiltration system to compensate for these factors as determined appropriate by the designer. In addition, routine maintenance consisting of clearing the system of clogged soils and debris should be expected.

ADDITIONAL SERVICES

Krazan & Associates should be retained to review your final foundation and grading plans, and specifications. It has been our experience that this review provides an opportunity to detect misinterpretation or misunderstandings with respect to the recommendations presented in this report prior to the start of construction.

Variations in soil types and conditions are possible and may be encountered during construction. In order to permit correlation between the soil data obtained during this investigation and the actual soil conditions encountered during construction, a representative of Krazan & Associates, Inc. should be present at the site during the earthwork and foundation construction activities to confirm that actual subsurface conditions are consistent with those contemplated in our development of this report. This will allow us the opportunity to compare actual conditions exposed during construction with those encountered in our investigation and to expedite supplemental recommendations if warranted by the exposed conditions. This activity is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

All earthworks should be performed in accordance with the recommendations presented in this report, or as recommended by Krazan & Associates during construction. Krazan & Associates should be notified at least five working days prior to the start of construction and at least two days prior to when observation and testing services are needed. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

The review of plans and specifications, and the observation and testing of earthwork related construction activities by Krazan & Associates are important elements of our services if we are to remain in the role of Geotechnical Engineer-Of-Record. If Krazan & Associates is not retained for these services, the client and the consultants providing these services will be assuming our responsibility for any potential claims that may arise during or after construction.

LIMITATIONS

Geotechnical Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although your site was analyzed using appropriate and current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Geotechnical Engineering, physical changes in the site due to site clearing or grading activities, new agency regulations, or possible changes in the proposed structure or development after issuance of this report will result in the need for professional review of this report. Updating or revisions to the recommendations report, and possibly additional study of the site may be required at that time. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that two years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. The logs of the exploratory borings do not provide a warranty as to the conditions that may exist beneath the entire site. The extent and nature of subsurface soil and groundwater variations may not become evident until construction begins. It is possible that variations in soil conditions and depth to groundwater could exist beyond the points of exploration that may require additional studies, consultation, and possible design revisions. If conditions are encountered in the field during construction, which differ from those described in this report, our firm should be contacted immediately to provide any necessary revisions to these recommendations.

This report presents the results of our Geotechnical Engineering Investigation, which was conducted for the purpose of evaluating the soil conditions in terms of foundation and retaining wall design, and grading and paving of the site. This report does not include reporting of any services related to environmental studies conducted to assessment the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere, or the presence of wetlands. Any statements in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive

purposes and are not intended to convey professional judgment regarding the presence of potentially hazardous or toxic substances. Conversely, the absence of statements in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, does not constitute our rendering professional judgment regarding the absence of potentially hazardous or toxic substances.

The conclusions of this report are based on the information provided regarding the proposed construction. We emphasize that this report is valid for the project as described in the text of this report and it should not be used for any other sites or projects. The geotechnical engineering information presented herein is based upon our understanding of the proposed project and professional interpretation of the data obtained in our studies of the site. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. The Geotechnical Engineer should be notified of any changes to the proposed project so the recommendations may be reviewed and re-evaluated. The work conducted through the course of this investigation, including the preparation of this report, has been performed in accordance with the generally accepted standards of geotechnical engineering practice, which existed in geographic area of the project at the time the report was written. No other warranty, express or implied, is made. This report is issued with the understanding that the owner chooses the risk they wish to bear by the expenditures involved with the construction alternatives and scheduling that are chosen.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

James M. Kellogg, PE, GE
Managing Engineer
RCE No. 65092 / GE No. 2902

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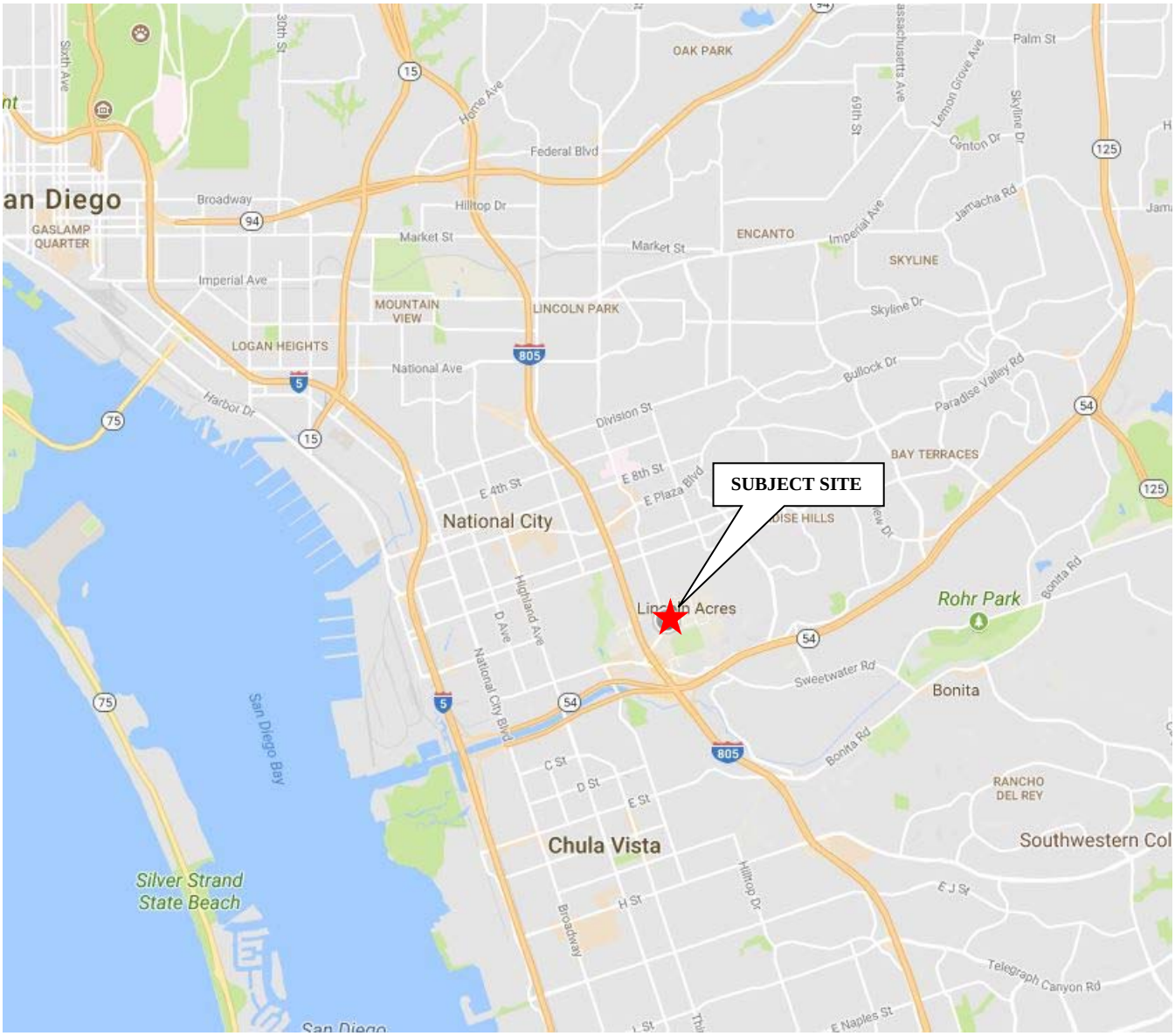
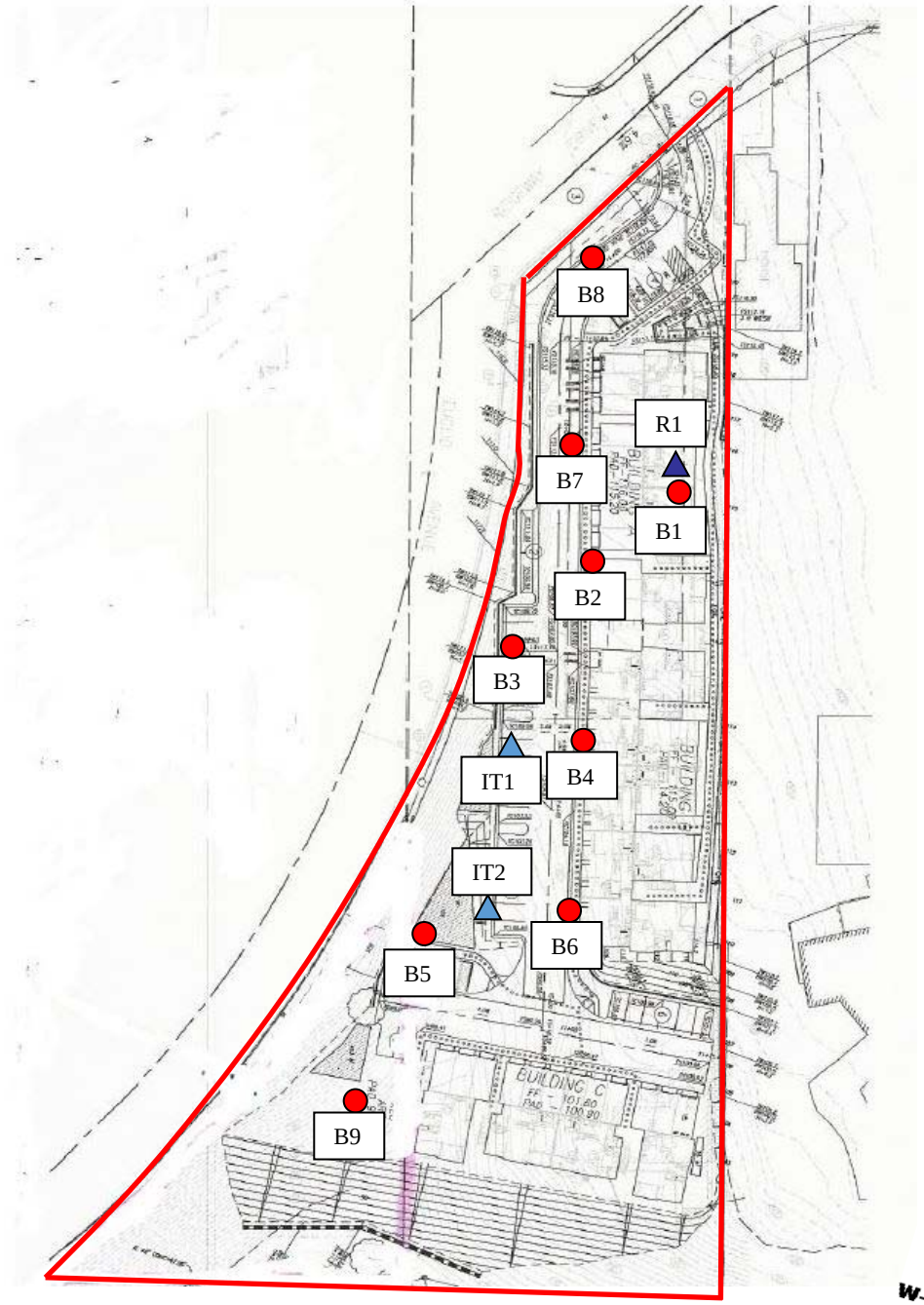
Project Engineer
RCE No. 91269

Figures



VICINITY MAP	**Scale:** NTS	**Date:** February, 2020	Krazan GEOTECHNICAL ENGINEERING
PROPOSED RESIDENTIAL DEVELOPMENT 2542 RIDGEWAY DRIVE NATIONAL CITY, CALIFORNIA	**Drawn by:** JP	**Approved by:** JK	
	Project No. 112-20017	**Figure No.** 1	

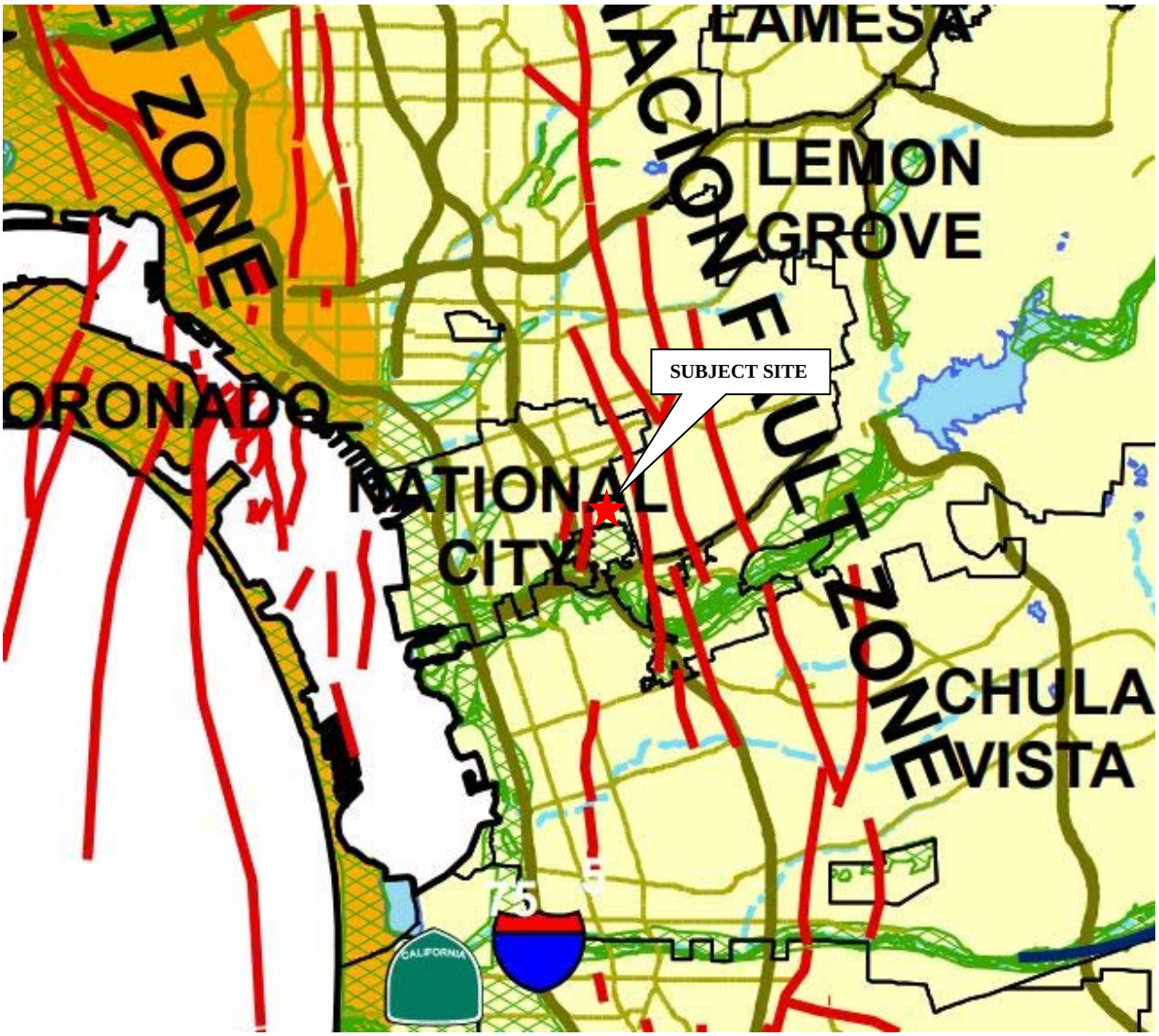


APPROXIMATE BORING LOCATION

APPROXIMATE INFILTRATION LOCATION

APPROXIMATE R-VALUE LOCATION

SITE MAP	**Scale:** NTS	**Date:** February, 2020	Krazan GEOTECHNICAL ENGINEERING
PROPOSED RESIDENTIAL DEVELOPMENT 2542 RIDGEWAY DRIVE NATIONAL CITY, CALIFORNIA	**Drawn by:** JP	**Approved by:** JK	
	Project No. 112-20017	**Figure No.** 2	



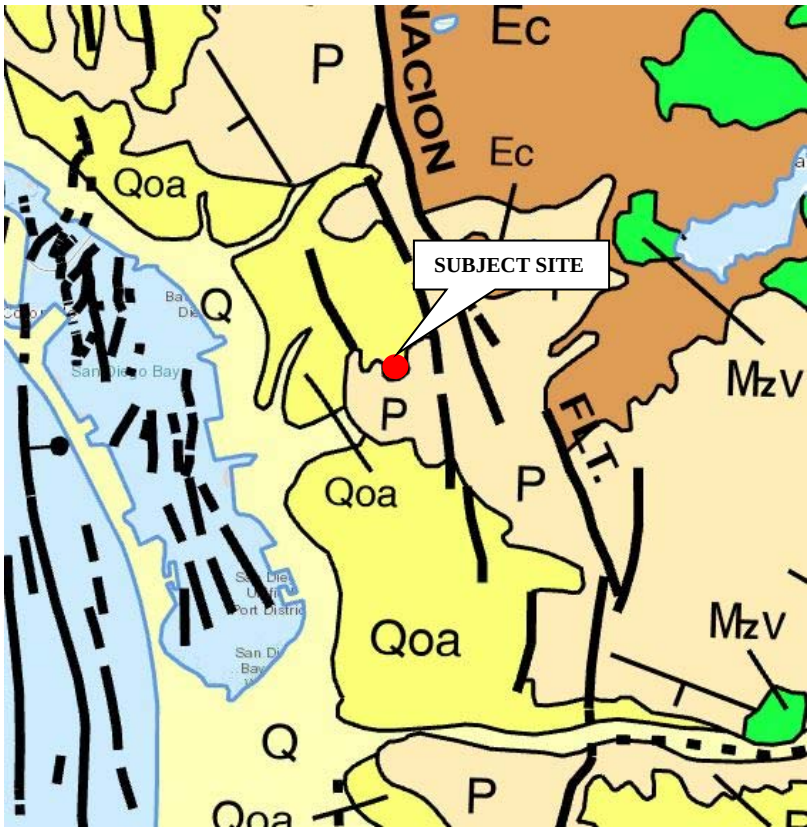
Peak Ground Acceleration (2% in 50 yrs)

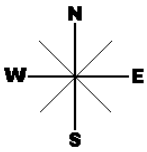
0.18 - 0.5 (Low Liquefaction Risk)

0.51 - 1.60 (High Liquefaction Risk)

N
W E
S

LIQUEFACTION: COUNTY OF SAN DIEGO MAP	**Scale:** NTS	**Date:** February, 2020	Krazan GEOTECHNICAL ENGINEERING
PROPOSED RESIDENTIAL DEVELOPMENT 2542 RIDGEWAY DRIVE NATIONAL CITY, CALIFORNIA	**Drawn by:** JP	**Approved by:** JK	
	Project No. 112-20017	**Figure No.** 3	





DESCRIPTION OF MAP UNITS

QUATERNARY DEPOSITS

- Qs — Extensive marine and nonmarine sand deposits, generally near the coast or desert playas
- Q — Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated
- Qls — Selected large landslides
- Qg — Glacial till and moraines. Found at high elevations mostly in the Sierra Nevada and Klamath Mountains
- Qoa — Older alluvium, lake, playa, and terrace deposits
- QPc — Pleistocene and/or Pliocene sandstone, shale, and gravels deposits; mostly loosely consolidated

QUATERNARY VOLCANIC ROCKS

- Qrv — Recent (Holocene) volcanic flow rocks; minor pyroclastic deposits
- Qrv^{p} — Recent (Holocene) pyroclastic and volcanic mudflow deposits
- Qv — Quaternary volcanic flow rocks; minor pyroclastic deposits
- Qv^{p} — Quaternary pyroclastic and volcanic mudflow deposits

PALEOZOIC MIXED ROCKS

- m — Undivided pre-Cenozoic metasedimentary and metavolcanic rocks of great variety. Mostly slate, quartzite, hornfels, chert, phyllite, mylonite, schist, gneiss, and minor marble

PALEOZOIC METAVOLCANIC ROCKS

- Pzv — Undivided Paleozoic metavolcanic rocks. Mostly flows, breccia, and tuff; includes greenstone, diabase, and pillow lavas; minor interbedded sedimentary rocks

PALEOZOIC PLUTONIC ROCKS

- gr^{PzTr} — Paleozoic and Permo-Triassic granitic rocks in the San Gabriel and Klamath Mountains

PRECAMBRIAN ROCKS

- pC — Conglomerate, shale, sandstone, limestone, dolomite, marble, gneiss, hornfels, and quartzite; may be Paleozoic in part
- pCc — Complex of Pre-cambrian igneous and metamorphic rocks. Mostly gneiss and schist intruded by igneous rocks; may be Mesozoic in part
- gr^{pC} — Precambrian granite, syenite, anorthosite, and gabbroic rocks in the San Gabriel Mountains; also various Precambrian plutonic rocks elsewhere in southeastern California

Source: Department of Conservation: Geologic Map of California, 2010

GEOLOGIC MAP	**Scale:** NTS	**Date:** February, 2020	Krazan GEOTECHNICAL ENGINEERING
PROPOSED RESIDENTIAL DEVELOPMENT 2542 RIDGEWAY DRIVE NATIONAL CITY, CALIFORNIA	**Drawn by:** JP	**Approved by:** JK	
	Project No. 112-20017	**Figure No.** 4	

Appendix A

Log of Borings & Laboratory Testing

APPENDIX A

FIELD AND LABORATORY INVESTIGATIONS

Field Investigation

Our field investigation consisted of a surface reconnaissance and a subsurface exploration program consisted of drilling, logging and sampling a total of nine (9) borings. The depths of exploration ranged from approximately 20 feet below the existing site surface.

A member of our staff visually classified the soils in the field as the drilling progressed and recorded a continuous log of each boring. Visual classification of the soils encountered in our exploratory borings was made in general accordance with the Unified Soil Classification System (ASTM D2487). A key for the classification of the soil and the boring logs are presented in this Appendix.

During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsoils. Samples were obtained from the borings by driving either a 2.5-inch inside diameter Modified California tube sampler fitted with brass sleeves or a 2-inch outside diameter, 1-3/8-inch inside diameter Standard Penetration ("split-spoon") test (SPT) sampler without sleeves. Soil samples were retained for possible laboratory testing. The samplers were driven up to a depth of 18 inches into the underlying soil using a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler was recorded for each 6-inch penetration interval and the number of blows required to drive the sampler the last 12 inches are shown as blows per foot on the boring logs.

The approximate locations of our borings and bulk samples are shown on the Site Plan, Figure 2. These approximate locations were estimated in the field based on pacing and measuring from the limits of existing site features.

Laboratory Investigation

The laboratory investigation was programmed to determine the physical and mechanical properties of the soil underlying the site. The laboratory-testing program was formulated with emphasis on the evaluation of in-situ moisture, density, gradation, shear strength, consolidation potential, and R-Value of the materials encountered. In addition, chemical tests were performed to evaluate the soil/cement reactivity and corrosivity. Test results were used in our engineering analysis with respect to site and building pad preparation through mass grading activities, foundation and retaining wall design recommendations, pavement section design, evaluation of the materials as possible fill materials and for possible exclusion of some soils from use at the structures as fill or backfill.

Select laboratory test results are presented on the boring logs, with graphic or tabulated results of selected tests included in this Appendix. The laboratory test data, along with the field observations, was used to prepare the final boring logs presented in the Appendix.

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

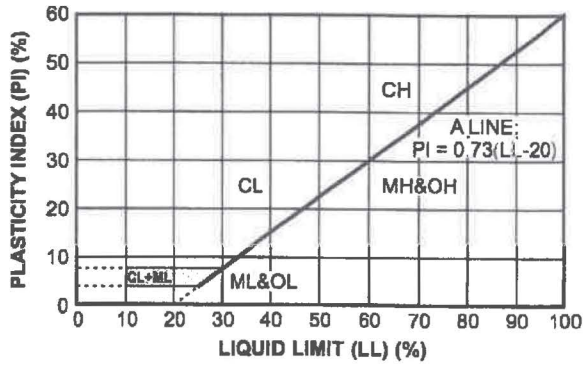
CONSISTENCY CLASSIFICATION

Description	Blows per Foot
Granular Soils	
Very Loose	< 5
Loose	5 – 15
Medium Dense	16 – 40
Dense	41 – 65
Very Dense	> 65
Cohesive Soils	
Very Soft	< 3
Soft	3 – 5
Firm	6 – 10
Stiff	11 – 20
Very Stiff	21 – 40
Hard	> 40

GRAIN SIZE CLASSIFICATION

Grain Type	*Standard Sieve Size*	*Grain Size in Millimeters*
Boulders	Above 12 inches	Above 305
Cobbles	12 to 13 inches	305 to 76.2
Gravel	3 inches to No. 4	76.2 to 4.76
Coarse-grained	3 to ¾ inches	76.2 to 19.1
Fine-grained	¾ inches to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
Coarse-grained	No. 4 to No. 10	4.76 to 2.00
Medium-grained	No. 10 to No. 40	2.00 to 0.042
Fine-grained	No. 40 to No. 200	0.042 to 0.074
Silt and Clay	Below No. 200	Below 0.074

PLASTICITY CHART



Standard Penetration Split Spoon Sampler

California Modified Split Spoon Sampler

Log of Boring B1

Project: Ridgeway Residential Development

Project No: 112-16114

Client: Blue Centurion Homes, LLC

Figure No.: A-1

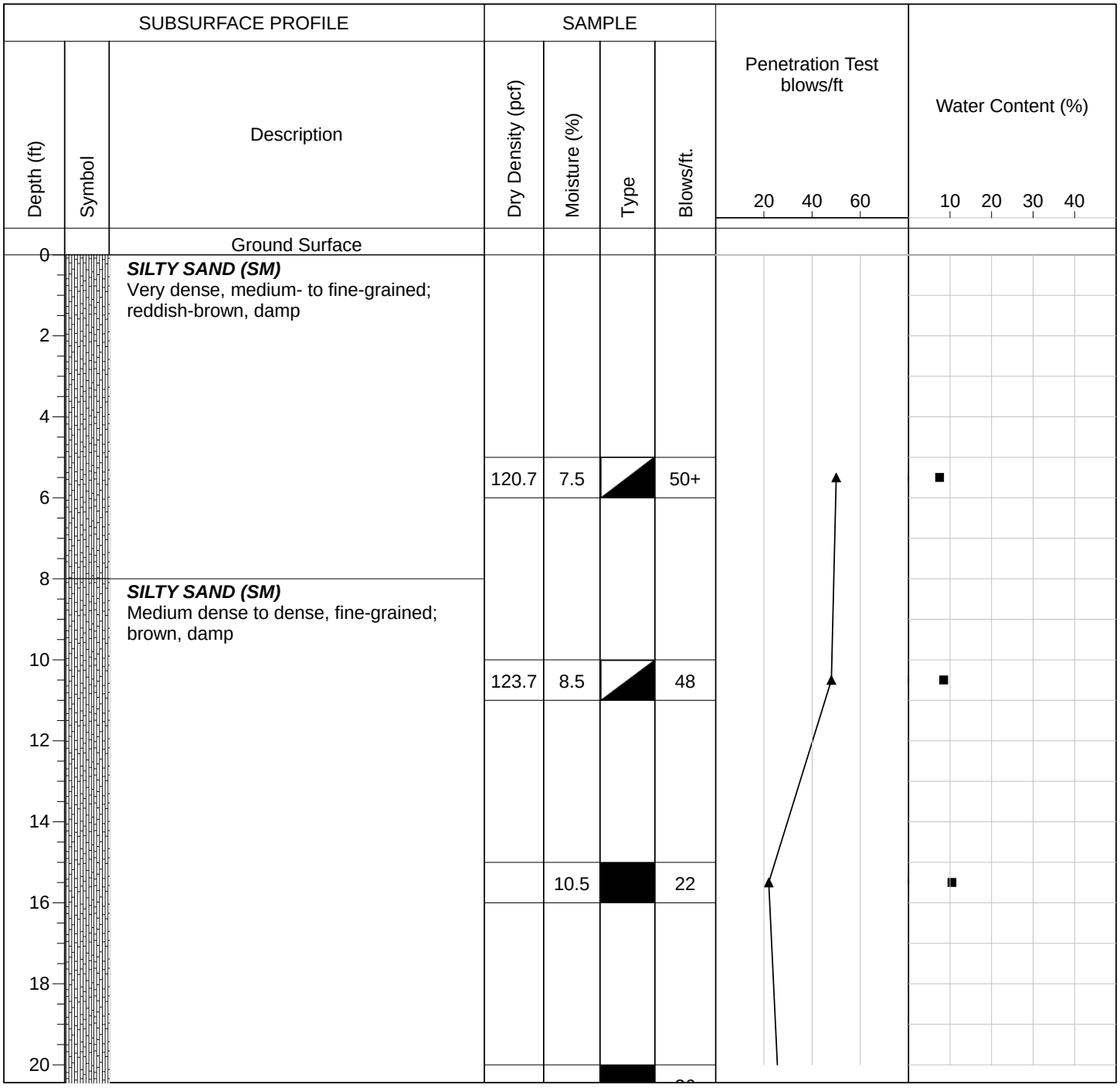
Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A



Drill Method: Hollow Stem

Drill Date: 10-5-16

Drill Rig: CME 75

Krazan and Associates

Hole Size: 5½ Inches

Driller: Baja Exploration

Elevation: 50 Feet

Log of Boring B1

Project: Ridgeway Residential Development

Project No: 112-16114

Client: Blue Centurion Homes, LLC

Figure No.: A-1

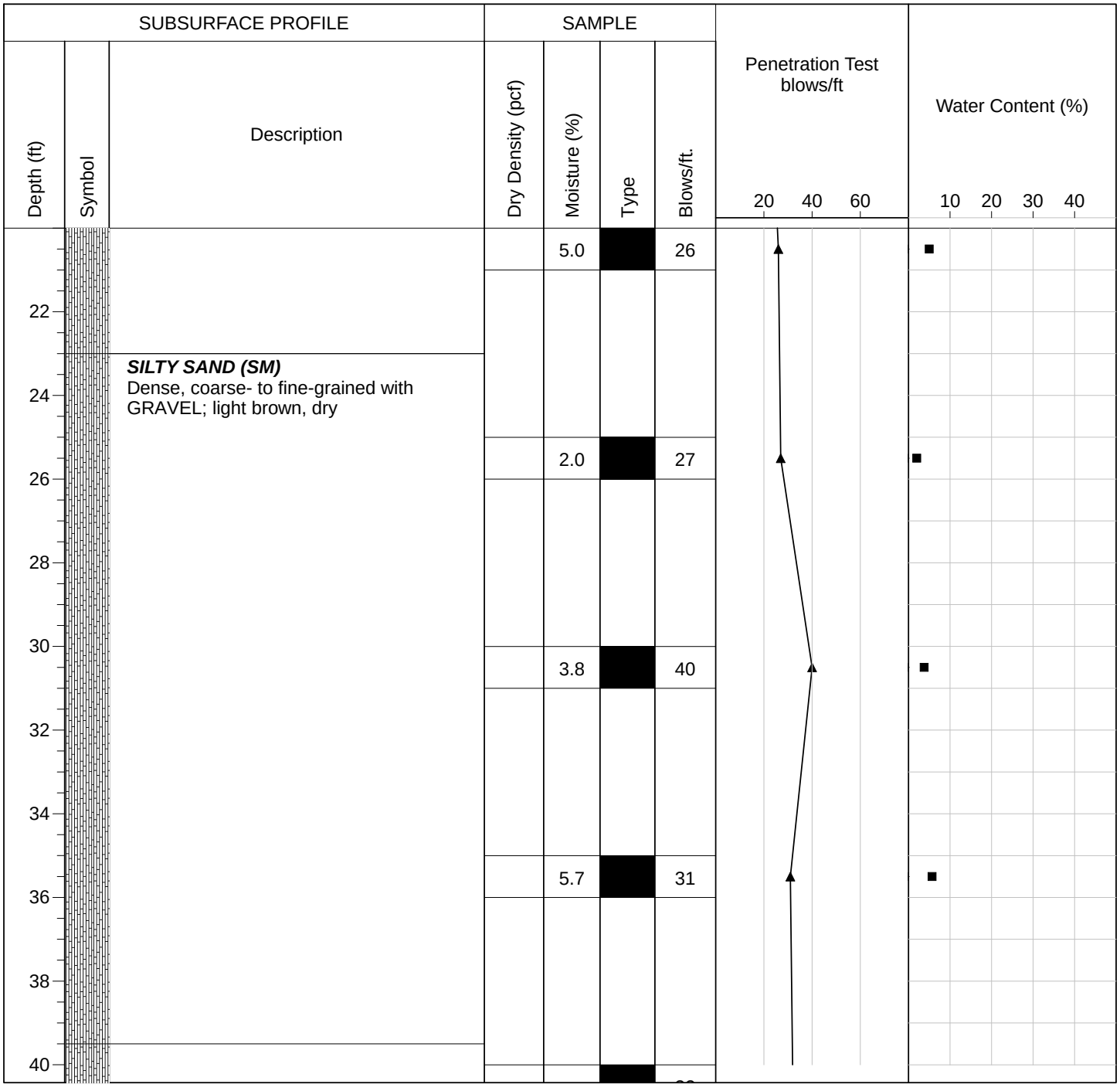
Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A



Drill Method: Hollow Stem

Drill Date: 10-5-16

Drill Rig: CME 75

Krazan and Associates

Hole Size: 5½ Inches

Driller: Baja Exploration

Elevation: 50 Feet

Log of Boring B1

Project: Ridgeway Residential Development

Project No: 112-16114

Client: Blue Centurion Homes, LLC

Figure No.: A-1

Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
42		***SILTY SAND (SM)*** Dense, coarse- to fine-grained; light brown, damp		3.3		32
44		***SILTY SAND (SM)*** Dense, fine-grained; brown, damp		4.2		31
48		***GRAVELLY SAND (SP)*** Very dense, coarse- to fine-grained with trace CLAY; light brown, damp		4.1		50+
50		End of Borehole No water encountered Boring backfilled with soil cuttings				
52						
54						
56						
58						
60						

Penetration Test blows/ft: 20, 40, 60

Water Content (%): 10, 20, 30, 40

Drill Method: Hollow Stem

Drill Date: 10-5-16

Drill Rig: CME 75

Krazan and Associates

Hole Size: 5½ Inches

Driller: Baja Exploration

Elevation: 50 Feet

Log of Boring B2

Project: Ridgeway Residential Development

Project No: 112-16114

Client: Blue Centurion Homes, LLC

Figure No.: A-2

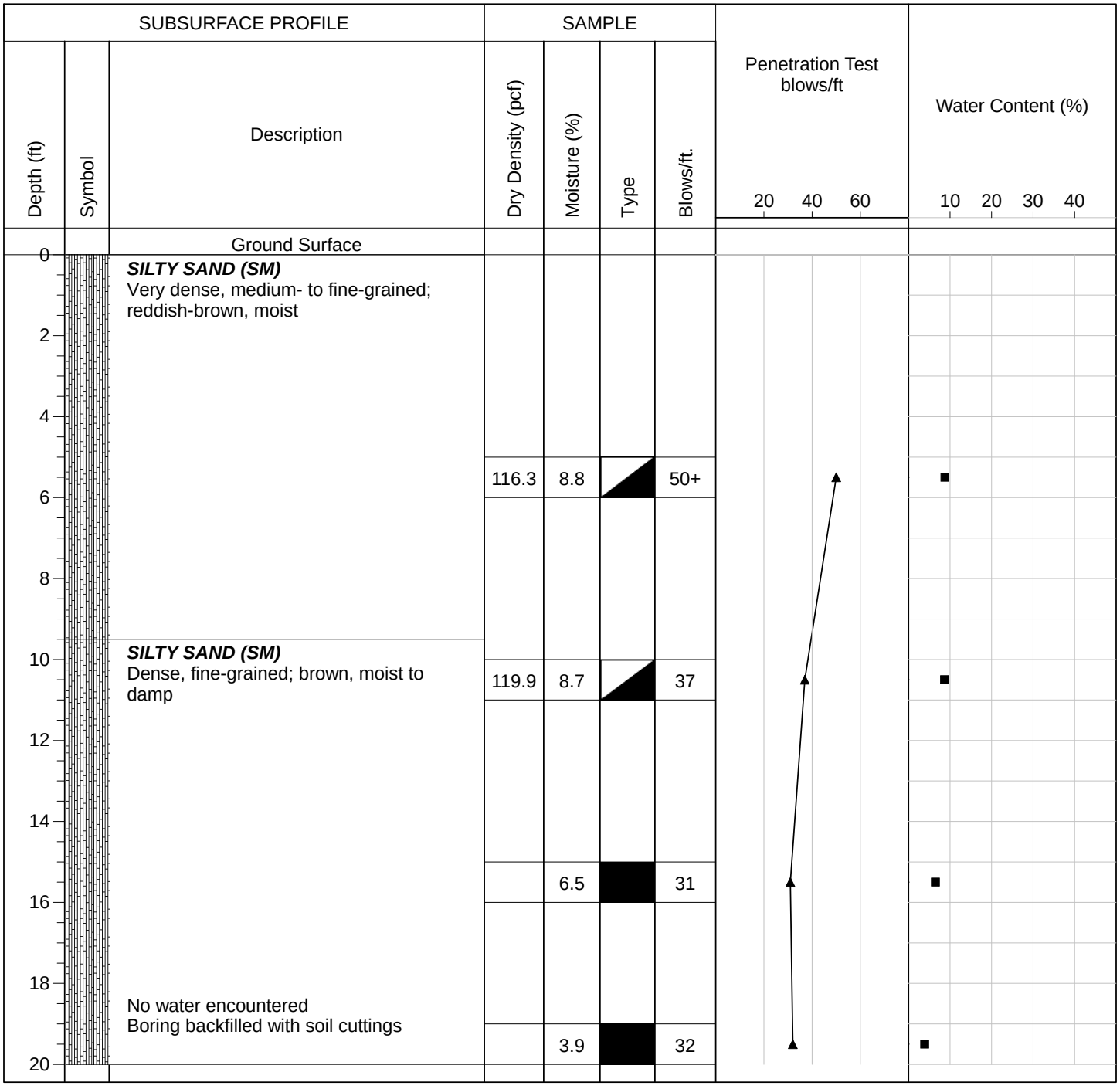
Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A



Drill Method: Hollow Stem

Drill Date: 10-5-16

Drill Rig: CME 75

Krazan and Associates

Hole Size: 5½ Inches

Driller: Baja Exploration

Elevation: 20 Feet

Log of Boring B3

Project: Ridgeway Residential Development

Project No: 112-16114

Client: Blue Centurion Homes, LLC

Figure No.: A-3

Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0		***SILTY SAND (SM)*** Dense, medium- to fine-grained; reddish-brown, moist				
6			116.5	9.8		53
8		***SILTY SAND (SM)*** Meduim dense to dense, fine-grained; brown, moist to damp				
10			124.2	5.0		52
16				4.1		24
18		No water encountered Boring backfilled with soil cuttings				
20				3.9		26

Penetration Test blows/ft: 20, 40, 60

Water Content (%): 10, 20, 30, 40

Drill Method: Hollow Stem

Drill Date: 10-5-16

Drill Rig: CME 75

Krazan and Associates

Hole Size: 5½ Inches

Driller: Baja Exploration

Elevation: 20 Feet

Log of Boring B4

Project: Ridgeway Residential Development

Project No: 112-16114

Client: Blue Centurion Homes, LLC

Figure No.: A-4

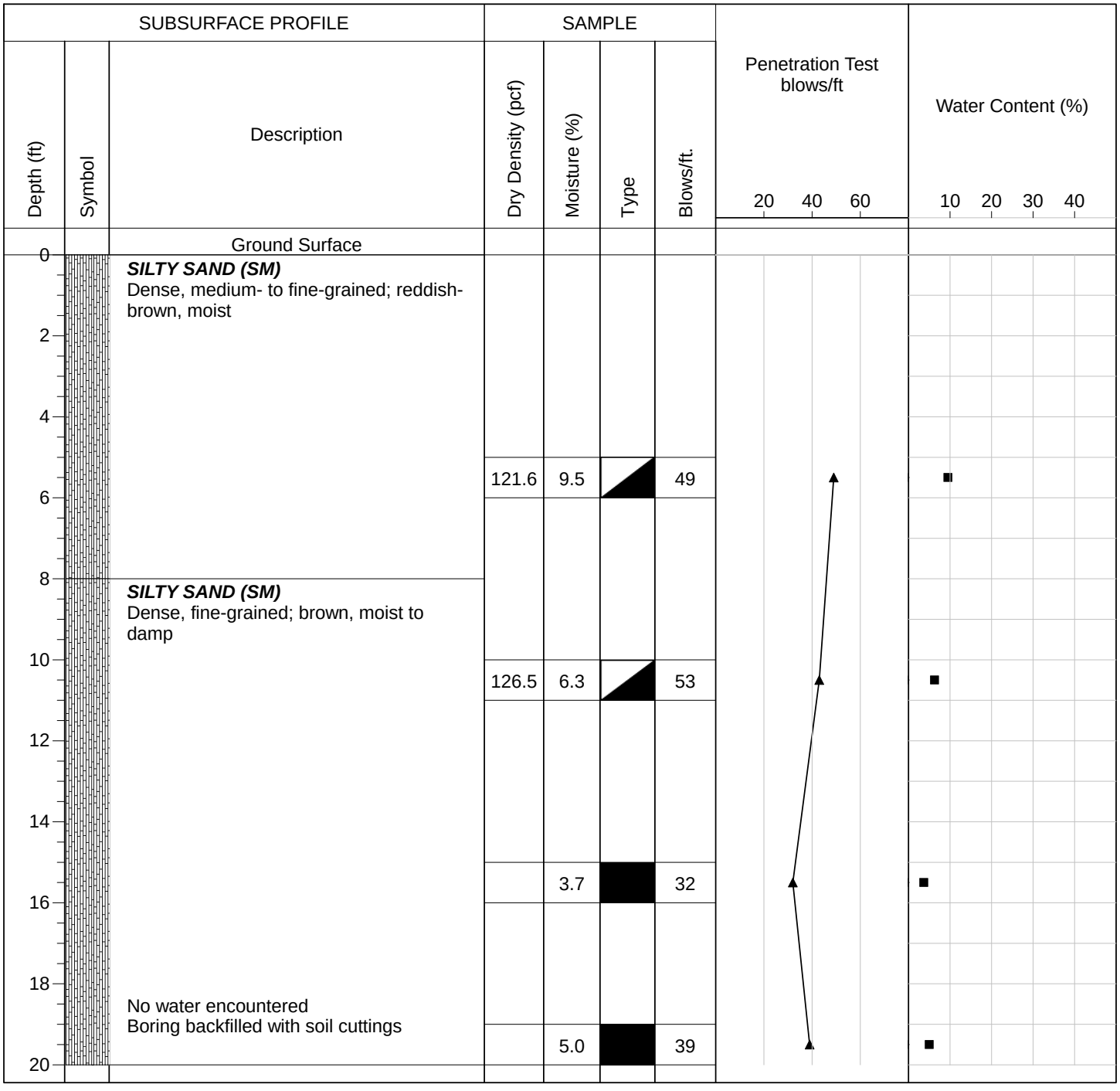
Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A



Drill Method: Hollow Stem

Drill Date: 10-5-16

Drill Rig: CME 75

Krazan and Associates

Hole Size: 5½ Inches

Driller: Baja Exploration

Elevation: 20 Feet

Log of Boring B5

Project: Ridgeway Residential Development

Project No: 112-16114

Client: Blue Centurion Homes, LLC

Figure No.: A-5

Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0		***SILTY SAND (SM)*** Very dense, medium- to fine-grained; reddish-brown, moist				
6			121.3	6.9		50+
8		***SILTY SAND (SM)*** Dense, fine-grained; brown, moist to damp				
10			127.3	7.5		49
16				8.6		13
18		No water encountered Boring backfilled with soil cuttings				
20				3.2		17

Penetration Test blows/ft: 20, 40, 60

Water Content (%): 10, 20, 30, 40

Drill Method: Hollow Stem

Drill Date: 10-5-16

Drill Rig: CME 75

Krazan and Associates

Hole Size: 5½ Inches

Driller: Baja Exploration

Elevation: 20 Feet

Log of Boring B6

Project: Ridgeway Residential Development

Project No: 112-16114

Client: Blue Centurion Homes, LLC

Figure No.: A-6

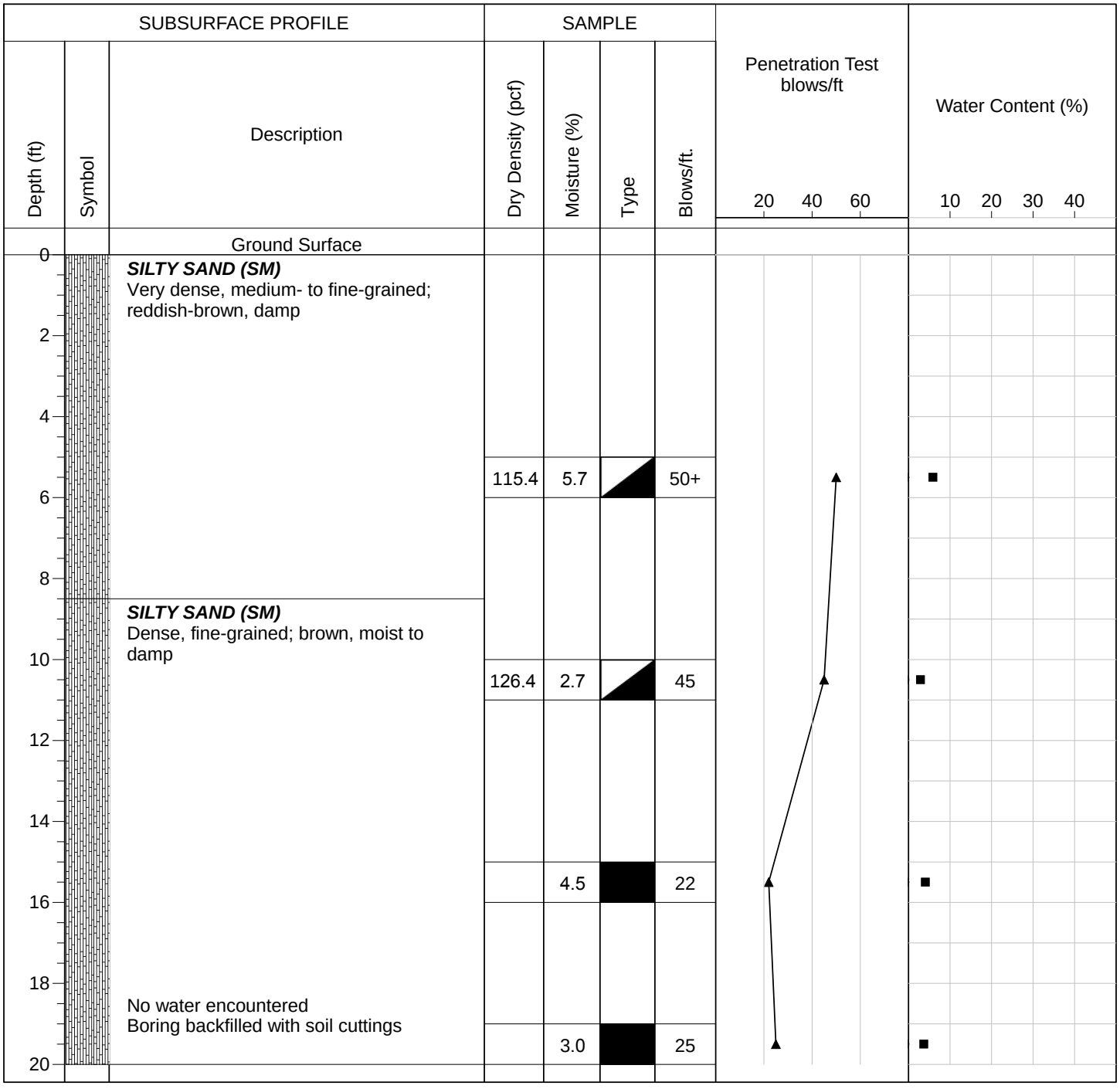
Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A



Drill Method: Hollow Stem

Drill Date: 10-5-16

Drill Rig: CME 75

Krazan and Associates

Hole Size: 5½ Inches

Driller: Baja Exploration

Elevation: 20 Feet

Log of Boring B7

Project: Ridgeway Residential Development

Project No: 112-20017

Client: Blue Centurion Homes, LLC

Figure No.: A-7

Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0		***SILTY SAND (SM)*** Medium dense to very dense, medium- to fine-grained; reddish-brown, damp to moist				
6			117.9	7.4		50+
10			123.0	3.4		40
15				3.6		25
18		No water encountered Boring backfilled with soil cuttings				
20				3.7		20

Penetration Test blows/ft: 20 40 60

Water Content (%): 10 20 30 40

Drill Method: Hollow Stem

Drill Date: 2-14-20

Drill Rig: CME 75

Krazan and Associates

Hole Size: 7½ Inches

Driller: Baja Exploration

Elevation: 20 Feet

Log of Boring B8

Project: Ridgeway Residential Development

Project No: 112-20017

Client: Blue Centurion Homes, LLC

Figure No.: A-8

Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.	20 40 60	10 20 30 40
0		Ground Surface						
0		***SILTY SAND (SM)*** Medium dense to very dense, medium- to fine-grained; reddish-brown, damp to moist						
6			120.4	8.4		50+	▲	■
10			126.1	4.6		47	▲	■
16				6.4		16	▲	■
18		No water encountered Boring backfilled with soil cuttings						
20				2.2		27	▲	■

Drill Method: Hollow Stem

Drill Date: 2-14-20

Drill Rig: CME 75

Krazan and Associates

Hole Size: 7½ Inches

Driller: Baja Exploration

Elevation: 20 Feet

Log of Boring B9

Project: Ridgeway Residential Development

Project No: 112-20017

Client: Blue Centurion Homes, LLC

Figure No.: A-9

Location: 2542 Ridgeway Drive, National City, CA

Logged By: Jorge Pelayo

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0		***SILTY SAND (SM)*** Dense to very dense, medium- to fine-grained; reddish-brown, damp to moist				
6			113.4	7.3		50+
10			124.6	6.4		50+
16				3.1		33
18		No water encountered Boring backfilled with soil cuttings				
20				3.0		38

Penetration Test blows/ft: 20, 40, 60

Water Content (%): 10, 20, 30, 40

Drill Method: Hollow Stem

Drill Date: 2-14-20

Drill Rig: CME 75

Krazan and Associates

Hole Size: 7½ Inches

Driller: Baja Exploration

Elevation: 20 Feet

Sieve Analysis

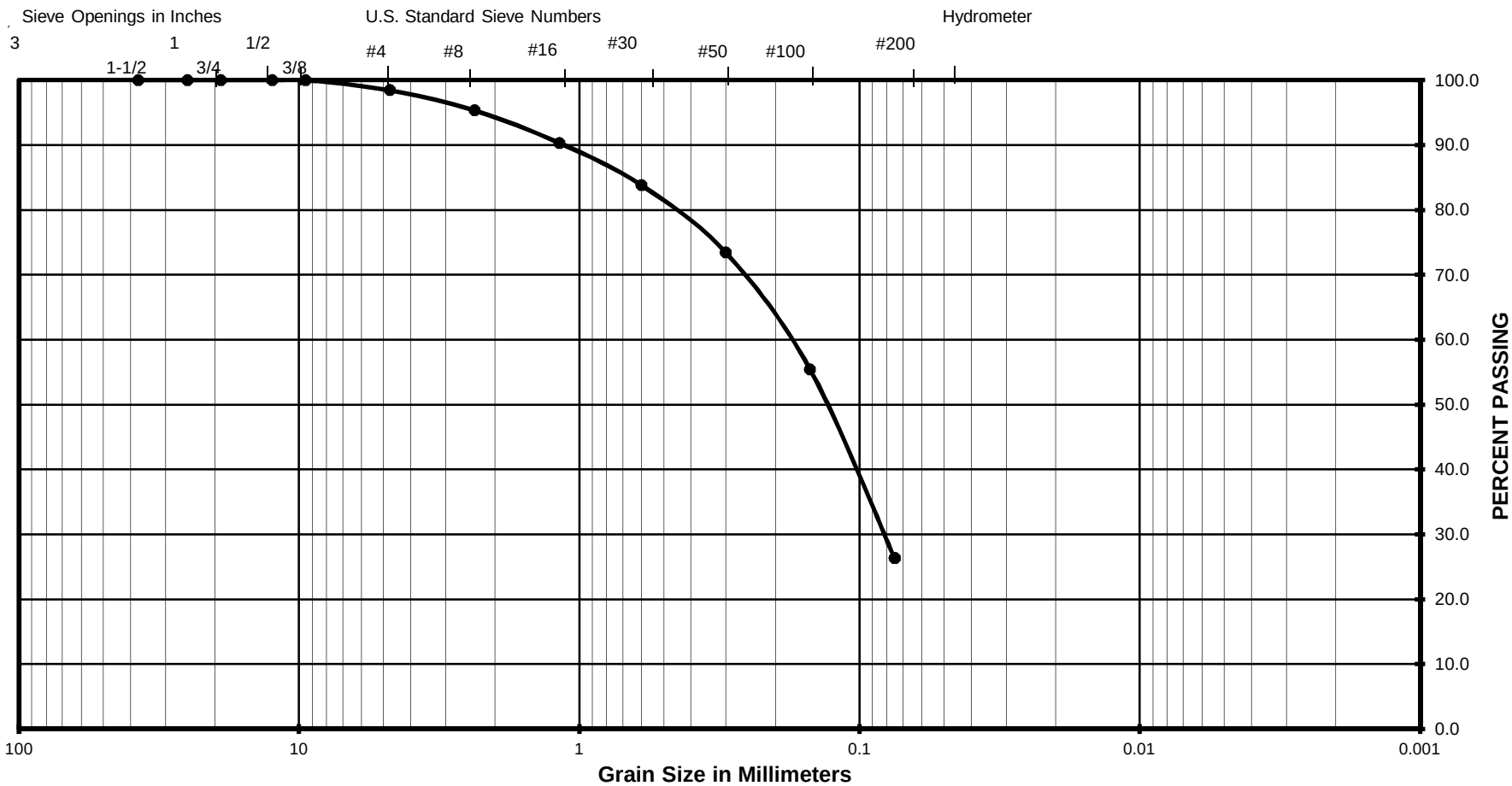
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 5'
Soil Classification	:	SM

Wet Weight	:	531.00
Dry Weight	:	494.10
Moisture Content	:	7%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	7.8	1.6	1.6	98.4
#8	2.36	15.4	3.1	4.7	95.3
#16	1.18	24.6	5.0	9.7	90.3
#30	0.60	32.4	6.6	16.2	83.8
#50	0.30	51.2	10.4	26.6	73.4
#100	0.15	89.0	18.0	44.6	55.4
#200	0.08	143.6	29.1	73.7	26.3

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM
Sample Number	B-1 @ 5'

Krazan Testing Laboratory

Sieve Analysis

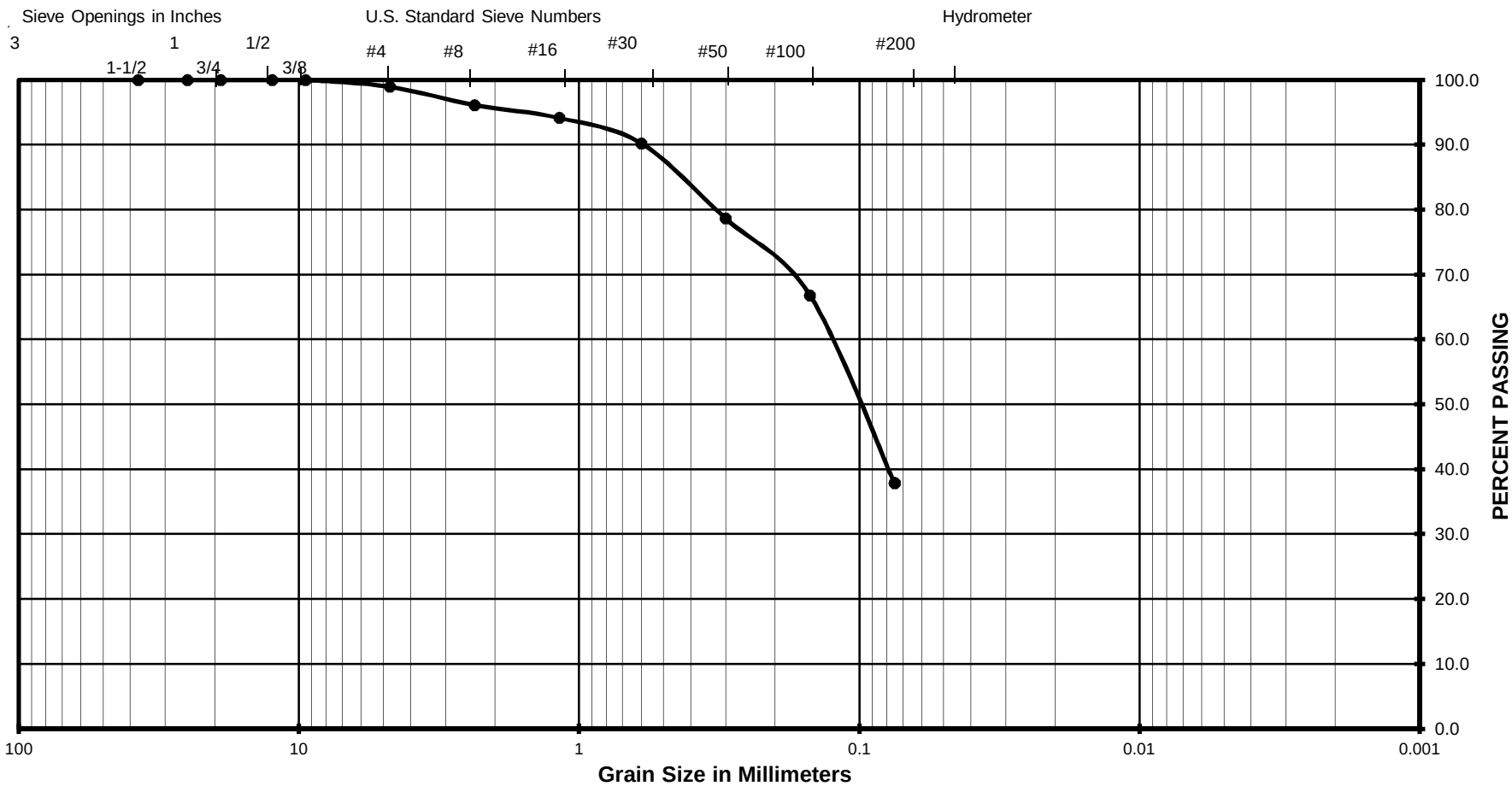
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 10'
Soil Classification	:	SM

Wet Weight	:	546.00
Dry Weight	:	503.40
Moisture Content	:	8%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	5.4	1.1	1.1	98.9
#8	2.36	14.2	2.8	3.9	96.1
#16	1.18	10.0	2.0	5.9	94.1
#30	0.60	19.6	3.9	9.8	90.2
#50	0.30	58.4	11.6	21.4	78.6
#100	0.15	59.6	11.8	33.2	66.8
#200	0.08	145.6	28.9	62.1	37.9

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM
Sample Number	B-1 @ 10'

Krazan Testing Laboratory

Sieve Analysis

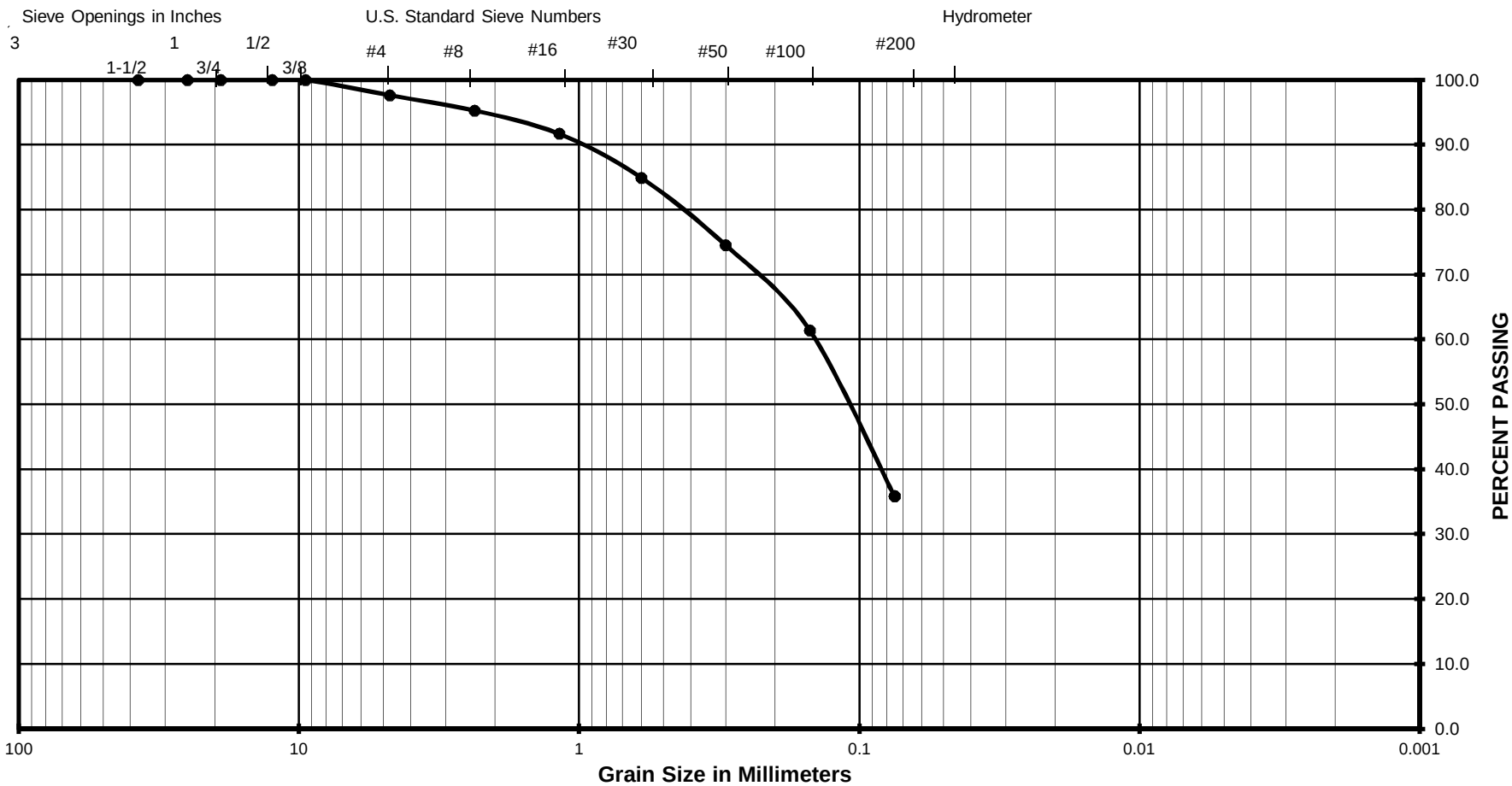
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 15'
Soil Classification	:	SM

Wet Weight	:	577.40
Dry Weight	:	522.30
Moisture Content	:	11%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	12.4	2.4	2.4	97.6
#8	2.36	12.3	2.4	4.7	95.3
#16	1.18	18.7	3.6	8.3	91.7
#30	0.60	35.4	6.8	15.1	84.9
#50	0.30	54.2	10.4	25.5	74.5
#100	0.15	68.9	13.2	38.7	61.3
#200	0.08	133.2	25.5	64.2	35.8

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM
Sample Number	B-1 @ 15'

Krazan Testing Laboratory

Sieve Analysis

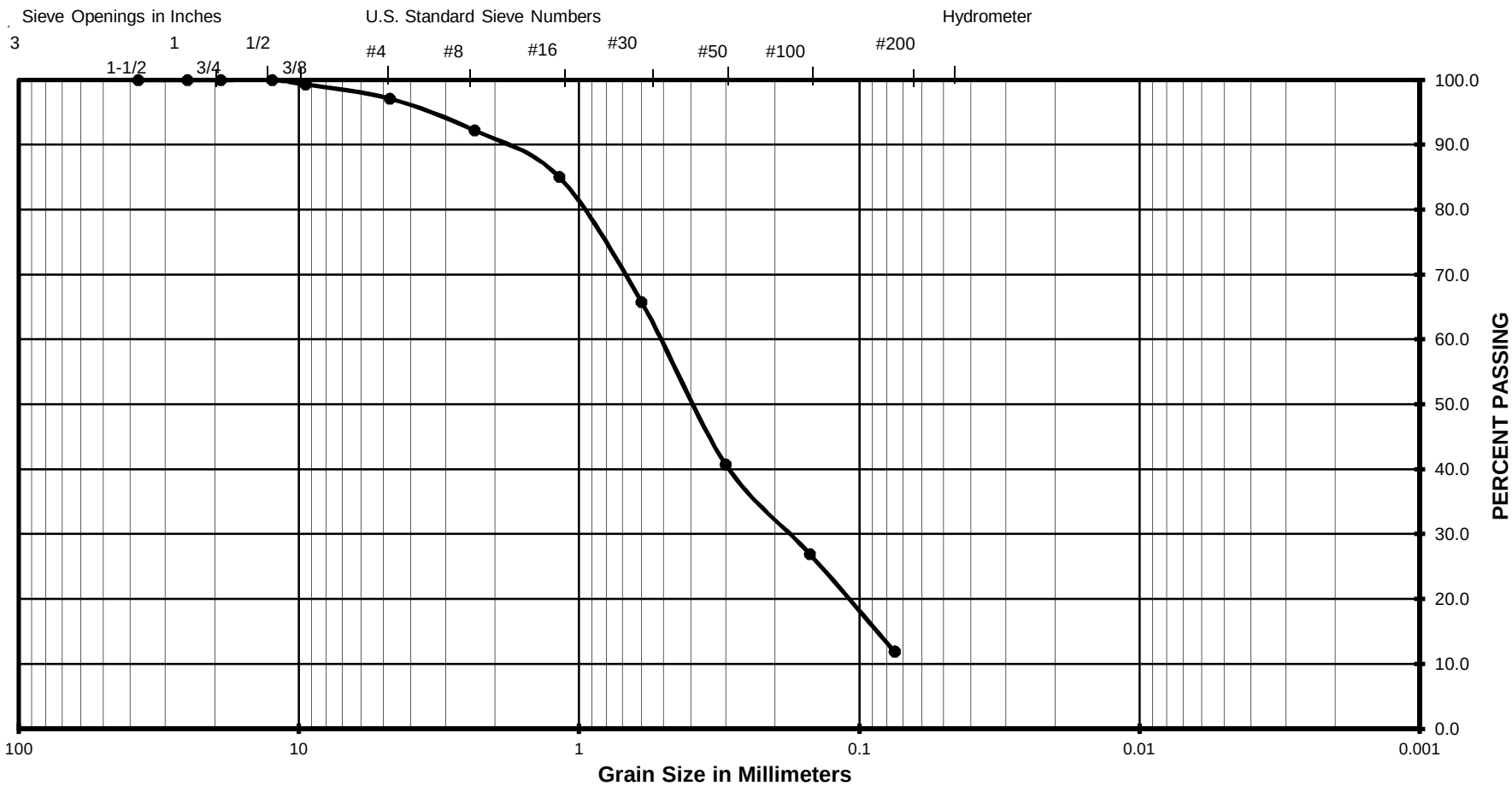
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 20'
Soil Classification	:	SM

Wet Weight	:	522.10
Dry Weight	:	497.10
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	3.5	0.7	0.7	99.3
#4	4.75	10.8	2.2	2.9	97.1
#8	2.36	24.5	4.9	7.8	92.2
#16	1.18	35.6	7.2	15.0	85.0
#30	0.60	95.6	19.2	34.2	65.8
#50	0.30	124.5	25.0	59.2	40.8
#100	0.15	68.9	13.9	73.1	26.9
#200	0.08	74.5	15.0	88.1	11.9

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM
Sample Number	B-1 @ 20'

Krazan Testing Laboratory

Sieve Analysis

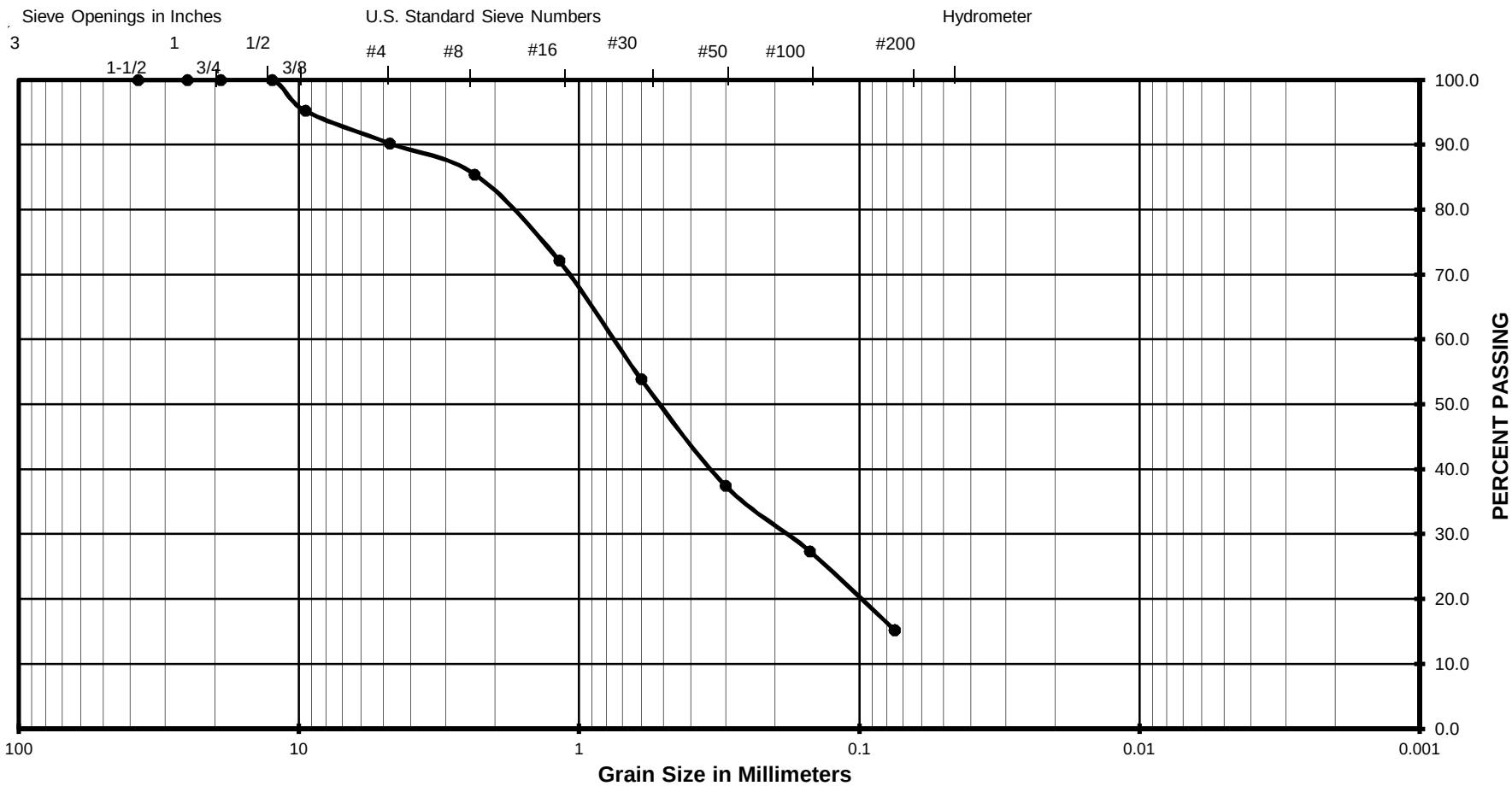
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 25'
Soil Classification	:	SM w/gravel

Wet Weight	:	525.50
Dry Weight	:	514.90
Moisture Content	:	2%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	24.6	4.8	4.8	95.2
#4	4.75	25.8	5.0	9.8	90.2
#8	2.36	24.6	4.8	14.6	85.4
#16	1.18	68.4	13.3	27.9	72.1
#30	0.60	94.2	18.3	46.1	53.9
#50	0.30	84.6	16.4	62.6	37.4
#100	0.15	52.0	10.1	72.7	27.3
#200	0.08	62.3	12.1	84.8	15.2

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM w/gravel
Sample Number	B-1 @ 25'

Krazan Testing Laboratory

Sieve Analysis

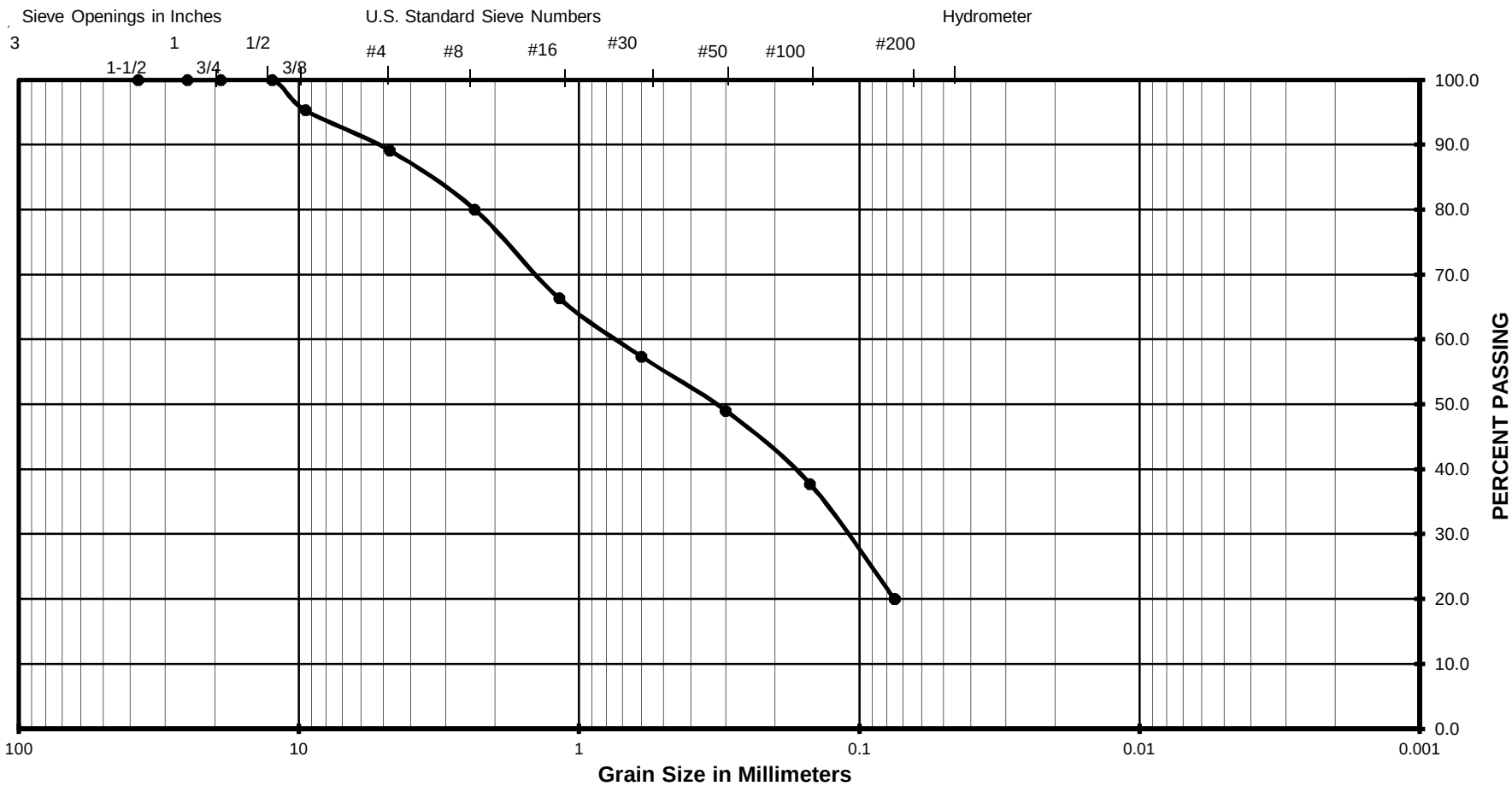
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 30'
Soil Classification	:	SM w/gravel

Wet Weight	:	522.20
Dry Weight	:	503.20
Moisture Content	:	4%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	23.5	4.7	4.7	95.3
#4	4.75	31.2	6.2	10.9	89.1
#8	2.36	45.8	9.1	20.0	80.0
#16	1.18	68.9	13.7	33.7	66.3
#30	0.60	45.1	9.0	42.6	57.4
#50	0.30	42.0	8.3	51.0	49.0
#100	0.15	56.8	11.3	62.3	37.7
#200	0.08	89.4	17.8	80.0	20.0

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM w/gravel
Sample Number	B-1 @ 30'

Krazan Testing Laboratory

Sieve Analysis

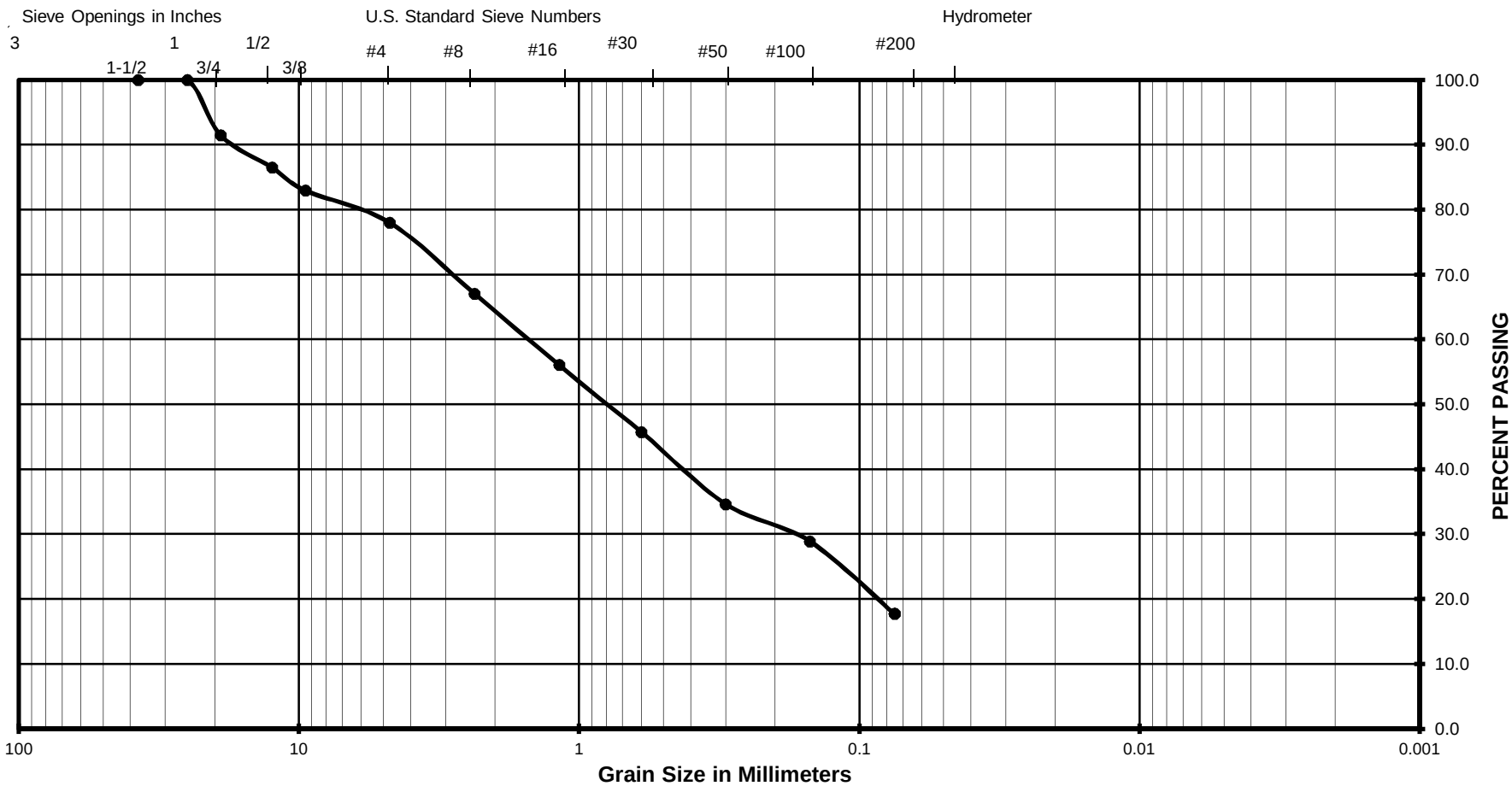
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 35'
Soil Classification	:	SM w/gravel

Wet Weight	:	525.40
Dry Weight	:	496.40
Moisture Content	:	6%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00	42.5	8.6	8.6	91.4
1/2"	12.50	24.5	4.9	13.5	86.5
3/8"	9.50	17.6	3.5	17.0	83.0
#4	4.75	24.6	5.0	22.0	78.0
#8	2.36	54.4	11.0	33.0	67.0
#16	1.18	54.6	11.0	44.0	56.0
#30	0.60	51.3	10.3	54.3	45.7
#50	0.30	55.0	11.1	65.4	34.6
#100	0.15	28.6	5.8	71.1	28.9
#200	0.08	55.4	11.2	82.3	17.7

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM w/gravel
Sample Number	B-1 @ 35'

Krazan Testing Laboratory

Sieve Analysis

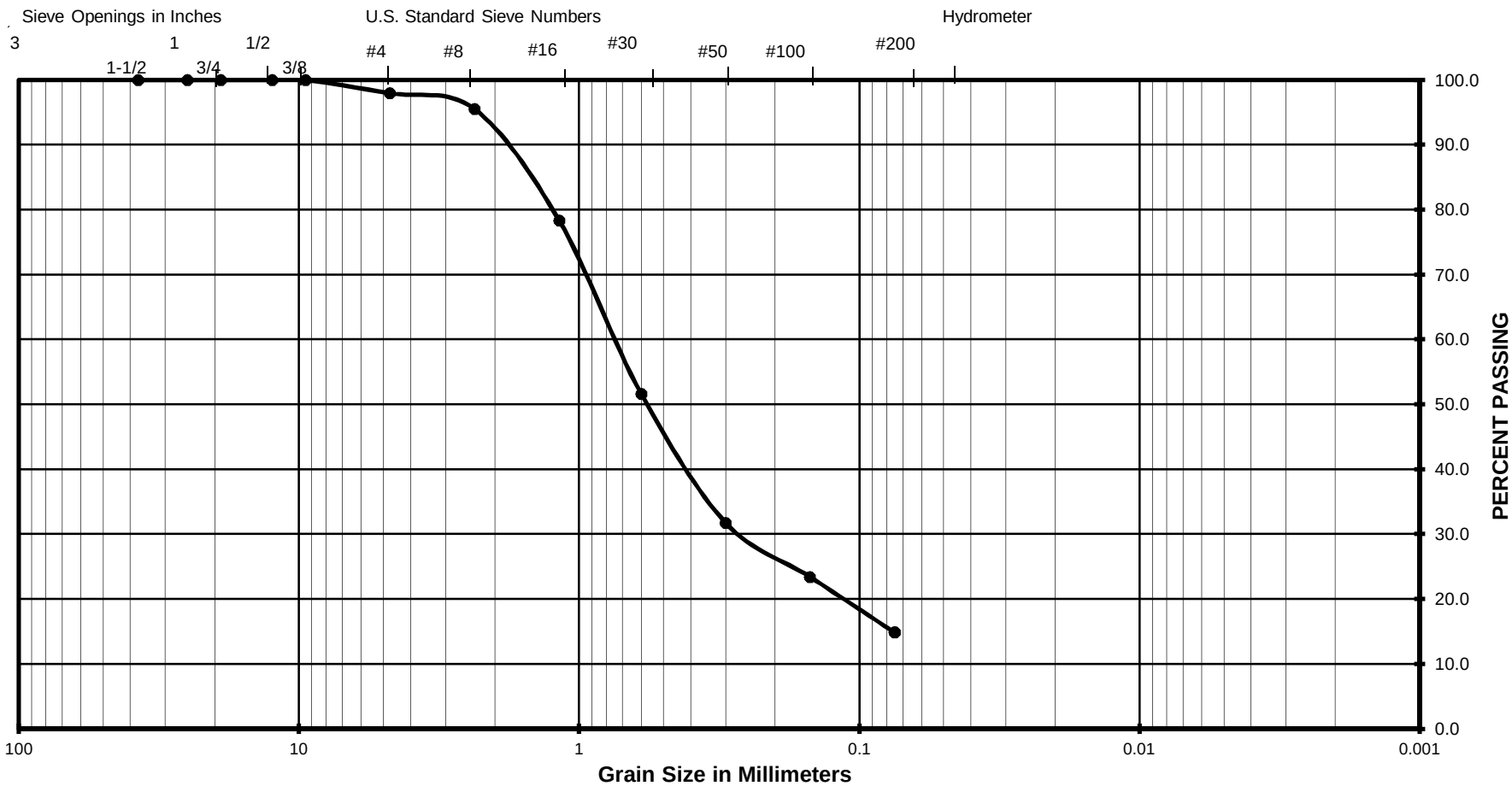
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 40'
Soil Classification	:	SM

Wet Weight	:	521.10
Dry Weight	:	504.10
Moisture Content	:	3%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	10.4	2.1	2.1	97.9
#8	2.36	12.4	2.5	4.5	95.5
#16	1.18	86.3	17.1	21.6	78.4
#30	0.60	135.0	26.8	48.4	51.6
#50	0.30	100.0	19.8	68.3	31.7
#100	0.15	42.0	8.3	76.6	23.4
#200	0.08	43.1	8.5	85.1	14.9

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM
Sample Number	B-1 @ 40'

Krazan Testing Laboratory

Sieve Analysis

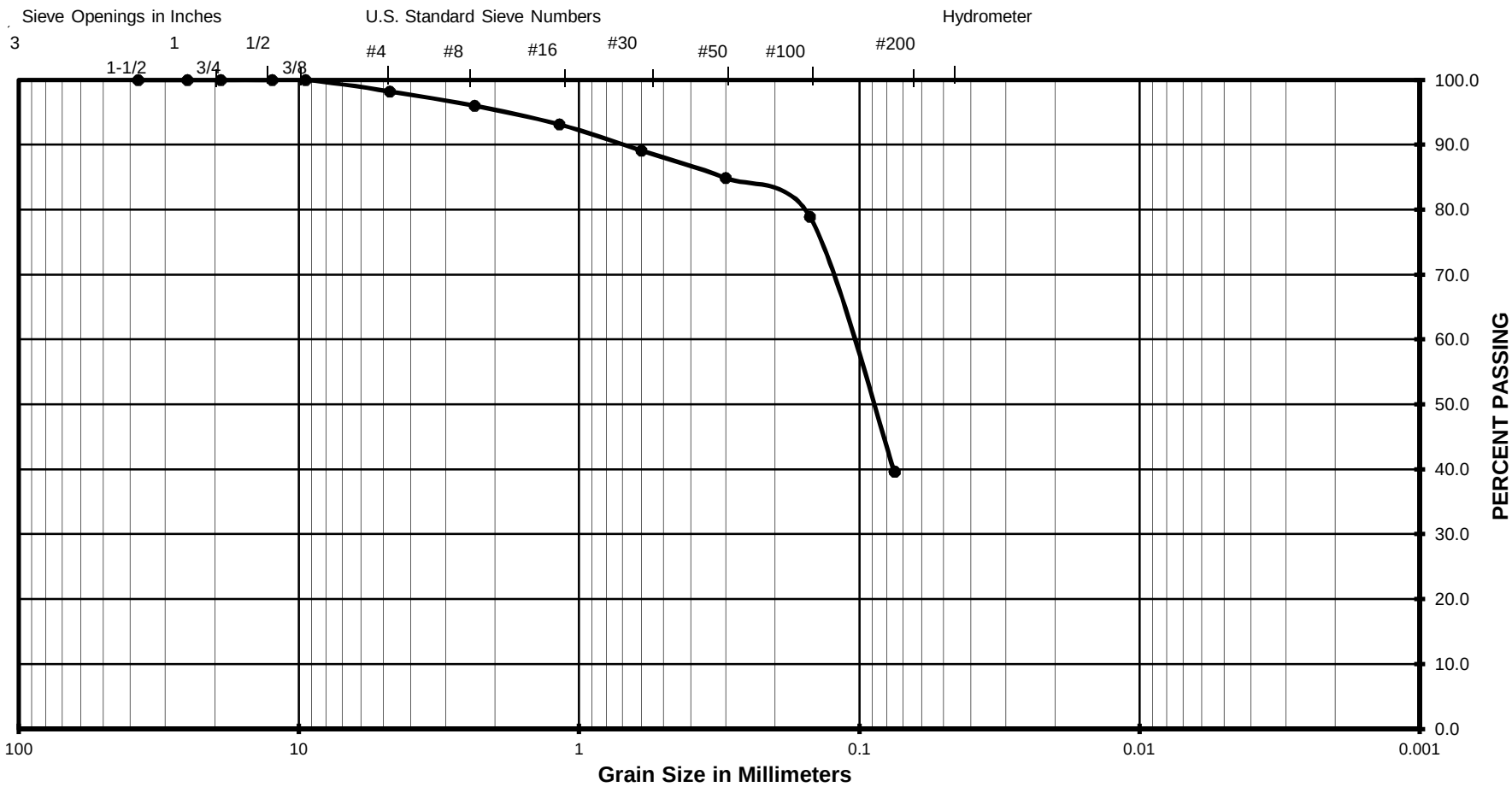
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 45'
Soil Classification	:	SM

Wet Weight	:	527.70
Dry Weight	:	505.40
Moisture Content	:	4%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	8.9	1.8	1.8	98.2
#8	2.36	11.2	2.2	4.0	96.0
#16	1.18	14.6	2.9	6.9	93.1
#30	0.60	20.4	4.0	10.9	89.1
#50	0.30	21.4	4.2	15.1	84.9
#100	0.15	30.1	6.0	21.1	78.9
#200	0.08	198.6	39.3	60.4	39.6

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM
Sample Number	B-1 @ 45'

Krazan Testing Laboratory

Sieve Analysis

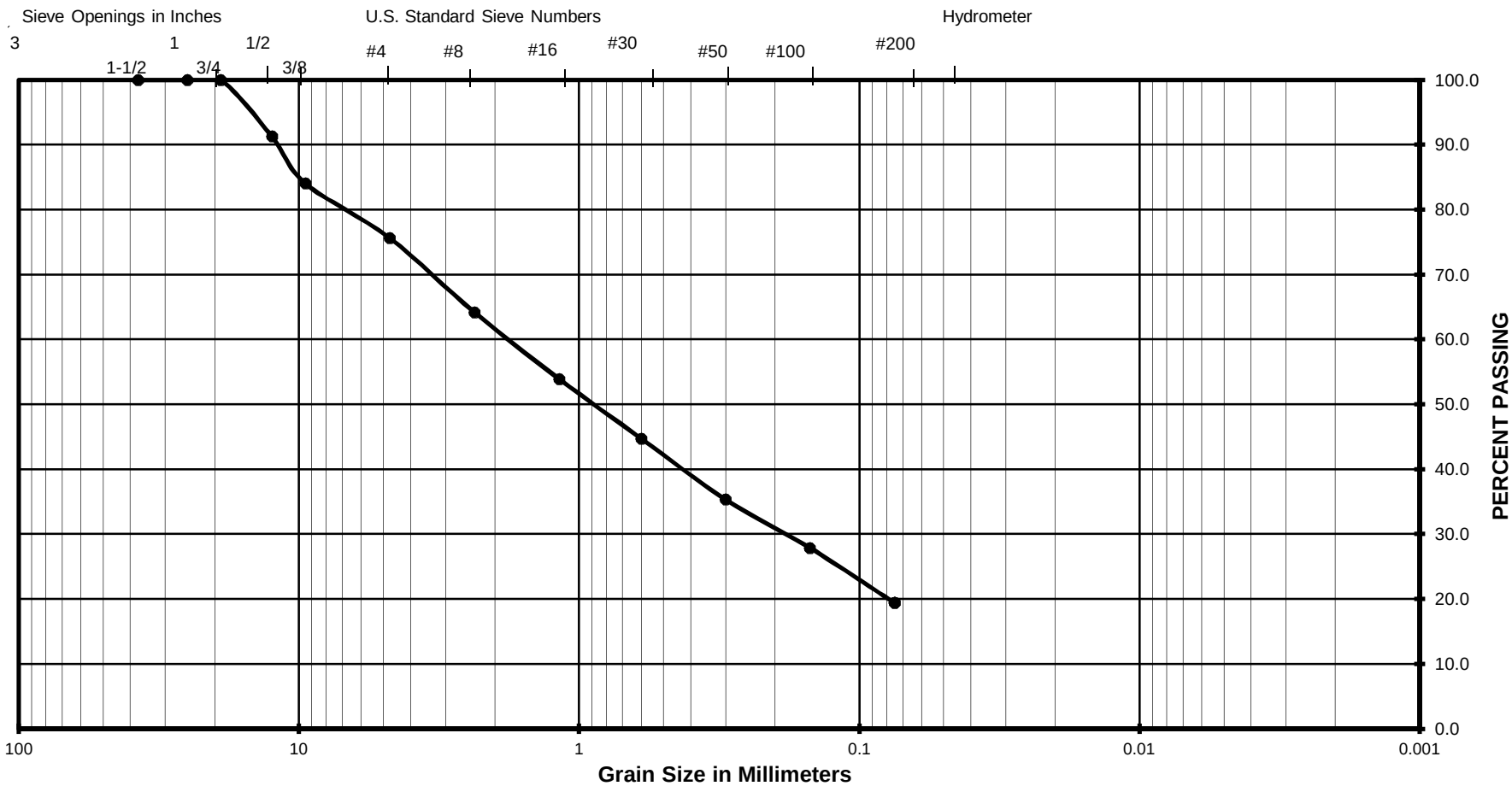
Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	########
Sample Location	:	B-1 @ 50'
Soil Classification	:	SM w/gravel

Wet Weight	:	509.90
Dry Weight	:	489.20
Moisture Content	:	4%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50	42.6	8.7	8.7	91.3
3/8"	9.50	35.4	7.2	15.9	84.1
#4	4.75	41.2	8.4	24.4	75.6
#8	2.36	56.2	11.5	35.9	64.1
#16	1.18	50.0	10.2	46.1	53.9
#30	0.60	45.1	9.2	55.3	44.7
#50	0.30	45.9	9.4	64.7	35.3
#100	0.15	36.4	7.4	72.1	27.9
#200	0.08	41.5	8.5	80.6	19.4

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	2542 Ridgeway Drive
Project Number	11216114
Soil Classification	SM w/gravel
Sample Number	B-1 @ 50'

Krazan Testing Laboratory

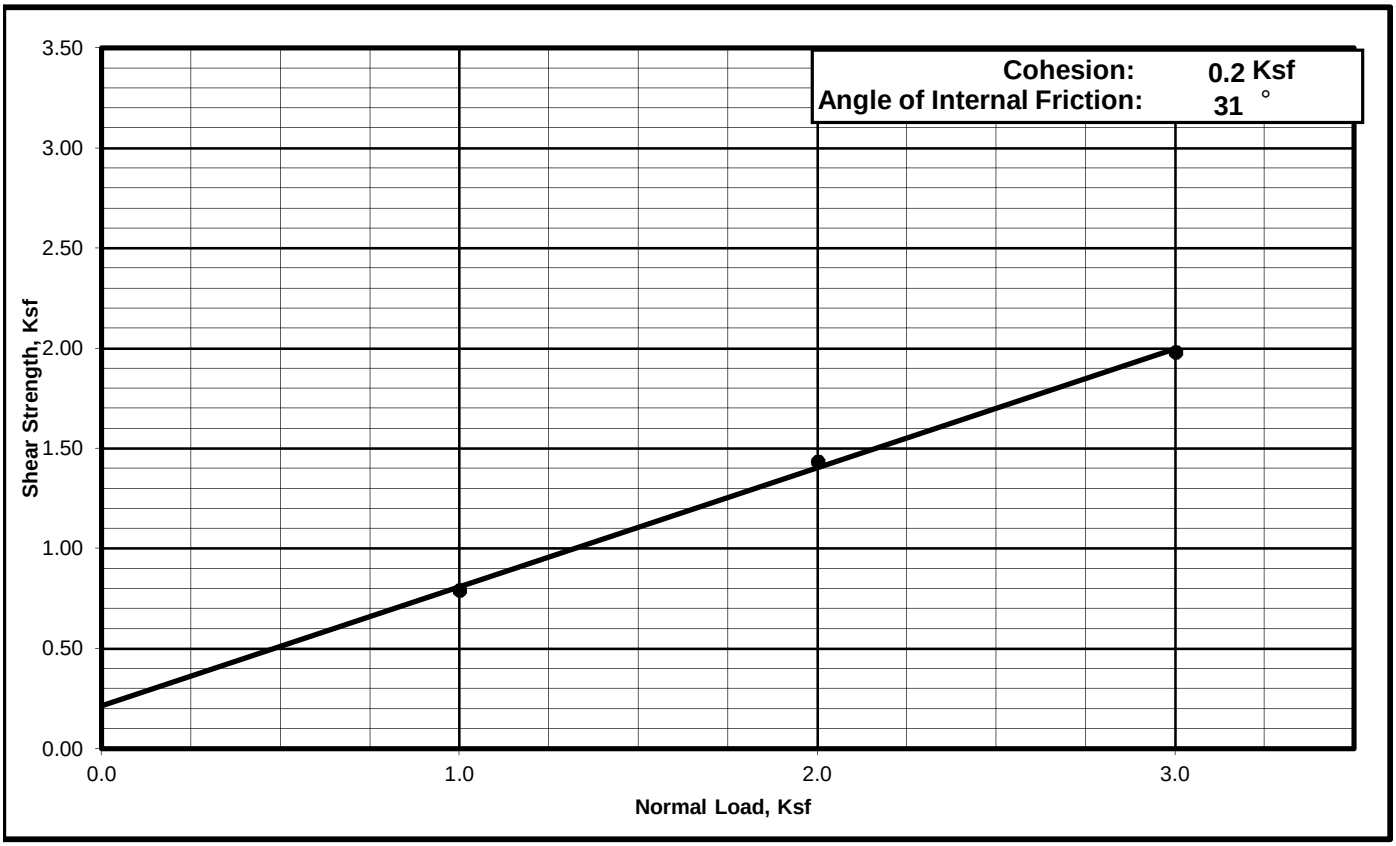
Direct Shear of Consolidated, Drained Soils
ASTM D - 3080 / AASHTO T - 236

Project Number	: 11216114
Project Name	: 2542 Ridgeway Drive
Date	: 10/17/2016
Sample Location	: B-3 @ 5'
Soil Classification	: SM
Sample Surface Area	: 0.0289

STRESS DISPLACEMENT DATA

Lat. Disp. (in.)	Normal Load		
	1000	2000	3000
0	0	0	0
0.030	30	38.2	41.3
0.060	44.4	60	68.8
0.090	55.4	78.4	84.6
0.120	61.4	92.4	102.4
0.150	63.8	101.6	124.6
0.180	68	118.6	147.6
0.210	69.4	125.6	164.7
0.240	67	128.4	174.6
0.270		125.4	178.6
0.300			174.6
0.330			
0.360			

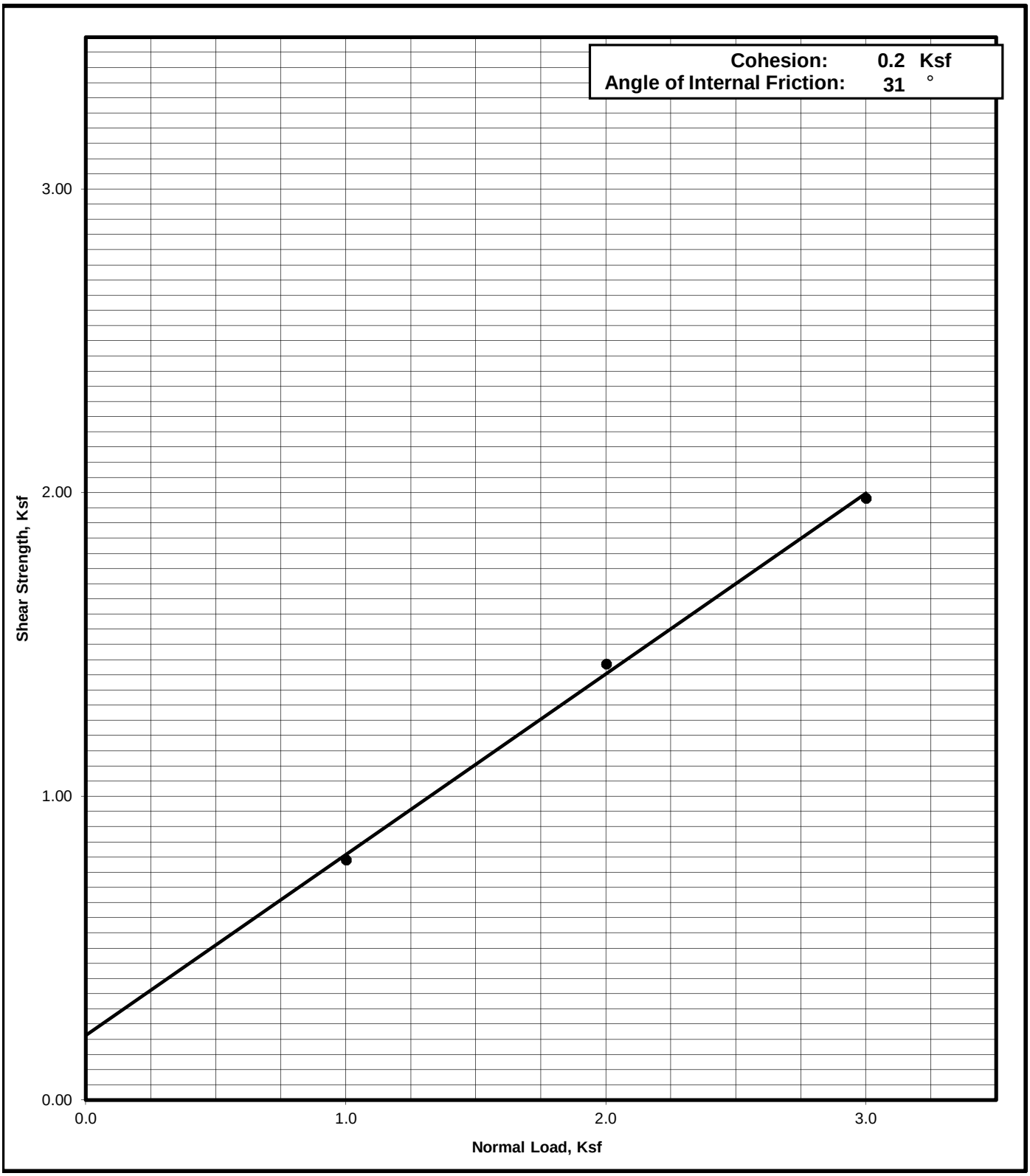
Normal Load psf	Shear force lbs	Shear Stress psf
1000	22.9	792
2000	41.5	1436
3000	57.3	1982



Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
11216114	B-3 @ 5'	SM	10/17/2016



Krazan Testing Laboratory

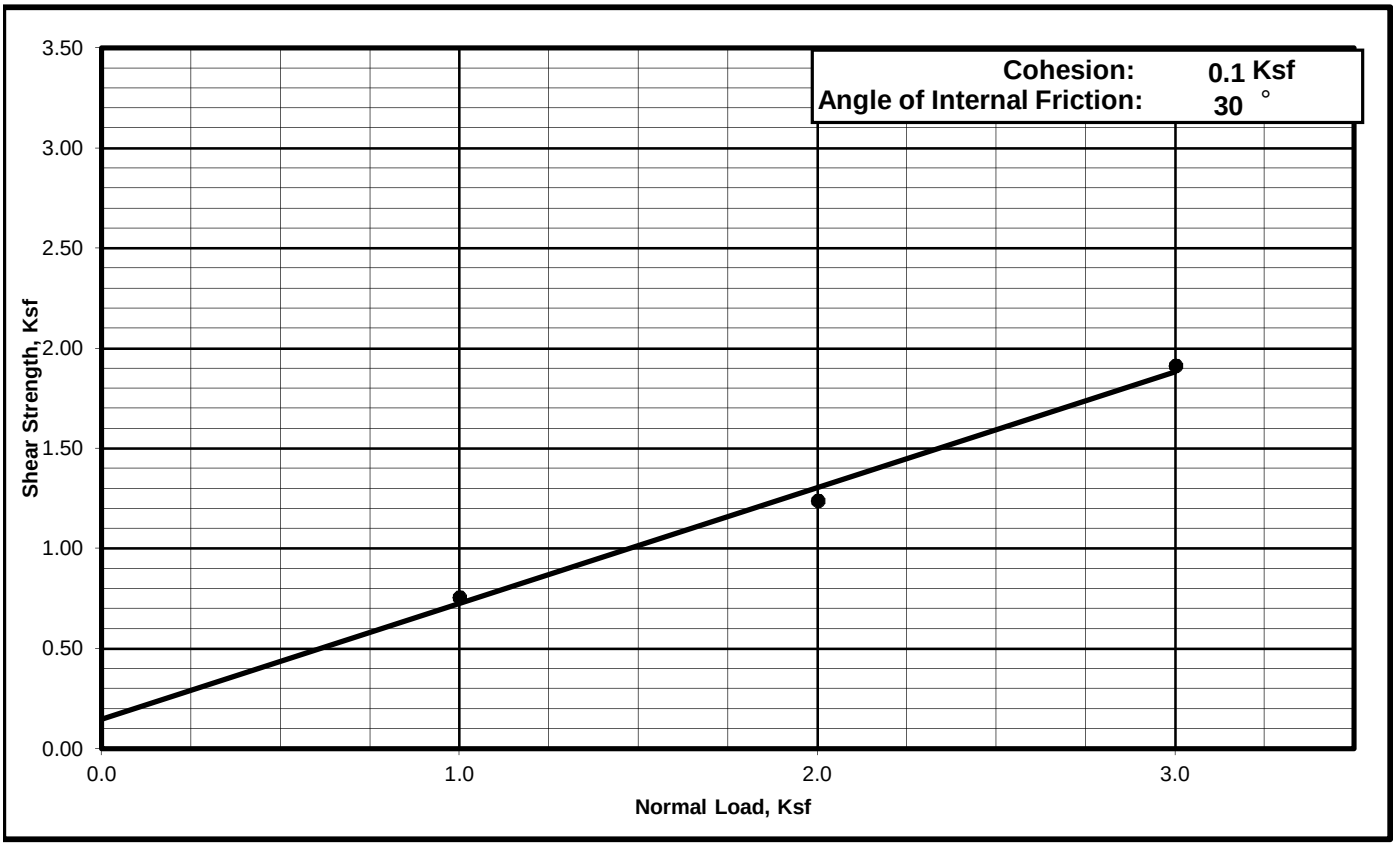
Direct Shear of Consolidated, Drained Soils
ASTM D - 3080 / AASHTO T - 236

Project Number	: 11216114
Project Name	: 2542 Ridgeway Drive
Date	: 10/17/2016
Sample Location	: B-5 @ 5'
Soil Classification	: SM
Sample Surface Area	: 0.0289

STRESS DISPLACEMENT DATA

Lat. Disp. (in.)	Normal Load		
	1000	2000	3000
0	0	0	0
0.030	28.6	38.4	54.6
0.060	42.4	61.4	78.4
0.090	58.4	78.6	92.4
0.120	62	88.2	114.6
0.150	66.8	96	124.8
0.180	64.8	105.4	136.4
0.210		110.6	148.2
0.240		107.6	157.6
0.270			167
0.300			172.4
0.330			168.2
0.360			

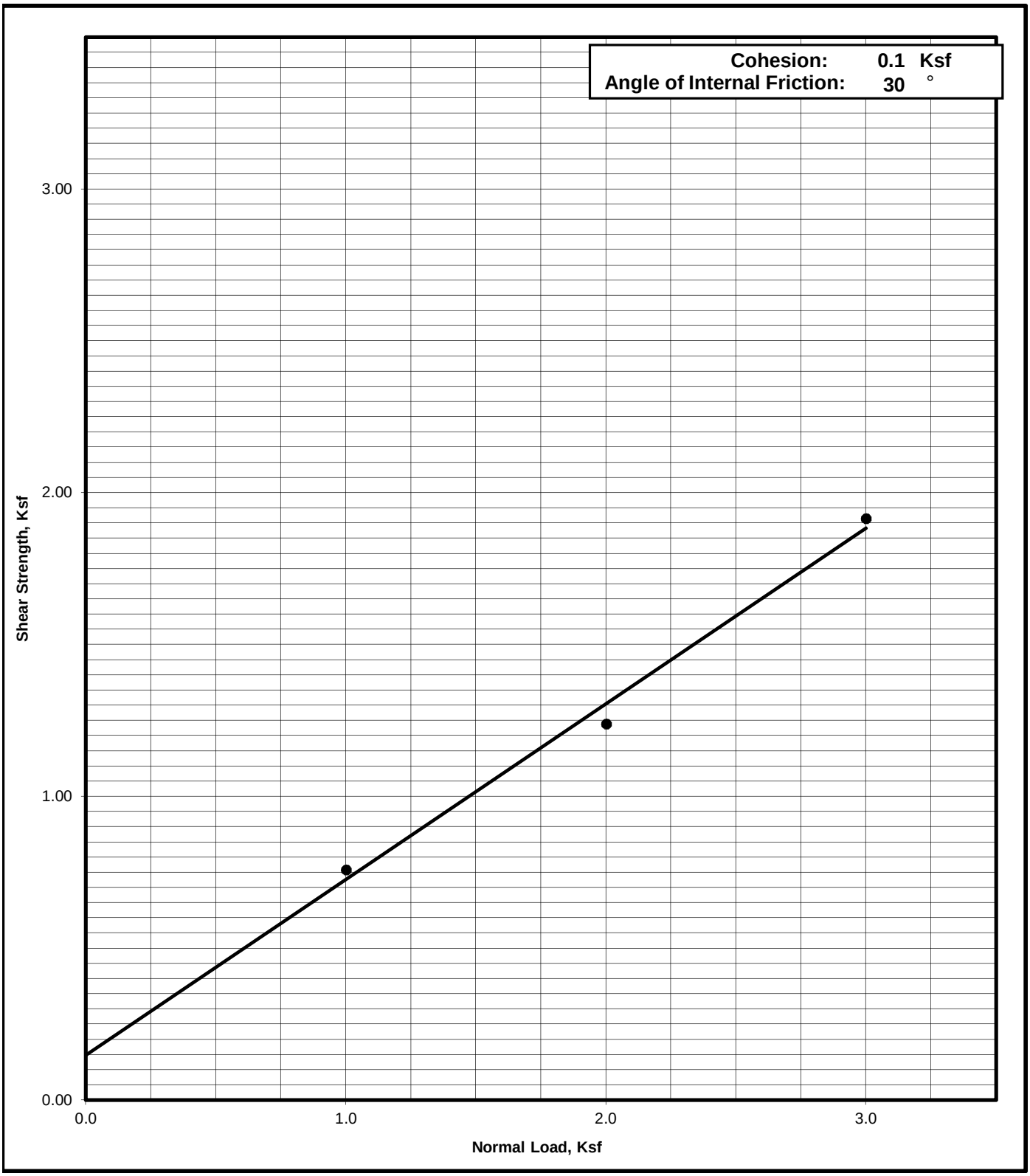
Normal Load psf	Shear force lbs	Shear Stress psf
1000	22.0	760
2000	35.8	1240
3000	55.4	1917



Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
11216114	B-5 @ 5'	SM	10/17/2016



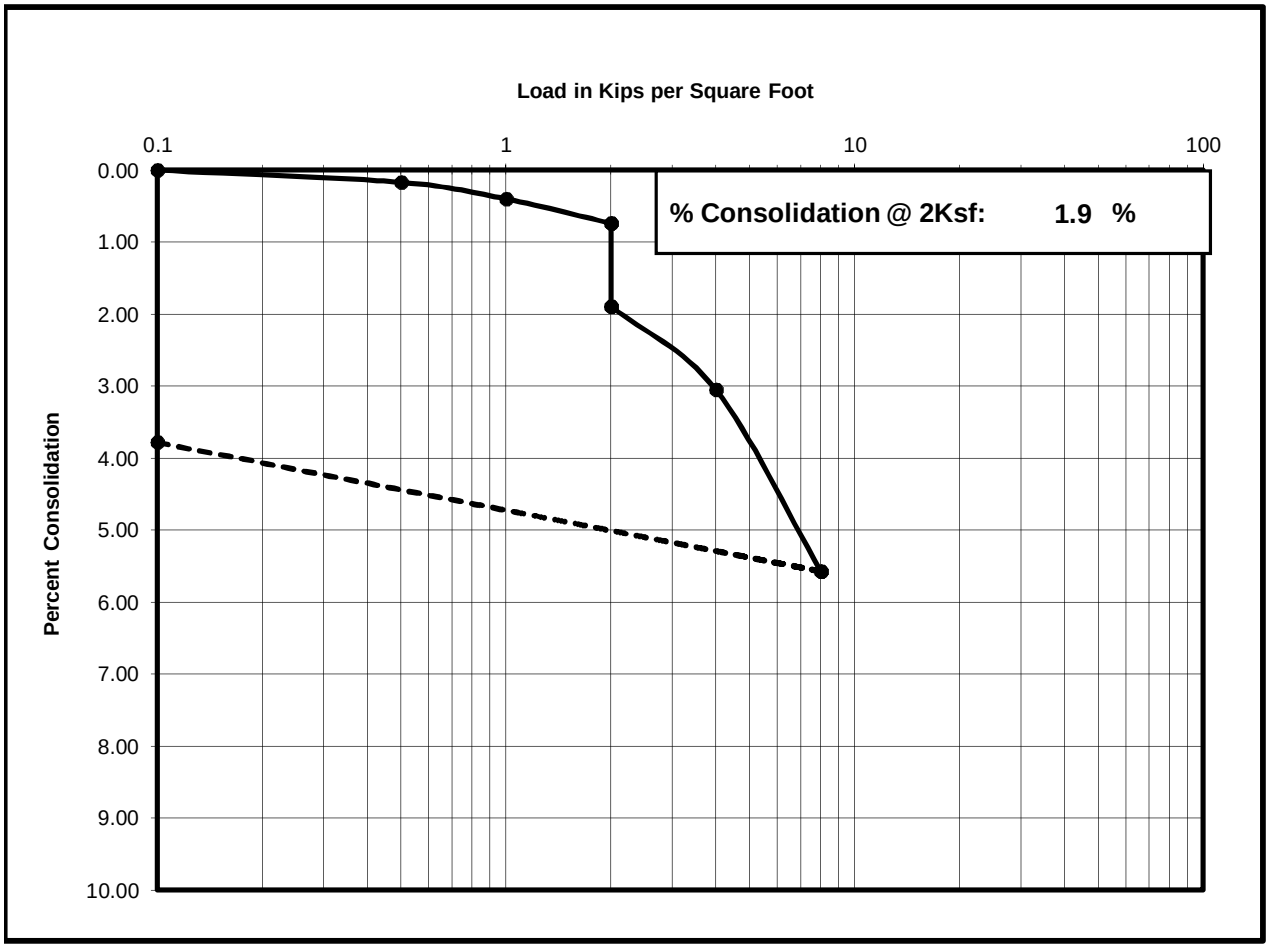
Krazan Testing Laboratory

One Dimensional Consolidation Properties of Soil

ASTM D - 2435 / AASHTO T - 216

Project Number : 11216114
Project Name : 2542 Ridgeway Drive
Date : 10/11/2016
Sample Location : B-2 @ 5'
Soil Classification : SM
Sample Condition : Undisturbed

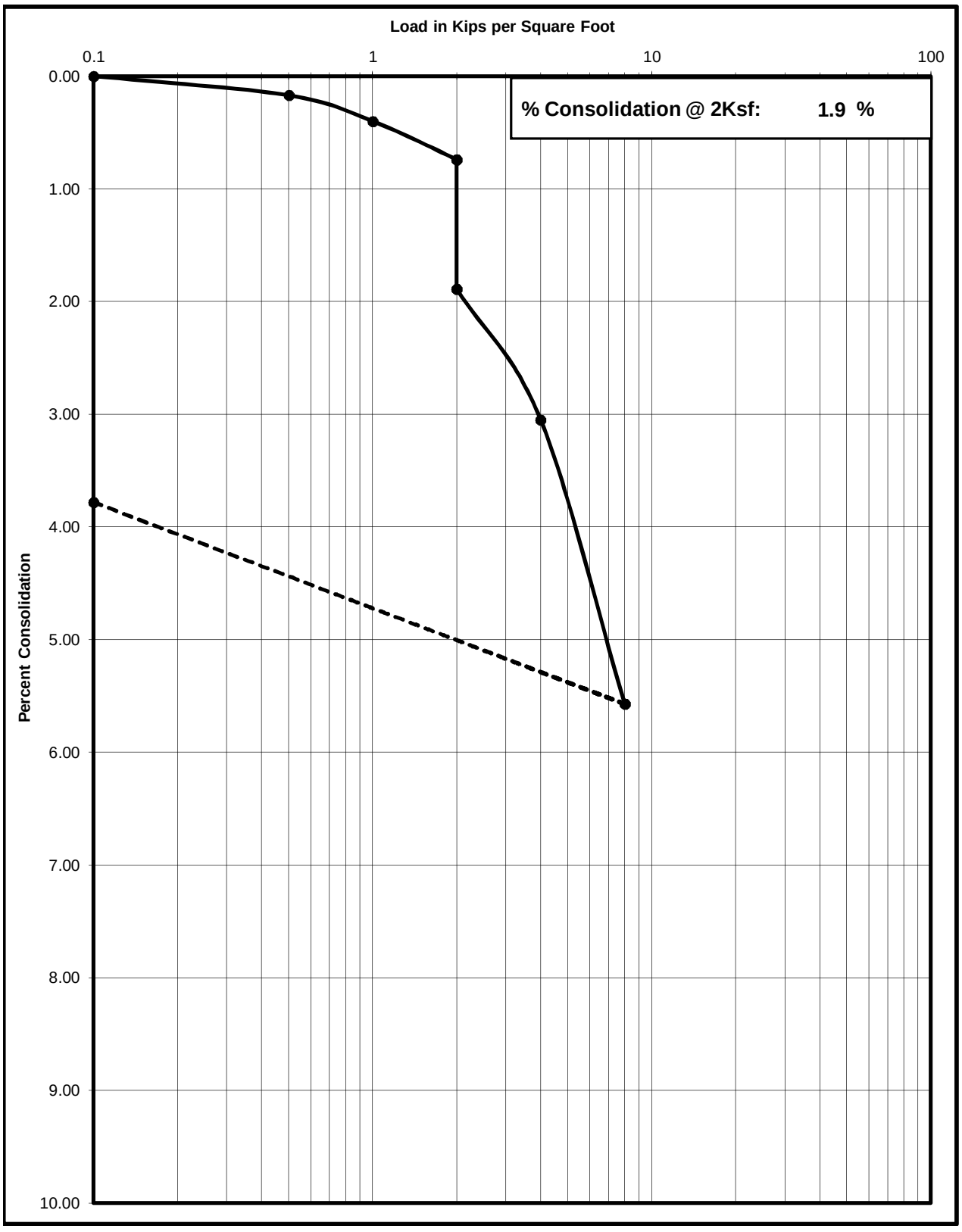
LOAD (ksf)	Reading	% Consolidation
0.1	0	--
0.5	0.0017	0.17
1	0.004	0.40
2	0.0074	0.74
Satur.	0.0189	1.89
4	0.0305	3.05
8	0.0557	5.57
0.1	0.0378	3.78



Krazan Testing Laboratory

Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
11216114	B-2 @ 5'	########	SM



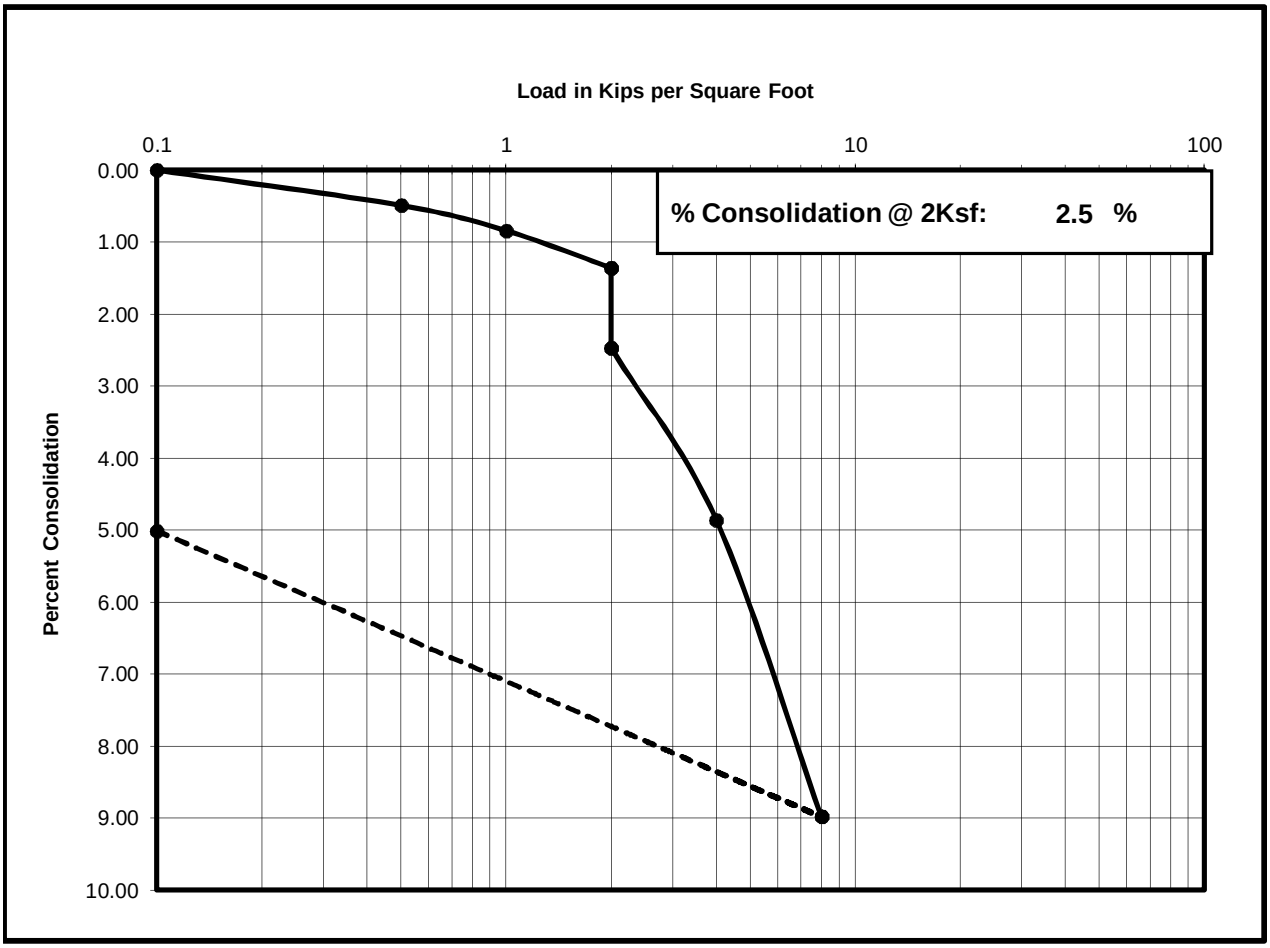
Krazan Testing Laboratory

One Dimensional Consolidation Properties of Soil

ASTM D - 2435 / AASHTO T - 216

Project Number	:	11216114
Project Name	:	2542 Ridgeway Drive
Date	:	10/11/2016
Sample Location	:	B-6 @ 5'
Soil Classification	:	SM
Sample Condition	:	Undisturbed

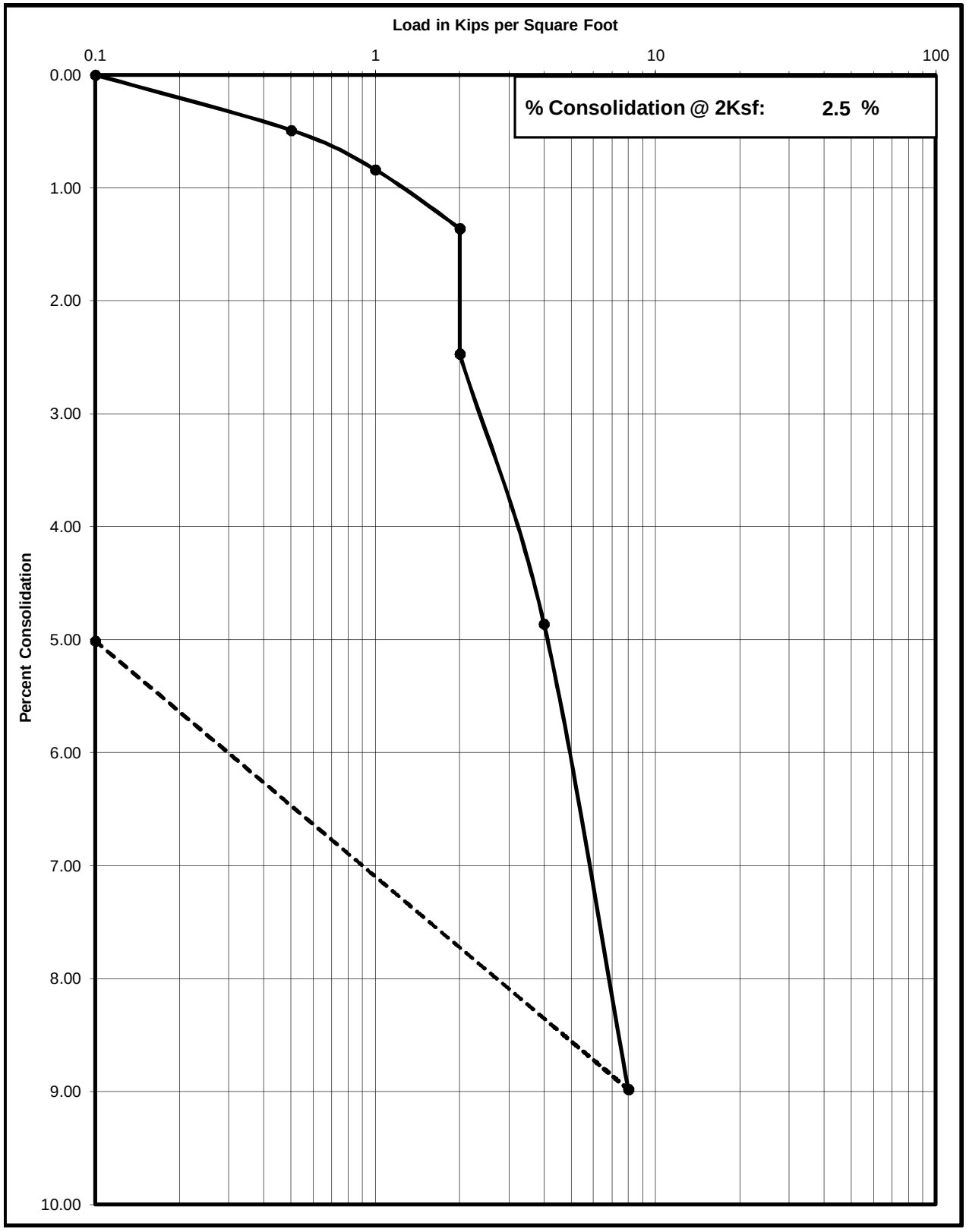
LOAD (ksf)	Reading	% Consolidation
0.1	0.0001	--
0.5	0.0049	0.49
1	0.0084	0.84
2	0.0136	1.36
Satur.	0.0247	2.47
4	0.0486	4.86
8	0.0898	8.98
0.1	0.0501	5.01



Krazan Testing Laboratory

Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
11216114	B-6 @ 5'	#########	SM



Krazan Testing Laboratory

ANAHEIM TEST LAB, INC

3008 ORANGE AVENUE
SANTA ANA, CALIFORNIA 92707
PHONE (714) 549-7267

Krazan & Associates, Inc
1100 Olympic Drive, Ste. 103
Corona, CA 92881

DATE: 10/13/16

P.O. NO: Verbal

LAB NO: B-9834

SPECIFICATION: 417/422/643

MATERIAL: Soil

Project No: 11216114
2542 Ridgeway
National City

ANALYTICAL REPORT

CORROSION SERIES
SUMMARY OF DATA

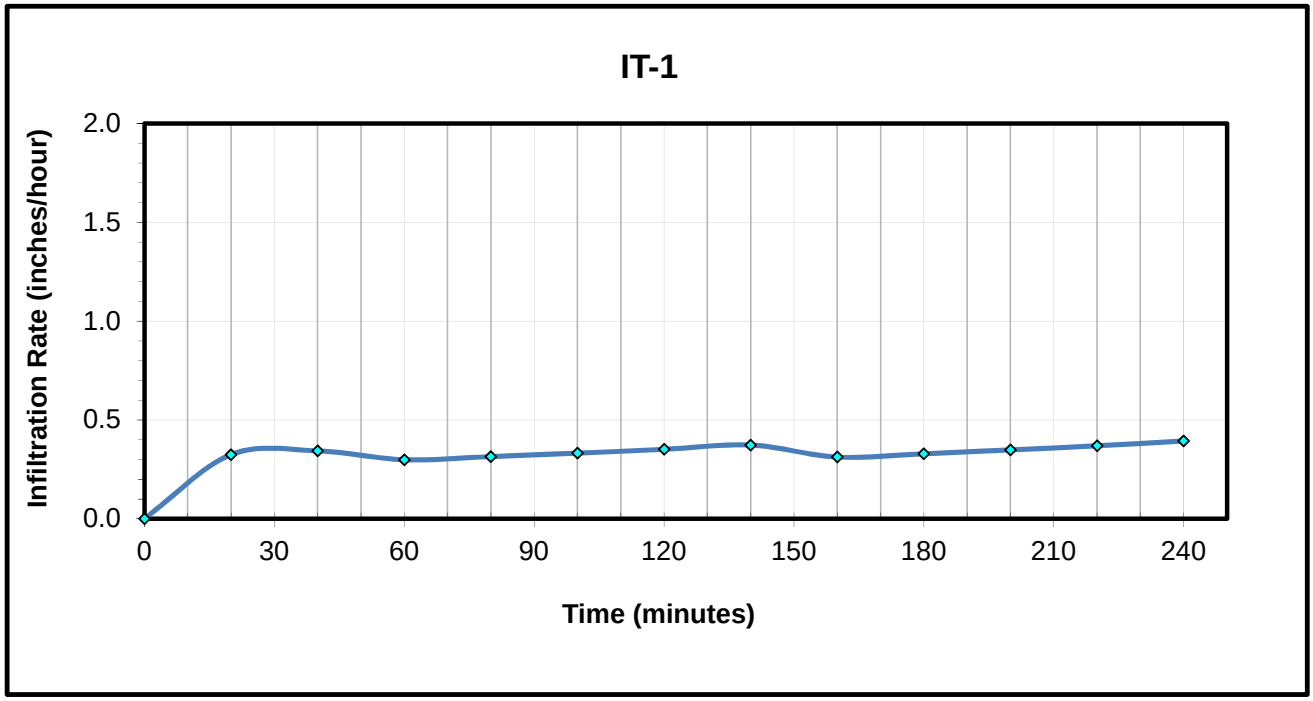
	pH	SOLUBLE SULFATES per CA. 417 ppm	SOLUBLE CHLORIDES per CA. 422 ppm	MIN. RESISTIVITY per CA. 643 ohm-cm
B-1 @ 0-5'	7.0	103	307	960

RESPECTFULLY SUBMITTED

WES BRIDGER CHEMIST

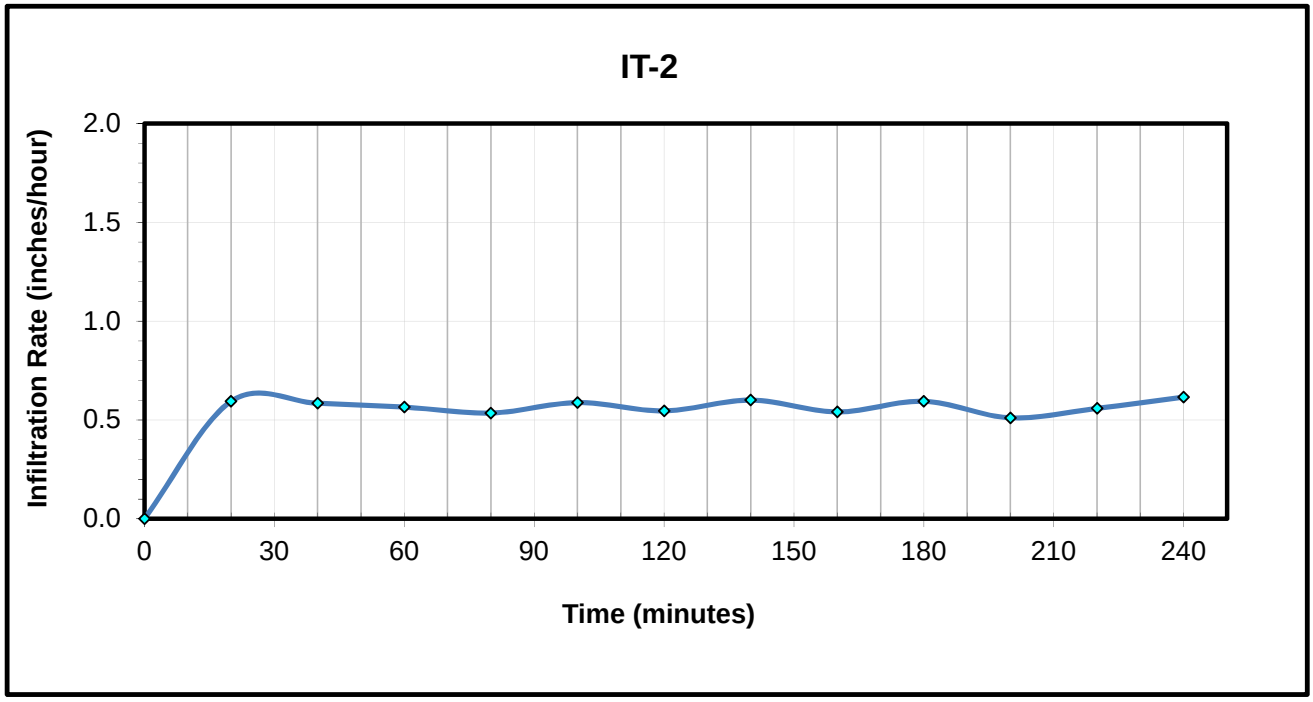
RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE						
Project #	**11220017**				**Date**	**2/14/2020**
Project Name	Ridgeway Development					
Project Address	National City, CA					
Test No:	IT-1	**Total Depth (in.)**		60	**Test Size (in)**	8
Depth To Water	>50'	**Soil Classification**		SM		

Reading	Elasped Time(min.)	Incremental Time (min.)	Initial Depth To Water(in.)	Final Depth To Water(in.)	Incremental Fall of Water(in.)	Incremental Infiltration Rate (in/hr)
Start	0	0.00		2.0	--	--
1	20.00	20.00	2.0	5.0	3.00	0.32
2	40.00	20.00	5.0	8.0	3.00	0.34
3	60.00	20.00	8.0	10.5	2.50	0.30
4	80.00	20.00	10.5	13.0	2.50	0.31
5	100.00	20.00	13.0	15.5	2.50	0.33
6	120.00	20.00	15.5	18.0	2.50	0.35
7	140.00	20.00	18.0	20.5	2.50	0.37
8	160.00	20.00	20.5	22.5	2.00	0.31
9	180.00	20.00	22.5	24.5	2.00	0.33
10	200.00	20.00	24.5	26.5	2.00	0.35
11	220.00	20.00	26.5	28.5	2.00	0.37
12	240.00	20.00	28.5	30.5	2.00	0.39
	Infiltration Rate in Inches per Hour					**0.30**



RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE						
Project #	**11220017**				**Date**	**2/19/2020**
Project Name	Ridgeway Development					
Project Address	National City, CA					
Test No:	IT-2	**Total Depth (in.)**		60	**Test Size (in)**	8
Depth To Water	>50'	**Soil Classification**		SM		

Reading	Elasped Time(min.)	Incremental Time (min.)	Initial Depth To Water(in.)	Final Depth To Water(in.)	Incremental Fall of Water(in.)	Incremental Infiltration Rate (in/hr)
Start	0	0.00		4.0	--	--
1	20.00	20.00	4.0	9.0	5.00	0.59
2	40.00	20.00	9.0	13.5	4.50	0.58
3	60.00	20.00	13.5	17.5	4.00	0.56
4	80.00	20.00	17.5	21.0	3.50	0.54
5	100.00	20.00	21.0	24.5	3.50	0.59
6	120.00	20.00	24.5	27.5	3.00	0.55
7	140.00	20.00	27.5	30.5	3.00	0.60
8	160.00	20.00	30.5	33.0	2.50	0.54
9	180.00	20.00	33.0	35.5	2.50	0.59
10	200.00	20.00	35.5	37.5	2.00	0.51
11	220.00	20.00	37.5	39.5	2.00	0.56
12	240.00	20.00	39.5	41.5	2.00	0.62
	Infiltration Rate in Inches per Hour					**0.51**



Appendix B

General Earthwork Specifications

APPENDIX B

EARTHWORK SPECIFICATIONS

GENERAL

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

SCOPE OF WORK: These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including, but not limited to, the furnishing of all labor, tools and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans and disposal of excess materials.

PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthworks in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Incorporated, hereinafter referred to as the Geotechnical Engineer and/or Testing Agency. Attainment of design grades, when achieved, shall be certified by the project Civil Engineer. Both the Geotechnical Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary adjustments until all work is deemed satisfactory as determined by both the Geotechnical Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Geotechnical Engineer, Civil Engineer, or project Architect.

No earthwork shall be performed without the physical presence or approval of the Geotechnical Engineer. The Contractor shall notify the Geotechnical Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the sole negligence of the Owner or the Engineers.

TECHNICAL REQUIREMENTS: All compacted materials shall be densified to the minimum relative compaction of 95 percent. Soil moisture-content requirements presented in the Geotechnical Engineer's report shall also be complied with. The maximum laboratory compacted dry unit weight of each soil placed as fill shall be determined in accordance with ASTM Test Method D1557-00 (Modified Proctor). The optimum moisture-content shall also be determined in accordance with this test method. The terms "relative compaction" and "compaction" are defined as the in-place dry density of the compacted soil divided by the laboratory compacted maximum dry density as determined by ASTM Test Method D1557-00, expressed as a percentage as specified in the technical portion of the Geotechnical Engineer's report. The location and frequency of field density tests shall be as determined by the Geotechnical Engineer. The results of these tests and compliance with these specifications shall be the basis upon which the Geotechnical Engineer will judge satisfactory completion of work.

SOILS AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the Geotechnical Engineering Investigation report.

The Contractor shall make his own interpretation of the data contained in the Geotechnical Engineering Investigation report and the Contractor shall not be relieved of liability under the Contract for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

DUST CONTROL: The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or wind-blown materials attributable to his work.

SITE PREPARATION

Site preparation shall consist of site clearing and grubbing, over-excavation of the proposed building pad areas, preparation of foundation materials for receiving fill, construction of Engineered Fill including the placement of non-expansive fill where recommended by the Geotechnical Engineer.

CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter and all other matter determined by the Geotechnical Engineer to be deleterious. Site stripping to remove organic materials and organic-laden soils in landscaped areas shall extend to a minimum depth of 2 inches or until all organic-laden soil with organic matter in excess of 3 percent of the soils by volume are removed. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed building areas should be removed to a minimum depth of 3 feet and to such an extent that would permit removal of all roots greater than 1 inch in diameter. Tree roots removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill of tree root excavation should not be permitted until all exposed surfaces have been inspected and the Geotechnical Engineer is present for the proper control of backfill placement and compaction. Burning in areas that are to receive fill materials shall not be permitted.

Excavations required to achieve design grades, depressions, soft or pliant areas, or areas disturbed by demolition activities extending below planned finished subgrade levels should be excavated down to firm, undisturbed soil and backfilled with Engineered Fill. The resulting excavations should be backfilled with Engineered Fill.

EXCAVATION: Following clearing and grubbing operations, the proposed building pad area shall be over-excavated to a depth of at least five feet below existing grades or two feet below the deepest existing structure foundation within the limits of each of the building pads. The remaining areas of the building and adjoining exterior concrete flatwork or pavements at the building perimeter shall be over-excavated to a depth of at least one foot below existing grade. The areas of over-excavation and recompaction beneath footings and slabs shall extend out laterally a minimum of five feet beyond the perimeter of these elements.

All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over-excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable **TECHNICAL REQUIREMENTS**.

SUBGRADE PREPARATION: Surfaces to receive Engineered Fill or to support structures directly, shall be scarified to a depth of 8 inches, moisture-conditioned as necessary and compacted in accordance with the **TECHNICAL REQUIREMENTS**, above.

Loose soil areas and/or areas of disturbed soil shall be should be excavated down to firm, undisturbed soil, moisture-conditioned as necessary and backfilled with Engineered Fill. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas that are to receive fill materials shall be approved by the Geotechnical Engineer prior to the placement of any of the fill material.

FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence of the Geotechnical Engineer. Material from the required site excavation may be utilized for construction of site fills, with the limitations of their use presented in the Geotechnical Engineer's report, provided the Geotechnical Engineer gives prior approval. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Geotechnical Engineer, and shall comply with the requirements for non-expansive fill, aggregate base or aggregate subbase as applicable for its proposed used on the site as presented in the Geotechnical Engineer's report.

PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. Fill materials should be placed and compacted in horizontal lifts, each not exceeding 8 inches in uncompacted thickness. Due to equipment limitations, thinner lifts may be necessary to achieve the recommended level of compaction. Compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Geotechnical Engineer. Additional lifts should not be placed if the previous lift did not meet the required dry density (relative compaction) or if soil conditions are not stable. The compacted subgrade in pavement areas should be non-yielding when proof-rolled with a loaded ten-wheel truck, such as a water truck or dump truck, prior to pavement construction.

Both cut and fill shall be surface-compacted to the satisfaction of the Geotechnical Engineer prior to final acceptance.

SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing, or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Geotechnical Engineer indicates that the moisture-content and density of previously placed fill is as specified.

Appendix C

General Paving Specifications

APPENDIX C

PAVEMENT SPECIFICATIONS

1. DEFINITIONS - The term "pavement" shall include asphalt concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

The term “Standard Specifications”: hereinafter referred to as the January 1999 Standard Specifications of the State of California, Department of Transportation, and the "Materials Manual" is the Materials Manual of Testing and Control Procedures, State of California, Department of Public Works, Division of Highways. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as defined in the ASTM D1557-00.

2. SCOPE OF WORK - This portion of the work shall include all labor, materials, tools, and equipment necessary for, and reasonably incidental to the completion of the pavement shown on the plans and as herein specified, except work specifically notes as "Work Not Included."

3. PREPARATION OF THE SUBGRADE - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 95 percent. The finished subgrades shall be tested and approved by the Geotechnical Engineer prior to the placement of additional pavement courses.

4. UNTREATED AGGREGATE BASE - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class 2 material, ¾-inches maximum size. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent. The aggregate base material shall be spread and compacted in accordance with Section 26 of the Standard Specifications. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Geotechnical Engineer prior to the placement of successive layers.

5. AGGREGATE SUBBASE - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class II material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent, and it shall be spread and compacted in accordance with Section 25 of the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Geotechnical Engineer prior to the placement of successive layers.

6. ASPHALT CONCRETE SURFACING - Asphalt concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades, and dimensions shown on the plans. The viscosity grade of the asphalt shall be AR-8000. The mineral aggregate shall be Type B, ½-inch or ¾-inch maximum, medium grading, for the wearing course and ¾-inch maximum, medium grading for the base course, and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The drying, proportioning, and mixing of the materials shall conform to Section 39.

The prime coat, spreading and compacting equipment, and spreading and compacting the mixture shall conform to the applicable chapters of Section 39, with the exception that no surface course shall be placed when the atmospheric temperature is below 50 degrees F. The surfacing shall be rolled with a combination steel-wheel and pneumatic rollers, as described in Section 39-6. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

7. FOG SEAL COAT - The fog seal (mixing type asphalt emulsion) shall conform to and be applied in accordance with the requirements of Section 37.

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

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	**GRADING**
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.	

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

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: Drainage Study For Ridgeway A

    Prepared By: Lundstrom Engineering & Surveying, Inc.

    Date: 9-15-2021

  - 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.

5.1 Description of Existing Site Condition

Provide the requested information below for the project site in its existing condition.

a. Current Site Status

Select all that apply to any portion of the site.

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

b. Existing Land Cover

Provide the area (in acres or square feet) within all applicable categories of land cover below. The total area should equal that of the entire project site.

	Area *(acres or ft²)*
☒ Vegetative Cover	108,650 s.f.
☐ Non-Vegetated Pervious Areas	Click here to enter text.
☒ Impervious Areas	9,400 s.f.

c. Underlying Soil

Select all soil groups that are present on the site.

NRCS Hydrologic Soil Group(s)			
Type A	Type B	Type C	Type D
☐	☐	☐	☒

5.2 Description of Existing Site Drainage

Describe how storm water runoff is conveyed from the site. At a minimum, address the following:

- Is the existing drainage conveyance ☒ **natural** or ☐ **urban**?
- Is runoff from offsite conveyed through the site? ☒ **Yes** ☐ **No**
  If **yes**, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site.
- Describe the existing project site drainage conveyance network (including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels).
- Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Summarize the pre-project drainage areas and design flows to each of the existing runoff discharge locations.
- Provide additional information as necessary or requested to describe the site drainage.

Description (add pages as necessary to provide all requested information).

The 2.7 acre site is a rectangular shaped lot located at 2542 Ridgeway Drive in the city of National City. The site is currently occupied by two single family homes and paved driveways.

Runoff generated onsite sheet flows from northeast to southwest into a natural drainage course. Offsite run-on occurs in three locations. A curb inlet at the corner of Ridgeway and Euclid Drive currently outlets 8.8 cfs(Q100) onto the property. Offsite flow from the adjacent property to the east surface flows 4.3 cfs(Q100) onto the site. The natural drainage course along the southern portion of the site flows from the east 56.7 cfs(Q100).

5.3 Description of Proposed Site Development

Provide a general description of the proposed site development, including at a minimum the information requested below. Add pages as necessary.

a. Project description/ Proposed land use and/or activities (project location, development type, size, numbers of units, etc.)

The project will consists of demolishing the two existing homes and ashplat driveway, then construct three multi-unti residential apartments buildings with associated driveways and parking areas.

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

The project proposes 59,300 sf of impervious area in forms of rooftop, drive isles, parking lot, walks and patios.

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

Landscape areas are proposed throughout the site. Total landscape area for the project is 59,350 sf. The project proposed the grading of two building pads and surface improvements.

d. Does the project include grading and changes to site topography? ☐ **Yes** ☐ **No**

*If **yes**, describe below.*

The project proposed the grading of three building pads, retaining walls and surface improvements.

5.4 Description of Proposed Site Drainage

A. Changes to Site Drainage -- Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)? ☐ **Yes** ☐ **No**

If **yes**:

- Describe (1) the proposed project site drainage conveyance network (including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels), and (2) the method for conveying offsite flows through or around the proposed project site.
- Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations.
- Provide a summary of pre- and post-project drainage areas and design flows to each of the runoff discharge locations.

Description (add pages as necessary to provide all requested information).

DMA#1: Drains to Filterra Bioscape (proprietary) biofiltration basin and underground detention storage. A on-site 24" private drainage system will convey runoff through the site to a proposed headwall.

Run-on will be bypassed in the following ways:

- The existing curb inlet in Euclid Avenue, that currently outlets in the property will capture existing off-site run-on. The existing headwall outlet will be removed and a new 24" private storm drain system will route flow through the property to outlet at a proposed headwall downstream of the site improvements, at the natural drainage course along the southern portion of the site, where existing flow patterns would lead. A proposed secondary overflow catch basin will be located on-site to capture off-site run-on that overruns the existing curb inlet in Euclid Avenue.

- The run-on from the adjacent easterly property will be picked up by a gutter along the property line and directed to a riprap protected spillway into the natural drainage course.

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 or Printouts	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**	• DCV calculations from SSD-BMP tool • Dispersion Areas calculations from SSD-BMP tool	• Fact Sheet SD-B (Appendix E.8) • Appendix I
☐ **Tree Wells**	• DCV calculations from SSD-BMP tool • Tree Well calculations from SSD-BMP tool	• Fact Sheet SD-A (Appendix E.7) • Appendix I

- Submit this cover page and all "Required Sub-attachments or Printouts" 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)*	
2	34,848	0	0	PDS2020-LDGRMJ-30273, Sheet 13

- "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.

6.2 De Minimis DMAs (complete this page once for ALL de minimis DMAs)

De minimis DMAs consist of areas too small to be considered significant contributors of pollutants and not practicable to drain to a BMP. They are excluded from DCV calculations. Examples include driveway aprons connecting to existing streets, portions of sidewalks, retaining walls, and similar features at the external boundaries of a project.

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

DMA #	***DMA Area (ft^2)***	***Permit # and Sheet #***

- "DMA #", "DMA Area", and "Permit # and Sheet #" are required.
- Check the boxes below to confirm that each required condition is satisfied for ALL de minimis DMAs on the site.

☐ Each DMA listed is less than 250 square feet and not adjacent or hydraulically connected to each other.

☐ Each DMA listed <u>fully</u> satisfies all design requirements and restrictions described in BMPDM Section 5.2.2 De Minimis DMAs.

6.3 Self-retaining DMAs using Significant Site Design BMPs

Self-retaining DMAs use Site Design BMPs to fully-retain the entire DCV, at a minimum. Site Design BMPs that fully retain the DCV, at a minimum, therefore replacing the need for a Structural BMP (S-BMP), are classified as Significant Site Design BMPs (SSD-BMPs). To satisfy pollutant control requirements only, self-retaining means retention of the entire DCV. However, under some circumstances, a self-retaining DMA can also satisfy hydromodification management requirements by implementing BMPs that retain a greater volume of runoff.

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

DMA #	**DMA Area (ft^2)**	**BMP Type** (choose one per DMA)		***Permit # and Sheet #***
		Dispersion Area (Att. 6.3.1)	**Tree Wells (Att. 6.3.2)**	
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Copy and Paste table here for additional DMAs

- "DMA #", "DMA Area", and "Permit # and Sheet #" are required.
- Select one BMP Type per DMA. Provide detailed documentation for each DMA in Attachments 6.3.1 (Impervious Dispersion Areas) and/or 6.3.2 (Tree Wells) below.
- Each self-retaining DMA must <u>fully</u> satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, applicable BMPDM Appendix E Fact Sheets, BMPDM Appendix I, and any other guidance or instruction identified by the County.

6.3.1 Self-retaining DMAs with Impervious Dispersion Areas

Impervious area dispersion (dispersion) refers to the practice of effectively disconnecting impervious areas from directly draining to the storm drain system by routing runoff from impervious areas such as rooftops (through downspout disconnection), walkways, and driveways onto the surface of adjacent pervious areas. The intent is to slow runoff discharges and reduce volumes. Dispersion with partial or full infiltration results in significant volume reduction by means of infiltration and evapotranspiration. When adequately sized, dispersion can also be used to satisfy both the pollutant control and hydromodification management structural performance standards for a DMA.

- Each self-retaining DMA with impervious area dispersion must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, Fact Sheet SD-B: Impervious Area Dispersion, and any other guidance or instruction identified by the County.
- Documentation of compliance with all applicable conditions must be submitted with this sub-attachment using the ***Summary Sheet for DMAs with Impervious Area Dispersion*** on the next page. One version of this Summary Sheet must be completed for each applicable DMA.
- Applicants are responsible to comply with all other applicable requirements, regardless of whether they are included in the summary sheet.
- The following applies if the dispersion area is **native soil** (SD-B in Appendix E):
    - For pollutant control only, the DMA is considered self-retaining if the impervious to pervious ratio is:
        - 2:1 when the pervious area is composed of Hydrologic Soil Group A
        - 1:1 when the pervious area is composed of Hydrologic Soil Group B
- The following applies if the dispersion area includes **amended soil** (SD-B in Appendix E):
    - DMAs using impervious area dispersion can be considered to meet both pollutant control and hydromodification flow control requirements if the impervious to pervious area ratio is 1:1 or less and all other design requirements of SD-B are satisfied, including 11 inches of amended soil.

Summary Sheet for Self-retaining DMAs with Impervious Area Dispersion

Attach Printouts from SSD-BMP tool below

- DCV calculations from SSD-BMP tool
- Dispersion Areas calculations from SSD-BMP tool

6.3.2 Self-retaining DMAs with Tree Wells

Trees wells can provide a variety of benefits such as interception and increased infiltration of rainfall, reduced erosion, energy conservation, air quality improvement, and aesthetic enhancement. They can also be used to satisfy both pollutant control and hydromodification management performance standards for a DMA.

- Each self-retaining DMA with tree wells must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, Fact Sheet SD-A: Tree Wells, and any other guidance or instruction identified by the County.
- For pollutant control only, the DMA must retain the entire DCV. For hydromodification management, an additional volume must be retained in accordance with the sizing requirements presented in the DCV multiplier table in Fact Sheet SD-A.
- Documentation of compliance with applicable conditions must be submitted using the ***Summary Sheet for Self-retaining DMAs with Tree Wells*** on the next page. One version of this Summary Sheet must be completed for each applicable DMA.
- If both pollutant control and hydromodification standards apply, the soil depth of all tree wells in the DMA must be selected before determining the Required Retention Volume (RRV). Each tree well must be constructed to the selected depth. For pollutant control only, tree wells within a DMA may be constructed to different soil depths.
- In most cases tree wells must use Amended Soil per Fact Sheet SD-F. However, Structural Soil is required in some cases (e.g., placing the tree well next to a curb). See ***Structural Requirements for Confined Tree Well Soil Volume*** in Fact Sheet SD-A for additional explanation. If applicable, list the DMAs and Tree Well #s below for all tree wells requiring Structural Soil.

DMA #	**Tree Wells Requiring Structural Soil (list Tree Well #s)**

- The Design Capture Volume (DCV) must be known for each DMA in order to determine the volume to be mitigated by the tree wells. Instructions for DCV calculation are provided in BMPDM Appendix I.1. An automated version of Worksheet I.1 (Calculation of Design Capture Volume) is available at www.sandiegocounty.gov/stormwater under the Development Resources tab.

Summary Sheet for Self-retaining DMAs with Tree Wells

Attach Printouts from SSD-BMP tool below

- DCV calculations from SSD-BMP tool
- Tree Wells calculations from SSD-BMP tool

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 Ridgeway A
Permit Application Number PDS2020-LDGRMJ-30273

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).

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

William Lundstrom
Print Name

Lundstrom Engineering & Surveying, Inc.
Company

9/15/2021 Engineer's Seal:
Date

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.

Infiltration testing resulted in a "no infiltration" condition and haverst/resuse are infeasible. Biofiltration and modular detention storage will be utilized.

Project runoff is collected and routed to a proprietary biofiltration basin with required retention volume. Downstream of the proprietary biofiltration basin is a proprietary under ground detention vault for HMP flow control and 100-year mitigation.

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 (ft^2)	Structural BMP Type							Permit # and Sheet #
			Harvest and Use	Infiltration	Unlined Biofiltration	Lined Biofiltration	Flow-thru treatment	Hydromodification Management [1]	Other	
1	1	83,800	☐	☐	☐	☒	☐	☒	☐	PDS2020-LDGRMJ-30273 SHEET 12
2	1	83,800	☐	☐	☐	☐	☐	☒	☐	PDS2020-LDGRMJ-30273 SHEET 12
			☐	☐	☐	☐	☐	☐	☐	
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			☐	☐	☐	☐	☐	☐	☐	

[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 #**	PDS2020-LDGRMJ-30273 SHEET 12

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	William Lundstrom bill@lundstrom.cc

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 #**	PDS2020-LDGRMJ-30273 SHEET 12

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	William Lundstrom bill@lundstrom.cc

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

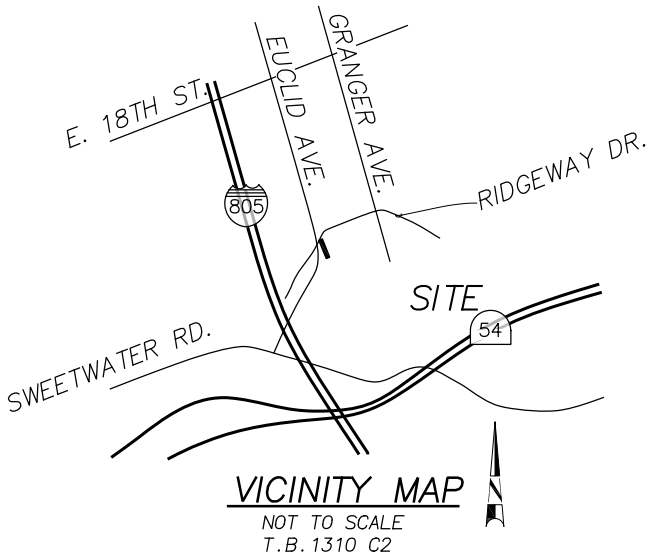
BMP Maintenance Category	Cat. 1 ☒	Cat. 2 ☐	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☐ HOA	☒ Property Owner	☐ County	☐ Other (describe):
Maintenance of BMP into perpetuity	☐ HOA	☒ Property Owner	☐ County	☐ Other (describe):

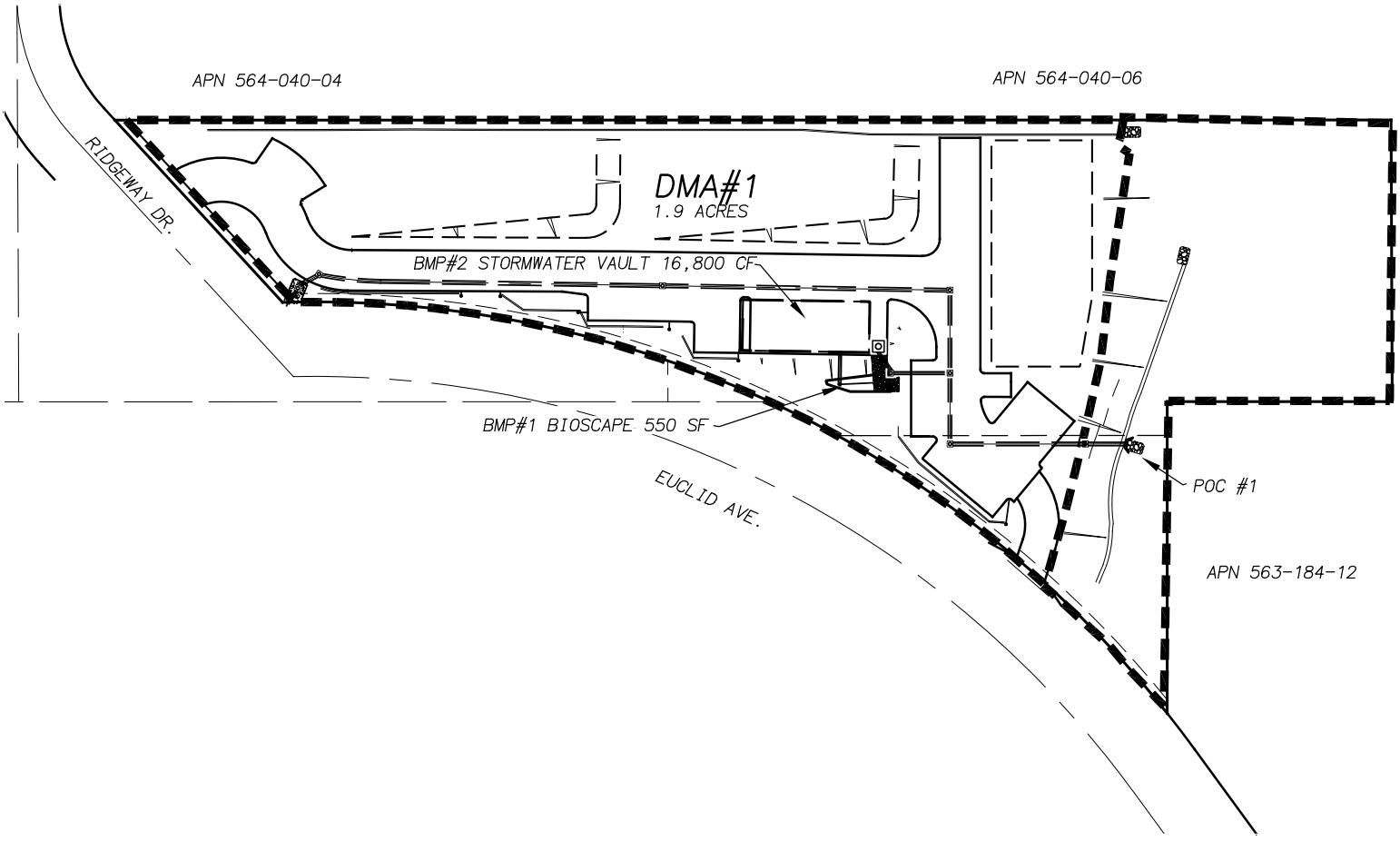
Discussion (As needed; Continue on subsequent pages as necessary)

Detention Vault and flow control sized for HMP & 100-year peak flow mitigation.

[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.

EXHIBIT A





SITE MAP DMA#1 (BMP#1 & BMP#2)

SCALE: 1"=100'

EXHIBIT B

MAINTENANCE PLAN

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

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

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

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

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

Category	#	Description	*i*	*ii*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	DMA 1	DMA 2	unitless
	2	85th Percentile 24-hr Storm Depth	0.55	0.55	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	59,300		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)			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)	24,500	34,850	sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	n/a	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	83,800	34,850	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.72	0.30	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.72	0.30	unitless
	26	Initial Design Capture Volume	2,765	479	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.72	0.30	unitless
	32	Design Capture Volume After Dispersion Techniques	2,765	479	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.72	0.30	unitless
	36	Final Effective Tributary Area	60,336	10,455	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	2,765	479	cubic-feet

No Warning Messages

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

Category	#	Description	*i*	*ii*	Units
Basic Analysis	1	Drainage Basin ID or Name	DMA 1	DMA 2	unitless
	2	85th Percentile Rainfall Depth	0.55	0.55	inches
	3	Predominant NRCS Soil Type Within BMP Location	D	D	unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	unitless
	5	Nature of Restriction	Soil Type	Soil Type	unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.000	in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	4.5%	4.5%	percentage
	12	Fraction of DCV Requiring Retention	0.02	0.02	ratio
	13	Required Retention Volume	55	10	cubic-feet

No Warning Messages

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

Category	#	Description	*i*	Units
BMP Inputs	1	Drainage Basin ID or Name	DMA 1	sq-ft
	2	Design Infiltration Rate Recommended	0.000	in/hr
	3	Design Capture Volume Tributary to BMP	2,765	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	unitless
	6	Does BMP Have an Underdrain?	Underdrain	unitless
	7	Does BMP Utilize Standard or Specialized Media?	Specialized	unitless
	8	Provided Surface Area	550	sq-ft
	9	Provided Surface Ponding Depth	6	inches
	10	Provided Soil Media Thickness	21	inches
	11	Provided Gravel Thickness (Total Thickness)	13	inches
	12	Underdrain Offset	3	inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	inches
	14	Specialized Soil Media Filtration Rate	175.00	in/hr
	15	Specialized Soil Media Pore Space for Retention		unitless
	16	Specialized Soil Media Pore Space for Biofiltration	0.20	unitless
	17	Specialized Gravel Media Pore Space	0.40	unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	unitless
	23	Effective Retention Depth	2.25	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.04	ratio
	25	Calculated Retention Storage Drawdown Time	120	hours
	26	Efficacy of Retention Processes	0.05	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	134	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	2,631	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.5914	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	125.00	in/hr
	31	Soil Media Filtration Rate per Specifications	175.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	125.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	749.97	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.20	inches
	38	Drawdown Time for Surface Ponding	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	0	hours
	40	Total Depth Biofiltered	764.17	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	3,947	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	3,947	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	1,974	cubic-feet
	44	Option 2 - Provided Storage Volume	651	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	cubic-feet

Attention!

- BMPs sized at <3% of the effective tributary areas must be accompanied by Reduced Size BMP Maintenance calculations (see last tab).

-Use of specialized or proprietary media requires submittal of supplemental information outlined in Appendix F of the BMPDM.

-Minimum annual retention criteria are not satisfied for each individual drainage area. Implement additional site design elements, increase structural
-This BMP does not fully satisfy the performance standards for pollutant control for the drainage area.

CONTECH ENGINEERED SOLUTIONS

filterra Bioretention Systems

Filterra Sizing Spreadsheet
San Diego Region
Uniform Intensity Approach
Storm Intensity = 0.20 in/hr

Filterra Infiltration Rate = 175 (in/hr)
Filterra Flow per Square Foot = 0.00405 (ft3/sec/ft2)

Filterra Flow Rate, Q = 0.00405 ft3/sec x Filterra Surface Area
Rational Method, Q = C x I x A
San Diego Multiplier, M = 1.5

Site Flowrate, Q = (C x DI x DA x M x 43560) / (12 x3600)
OR DA = (12 x 3600 x Q) / (C x 43560 x DI x M)

where
Q = Flow (ft3/sec)
DA = Drainage Area (acres)
DI = Design Intensity (in/hr)
C = Runoff coefficient (dimensionless)
M = Multiplier (dimensionless)

$Q = \frac{(0.71 \times 0.2\,in/hr \times 1.9\,Ac. \times 1.5 \times 43560)}{43,000}$

$Q = 0.41\ cfs$

			DI 0.2	C 0.95	C 0.85	C 0.50
Available Filterra Box Sizes			Filterra Flow Rate, Q	100% Imperv. DA	Commercial max DA	Residential max DA
L (ft)	W (ft)	Filterra Surface Area (ft2)	(ft3/sec)	(acres)	(acres)	(acres)
4	4	16	0.0648	0.226	0.252	0.429
6	4	24	0.0972	0.338	0.378	0.643
6.5	4	26	0.1053	0.367	0.410	0.696
8	4	32	0.1296	0.451	0.504	0.857
12	4	48	0.1944	0.677	0.756	1.286
6	6	36	0.1458	0.507	0.567	0.964
8	6	48	0.1944	0.677	0.756	1.286
10	6	60	0.2431	0.846	0.945	1.607
12	6	72	0.2917	1.015	1.134	1.928
13	7	91	0.3686	1.283	1.434	2.437
12	8	96	0.3889	1.353	1.512	2.571
14	8	112	0.4537	1.579	1.765	3.000
16	8	128	0.5185	1.804	2.017	3.428
18	8	144	0.5833	2.030	2.269	3.857
20	8	160	0.6481	2.255	2.521	4.285
22	8	176	0.7130	2.481	2.773	4.714

112 sf →

WASHINGTON STATE DEPARTMENT OF ECOLOGY

September 2019

GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS), ENHANCED, PHOSPHORUS & OIL TREATMENT

For

CONTECH Engineered Solutions Filterra®

Ecology's Decision:

Based on Contech's submissions, including the Final Technical Evaluation Reports, dated August 2019, March 2014, December 2009, and additional information provided to Ecology dated October 9, 2009, Ecology hereby issues the following use level designations:

1. A General Use Level Designation for Basic, Enhanced, Phosphorus, and Oil Treatment for the Filterra® system constructed with a minimum media thickness of 21 inches (1.75 feet), at the following water quality design hydraulic loading rates:

Treatment	Infiltration Rate (in/hr) for use in Sizing
Basic	175
Phosphorus	100
Oil	50
Enhanced	175

2. The Filterra is not appropriate for oil spill-control purposes.
3. Ecology approves Filterra systems for treatment at the hydraulic loading rates listed above, to achieve the maximum water quality design flow rate. Calculate the water quality design flow rates using the following procedures:

- Western Washington: for treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
- Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three flow rate based methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
- Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.

4. This General Use Level Designation has no expiration date, but Ecology may revoke or amend the designation, and is subject to the conditions specified below.

Ecology's Conditions of Use:

Filterra systems shall comply with these conditions shall comply with the following conditions:

1. Design, assemble, install, operate, and maintain the Filterra systems in accordance with applicable Contech Filterra manuals and this Ecology Decision.
2. The minimum size filter surface-area for use in Washington is determined by using the design water quality flow rate (as determined in this Ecology Decision, Item 3, above) and the Infiltration Rate from the table above (use the lowest applicable Infiltration Rate depending on the level of treatment required). Calculate the required area by dividing the water quality design flow rate (cu-ft/sec) by the Infiltration Rate (converted to ft/sec) to obtain required surface area (sq-ft) of the Filterra unit.
3. Each site plan must undergo Contech Filterra review before Ecology can approve the unit for site installation. This will ensure that design parameters including site grading and slope are appropriate for use of a Filterra unit.
4. Filterra media shall conform to the specifications submitted to and approved by Ecology and shall be sourced from Contech Engineered Solutions, LLC with no substitutions.
5. Maintenance includes removing trash, degraded mulch, and accumulated debris from the filter surface and replacing the mulch layer. Use inspections to determine the site-specific maintenance schedules and requirements. Follow maintenance procedures given in the most recent version of the Filterra Operation and Maintenance Manual.
6. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured treatment device.

    - Contech designs Filterra systems for a target maintenance interval of 6 months in the Pacific Northwest. Maintenance includes removing and replacing the mulch layer above the media along with accumulated sediment, trash, and captured organic materials therein, evaluating plant health, and pruning the plant if deemed necessary.
    - Conduct maintenance following manufacturer's guidelines.

7. Filterra systems come in standard sizes.

8. Install the Filterra in such a manner that flows exceeding the maximum Filterra operating rate are conveyed around the Filterra mulch and media and will not resuspend captured sediment.
9. Discharges from the Filterra units shall not cause or contribute to water quality standards violations in receiving waters.

Approved Alternate Configurations

Filterra Internal Bypass - Pipe (FTIB-P)

1. The Filterra® Internal Bypass – Pipe allows for piped-in flow from area drains, grated inlets, trench drains, and/or roof drains. Design capture flows and peak flows enter the structure through an internal slotted pipe. Filterra® inverted the slotted pipe to allow design flows to drop through to a series of splash plates that then disperse the design flows over the top surface of the Filterra® planter area. Higher flows continue to bypass the slotted pipe and convey out the structure.
2. To select a FTIB-P unit, the designer must determine the size of the standard unit using the sizing guidance described above.

Filterra Internal Bypass – Curb (FTIB-C)

1. The Filterra® Internal Bypass –Curb model (FTIB-C) incorporates a curb inlet, biofiltration treatment chamber, and internal high flow bypass in one single structure. Filterra® designed the FTIB-C model for use in a "Sag" or "Sump" condition and will accept flows from both directions along a gutter line. An internal flume tray weir component directs treatment flows entering the unit through the curb inlet to the biofiltration treatment chamber. Flows in excess of the water quality treatment flow rise above the flume tray weir and discharge through a standpipe orifice; providing bypass of untreated peak flows. Americast manufactures the FTIB-C model in a variety of sizes and configurations and you may use the unit on a continuous grade when a single structure providing both treatment and high flow bypass is preferred. The FTIB-C model can also incorporate a separate junction box chamber to allow larger diameter discharge pipe connections to the structure.
2. To select a FTIB-C unit, the designer must determine the size of the standard unit using the sizing guidance described above.

Filterra® Shallow

1. The Filterra Shallow provides additional flexibility for design engineers and designers in situations where various elevation constraints prevent application of a standard Filterra configuration. Engineers can design this system up to six inches shallower than any of the previous Filterra unit configurations noted above.
2. Ecology requires that the Filterra Shallow provide a media contact time equivalent to that of the standard unit. This means that with a smaller depth of media, the surface area must increase.
3. To select a Filterra Shallow System unit, the designer must first identify the size of the standard unit using the modeling guidance described above.
4. Once the size of the standard Filterra unit is established using the sizing technique described above, use information from the following table to select the appropriate size Filterra Shallow System unit.

Shallow Unit Basic, Enhanced, and Oil Treatment Sizing

Standard Depth	Equivalent Shallow Depth
4x4	4x6 or 6x4
4x6 or 6x4	6x6
4x8 or 8x4	6x8 or 8x6
6x6	6x10 or 10x6
6x8 or 8x6	6x12 or 12x6
6x10 or 10x6	13x7

Notes:
1. Shallow Depth Boxes are less than the standard depth of 3.5 feet but no less than 3.0 feet deep (TC to INV).

Applicant: Contech Engineered Solutions, LLC.

Applicant's Address: 11815 NE Glenn Widing Drive
Portland, OR 97220

Application Documents:

- State of Washington Department of Ecology Application for Conditional Use Designation, Americast (September 2006)
- Quality Assurance Project Plan Filterra® Bioretention Filtration System Performance Monitoring, Americast (April 2008)
- Quality Assurance Project Plan Addendum Filterra® Bioretention Filtration System Performance Monitoring, Americast (June 2008)
- Draft Technical Evaluation Report Filterra® Bioretention Filtration System Performance Monitoring, Americast (August 2009)
- Final Technical Evaluation Report Filterra® Bioretention Filtration System Performance Monitoring, Americast (December 2009)
- Technical Evaluation Report Appendices Filterra® Bioretention Filtration System Performance Monitoring, Americast, (August 2009)
- Memorandum to Department of Ecology Dated October 9, 2009 from Americast, Inc. and Herrera Environmental Consultants
- Quality Assurance Project Plan Filterra® Bioretention System Phosphorus treatment and Supplemental Basic and Enhanced Treatment Performance Monitoring, Americast (November 2011)
- Filterra® letter August 24, 2012 regarding sizing for the Filterra® Shallow System.
- University of Virginia Engineering Department Memo by Joanna Crowe Curran, Ph. D dated March 16, 2013 concerning capacity analysis of Filterra® internal weir inlet tray.
- Terraphase Engineering letter to Jodi Mills, P.E. dated April 2, 2013 regarding Terraflume Hydraulic Test, Filterra® Bioretention System and attachments.
- Technical Evaluation Report, Filterra® System Phosphorus Treatment and Supplemental Basic Treatment Performance Monitoring. March 27th, 2014.
- State of Washington Department of Ecology Application for Conditional Use Level Designation, Contech Engineered Solutions (May 2015)

- Quality Assurance Project Plan Filterra® Bioretention System, Contech Engineered Solutions (May 2015)
- Filterra Bioretention System Armco Avenue General Use Level Designation Technical Evaluation Report, Contech Engineered Solutions (August 2019)

Applicant's Use Level Request:

General Level Use Designation for Basic (175 in/hr), Enhanced (175 in/hr), Phosphorus (100 in/hr), and Oil Treatment (50 in/hr).

Applicant's Performance Claims:

Field-testing and laboratory testing show that the Filterra® unit is promising as a stormwater treatment best management practice and can meet Ecology's performance goals for basic, enhanced, phosphorus, and oil treatment.

Findings of Fact:

Field Testing 2015-2019

1. Contech completed field testing of a 4 ft. x 4 ft. Filterra® unit at one site in Hillsboro, Oregon from September 2015 to July 2019. Throughout the monitoring period a total of 24 individual storm events were sampled, of which 23 qualified for TAPE sampling criteria.
2. Contech encountered several unanticipated events and challenges that prevented them from collecting continuous flow and rainfall data. An analysis of the flow data from the sampled events, including both the qualifying and non-qualifying events, demonstrated the system treated over 99 % of the influent flows. Peak flows during these events ranged from 25 % to 250 % of the design flow rate of 29 gallons per minute.
3. Of the 23 TAPE qualified sample events, 13 met requirements for TSS analysis. Influent concentrations ranged from 20.8 mg/L to 83 mg/L, with a mean concentration of 46.3 mg/L. The UCL95 mean effluent concentration was 15.9 mg/L, meeting the 20 mg/L performance goal for Basic Treatment.
4. All 23 TAPE qualified sample events met requirements for dissolved zinc analysis. Influent concentrations range from 0.0384 mg/L to 0.2680 mg/L, with a mean concentration of 0.0807 mg/L. The LCL 95 mean percent removal was 62.9 %, meeting the 60 % performance goal for Enhanced Treatment.
5. Thirteen of the 23 TAPE qualified sample events met requirements for dissolved copper analysis. Influent concentrations ranged from 0.00543 mg/L to 0.01660 mg/L, with a mean concentration of 0.0103 mg/L. The LCL 95 mean percent removal was 41.2 %, meeting the 30 % performance goal for Enhanced Treatment.
6. Total zinc concentrations were analyzed for all 24 sample events. Influent EMCs for total zinc ranged from 0.048 mg/L to 5.290 mg/L with a median of 0.162 mg/L. Corresponding effluent EMCs for total zinc ranged from 0.015 mg/L to 0.067 mg/L with a median of

0.029 mg/L. Total event loadings for the study for total zinc were 316.85 g at the influent and 12.92 g at the effluent sampling location, resulting in a summation of loads removal efficiency of 95.9 %.

7. Total copper concentrations were analyzed for all 24 sample events. Influent EMCs for total copper ranged from 0.003 mg/L to 35.600 mg/L with a median value of 0.043 mg/L. Corresponding effluent EMCs for total copper ranged from 0.002 mg/L to 0.015 mg/L with a median of 0.004 mg/L. Total event loadings for total copper for the study were 1,810.06 g at the influent and 1.90 g at the effluent sampling location, resulting in a summation of loads removal efficiency of 99.9 %.

Field Testing 2013

1. Filterra completed field-testing of a 6.5 ft x 4 ft. unit at one site in Bellingham, Washington. Continuous flow and rainfall data collected from January 1, 2013 through July 23, 2013 indicated that 59 storm events occurred. Water quality data was obtained from 22 storm events. Not all the sampled storms produced information that met TAPE criteria for storm and/or water quality data.
2. The system treated 98.9 % of the total 8-month runoff volume during the testing period. Consequently, the system achieved the goal of treating 91 % of the volume from the site. Stormwater runoff bypassed Filterra treatment during four of the 59 storm events.
3. Of the 22 sampled events, 18 qualified for TSS analysis (influent TSS concentrations ranged from 25 to 138 mg/L). The data were segregated into sample pairs with influent concentration greater than and less than 100 mg/L. The UCL95 mean effluent concentration for the data with influent less than 100 mg/L was 5.2 mg/L, below the 20-mg/L threshold. Although the TAPE guidelines do not require an evaluation of TSS removal efficiency for influent concentrations below 100 mg/L, the mean TSS removal for these samples was 90.1 %. Average removal of influent TSS concentrations greater than 100 mg/L (three events) was 85 %. In addition, the system consistently exhibited TSS removal greater than 80 % at flow rates equivalent to a 100 in/hr infiltration rate and was observed at 150 in/hr.
4. Ten of the 22 sampled events qualified for TP analysis. Americast augmented the dataset using two sample pairs from previous monitoring at the site. Influent TP concentrations ranged from 0.11 to 0.52 mg/L. The mean TP removal for these twelve events was 72.6 %. The LCL95 mean percent removal was 66.0, well above the TAPE requirement of 50 %. Treatment above 50 % was evident at 100 in/hr infiltration rate and as high as 150 in/hr. Consequently, the Filterra test system met the TAPE Phosphorus Treatment goal at 100 in/hr. Influent ortho-P concentrations ranged from 0.005 to 0.012 mg/L; effluent ortho-P concentrations ranged from 0.005 to 0.013 mg/L. The reporting limit/resolution for the ortho-P test method is 0.01 mg/L, therefore the influent and effluent ortho-P concentrations were both at and near non-detect concentrations.

Field Testing 2008-2009

1. Filterra completed field-testing at two sites at the Port of Tacoma. Continuous flow and rainfall data collected during the 2008-2009 monitoring period indicated that 89 storm events occurred. The monitoring obtained water quality data from 27 storm events. Not all the sampled storms produced information that met TAPE criteria for storm and/or water quality data.
2. During the testing at the Port of Tacoma, 98.96 to 99.89 % of the annual influent runoff volume passed through the POT1 and POT2 test systems respectively. Stormwater runoff bypassed the POT1 test system during nine storm events and bypassed the POT2 test system during one storm event. Bypass volumes ranged from 0.13 % to 15.3% of the influent storm volume. Both test systems achieved the 91 % water quality treatment-goal over the 1-year monitoring period.
3. Consultants observed infiltration rates as high as 133 in/hr during the various storms. Filterra did not provide any paired data that identified percent removal of TSS, metals, oil, or phosphorus at an instantaneous observed flow rate.
4. The maximum storm average hydraulic loading rate associated with water quality data is <40 in/hr, with the majority of flow rates < 25 in/hr. The average instantaneous hydraulic loading rate ranged from 8.6 to 53 in/hr.
5. The field data showed a removal rate greater than 80 % for TSS with an influent concentration greater than 20 mg/L at an average instantaneous hydraulic loading rate up to 53 in/hr (average influent concentration of 28.8 mg/L, average effluent concentration of 4.3 mg/L).
6. The field data showed a removal rate generally greater than 54 % for dissolved zinc at an average instantaneous hydraulic loading rate up to 60 in/hr and an average influent concentration of 0.266 mg/L (average effluent concentration of 0.115 mg/L).
7. The field data showed a removal rate generally greater than 40 % for dissolved copper at an average instantaneous hydraulic loading rate up to 35 in/hr and an average influent concentration of 0.0070 mg/L (average effluent concentration of 0.0036 mg/L).
8. The field data showed an average removal rate of 93 % for total petroleum hydrocarbon (TPH) at an average instantaneous hydraulic loading rate up to 53 in/hr and an average influent concentration of 52 mg/L (average effluent concentration of 2.3 mg/L). The data also shows achievement of less than 15 mg/L TPH for grab samples. Filterra provided limited visible sheen data due to access limitations at the outlet monitoring location.
9. The field data showed low percentage removals of total phosphorus at all storm flows at an average influent concentration of 0.189 mg/L (average effluent concentration of 0.171 mg/L). We may relate the relatively poor treatment performance of the Filterra system at this location to influent characteristics for total phosphorus that are unique to the Port of Tacoma site. It appears that the Filterra system will not meet the 50 % removal performance goal when the majority of phosphorus in the runoff is expected to be in the dissolved form.

Laboratory Testing

1. Filterra performed laboratory testing on a scaled down version of the Filterra unit. The lab data showed an average removal from 83-91 % for TSS with influents ranging from 21 to 320 mg/L, 82-84 % for total copper with influents ranging from 0.94 to 2.3 mg/L, and 50-61 % for orthophosphate with influents ranging from 2.46 to 14.37 mg/L.
2. Filterra conducted permeability tests on the soil media.
3. Lab scale testing using Sil-Co-Sil 106 showed removals ranging from 70.1 % to 95.5 % with a median removal of 90.7 %, for influent concentrations ranging from 8.3 to 260 mg/L. Filterra ran these laboratory tests at an infiltration rate of 50 in/hr.
4. Supplemental lab testing conducted in September 2009 using Sil-Co-Sil 106 showed an average removal of 90.6 %. These laboratory tests were run at infiltration rates ranging from 25 to 150 in/hr for influent concentrations ranging from 41.6 to 252.5 mg/L. Regression analysis results indicate that the Filterra system's TSS removal performance is independent of influent concentration in the concentration rage evaluated at hydraulic loading rates of up to 150 in/hr.

Contact Information:

Applicant:
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Contech Engineered Solutions, LLC.
11815 Glenn Widing Dr
Portland, OR 97220
(503) 258-3136
jlehman@conteches.com

Applicant's Website: http://www.conteches.com

Ecology web link: http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html

Ecology:
Douglas C. Howie, P.E.
Department of Ecology
Water Quality Program
(360) 407-6444
douglas.howie@ecy.wa.gov

Date	**Revision**
December 2009	GULD for Basic, Enhanced, and Oil granted, CULD for Phosphorus
September 2011	Extended CULD for Phosphorus Treatment
September 2012	Revised design storm discussion, added Shallow System.
January 2013	Revised format to match Ecology standards, changed Filterra contact information
February 2013	Added FTIB-P system
March 2013	Added FTIB-C system
April 2013	Modified requirements for identifying appropriate size of unit

June 2013	Modified description of FTIB-C alternate configuration
March 2014	GULD awarded for Phosphorus Treatment. GULD updated for a higher flow-rate for Basic Treatment.
June 2014	Revised sizing calculation methods
March 2015	Revised Contact Information
June 2015	CULD for Basic and Enhanced at 100 in/hr infiltration rate
September 2019	GULD for Basic and Enhanced at 175 in/hr infiltration rate

7.5 Identification and Narrative of Receiving Water and Pollutants of Concern

- Complete this sub-attachment *only if flow-thru treatment BMPs are implemented onsite* in lieu of retention or biofiltration BMPs. Unless excepted because of a Prior Lawful Approval[4], PDPs must also participate in an alternative compliance program[5].

A. General Description

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

B. Water Body Impairments and Priorities

List any 303(d) impaired water bodies[6] within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
San Diego Bay	Mercury, PAHs (Polycyclic Aromatic Hydrocarbons) PCBs (Polychlorinated biphenyls)	Heavy Metals

C. Identification of Project Site Pollutants

Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix J.5)

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

[4] See BMPDM Appendix L: Prior Lawful Approval Requirements and Guidance.
[5] See SWQMP Attachment 12 (Alternative Compliance Projects) and BMPDM Appendix J (Offsite Alternative Compliance Requirements and Guidance).
[6] The current list of Section 303(d) impaired water bodies can be found at: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml

Pesticides	☐	☒	☐

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.

June 23, 2022

Vector Control Plan
for
2542 Ridgeway Drive
Grading Plan & SWQMP Ref# PDS2021-LDGRMJ-30273

Project Description

This vector control plan references Grading Plan and the Storm Water Quality Management Plan (SWQMP) for 2542 Ridgeway Drive (PDS2021-LDGRMJ-30273), located at 2542 Ridgeway Drive, National City, California 91950. The site is bound to the north and east by residential developments, cemetery to the south, and Euclid Eve to the west.

The proposed redevelopment will consist of three multi-family buildings with paved private driveways. A proposed private drainage system will convey storm water runoff generated on-site to a proprietary biofiltration basin for water quality treatment and underground storm drain detention storage for hydromodification flow requirements. The proposed storm drain system will convey storm water to the natural drainage course along the south end of the site.

Description of the Facilities

The proposed storage volume of approximately 17,500 cubic-feet will be detained in underground modular detention system. The drawdown time when the underground detention is full exceeds 96 hours. Therefore, flap gates will be installed at the 18-inch inlet and outlet pipes, sealing off the underground storage. The referenced Grading Plans and SWQMP provides construction details of the private storm drain system.

The property owner shall maintain the proposed private drainage system and record a "Maintenance Notification Agreement for Category 1 Stormwater Structural BMP's" as part of the approval of the Grading Plans and SWQMP.

Goals of the Plan

Given that a vector is any insect, arthropod, rodent or other animal of public health significance that can cause human discomfort, injury or is capable of harboring or transmitting a causative agent of human disease, the objective of this *Vector Control Plan* is to prevent mosquito breeding and provide public awareness about vectors that could be encountered.

This Vector Control Plan is also an agreement with the *County of San Diego* to affirm a commitment to control mosquito breeding as required by the State of California Health and Safety Code § 2060-2067.

Description of Water Management

Prevention of mosquito breeding will utilize best management practices as advised by the *San Diego County Department of Environmental Health* (DEH). These include the following:

- Standing Water: Standing water in storage container between storm events outside of normal use timeframe for the stored water. Normal use timeframe is 284 hours following a storm event.

- Sediment & Debris Management: Remove accumulated sediment or debris from storage pipe. Access manholes upstream and downstream of storage pipe

- Outlet blocked: Visually check and clear blockage.

- Vector Control: If mosquitos/larvae are observed; first, immediately remove any standing water by using water as intended for irrigation or alternative grey water, or by dispersing to landscaping; second, check cistern outlet for blockage and clear blockage if applicable to restore drainage.(included in Standing Water Maintenance Activity)

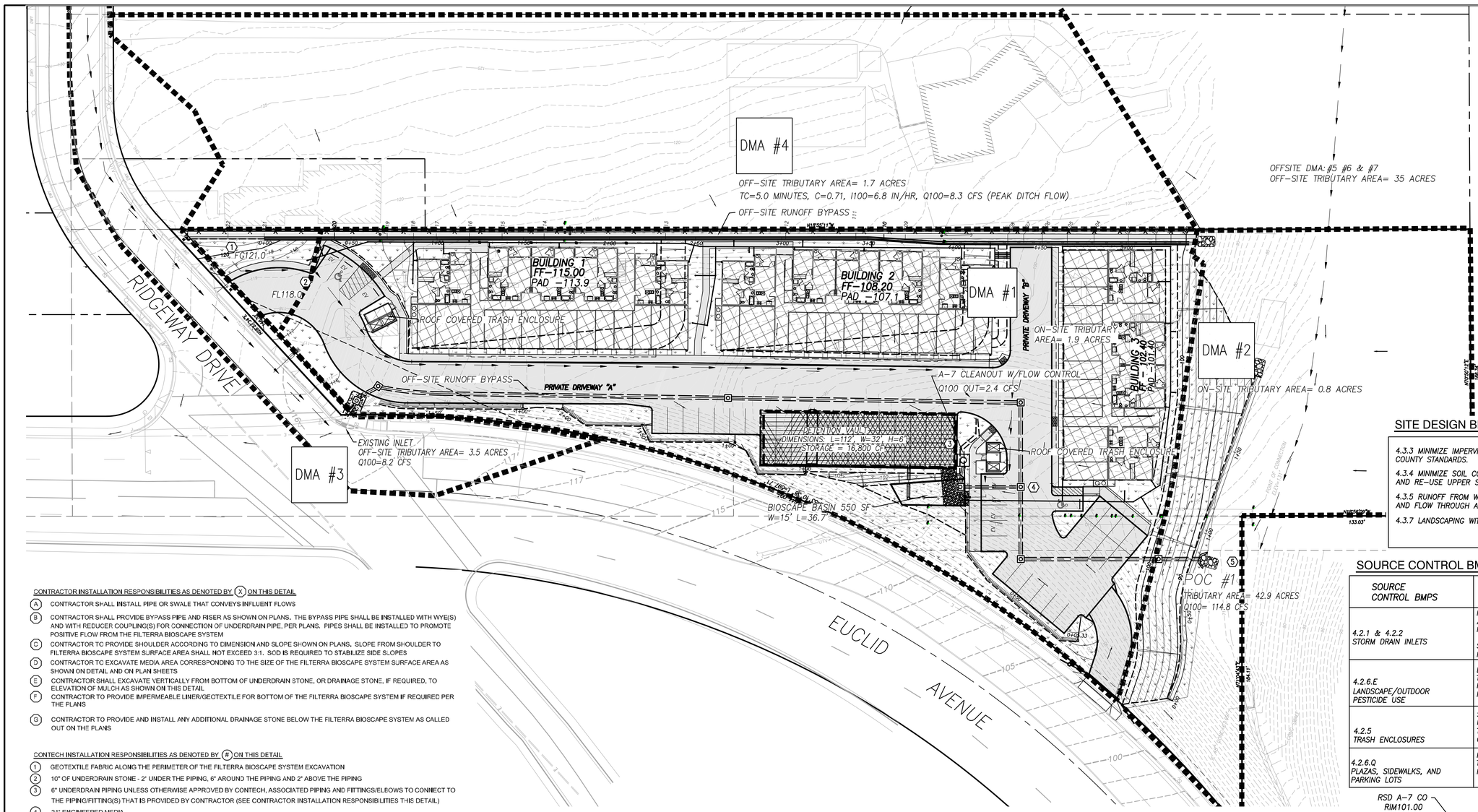
Access for Vector Control

The *County of San Diego* and any DEH authorized agent is hereby granted egress for purposes of vector control and public health related activities. This includes the introduction of mosquito fish, placement of adult mosquito monitors or any other best management practice used by DEH.

Agreement

Name/Title Applicant BC EUCLID LLC ABRAHAM EDID, MANAGER — Date 11/21/22

Name.Title DEH Agent GREGORY SLAWSON, SR. VECTOR ECOLOGIST — Date 11/21/22



SITE DESIGN BMPS

4.3.3 MINIMIZE IMPERVIOUS AREA: RESIDENTIAL STREETS ARE AT THE MINIMUM REQUIRED WIDTH PER COUNTY STANDARDS.

4.3.4 MINIMIZE SOIL COMPACTION: RE-TILL SOILS COMPACTED BY CONSTRUCTION VEHICLES. COLLECT AND RE-USE UPPER SOIL LAYERS DEVELOPMENT SITE CONTAINING ORGANIC MATERIALS.

4.3.5 RUNOFF FROM WALKS AND ROOF DRAIN DOWNSPOUTS SHALL DISCHARGE ONTO SPLASH BLOCKS AND FLOW THROUGH ADJACENT LANDSCAPE AREA BEFORE ENTERING BIORETENTION BASINS

4.3.7 LANDSCAPING WITH DROUGHT TOLERANT SPECIES

SOURCE CONTROL BMPs

SOURCE CONTROL BMPS	PROJECT IMPLEMENTATION
4.2.1 & 4.2.2 STORM DRAIN INLETS	MARK ALL INLETS WITH THE WORDS "NO DUMPING! DRAINS TO WATERWAYS" IN ENGLISH AND "NO CONTAMINE" IN SPANISH. MAINTAIN AND PERIODICALLY REPLACE INLET MARKINGS. SEE APPLICABLE OPERATIONAL BMPS IN CASQA FACT SHEET SC-44, "DRAINAGE SYSTEM MAINTENANCE."
4.2.6.E LANDSCAPE/OUTDOOR PESTICIDE USE	LANDSCAPE HAS BEEN DESIGNED PER CITY OF SAN SAN DIEGO LANDSCAPE STANDARDS TO MINIMIZE IRRIGATION AND RUNOFF, AND TO MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES THAT CAN CONTRIBUTE TO STORMWATER POLLUTION. SEE APPLICABLE BMPS IN CASQA FACT SHEETS SC-41, "BUILDING AND GROUNDS MAINTENANCE."
4.2.5 TRASH ENCLOSURES	STORAGE AREA IS PAVED WITH CONCRETE AND DESIGN NOT TO ALLOW RUN-ON FROM ADJOINING AREAS, WALLED AND CONTAINS A ROOF. SIGNS ON DUMPSTER WITH THE WORDS "DO NOT DUMP HAZARDOUS MATERIAL HERE" OR SIMILAR APPROVED BY CITY. SEE CASQA FACT SHEET SC-34, "WASTE HANDLING AND DISPOSAL."
4.2.6.Q PLAZAS, SIDEWALKS, AND PARKING LOTS	PLAZAS, SIDEWALKS, AND PARKING LOTS SHALL BE SWEPT REGULARLY AND ONCE PRIOR TO OCTOBER 1ST TO PREVENT THE ACCUMULATION OF LITTER AND DEBRIS. SEE CASQA FACT SHEET SC-41, "BUILDING AND GROUNDS MAINTENANCE."

CONTRACTOR INSTALLATION RESPONSIBILITIES AS DENOTED BY (X) ON THIS DETAIL

(A) CONTRACTOR SHALL INSTALL PIPE OR SWALE THAT CONVEYS INFLUENT FLOWS

(B) CONTRACTOR SHALL PROVIDE BYPASS PIPE AND RISER AS SHOWN ON PLANS. THE BYPASS PIPE SHALL BE INSTALLED WITH WYE(S) AND WITH REDUCER COUPLING(S) FOR CONNECTION OF UNDERDRAIN PIPE, PER PLANS. PIPES SHALL BE INSTALLED TO PROMOTE POSITIVE FLOW FROM THE FILTERRA BIOSCAPE SYSTEM

(C) CONTRACTOR TC PROVIDE SHOULDER ACCORDING TO DIMENSION AND SLOPE SHOWN ON PLANS. SLOPE FROM SHOULDER TO FILTERRA BIOSCAPE SYSTEM SURFACE AREA SHALL NOT EXCEED 3:1. SOD IS REQUIRED TO STABILIZE SIDE SLOPES

(D) CONTRACTOR TC EXCAVATE MEDIA AREA CORRESPONDING TO THE SIZE OF THE FILTERRA BIOSCAPE SYSTEM SURFACE AREA AS SHOWN ON DETAIL AND ON PLAN SHEETS

(E) CONTRACTOR SHALL EXCAVATE VERTICALLY FROM BOTTOM OF UNDERDRAIN STONE, OR DRAINAGE STONE, IF REQUIRED, TO ELEVATION OF MULCH AS SHOWN ON THIS DETAIL

(F) CONTRACTOR TO PROVIDE IMPERMEABLE LINER/GEOTEXTILE FOR BOTTOM OF THE FILTERRA BIOSCAPE SYSTEM IF REQUIRED PER THE PLANS

(G) CONTRACTOR TO PROVIDE AND INSTALL ANY ADDITIONAL DRAINAGE STONE BELOW THE FILTERRA BIOSCAPE SYSTEM AS CALLED OUT ON THE PLANS

CONTECH INSTALLATION RESPONSIBILITIES AS DENOTED BY (#) ON THIS DETAIL

(1) GEOTEXTILE FABRIC ALONG THE PERIMETER OF THE FILTERRA BIOSCAPE SYSTEM EXCAVATION

(2) 10" OF UNDERDRAIN STONE - 2' UNDER THE PIPING, 6" AROUND THE PIPING AND 2" ABOVE THE PIPING

(3) 6" UNDERDRAIN PIPING UNLESS OTHERWISE APPROVED BY CONTECH, ASSOCIATED PIPING AND FITTINGS/ELEOWS TO CONNECT TO THE PIPING/FITTING(S) THAT IS PROVIDED BY CONTRACTOR (SEE CONTRACTOR INSTALLATION RESPONSIBILITIES THIS DETAIL)

(4) 21" ENGINEERED MEDIA

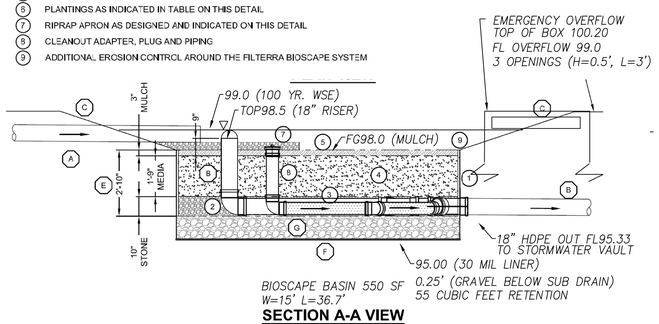
(5) 3" DOUBLESHREDDED HARDWOOD MULCH OVER ENTIRE FILTERRA BIOSCAPE SYSTEM SURFACE AREA

(6) PLANTINGS AS INDICATED IN TABLE ON THIS DETAIL

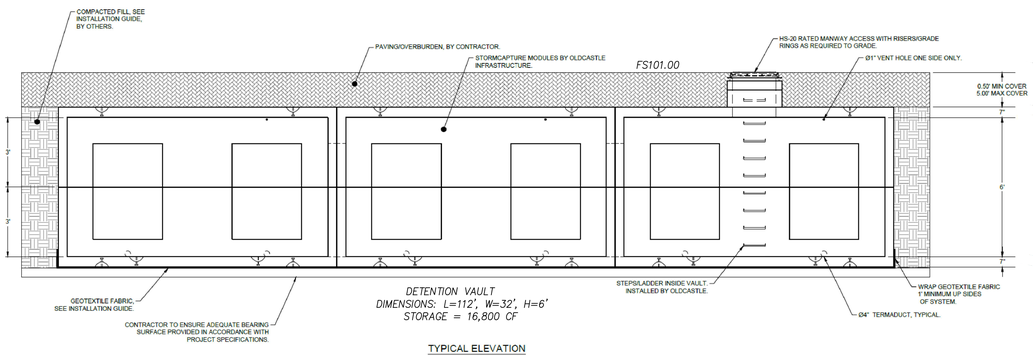
(7) RIPRAP APRON AS DESIGNED AND INDICATED ON THIS DETAIL

(8) CLEANOUT ADAPTER, PLUG AND PIPING

(9) ADDITIONAL EROSION CONTRCL AROUND THE FILTERRA BIOSCAPE SYSTEM



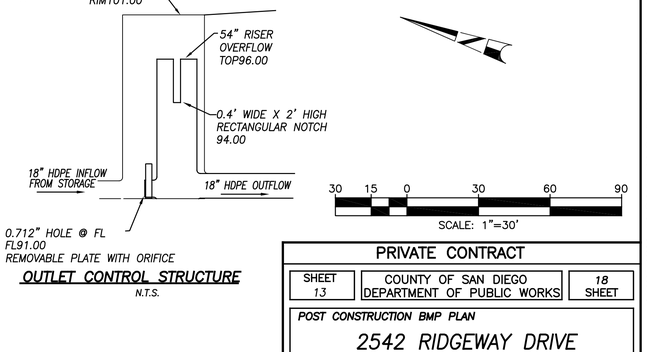
SECTION A-A VIEW



DETENTION VAULT
DIMENSIONS: L=112', W=32', H=6'
STORAGE = 16,800 CF

TYPICAL ELEVATION
NTS

STORMCAPTURE ®
DETENTION SYSTEM



OUTLET CONTROL STRUCTURE
N.T.S.

COUNTY APPROVED CHANGES

NO.	DESCRIPTION	APPROVED BY	DATE

BENCHMARK

DESCRIPTION: CITY OF SAN DIEGO BENCHMARK NO. 16070
LOCATION: BRASS PLUG IN TOP OF NORTHEAST CURB RETURN AT INTERSECTION OF RACHEL AVE. AND ROANOKE ST.
RECORD FROM: CITY OF SAN DIEGO
ELEVATION: 167.361 DATUM: NGVD-29

PRIVATE CONTRACT

SHEET 13 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 18 SHEET

POST CONSTRUCTION BMP PLAN

2542 RIDGEWAY DRIVE NATIONAL CITY, CA 91950

CALIFORNIA COORDINATE INDEX 182-1743

APPROVED FOR: WILLIAM P. MORGAN COUNTY ENGINEER
BY:
DATE:

ENGINEER OF WORK: WILLIAM LUNDSTROM
EXP. 6-30-23 R.C.E. 61630

GRADING PERMIT NO. PDS2020-LDGRMJ-30273

Lundstrom
Engineering and Surveying, Inc.
3333 Camino del Rio South, #330 • San Diego, CA 92108
Phone (619) 814-1220 • Fax (619) 641-5910

ENGINEER'S NAME: LUNDSTROM ENGINEERING & SURVEYING
PHONE NO. (619) 814-1220

Drawing: z:\proj\L209-04\dwg\gp\L209-04 gp-13 post construction bmp.dwg Plot Date: 11/29/2022 2:02 PM

DPW2021-WWSWCP-00064 J.N. L209-04

SDHM 3.1

PROJECT REPORT

General Model Information

Project Name:	ridgeway c 11-01-2022
Site Name:	Ridgeway A
Site Address:	
City:	
Report Date:	11/3/2022
Gage:	BONITA
Data Start:	10/01/1971
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.000
Version Date:	2020/04/07

POC Thresholds

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

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Moderate	1.9
Pervious Total	1.9
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.9

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
D,Urban,Moderate	0.54
Pervious Total	0.54

Impervious Land Use	acre
IMPERVIOUS-FLAT	1.36
Impervious Total	1.36
Basin Total	1.9

Element Flows To:

Surface	Interflow	Groundwater
Vault 1	Vault 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault 1

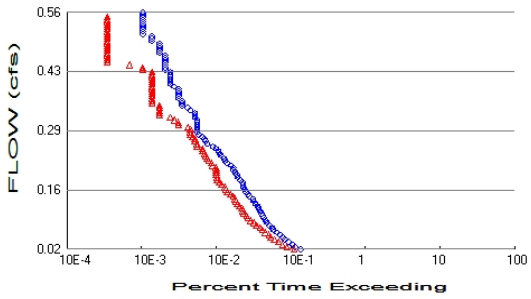
Width: 53.7834401787442 ft.
Length: 53.7834401787442 ft.
Depth: 6 ft.
Discharge Structure
Riser Height: 5 ft.
Riser Diameter: 54 in.
Notch Type: Rectangular
Notch Width: 0.400 ft.
Notch Height: 2.000 ft.
Orifice 1 Diameter: 0.69993 in Elevation:0 ft.
Element Flows To:
Outlet 1 Outlet 2

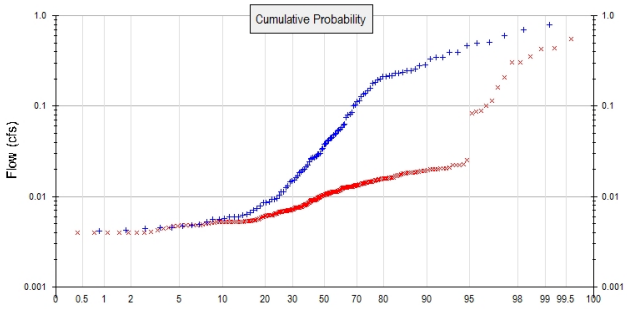
Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.066	0.000	0.000	0.000
0.0667	0.066	0.004	0.003	0.000
0.1333	0.066	0.008	0.004	0.000
0.2000	0.066	0.013	0.005	0.000
0.2667	0.066	0.017	0.006	0.000
0.3333	0.066	0.022	0.007	0.000
0.4000	0.066	0.026	0.008	0.000
0.4667	0.066	0.031	0.009	0.000
0.5333	0.066	0.035	0.009	0.000
0.6000	0.066	0.039	0.010	0.000
0.6667	0.066	0.044	0.010	0.000
0.7333	0.066	0.048	0.011	0.000
0.8000	0.066	0.053	0.011	0.000
0.8667	0.066	0.057	0.012	0.000
0.9333	0.066	0.062	0.012	0.000
1.0000	0.066	0.066	0.013	0.000
1.0667	0.066	0.070	0.013	0.000
1.1333	0.066	0.075	0.014	0.000
1.2000	0.066	0.079	0.014	0.000
1.2667	0.066	0.084	0.015	0.000
1.3333	0.066	0.088	0.015	0.000
1.4000	0.066	0.093	0.015	0.000
1.4667	0.066	0.097	0.016	0.000
1.5333	0.066	0.101	0.016	0.000
1.6000	0.066	0.106	0.016	0.000
1.6667	0.066	0.110	0.017	0.000
1.7333	0.066	0.115	0.017	0.000
1.8000	0.066	0.119	0.017	0.000
1.8667	0.066	0.124	0.018	0.000
1.9333	0.066	0.128	0.018	0.000
2.0000	0.066	0.132	0.018	0.000
2.0667	0.066	0.137	0.019	0.000
2.1333	0.066	0.141	0.019	0.000
2.2000	0.066	0.146	0.019	0.000
2.2667	0.066	0.150	0.020	0.000
2.3333	0.066	0.154	0.020	0.000
2.4000	0.066	0.159	0.020	0.000

2.4667	0.066	0.163	0.020	0.000
2.5333	0.066	0.168	0.021	0.000
2.6000	0.066	0.172	0.021	0.000
2.6667	0.066	0.177	0.021	0.000
2.7333	0.066	0.181	0.022	0.000
2.8000	0.066	0.185	0.022	0.000
2.8667	0.066	0.190	0.022	0.000
2.9333	0.066	0.194	0.022	0.000
3.0000	0.066	0.199	0.023	0.000
3.0667	0.066	0.203	0.045	0.000
3.1333	0.066	0.208	0.086	0.000
3.2000	0.066	0.212	0.138	0.000
3.2667	0.066	0.216	0.197	0.000
3.3333	0.066	0.221	0.263	0.000
3.4000	0.066	0.225	0.334	0.000
3.4667	0.066	0.230	0.409	0.000
3.5333	0.066	0.234	0.488	0.000
3.6000	0.066	0.239	0.570	0.000
3.6667	0.066	0.243	0.653	0.000
3.7333	0.066	0.247	0.739	0.000
3.8000	0.066	0.252	0.826	0.000
3.8667	0.066	0.256	0.914	0.000
3.9333	0.066	0.261	1.003	0.000
4.0000	0.066	0.265	1.092	0.000
4.0667	0.066	0.270	1.200	0.000
4.1333	0.066	0.274	1.312	0.000
4.2000	0.066	0.278	1.428	0.000
4.2667	0.066	0.283	1.546	0.000
4.3333	0.066	0.287	1.668	0.000
4.4000	0.066	0.292	2.358	0.000
4.4667	0.066	0.296	2.527	0.000
4.5333	0.066	0.301	2.699	0.000
4.6000	0.066	0.305	2.875	0.000
4.6667	0.066	0.309	3.055	0.000
4.7333	0.066	0.314	3.239	0.000
4.8000	0.066	0.318	3.426	0.000
4.8667	0.066	0.323	3.617	0.000
4.9333	0.066	0.327	3.811	0.000
5.0000	0.066	0.332	4.008	0.000
5.0667	0.066	0.336	4.831	0.000
5.1333	0.066	0.340	6.333	0.000
5.2000	0.066	0.345	8.275	0.000
5.2667	0.066	0.349	10.57	0.000
5.3333	0.066	0.354	13.17	0.000
5.4000	0.066	0.358	16.03	0.000
5.4667	0.066	0.363	19.13	0.000
5.5333	0.066	0.367	22.42	0.000
5.6000	0.066	0.371	25.90	0.000
5.6667	0.066	0.376	29.52	0.000
5.7333	0.066	0.380	33.27	0.000
5.8000	0.066	0.385	37.11	0.000
5.8667	0.066	0.389	41.03	0.000
5.9333	0.066	0.394	44.98	0.000
6.0000	0.066	0.398	48.94	0.000
6.0667	0.066	0.402	52.89	0.000
6.1333	0.000	0.000	56.79	0.000

Analysis Results
POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.9
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.54
Total Impervious Area: 1.36

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.23855
5 year	0.406261
10 year	0.561449
25 year	0.744842

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.022328
5 year	0.226606
10 year	0.392587
25 year	0.494665

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0239	391	322	82	Pass
0.0293	332	257	77	Pass
0.0347	307	225	73	Pass
0.0401	269	197	73	Pass
0.0456	242	175	72	Pass
0.0510	227	155	68	Pass
0.0564	208	148	71	Pass
0.0619	192	132	68	Pass
0.0673	169	120	71	Pass
0.0727	163	112	68	Pass
0.0782	148	100	67	Pass
0.0836	140	94	67	Pass
0.0890	134	83	61	Pass
0.0944	126	77	61	Pass
0.0999	122	74	60	Pass
0.1053	117	67	57	Pass
0.1107	113	66	58	Pass
0.1162	108	64	59	Pass
0.1216	104	59	56	Pass
0.1270	97	55	56	Pass
0.1325	91	54	59	Pass
0.1379	90	52	57	Pass
0.1433	81	49	60	Pass
0.1488	77	45	58	Pass
0.1542	73	41	56	Pass
0.1596	69	39	56	Pass
0.1650	67	38	56	Pass
0.1705	66	34	51	Pass
0.1759	65	32	49	Pass
0.1813	61	30	49	Pass
0.1868	57	30	52	Pass
0.1922	55	29	52	Pass
0.1976	52	29	55	Pass
0.2031	49	29	59	Pass
0.2085	49	29	59	Pass
0.2139	46	26	56	Pass
0.2193	40	25	62	Pass
0.2248	38	23	60	Pass
0.2302	37	22	59	Pass
0.2356	34	21	61	Pass
0.2411	33	20	60	Pass
0.2465	31	19	61	Pass
0.2519	29	19	65	Pass
0.2574	26	16	61	Pass
0.2628	22	16	72	Pass
0.2682	21	15	71	Pass
0.2736	20	15	75	Pass
0.2791	19	14	73	Pass
0.2845	17	13	76	Pass
0.2899	16	13	81	Pass
0.2954	16	13	81	Pass
0.3008	16	12	75	Pass
0.3062	16	9	56	Pass

0.3117	16	9	56	Pass
0.3171	16	8	50	Pass
0.3225	15	7	46	Pass
0.3279	15	5	33	Pass
0.3334	15	5	33	Pass
0.3388	13	5	38	Pass
0.3442	12	5	41	Pass
0.3497	10	5	50	Pass
0.3551	10	4	40	Pass
0.3605	10	4	40	Pass
0.3660	9	4	44	Pass
0.3714	9	4	44	Pass
0.3768	9	4	44	Pass
0.3823	9	4	44	Pass
0.3877	9	4	44	Pass
0.3931	8	4	50	Pass
0.3985	7	4	57	Pass
0.4040	7	4	57	Pass
0.4094	7	4	57	Pass
0.4148	7	4	57	Pass
0.4203	7	4	57	Pass
0.4257	7	4	57	Pass
0.4311	6	3	50	Pass
0.4366	6	3	50	Pass
0.4420	6	2	33	Pass
0.4474	6	1	16	Pass
0.4528	6	1	16	Pass
0.4583	6	1	16	Pass
0.4637	6	1	16	Pass
0.4691	5	1	20	Pass
0.4746	5	1	20	Pass
0.4800	5	1	20	Pass
0.4854	5	1	20	Pass
0.4909	5	1	20	Pass
0.4963	4	1	25	Pass
0.5017	4	1	25	Pass
0.5071	4	1	25	Pass
0.5126	3	1	33	Pass
0.5180	3	1	33	Pass
0.5234	3	1	33	Pass
0.5289	3	1	33	Pass
0.5343	3	1	33	Pass
0.5397	3	1	33	Pass
0.5452	3	1	33	Pass
0.5506	3	1	33	Pass
0.5560	3	0	0	Pass
0.5614	3	0	0	Pass

Water Quality

Drawdown Time Results

Pond: Vault 1

Days	Stage(feet)	Percent of Total Run Time
1	0.439	5.0996
2	0.760	3.1963
3	1.161	1.8786
4	1.641	1.0383
5	2.199	0.5057

Maximum Stage: 5.000 Drawdown Time: 05 00:00:10

Model Default Modifications

Total of 0 changes have been made.

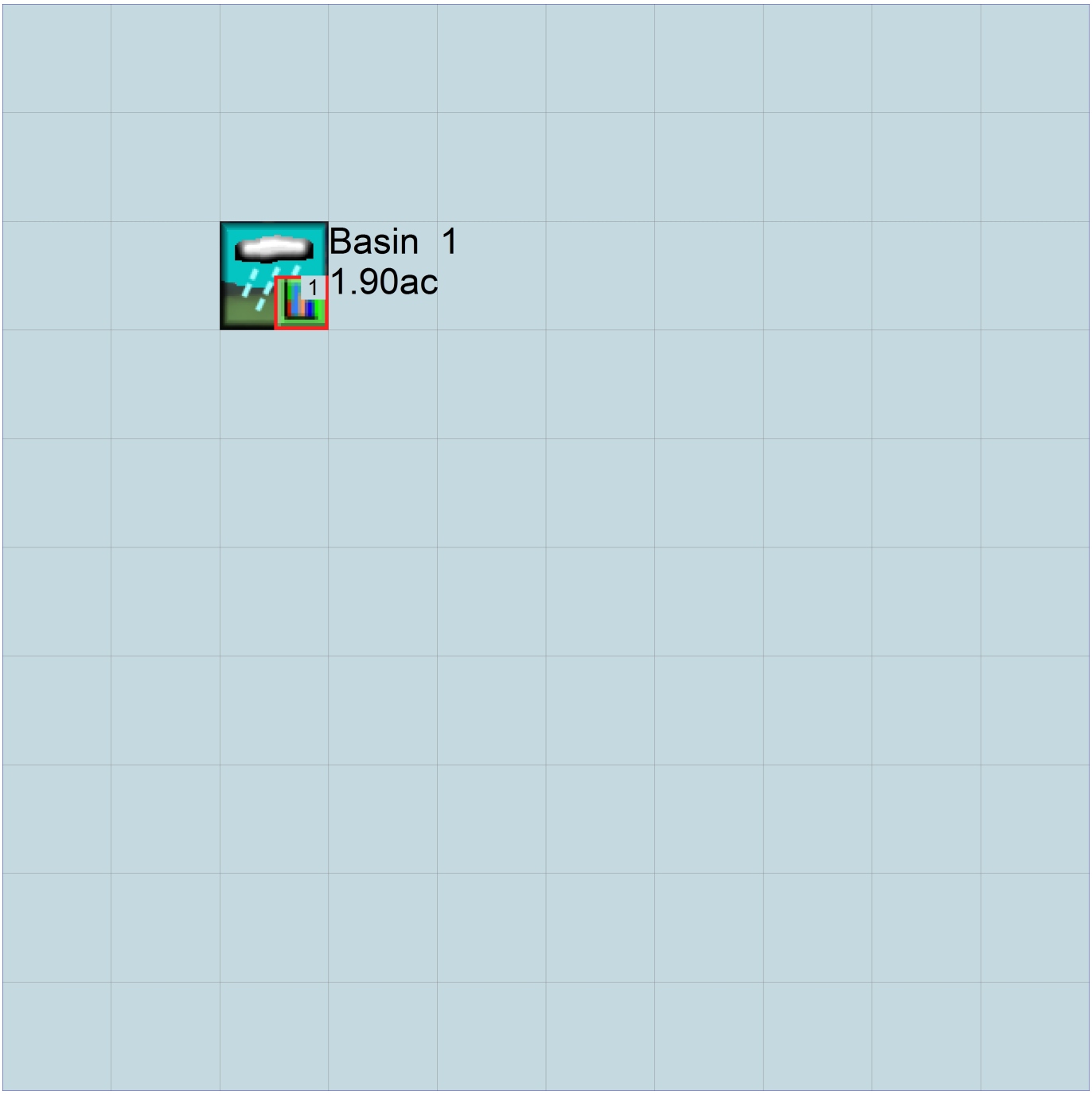
PERLND Changes

No PERLND changes have been made.

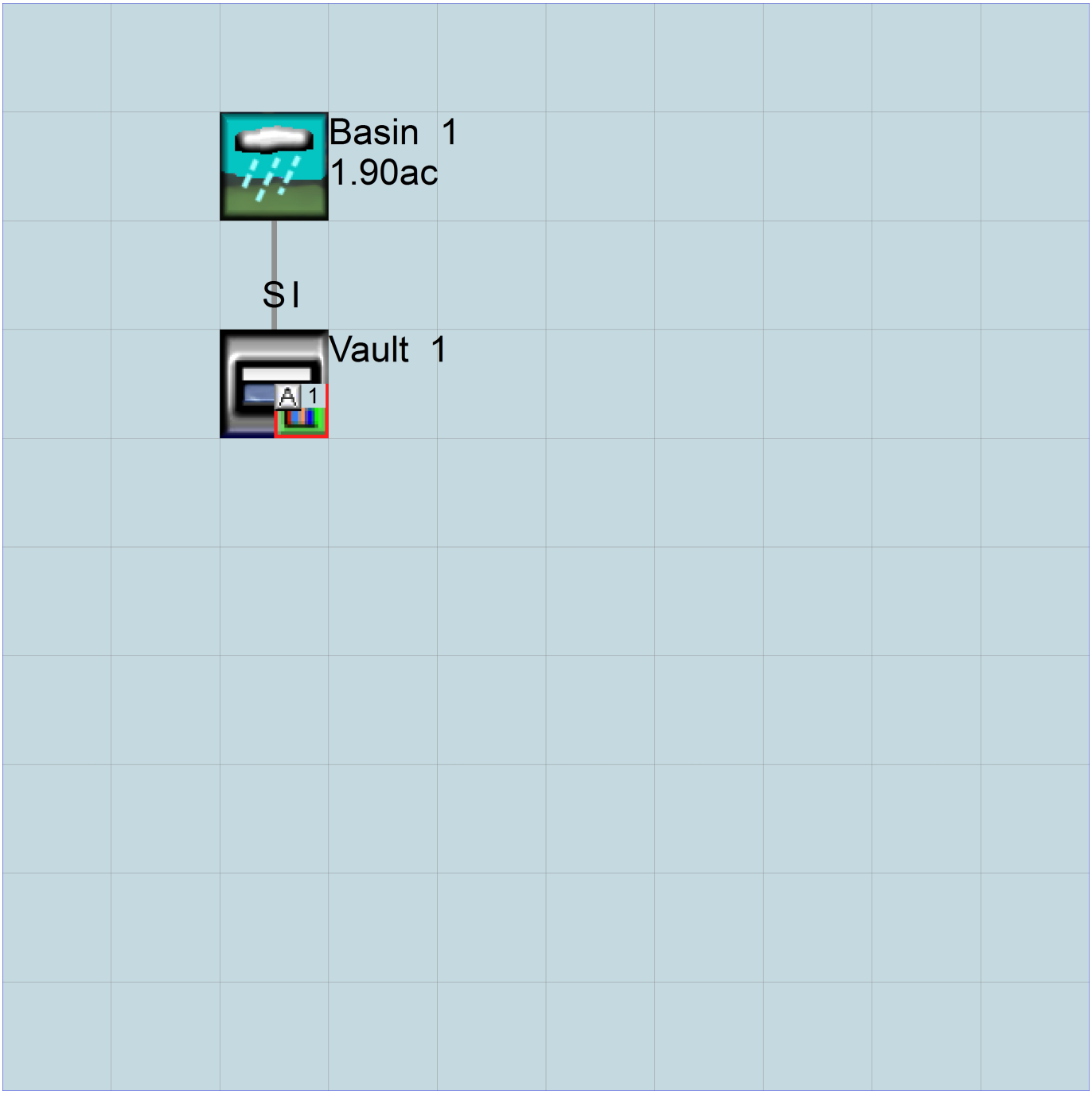
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1971 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   ridgeway c 11-01-2022.wdm
MESSU      25   Mitridgeway c 11-01-2022.MES
           27   Mitridgeway c 11-01-2022.L61
           28   Mitridgeway c 11-01-2022.L62
           30   POCridgeway c 11-01-20221.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      47
      IMPLND       1
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Vault  1                   MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         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           ***
   47      D,Urban,Moderate       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 ***
   47         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  *********
```

```
 47         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 ***
   47         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
   47              0       3.5     0.025        50       0.1       2.5     0.915
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   47              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 ***
   47              0       0.6      0.03         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  ***
   47       0.6  0.6  0.6  0.6  0.7  0.7  0.7  0.7  0.7  0.6  0.6  0.6
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   47       0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  0.1  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
   47              0         0      0.15         0         1      0.05         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#   ***
Basin  1***
PERLND  47                       0.54     RCHRES   1      2
PERLND  47                       0.54     RCHRES   1      3
IMPLND   1                       1.36     RCHRES   1      5

******Routing******
PERLND  47                       0.54     COPY     1     12
IMPLND   1                       1.36     COPY     1     15
PERLND  47                       0.54     COPY     1     13
RCHRES   1                          1     COPY   501     16
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



<-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     Vault  1                1    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
  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
  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  0  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       0.0       0.5       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  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   92    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.066406  0.000000  0.000000
  0.066667  0.066406  0.004427  0.003433
  0.133333  0.066406  0.008854  0.004854
  0.200000  0.066406  0.013281  0.005945
  0.266667  0.066406  0.017708  0.006865
  0.333333  0.066406  0.022135  0.007676
  0.400000  0.066406  0.026563  0.008408
  0.466667  0.066406  0.030990  0.009082
  0.533333  0.066406  0.035417  0.009709
  0.600000  0.066406  0.039844  0.010298
  0.666667  0.066406  0.044271  0.010855
  0.733333  0.066406  0.048698  0.011385
  0.800000  0.066406  0.053125  0.011891
  0.866667  0.066406  0.057552  0.012376
  0.933333  0.066406  0.061979  0.012844
  1.000000  0.066406  0.066406  0.013294
  1.066667  0.066406  0.070833  0.013730
  1.133333  0.066406  0.075260  0.014153
  1.200000  0.066406  0.079688  0.014563
  1.266667  0.066406  0.084115  0.014962
  1.333333  0.066406  0.088542  0.015351
  1.400000  0.066406  0.092969  0.015730
  1.466667  0.066406  0.097396  0.016100
  1.533333  0.066406  0.101823  0.016462
  1.600000  0.066406  0.106250  0.016816
  1.666667  0.066406  0.110677  0.017163
  1.733333  0.066406  0.115104  0.017503
  1.800000  0.066406  0.119531  0.017836
  1.866667  0.066406  0.123958  0.018164
  1.933333  0.066406  0.128386  0.018485
  2.000000  0.066406  0.132813  0.018801
  2.066667  0.066406  0.137240  0.019112
  2.133333  0.066406  0.141667  0.019418
  2.200000  0.066406  0.146094  0.019719
  2.266667  0.066406  0.150521  0.020015
  2.333333  0.066406  0.154948  0.020307
  2.400000  0.066406  0.159375  0.020596
  2.466667  0.066406  0.163802  0.020880
  2.533333  0.066406  0.168229  0.021160
  2.600000  0.066406  0.172656  0.021437
  2.666667  0.066406  0.177083  0.021710
  2.733333  0.066406  0.181511  0.021979
```

```
  2.800000  0.066406  0.185938  0.022246
  2.866667  0.066406  0.190365  0.022509
  2.933333  0.066406  0.194792  0.022769
  3.000000  0.066406  0.199219  0.023027
  3.066667  0.066406  0.203646  0.045903
  3.133333  0.066406  0.208073  0.086654
  3.200000  0.066406  0.212500  0.138154
  3.266667  0.066406  0.216927  0.197670
  3.333333  0.066406  0.221354  0.263526
  3.400000  0.066406  0.225781  0.334528
  3.466667  0.066406  0.230209  0.409754
  3.533333  0.066406  0.234636  0.488453
  3.600000  0.066406  0.239063  0.569995
  3.666667  0.066406  0.243490  0.653833
  3.733333  0.066406  0.247917  0.739485
  3.800000  0.066406  0.252344  0.826521
  3.866667  0.066406  0.256771  0.914551
  3.933333  0.066406  0.261198  1.003216
  4.000000  0.066406  0.265625  1.092189
  4.066667  0.066406  0.270052  1.200726
  4.133333  0.066406  0.274479  1.312702
  4.200000  0.066406  0.278906  1.428013
  4.266667  0.066406  0.283334  1.546566
  4.333333  0.066406  0.287761  1.668273
  4.400000  0.066406  0.292188  2.358320
  4.466667  0.066406  0.296615  2.526956
  4.533333  0.066406  0.301042  2.699464
  4.600000  0.066406  0.305469  2.875757
  4.666667  0.066406  0.309896  3.055757
  4.733333  0.066406  0.314323  3.239388
  4.800000  0.066406  0.318750  3.426580
  4.866667  0.066406  0.323177  3.617266
  4.933333  0.066406  0.327604  3.811383
  5.000000  0.066406  0.332032  4.008871
  5.066667  0.066406  0.336459  4.831157
  5.133333  0.066406  0.340886  6.333040
  5.200000  0.066406  0.345313  8.275949
  5.266667  0.066406  0.349740  10.57334
  5.333333  0.066406  0.354167  13.17282
  5.400000  0.066406  0.358594  16.03599
  5.466667  0.066406  0.363021  19.13104
  5.533333  0.066406  0.367448  22.42942
  5.600000  0.066406  0.371875  25.90403
  5.666667  0.066406  0.376302  29.52824
  5.733333  0.066406  0.380729  33.27534
  5.800000  0.066406  0.385157  37.11829
  5.866667  0.066406  0.389584  41.02963
  5.933333  0.066406  0.394011  44.98148
  6.000000  0.066406  0.398438  48.94574
  6.066667  0.066406  0.402865  52.89423
  END FTABLE  1
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  47     EXTNL  SURLI

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   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     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
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       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


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

Legal Notice

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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
POC #1		South property line.
		.

8.3 Geomorphic Assessment of Receiving Water Channels

Insert Geomorphic Assessment behind this cover page or submit as a separate stand-alone document labeled Sub-attachment 8.3.

8.4 Vector Control Plan

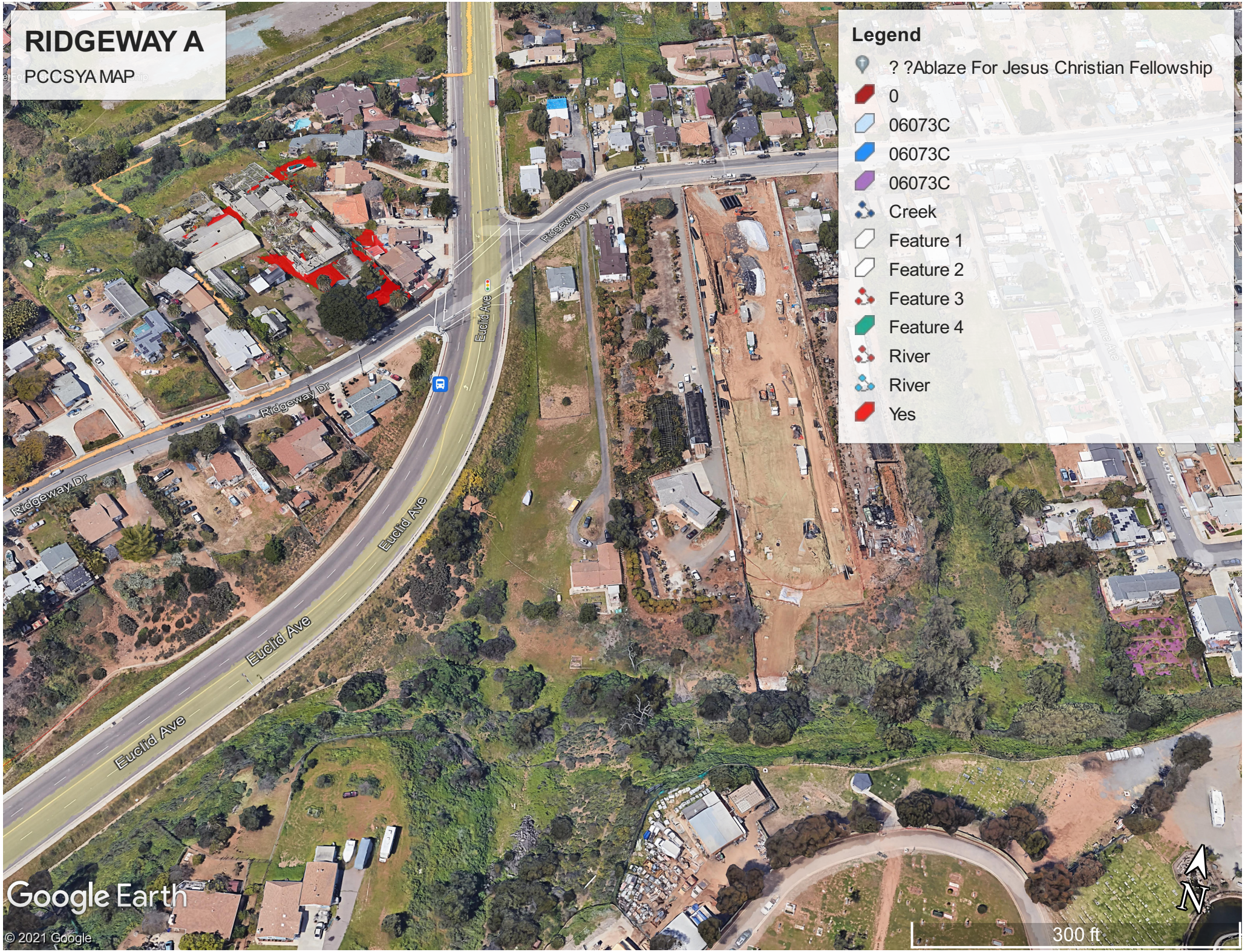
Insert Vector Control Plan behind this cover page or submit as a separate stand-alone document labeled Sub-attachment 8.4.

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/


RIDGEWAY A
PCCSYA MAP
Legend
? ?Ablaze For Jesus Christian Fellowship
0
06073C
06073C
06073C
Creek
Feature 1
Feature 2
Feature 3
Feature 4
River
River
Yes
Ridgeway Dr
Euclid Ave
Google Earth
© 2021 Google
300 ft
N

9.1 Documentation of Hydromodification Management Exemption (BMPDM Section 1.6)

- If the PDP is exempt from hydromodification management requirements (see Table 4 Part A.1 of the PDP SWQMP), use this Sub-attachment to document the exemption.
- Select the type of exemption below that applies and provide an explanation of the selection, including maps or other applicable documentation. Additional documentation may be requested by County staff.

Exemption Type per BMPDM Figure 1-2 (select one)
☐ a. The proposed project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
☐ b. The proposed project will discharge runoff directly to conveyance channels whose bed and bank are concrete lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
☐ c. The proposed project will discharge runoff directly to an area identified by the County as appropriate for an exemption by the WMAA for the watershed in which the project resides[2].
Explanation (add or attach pages as necessary)

[2] This option must include an analysis of the project using the methodology presented in Attachment E of the Regional Watershed Management Area Analysis.

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

Watershed Management Area Analysis (WMAA) mapping is a simple way to screen projects to determine the presence of onsite or offsite upstream Potential Critical Coarse Sediment Yield Areas (PCCSYAs). The San Diego County Regional WMAA mapping data can be found on the Project Clean Water website here: http://www.projectcleanwater.org/download/wmaa_attc_data/ .[3]

- Based on the WMAA map and the proposed project design, demonstrate below that both of the following conditions apply to the PDP:

  (a) Less than 5% of PCCSYAs will be impacted (built on or obstructed) by the PDP, and

  (b) All upstream offsite PCCYSAs will be bypassed (see BMPDM Appendix H.3).

A. Mapping Results -- At a minimum, show: (1) the project footprint, (2) areas of proposed development, (3) impacted onsite PCCSYAs, (4) offsite tributary areas[4], and (5) bypass of upstream offsite PCCSYAs.

No PCCSYAs upstream or downstream of project site. See attached exhibit.

[3] Applicants may refine initial mapping results using options identified in BMPDM Appendix H.1.2.
[4] Tributary areas must be shown to demonstrate that upstream offsite PCCSYAs do not exist. If bypassing these areas, only the bypass should be shown.

B. Explanation -- Provide documentation as needed to demonstrate that (1) impacts to PCCSYAs are below 5%, and (2) upstream offsite PCCYSAs are effectively bypassed. Add pages as necessary.

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.

[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.

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

- When impacts to CCSYAs cannot be avoided or effectively bypassed, applicants must demonstrate that their project generates no net impact to the receiving water per the performance metrics identified in BMPDM Appendix H.4.
- Use the space below to document that the PDP will generate no net impact to any receiving water.

No Net Impact Analysis (add or attach pages as necessary)

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.

PART 1 PROJECT INFORMATION

A. Project Summary Information	
Project Name	Ridgeway A
Record ID (e.g. grading/improvement plan number, building permit)	PDS2021-LDGRMJ-30273
Project Address	2542 Ridgeway Dr, National City, CA 91950
Assessor's Parcel Number(s) APN(s)	564-040-02, 21, 23 & 563-184-44
Project Watershed (Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	Lower Sweetwater River
B. Owner Information	
Name	BC Euclid, LLC
Address	8445 Camino Santa Fe, Ste 102, San Diego, CA 92121
Email Address	Abraham.edid@bluecenturionhomes.com
Phone Number	858-427-1450

COUNTY – OFFICIAL USE ONLY	
INTAKE ID#	
ACCEPTANCE ID#	

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

If final grade release or granting of occupancy is being requested for only a portion of the Priority Development Project (PDP) please fill out the table below. Include ALL of the Structural BMPs and/or Significant Site Design BMPs for the entire project in the table. **Include a mark-up of the DMA map from the approved SWQMP with this Verification package that clearly shows which DMAs you are submitting for approval and which DMAs have already been accepted (if any).**

DMA #	APN or Lot #	BMP ID #	WPP Acceptance Date (If applicable)	WPP Acceptance ID# (If applicable, e.g. 20/21-001)
1		BMP#1: BIOSCAPE		
1		BMP#2: STORMWATER VAULT		

PART 2 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.
- 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.

DMA #	BMP Information			Maintenance Category (1, 2, 3, or 4)	Maintenance Agreement Recorded DOC #	Construction Plan Sheet #	Landscape Plan Sheet #	FOR DPW-WPP USE ONLY
	Quantity	Description/Type of Structural BMP	BMP ID #					
A. Structural BMPs (S-BMPs)								
1	550 SF	Filterra Bioscape System	1	1		13		
1	16,800 CF	STORMWATER VAULT	2	1		13		
Add rows as needed. Click into the last column in the row below this, then press TAB to add a new row.								
B. Significant Site Design BMPs (SSD-BMPs)								
		Choose an item.		Choose				
		Choose an item.		Choose				
		Choose an item.		Choose				
		Choose an item.		Choose				
		Choose an item.		Choose				
		Choose an item.		Choose				
Add rows as needed. Click into the last column in the row below this, then press TAB to add a new row.								

PART 3 REQUIRED ATTACHMENTS

For the permanent BMPs listed in Part 2, submit the following to the County inspector along with this Verification form as a package (check all that are attached):

☐ **PHOTOGRAPHS:** Final construction photos of every permanent BMP listed in Part 2 are required. Final photos must be recent and be labeled with the date and a BMP Identifier. Additional photographs illustrating proper construction of the BMPs are recommended to be included and may be requested by WPP prior to acceptance of this Verification (e.g. excavation depths, liners, hydromodification orifices, Biofiltration Soil Media (BSM), vegetation, mulch).

☐ **MAINTENANCE AGREEMENTS:** Copies of approved and recorded Storm Water Maintenance Agreements (SWMA), Category 1 Maintenance Notification Agreements (MN), or Encroachment Maintenance and Removal Agreements (EMRA) for all S-BMPs.

Note: Significant Site Design (SSD) BMPs and most Category 4 BMPs do not require recorded maintenance agreements.

☐ **CONSTRUCTION PLANS:** Submit electronic and/or 11" X 17" hard copies of the current approved Construction Plan sheets for the Record ID(s) listed on Page 1:

- ☐ Grading Plans
- ☐ Improvement Plans
- ☐ Precise Grading Plan
- ☐ Building Plan (Applicable BMP Sheets only)
- ☐ Other (Please specify) _____

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

- A BMP Table on Sheet 1, AND
- A plan detail cross-section of each verified as-built BMP, AND
- The location of each verified as-built BMP

☐ **LANDSCAPE PLANS**: If the PDP includes vegetated BMPs and has a Landscape Plan, submit the following:

- ☐ Final Landscape Plans
- ☐ Proof of Irrigation Installed (if applicable)

PART 4 PREPARER'S CERTIFICATION

By signing below, I certify that the BMP(s) listed in Part 2 of this Verification Form have been constructed and 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 must be certified by a licensed professional engineer.

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

Preparer's Name:	
Email Address:	
Phone Number:	
Preparer's Signature:	
Date:	

[SEAL]

PROJECT RECORD ID: _____

COUNTY - OFFICIAL USE ONLY

County Inspector Approval:

***NOTE: The County approved SWQMP document and any Addendums or Revisions must be included with this BMP Installation Verification submittal package.**

- ☐ DPW Private Development Construction Inspection (PDCI)
- ☐ PDS Building
- ☐ DGS
- ☐ DPR

By signing below, the County Inspector concurs that every BMP listed in Part 2 of this BMP Installation Verification form has been installed per plan.

Inspector Name: _____

Inspector's Signature: _____ Date: _____

DPW Watershed Protection Program (WPP) Acceptance:

Date Received: _____

WPP Reviewer: _____

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

WPP Reviewer's Signature: _____ Date: _____

Enter Acceptance ID# on page 1.

NOTES:

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.

RECORDING REQUESTED BY:

WHEN RECORDED MAIL TO:

(property owner)

SPACE ABOVE THIS LINE FOR RECORDER'S USE

MAINTENANCE NOTIFICATION AGREEMENT FOR CATEGORY 1 STORMWATER STRUCTURAL BMPs

☐ **This Maintenance Notification Agreement rescinds and replaces Doc#_____**

THIS AGREEMENT is made on the _____ day of _____, 20_____.

_____, the Owner(s) of the hereinafter described real property:

Address 2542 Ridgeway Drive, National City, CA Post Office Box _____ Zip Code 91950.

Assessor Parcel No.(s) _____

List each Structural Best Management Practice (BMP) for the property as follows: BMP ID, Type, Permit #, Sheet #.
BMP #1 Proprietary Biofiltration, BMP #2 Proprietary Underground Detention,

Permit #: PDS2020-LDGRMJ-30273, Sheet 13 *Attach BMP sheets and details as Exhibit A.*

Owner(s) of the above property acknowledge the existence of the stormwater Structural BMP(s) on the said property. Perpetual maintenance of the Structural BMP(s) is the requirement of the State NPDES Permit, Order No. R9-2013-0001 and subsequent amendments, Section E.3.e. and the County of San Diego Watershed Protection Ordinance (WPO) Ordinance No. 10410 Section 67.812 through Section 67.814, and County BMP Design Manual Chapters 7 & 8. In consideration of the requirement to construct and maintain Structural BMP(s), as conditioned by Discretionary Permit, Grading Permit, and/or Building Permit (as may be applicable), I/we hereby covenant and agree that:

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

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

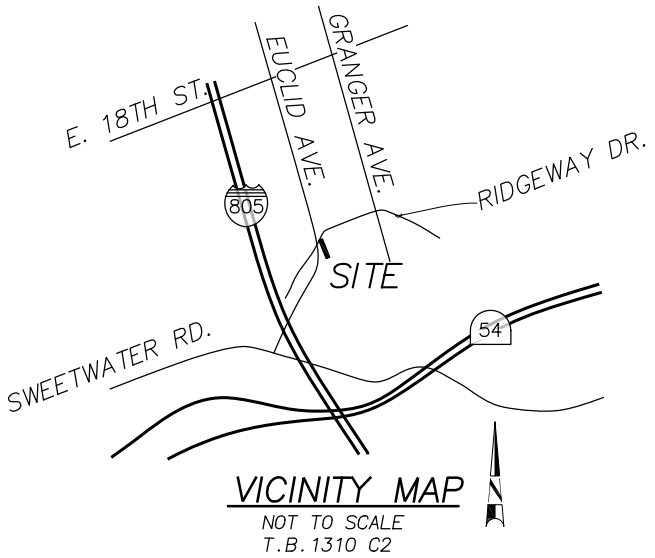
_____ _____

Owner Signature(s)

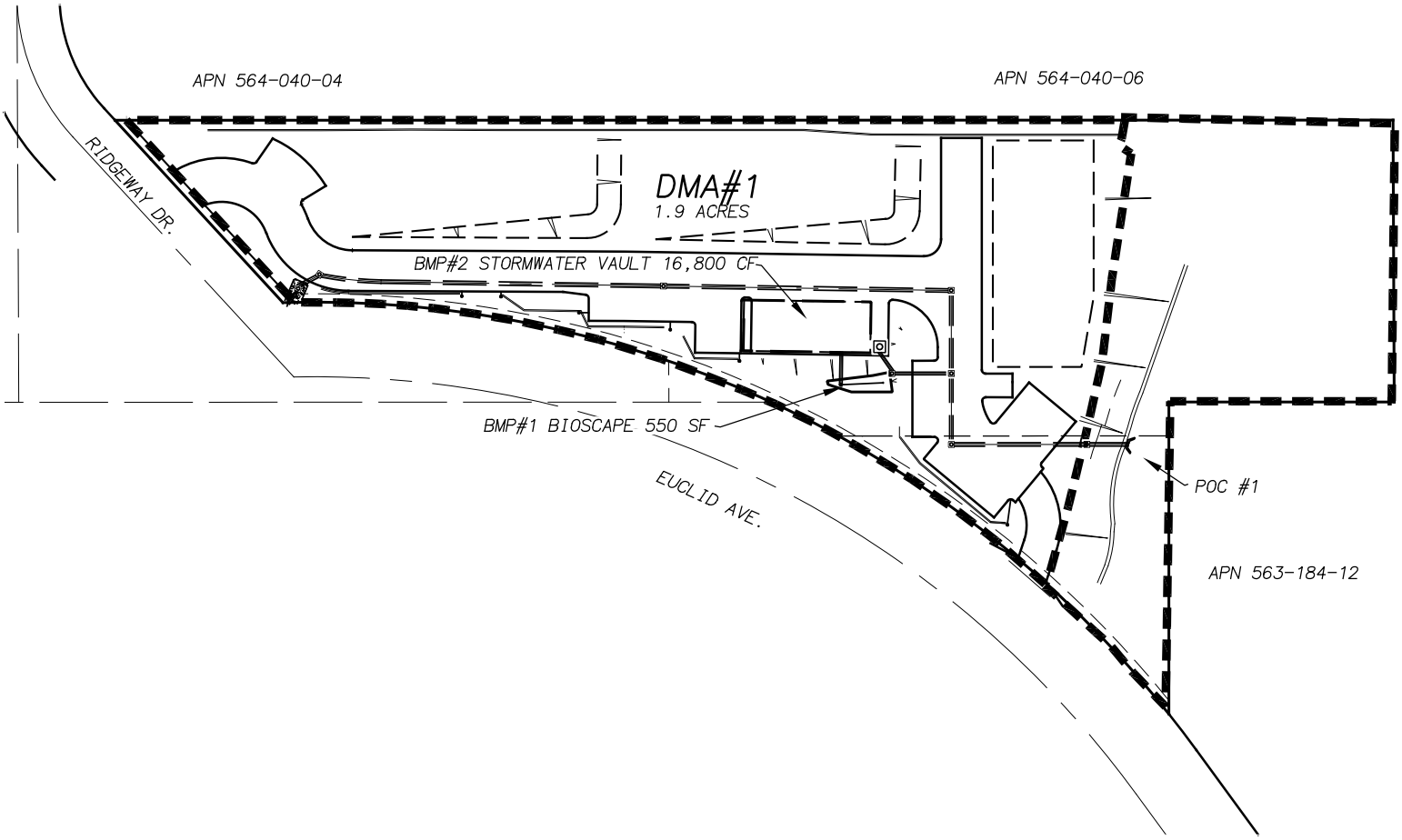
_____ _____

Print Owner Name(s) and Title

EXHIBIT A



VICINITY MAP
NOT TO SCALE
T.B. 1310 C2



SITE MAP DMA#1 (BMP#1 & BMP#2)
SCALE: 1"=100'

EXHIBIT B

MAINTENANCE PLAN

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

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

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

EXHIBIT B
VAULT MAINTENANCE PLAN

ROUTINE ACTION	MAINTENANCE INDICATOR	FIELD MEASUREMENT	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY
Sediment Management	Accumulation of sediment, litter or debris at the inlet	Visual observation	Monthly	Remove and properly dispose of accumulated materials
Sediment Management	Accumulation of sediment, litter or debris in storage container	Visual observation	Semi-annually (minimum) or when debris accumulation is 25% of the total container volume, or accumulation blocks outlet, whichever is more frequent	Remove and properly dispose of accumulated materials.
Standing Water	Standing water in storage container between storm events outside of normal use timeframe for the stored water. Normal use timeframe is 36 to 96 hours following a storm event depending on the purpose and design of the cistern.	Visual observation	Annually, 96 hours after a target storm event	Use the water as intended, or disperse to landscaping.
General Maintenance Inspection	Leaks or other damage to storage container	Visual observation	Annually, prior to start of wet season	Repair or replace as applicable. (expected every 5 years)
General Maintenance Inspection	Leaks or other damage to ancillary parts including valves, piping, screens, level indicators, and other accessories.	Visual observation	Annually, prior to start of wet season	Repair or replace as applicable. (expected every 5 years)
General Maintenance Inspection	Outlet blocked	Visual observation	Annually, prior to start of wet season	Clear blockage
		Visual observation	Annually, prior to start of wet season	Make repairs as appropriate to correct the problem and stabilize the system. (expected every 10 years)

General Maintenance Inspection	Cistern leaning or unstable, damage to roof, supports, anchors, or foundation			
Vector Control	Presence of mosquitos/larvae	Visual observation	Annually	If mosquitos/larvae are observed; first, immediately remove any standing water by using water as intended for irrigation or alternative grey water, or by dispersing to landscaping; second, check cistern outlet for blockage and clear blockage if applicable to restore drainage; third, install barriers such as screens that prevent mosquito access to storage container.(included in Standing Water Maintenance Activity)

MODULE NOTES

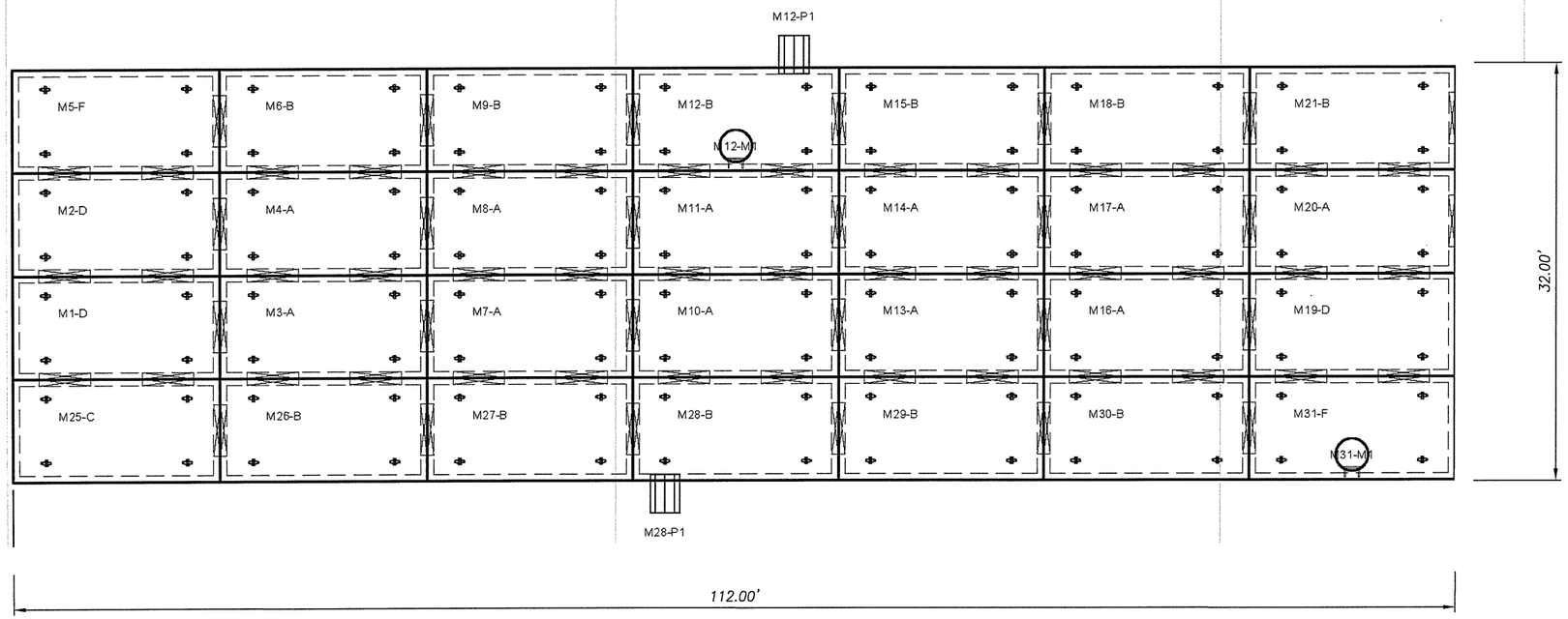
TYPE	QUANTITY	HEIGHT
A	11	6.00'
B	11	6.00'
C	1	6.00'
D	3	6.00'
F	2	6.00'
TOTAL	28	
VOLUME	17,640	CUBIC FEET

PIPE SCHEDULE

PIPE	SIZE	INVERT
M12-P1	18" RCP	91.00'
M28-P1	18" RCP	91.00'

MANHOLE SCHEDULE

MANHOLE	TYPE	RIM
M12-M1	30" DIA. F&C Steps	101.00'
M31-M1	30" DIA. F&C Steps	101.00'



PLAN VIEW
SCALE: 3/32" = 1'-0"

DESIGN NOTES

1. LIVE LOADING CRITERIA:
   - A. AASHTO HS-20-44 DESIGN TRUCK (WITH IMPACT AT 0.50FT MINIMUM COVER)
   - B. LATERAL LIVE LOAD SURCHARGE: 80 PSF (TO 8.00FT DEPTH)
   - C. NO LATERAL SURCHARGE(S) FROM ANY ADJACENT BUILDINGS, WALLS, FOUNDATIONS, OR ANY ADDITIONAL SITE ELEMENTS.
2. SOIL LOADING CRITERIA:
   - A. SOIL COVER DEPTH: 0.50FT (MIN.) - 5.00FT (MAX.)
   - B. SOIL UNIT WEIGHT: 120 PCF
   - C. ASSUMED WATER TABLE ELEVATION: BELOW BOTTOM OF PRECAST
   - D. REQUIRED ALLOWABLE BEARING PRESSURE: 2,500 PSF
   - E. EQUIVALENT LATERAL FLUID PRESSURE, ACTIVE: 45 PCF (DRAINED)
   - F. EQUIVALENT LATERAL FLUID PRESSURE, AT-REST: 60 PCF (DRAINED)
   - G. EQUIVALENT LATERAL FLUID PRESSURE, PASSIVE: 150 PCF (DRAINED)
   - H. ASSUMED COEFFICIENT OF FRICTION: 0.40
   - I. SEISMIC LATERAL EARTH PRESSURES: NOT APPLICABLE
3. STORMCAPTURE MODULE TYPE: DETENTION (WATERTIGHT).
4. CONCRETE (NORMALWEIGHT):
   - A. MIN. 28-DAY COMPRESSIVE STRENGTH: 6,000 PSI
   - B. CEMENT: ASTM C150
5. STEEL REINFORCEMENT: ASTM A615 / A706 (GRADE 60), ASTM A1064 (GRADE 80)
6. REFERENCE STANDARDS: ASTM C913 & C890, ACI 318-14

Detention/
Infiltration

REV	DESCRIPTION	DATE
-	-	-

Oldcastle Infrastructure™
A CRH COMPANY

Ph: 800.579.8819 | www.oldcastleinfrastructure.com/stormwater

STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: 1	PLAN-N
CUSTOMER: Lundstrom & Associates		
JOB NAME: RIDGEWAY A, NATIONAL CITY		JOB NUMBER: -

DATE	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER
6/14/2022	-	-	-	-	-

DRAWING NAME: SC1 3-0

SHEET: 1 OF 3