

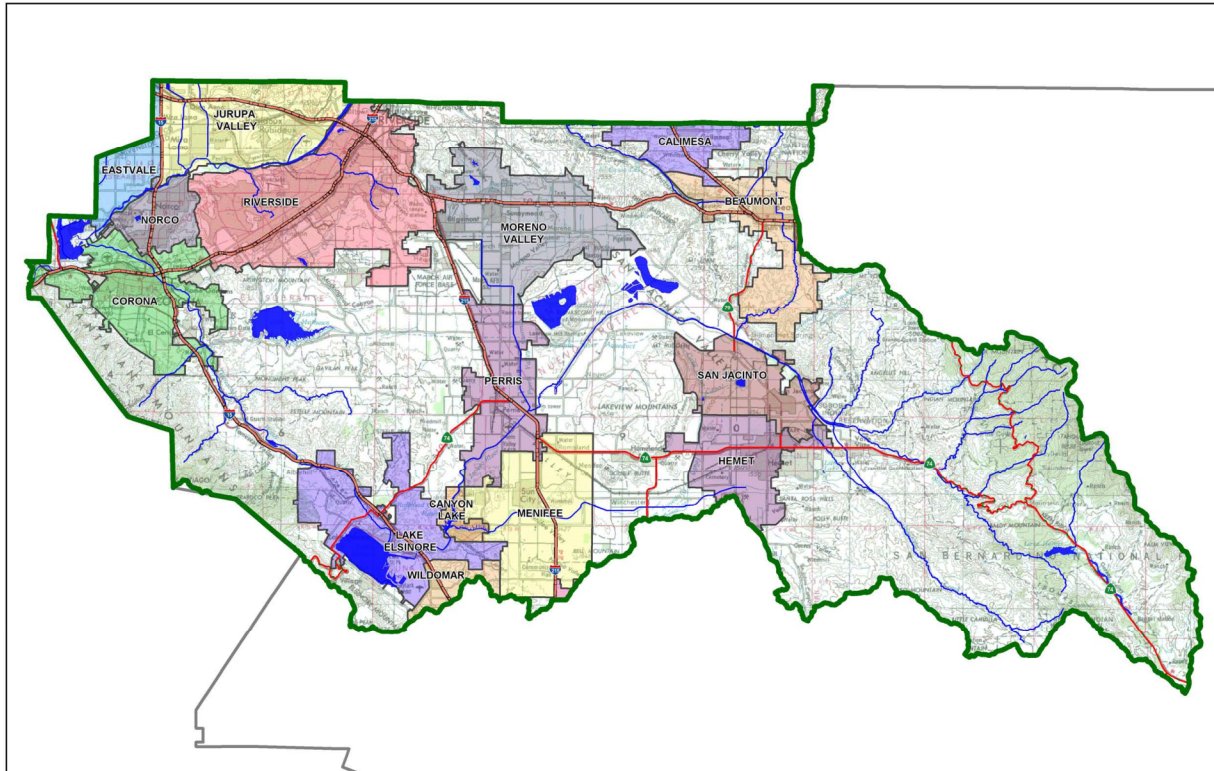
# Project Specific Water Quality Management Plan

A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County

**Project Title:** Public Storage

**Development No:** TBD

**Design Review/Case No:** PEN24-0154/LWQ24-0034



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- Preliminary
- Final

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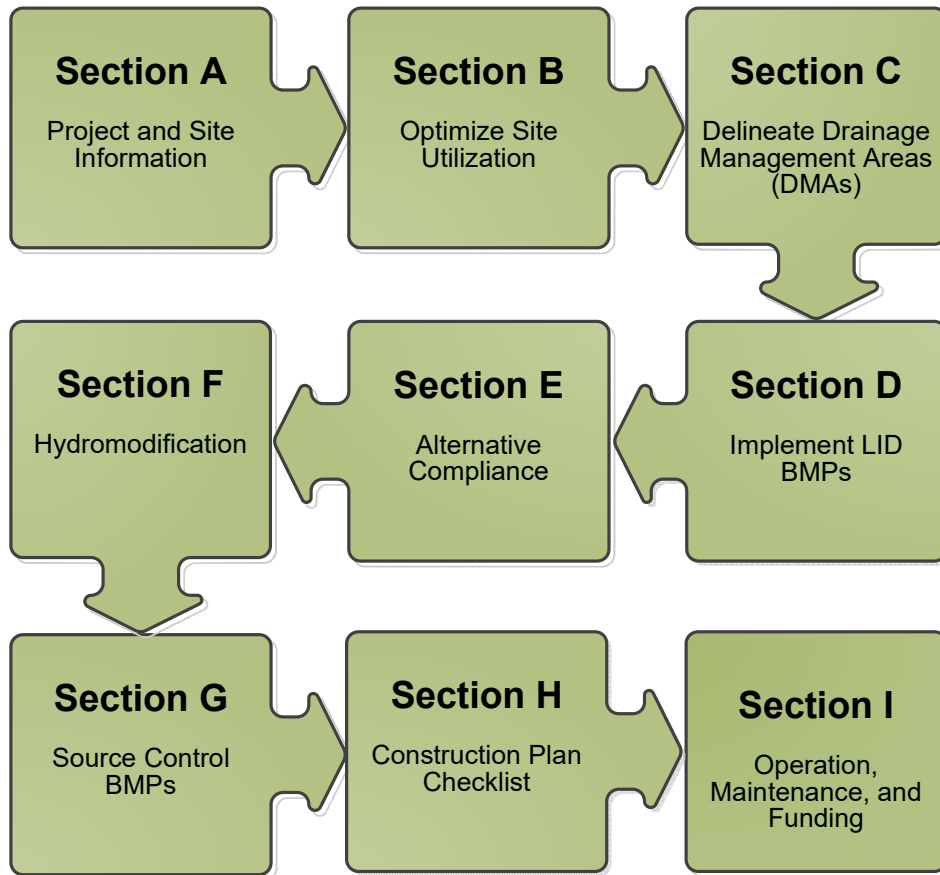
**Revision Date(s):** January 30, 2025, October 14, 2025

*Prepared for Compliance with*  
*Regional Board Order No. **R8-2010-0033***

**Template revised June 30, 2016**

## A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your “how-to” manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



## OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Public Storage Inc. by DRC Engineering Inc. for the Public Storage - Indian Street project.

This WQMP is intended to comply with the requirements of the City of Moreno Valley for Ordinance No. 827 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Moreno Valley Water Quality Ordinance (Municipal Code Section 8.10).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."



Owner's Signature

10/14/2025

Date

Sharon Linder

Owner's Printed Name

Vice President o/b/o PS Southern California One, LLC (aka Public Storage)

Owner's Title/Position

## PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0033 and any subsequent amendments thereto."



Preparer's Signature

10/14/2025

Date

Kenny Hostetler

Preparer's Printed Name

Project Manager

Preparer's Title/Position

Preparer's Licensure:



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## Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Commercial
Planning Area:	N/A
Community Name:	N/A
Development Name:	N/A
PROJECT LOCATION	
Latitude & Longitude (DMS): 33°55'06"N 117°14'03"W	
Project Watershed and Sub-Watershed: Sunnymead Master Drainage Plan, Santa Ana River	
Gross Acres: 3.1	
APN(s): 482-190-022	
Map Book and Page No.: Map Book 237, Pages 13 and 14	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Self Storage
Proposed or Potential SIC Code(s)	4225
Area of Impervious Project Footprint (SF)	110,913
Total Area of <u>proposed</u> Impervious Surfaces within the Project Footprint (SF)/or Replacement	110,913
Does the project consist of offsite road improvements?	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
Does the project propose to construct unpaved roads?	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
Is the project part of a larger common plan of development (phased project)?	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
EXISTING SITE CHARACTERISTICS	
Total area of <u>existing</u> Impervious Surfaces within the Project limits Footprint (SF)	6,300
Is the project located within any MSHCP Criteria Cell?	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
Is a Geotechnical Report attached?	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	-
What is the Water Quality Design Storm Depth for the project?	0.66

### A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

## A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

**Table A.1 Identification of Receiving Waters**

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Heacock Channel - Sunnymead Channel Line B	-	-	Not a water body classified as RARE
Perris Valley Channel Hu #802.11	-	REC 1, REC 2, WARM, WILD, RARE	5.1 MILES
San Jacinto River Reach 3, HU #802.11	-	AGR, GWR, REC1, REC2, WARM, WILD, RARE	10.15 MILES
Canyon Lake, HU #802.11, 802.12	Nutrients	MUN, AGR, GWR, REC1, REC2, COMM, WARM, WILD	Not a water body classified as RARE
San Jacinto River Reach 1, HU #802.31, 802.32	-	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	16.97 MILES
Lake Elsinore, HU #802.31	DDT, Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs, Toxicity	REC1, REC2, COMM, WARM, WILD, RARE	18.68 MILES

## A.3 Additional Permits/Approvals required for the Project:

**Table A.2 Other Applicable Permits**

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
US Army Corps of Engineers, CWA Section 404 Permit	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
Statewide Construction General Permit Coverage	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N
Statewide Industrial General Permit Coverage	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N
Other (please list in the space below as required) City Grading and Building Permit	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

## Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

### Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

*The site currently drains to the southwest into an existing v-gutter and parkway drain being released to Indian Street. The proposed site will continue to release larger flows that cannot infiltrate onto Indian Street*

Did you identify and protect existing vegetation? If so, how? If not, why?

*There is no existing vegetation to protect.*

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

*Infiltration capacity has been utilized in the proposed underground infiltration chambers*

Did you identify and minimize impervious area? If so, how? If not, why?

*impervious areas have been minimized to the maximum extent possible.*

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

*Drainage leads to infiltration chambers. Not Applicable.*

# Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

**Table C.1 DMA Classifications**

DMA Name or ID	Surface Type(s) <sup>12</sup>	Area (Sq. Ft.)	DMA Type
1	Roofs	44001	Type D
2	Asphalt	63311	Type D
3	Concrete	3601	Type D
4	Ornamental Landscaping	15950	Type D
5	Ornamental Landscaping	597	Type D
6	Ornamental Landscaping	2672	Type D
7	Ornamental Landscaping	646	Type D

<sup>1</sup>Reference Table 2-1 in the WQMP Guidance Document to populate this column

<sup>2</sup>If multi-surface provide back-up

**Table C.2 Type 'A', Self-Treating Areas**

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

**Table C.3 Type 'B', Self-Retaining Areas**

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet)	Storm Depth (inches)	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches)
		[A]	[B]			

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

**Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas**

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Impervious fraction	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]

**Table C.5 Type 'D', Areas Draining to BMPs**

DMA Name or ID	BMP Name or ID
1	Underground Infiltration Chamber (INF)
2	Underground Infiltration Chamber (INF)
3	Underground Infiltration Chamber (INF)
4	Underground Infiltration Chamber (INF)
5	Underground Infiltration Chamber (INF)
6	Underground Infiltration Chamber (INF)
7	Underground Infiltration Chamber (INF)

*Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.*

## Section D: Implement LID BMPs

### D.1 Infiltration Applicability

Is there an approved downstream ‘Highest and Best Use’ for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)?  Y  N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream ‘Highest and Best Use’ feature.

### Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermitee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document?  Y  N

### Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site...	YES	NO
...have any DMAs with a seasonal high groundwater mark shallower than 10 feet? If Yes, list affected DMAs:		X
...have any DMAs located within 100 feet of a water supply well? If Yes, list affected DMAs:		X
...have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact? If Yes, list affected DMAs:		X
...have measured in-situ infiltration rates of less than 1.6 inches / hour? If Yes, list affected DMAs:		X
...have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface? If Yes, list affected DMAs:		X
...geotechnical report identify other site-specific factors that would preclude effective and safe infiltration? Describe here:		X

If you answered “Yes” to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

## D.2 Harvest and Use Assessment

Please check what applies:

- Reclaimed water will be used for the non-potable water demands for the project.
- Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).
- The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

### Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

*Total Area of Irrigated Landscape:* Insert Area (Acres)

*Type of Landscaping (Conservation Design or Active Turf):* List Landscaping Type

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

*Total Area of Impervious Surfaces:* Insert Area (Acres)

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

*Enter your EIATIA factor:* EIATIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

*Minimum required irrigated area:* Insert Area (Acres)

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

<b>Minimum required irrigated area (Step 4)</b>	<b>Available Irrigated Landscape (Step 1)</b>
Insert Area (Acres)	Insert Area (Acres)

## Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

*Projected Number of Daily Toilet Users: Number of daily Toilet Users*

*Project Type: Enter 'Residential', 'Commercial', 'Industrial' or 'Schools'*

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

*Total Area of Impervious Surfaces: Insert Area (Acres)*

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number of toilet users per tributary impervious acre (TUTIA).

*Enter your TUTIA factor: TUTIA Factor*

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

*Minimum number of toilet users: Required number of toilet users*

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

<b>Minimum required Toilet Users (Step 4)</b>	<b>Projected number of toilet users (Step 1)</b>
Insert Area (Acres)	Insert Area (Acres)

## Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

Insert narrative description here.

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

*Average Daily Demand: Projected Average Daily Use (gpd)*

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

*Total Area of Impervious Surfaces: Insert Area (Acres)*

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

*Enter the factor from Table 2-4: Enter Value*

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

*Minimum required use: Minimum use required (gpd)*

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

<b>Minimum required non-potable use (Step 4)</b>	<b>Projected average daily use (Step 1)</b>
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

### **D.3 Bioretention and Biotreatment Assessment**

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

*Select one of the following:*

- LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).
- A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

## D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

## D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First, calculate the Design Capture Volume for each LID BMP using the  $V_{BMP}$  worksheet in Appendix F of the LID BMP Design Handbook. Second, design the LID BMP to meet the required  $V_{BMP}$  using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, $I_f$	DMA Runoff Factor	DMA Areas x Runoff Factor	Enter BMP Name / Identifier Here		
	[A]		[B]	[C]	[A] x [C]			
1	44,001	Roofs	1	0.89	39248.9	Design Storm Depth (in)	Design Capture Volume, $V_{BMP}$ (cubic feet)	Proposed Volume on Plans (cubic feet)
2	63,311	Asphalt	1	0.89	56473.4			
3	3,601	Concrete	1	0.89	3212.1			
4	15,950	Landscape	0.1	0.11	1761.8			
5	597	Landscape	0.1	0.11	65.9			
6	2,672	Landscape	0.1	0.11	295.1			
7	646	Landscape	0.1	0.11	71.4			
	$A_T = \Sigma[A]$ 130,778				$\Sigma = [D]$ 101128.6	[E] 0.66	$[F] = \frac{[D] \times [E]}{12}$ 5562.1	[G] 21,313

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

## Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- Or -

The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

## E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

**Table E.1 Potential Pollutants by Land Use Type**

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
<input type="checkbox"/> Detached Residential Development	P	N	P	P	N	P	P	P
<input type="checkbox"/> Attached Residential Development	P	N	P	P	N	P	P	P <sup>(2)</sup>
<input type="checkbox"/> Commercial/Industrial Development	P <sup>(3)</sup>	P	P <sup>(1)</sup>	P <sup>(1)</sup>	P <sup>(5)</sup>	P <sup>(1)</sup>	P	P
<input type="checkbox"/> Automotive Repair Shops	N	P	N	N	P <sup>(4, 5)</sup>	N	P	P
<input type="checkbox"/> Restaurants (>5,000 ft <sup>2</sup> )	P	N	N	N	N	N	P	P
<input type="checkbox"/> Hillside Development (>5,000 ft <sup>2</sup> )	P	N	P	P	N	P	P	P
<input type="checkbox"/> Parking Lots (>5,000 ft <sup>2</sup> )	P <sup>(6)</sup>	P	P <sup>(1)</sup>	P <sup>(1)</sup>	P <sup>(4)</sup>	P <sup>(1)</sup>	P	P
<input type="checkbox"/> Retail Gasoline Outlets	N	P	N	N	P	N	P	P
<b>Project Priority Pollutant(s) of Concern</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*P = Potential*

*N = Not Potential*

<sup>(1)</sup> *A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected*

<sup>(2)</sup> *A potential Pollutant if the project includes uncovered parking areas; otherwise not expected*

<sup>(3)</sup> *A potential Pollutant is land use involving animal waste*

<sup>(4)</sup> *Specifically petroleum hydrocarbons*

<sup>(5)</sup> *Specifically solvents*

<sup>(6)</sup> *Bacterial indicators are routinely detected in pavement runoff*

## E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage <sup>2</sup>
<i>Total Credit Percentage<sup>1</sup></i>	

<sup>1</sup>Cannot Exceed 50%

<sup>2</sup>Obtain corresponding data from Table 3-8 in the WQMP Guidance Document

## E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I <sub>f</sub>	DMA Runoff Factor	DMA Area x Runoff Factor	Enter BMP Name / Identifier Here			
	[A]		[B]	[C]	[A] x [C]				
	$\frac{A_T}{\Sigma[A]}$				$\Sigma = [D]$	[E]	$[F] = \frac{[D] \times [E]}{[G]}$	$[F] \times (1 - [H])$	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document

[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document

[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12

[H] is from the Total Credit Percentage as Calculated from Table E.2 above

[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

## E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High:** equal to or greater than 80% removal efficiency
- **Medium:** between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

**Table E.4 Treatment Control BMP Selection**

Selected Treatment Control BMP Name or ID <sup>1</sup>	Priority Pollutant(s) of Concern to Mitigate <sup>2</sup>	Removal Efficiency Percentage <sup>3</sup>

<sup>1</sup> Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.

<sup>2</sup> Cross Reference Table E.1 above to populate this column.

<sup>3</sup> As documented in a Co-Permittee Approved Study and provided in Appendix 6.

# Section F: Hydromodification

## F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

**HCOC EXEMPTION 1:** The Priority Development Project disturbs less than one acre. The Copermitttee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption?       Y     N

If Yes, HCOC criteria do not apply.

**HCOC EXEMPTION 2:** The volume and time of concentration<sup>1</sup> of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption?       Y     N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

**Table F.1** Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	Post-condition	% Difference
<b>Time of Concentration</b>	INSERT VALUE	INSERT VALUE	INSERT VALUE
<b>Volume (Cubic Feet)</b>	INSERT VALUE	INSERT VALUE	INSERT VALUE

<sup>1</sup> Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

**HCOC EXEMPTION 3:** All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption?       Y     N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

Heacock Channel improvements have been completed which was the only watercourse that was defined as a potentially susceptible stream channel on the Riverside County HCOC Map. Canyon Lake and Lake Elsinore will provide adequate sumps downstream of the site as they are engineered and regularly maintained to ensure design flow capacity. Therefore, this project would qualify for HCOC Exemption 3.

## Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and “housekeeping”, that must be implemented by the site’s occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. **Identify Pollutant Sources:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.
2. **Note Locations on Project-Specific WQMP Exhibit:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.
3. **Prepare a Table and Narrative:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.
4. **Identify Operational Source Control BMPs:** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

**Table G.1** Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Mark all inlets with the words “Only Rain Down the Storm Drain” or similar.	Maintain and periodically repaint or replace markings. Verify annually.  Provide stormwater pollution prevention information to new site owners, lessees, or operators.  Include the following in lease agreements: “Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.”

Interior floor drains and elevator shaft sump pumps	State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow monthly.
Landscape/Outdoor Pesticide Use	<p>State that final landscape plans will accomplish all of the following.</p> <p>Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.</p> <p>Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.</p> <p>Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.</p> <p>Consider using pest-resistant plants, especially adjacent to hardscape.</p> <p>To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.</p>	<p>Maintain landscaping using minimum or no pesticides.</p> <p>See applicable operational BMPs in “What you should know for.....Landscape and Gardening” at <a href="http://rcflood.org/stormwater/Error!">http://rcflood.org/stormwater/Error!</a> Hyperlink reference not valid.</p> <p>Provide IPM information to new owners, lessees and operators.</p> <p>Landscape areas should be inspected monthly or according to an established maintenance schedule.</p>
Refuse Areas	<p>State how site refuse will be handled and provide supporting detail to what is shown on plans.</p> <p>State that signs will be posted on or near dumpsters with the words “Do not dump hazardous materials here”</p>	<p>Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post “no hazardous materials” signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-</p>

	<p>Show how designated area will be covered, graded and paved to prevent run-on.</p>	<p>site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></p> <p>Trash lids and dumpster areas should be inspected daily. Structural elements can be inspected monthly.</p>
<p>Miscellaneous drain or Wash Water or Other Sources</p>	<p>Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur.</p> <p>Condensate drain lines may not discharge to the storm drain system.</p> <p>Roof top equipment with potential to produce pollutants shall be roofed and/or have secondary containment.</p> <p>Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.</p>	<p>N/A</p>
<p>Plazas, sidewalks, and parking lots</p>		<p>Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris.</p> <p>Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.</p> <p>Tasks should be completed daily to weekly.</p>

## Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

**Table H.1** Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
INF	ADS Stormtech Infiltration Chamber	Conceptual Grading/Conceptual Utility	33°55'06.31N, 117°14'02.62W

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

## Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

**Maintenance Mechanism:** The property owner, Public Storage, will record an agreement with the County of Riverside.

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

Y

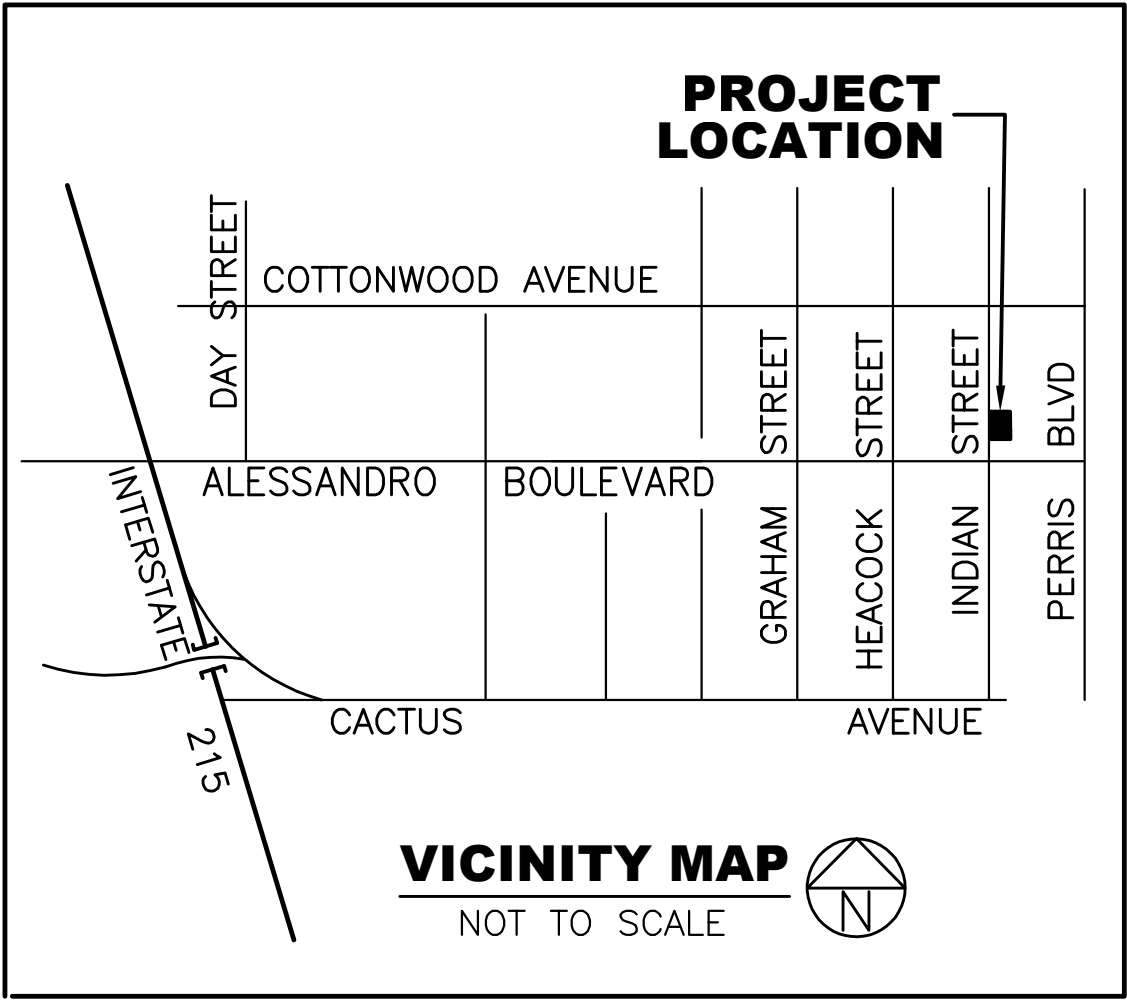
N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

# Appendix 1: Maps and Site Plans

*Location Map, WQMP Site Plan and Receiving Waters Map*

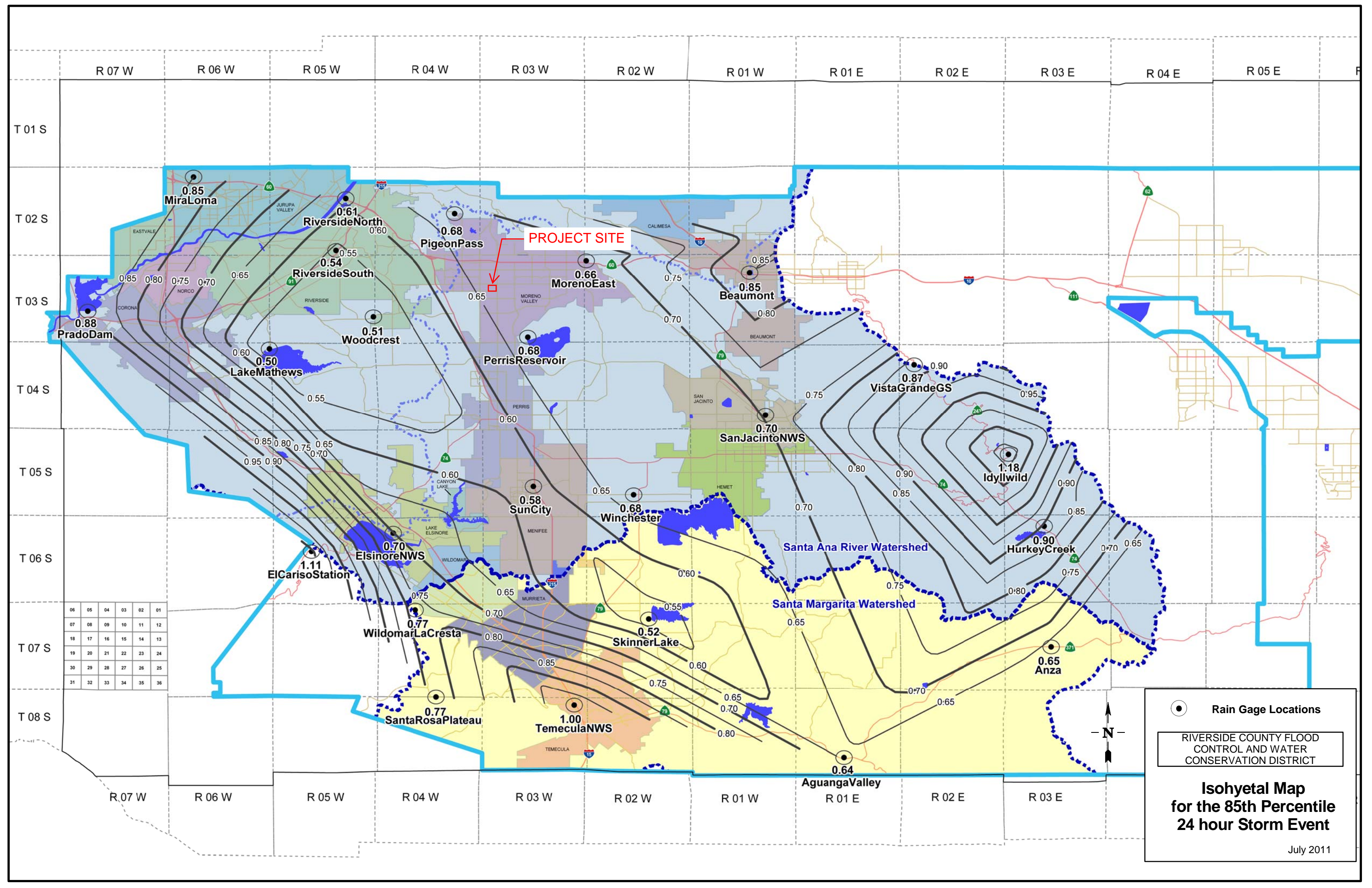
# PROJECT LOCATION



## VICINITY MAP

NOT TO SCALE





R 07 W R 06 W R 05 W R 04 W R 03 W R 02 W R 01 W R 01 E R 02 E R 03 E R 04 E R 05 E

T 01 S  
T 02 S  
T 03 S  
T 04 S  
T 05 S  
T 06 S  
T 07 S  
T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

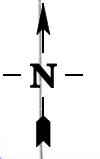
**PROJECT SITE**

● Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

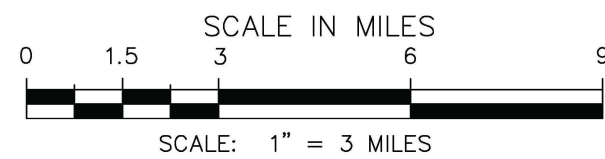
**Isohyetal Map for the 85th Percentile 24 hour Storm Event**

July 2011



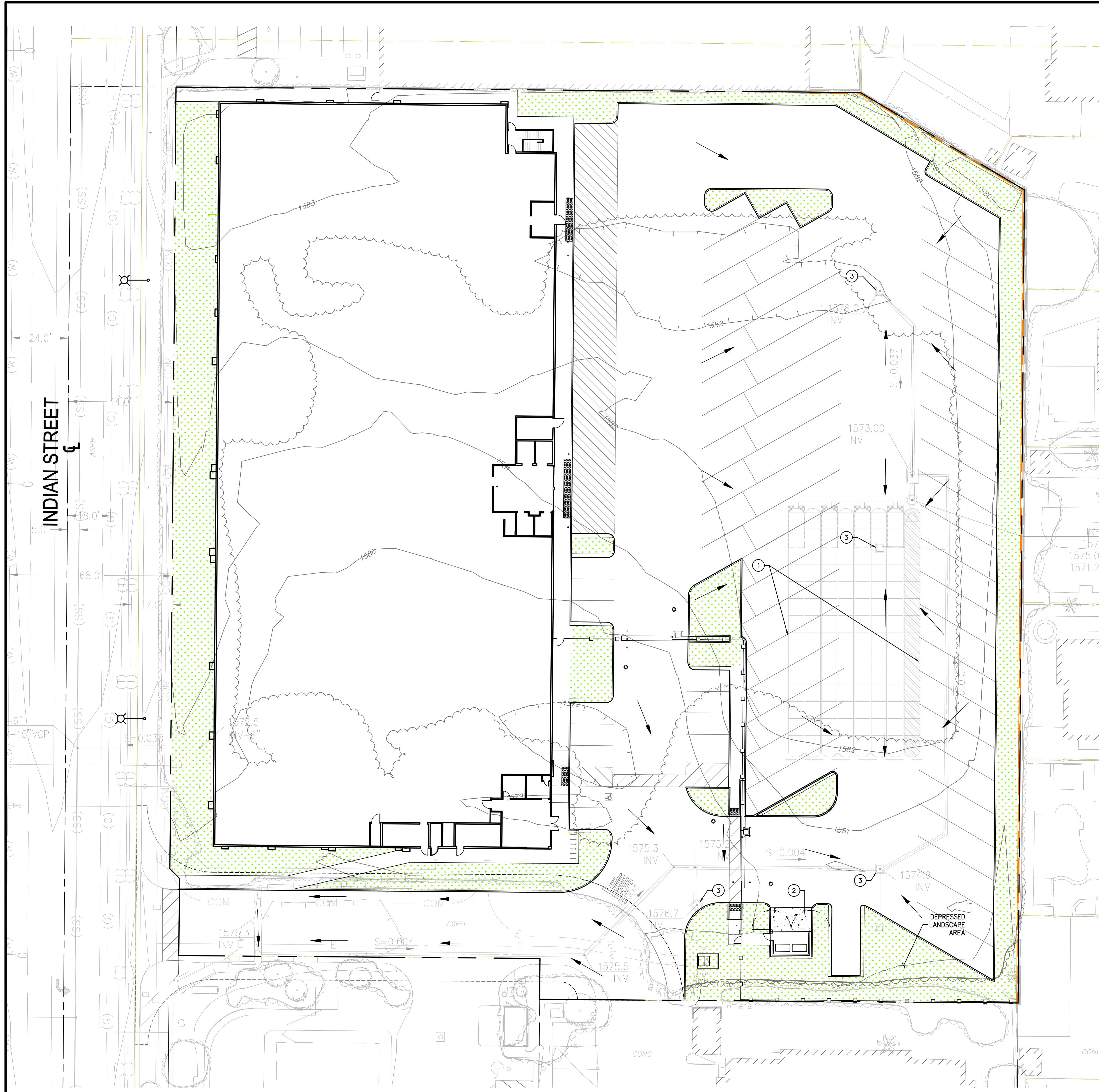
R 07 W R 06 W R 05 W R 04 W R 03 W R 02 W R 01 W R 01 E R 02 E R 03 E

FILENAME: M:\2024\24-077 PS Moreno Valley Indian St\WGMP\WGMP DOWNSTREAM RECEIVING WATERS.dwg, Feb 26 2025 8:59am



PUBLIC STORAGE – INDIAN STREET	
DOWNSTREAM RECEIVING WATERS	
MORENO VALLEY, CA	
 <b>ORC Engineering, Inc.</b>	160 S. Old Springs Road, Ste. 210 Anaheim Hills, California 92808 (714) 685-6860
Civil Engineering/Land Surveying/Land Planning	





**LEGEND**

- ① ADS STORMTECH INFILTRATION CHAMBER SYSTEM (21,313 CF OF STORAGE)
- ② COVERED TRASH ENCLOSURE
- ③ STORM DRAIN INLET INSTALLED WITH OLDCASTLE FLOGARD CATCH BASIN INSERT FILTER AND STENCIL PAINTED PER DETAIL HEREON
- FLOW DIRECTION
- ▨ LANDSCAPE AREA
- NO RUN-ON ANTICIPATED FOR THE PROJECT SITE



160 S. Old Springs Road  
Suite 210  
Anaheim Hills, CA 92808  
714-685-6860

**MDRC**  
Engineering, Inc.  
Civil Engineering/Land Surveying/Land Planning

NO.	REVISION:	DATE:

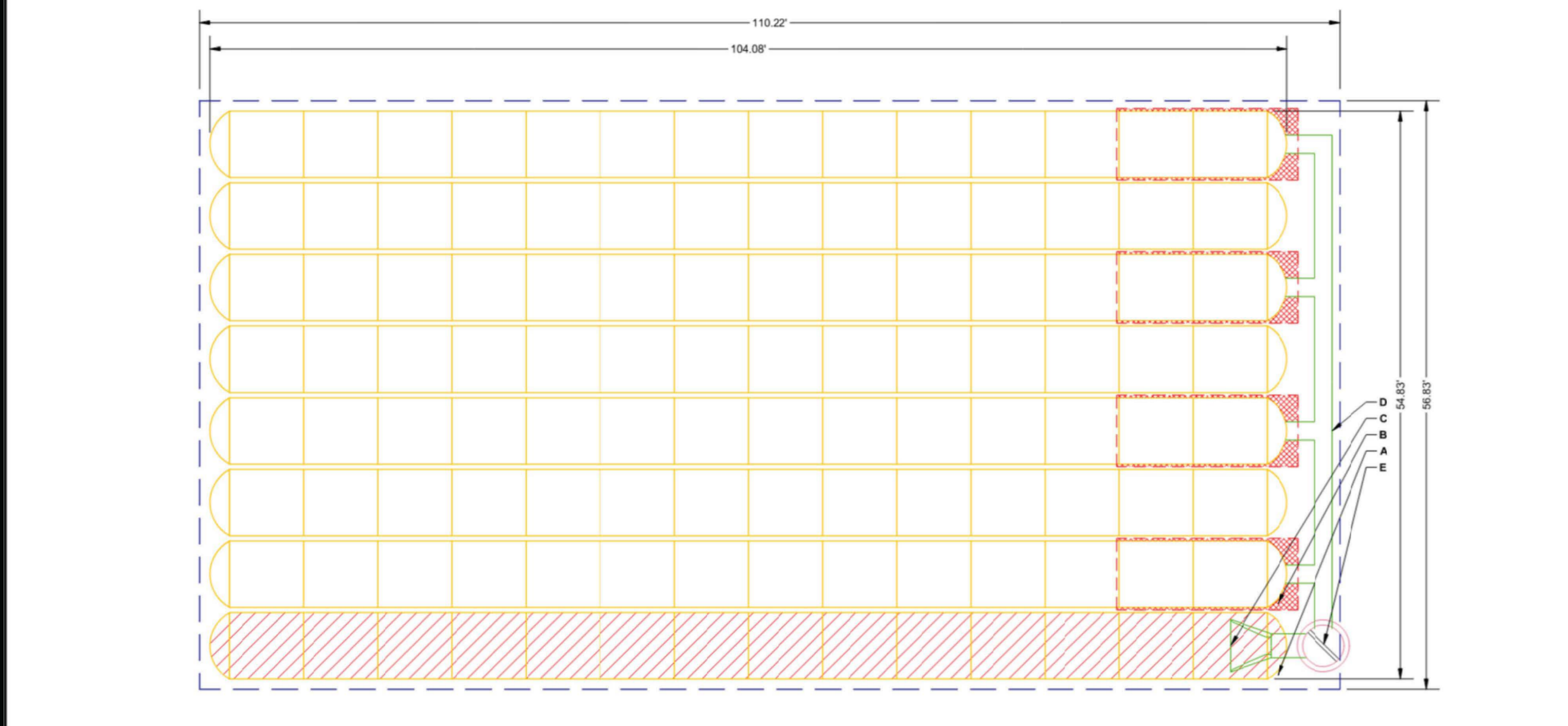
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INDIAN STREET  
MORENO VALLEY, CA 92551

**DRAWING NAME:** WQMP SITE PLAN

**ISSUE:** WQMP  
**DATE:** 10/14/25  
**CHECKED:** KH **DRAWN:** KH  
**DRAWING FILE:**  
**PROJECT NO.:** 24-077  
**SHEET NUMBER:**  
**1**  
**OF** 2 **SHEETS**  
**SCALE:** AS SHOWN

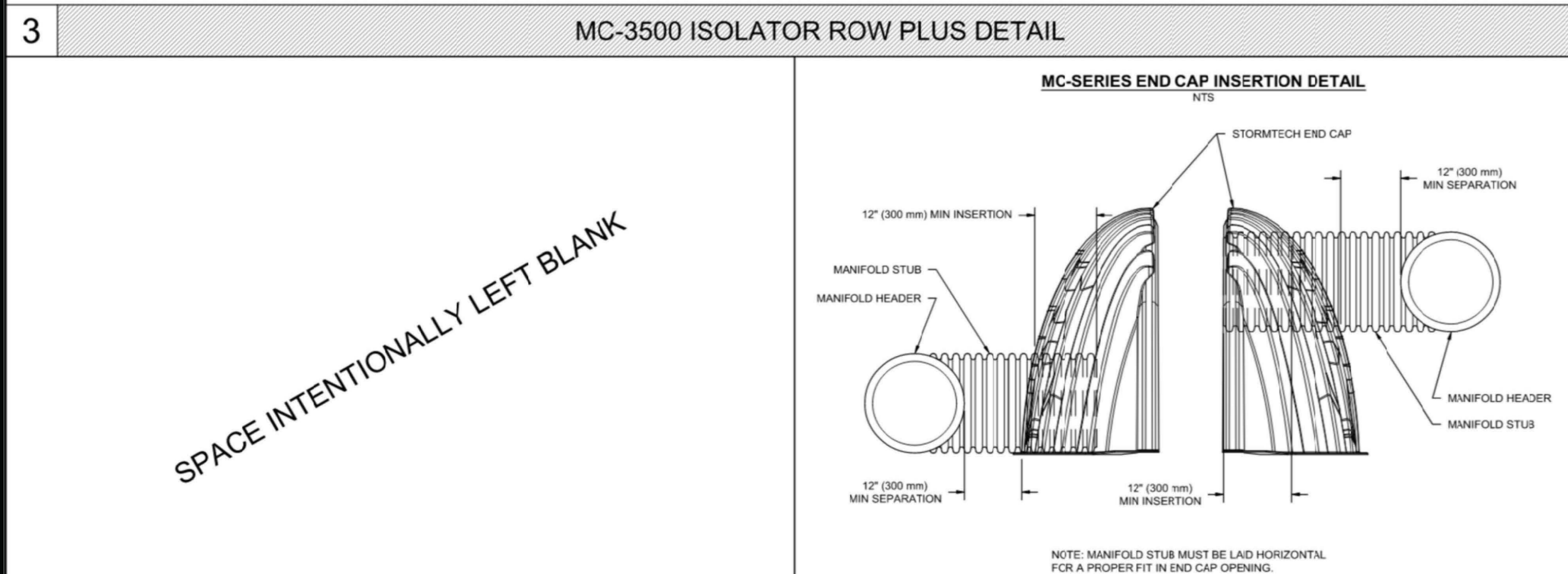
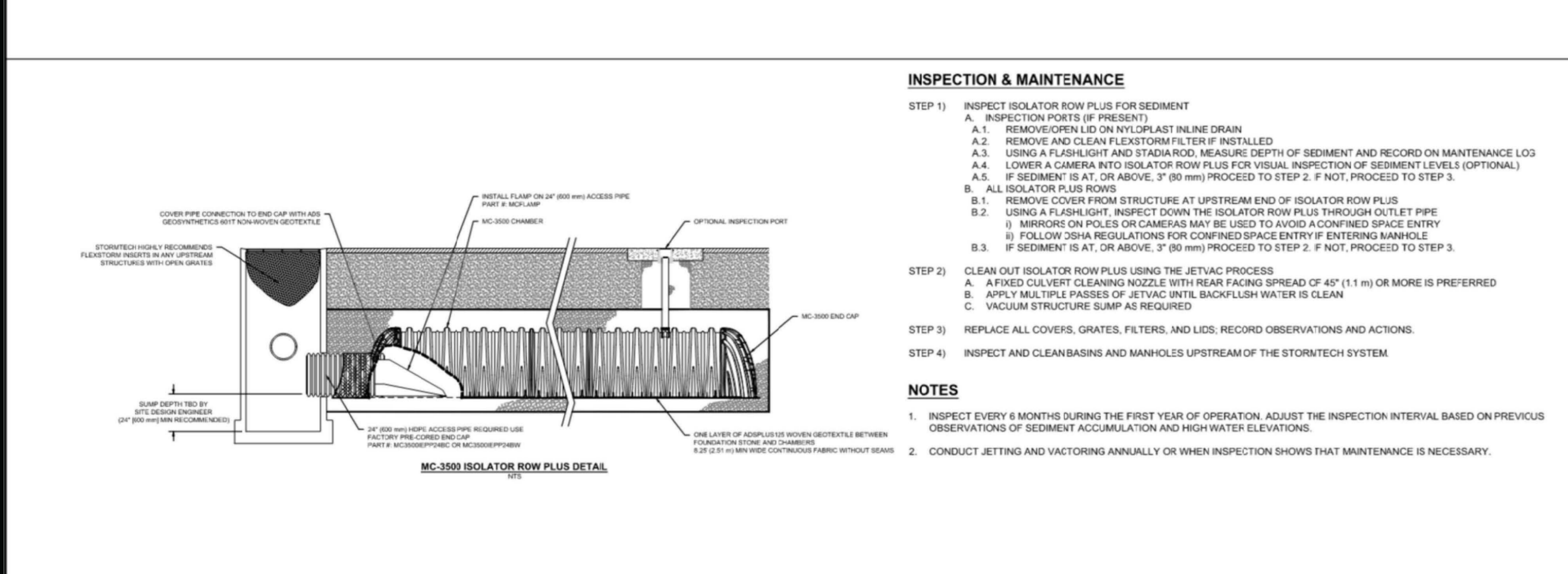
FILENAME: M:\2024\24-077 PS Moreno Valley Indian St WQMP\GDA\24077 WQMP SITE PLAN.dwg, LAST SAVED: ON: Oct 14 2025 10:14am PLOTTED BY: KENNY, ON: Oct 14 2025 10:26am, GFC:

PROPOSED LAYOUT		PROPOSED ELEVATIONS:		PART TYPE		ITEM ON LAYOUT		DESCRIPTION		**INVERT ABOVE BASE OF CHAMBER	
NO.	DESCRIPTION	MINIMUM ALLOWABLE GRADE (TOP OF PAVEMENT UNPAVED)	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT)	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)	NO.	DESCRIPTION	MINIMUM ALLOWABLE GRADE (TOP OF STONE)	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)	INVERT	MAX FLOW
112	STORMTECH MC-3500 CHAMBERS	1573.01	1577.00	1576.50	1576.50	A	24" BOTTOM CORED END CAP, PART# MC3500EPP24BC / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	1574.00	1574.00	2.06'	
12	STONE ABOVE (IN)	1576.50	1576.50	1576.50	1576.50	B	18" BOTTOM CORED END CAP, PART# MC3500EPP18BC / TYP OF ALL 18" BOTTOM CONNECTIONS	1574.00	1574.00	1.77'	
3	STONE BELOW (IN)	1576.50	1576.50	1576.50	1576.50	C	24" ISOLATOR ROW PLUS INVERT	1574.00	1574.00		
40	STONE VOID	1576.50	1576.50	1576.50	1576.50	D	18" x 18" BOTTOM MANIFOLD, ADS N-12	1574.00	1574.00	1.77'	
21313	INSTALLED SYSTEM VOLUME (C) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED)	1574.00	1574.00	1574.00	1574.00	E	CONCRETE STRUCTURE	1574.00	1574.00		20.3 CFS IN
6264	SYSTEM AREA (SF)	1574.00	1574.00	1574.00	1574.00		WEIR	1574.00	1574.00		
334.1	SYSTEM PERIMETER (IN)	1574.00	1574.00	1574.00	1574.00			1574.00	1574.00		

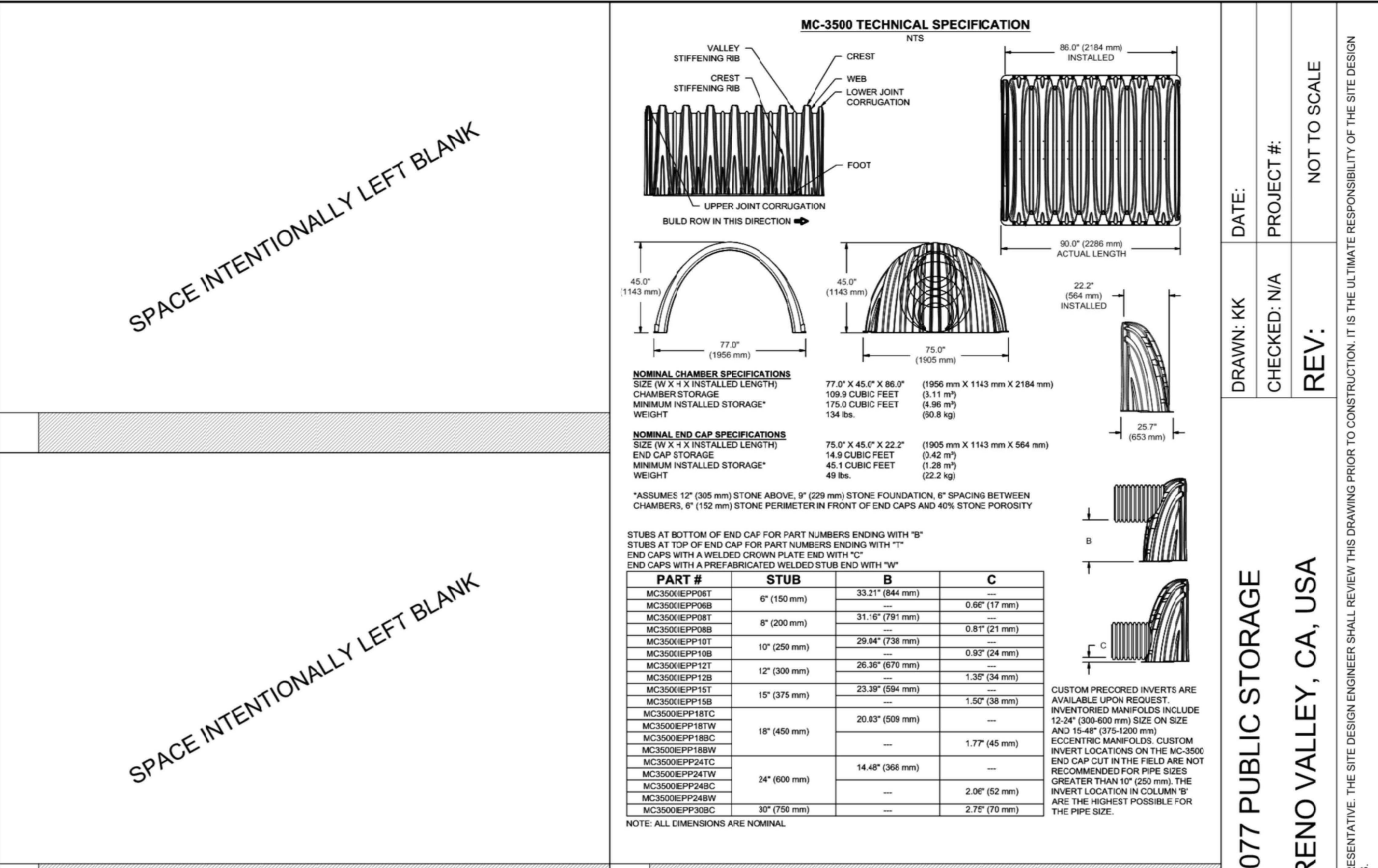


**NOTES:**

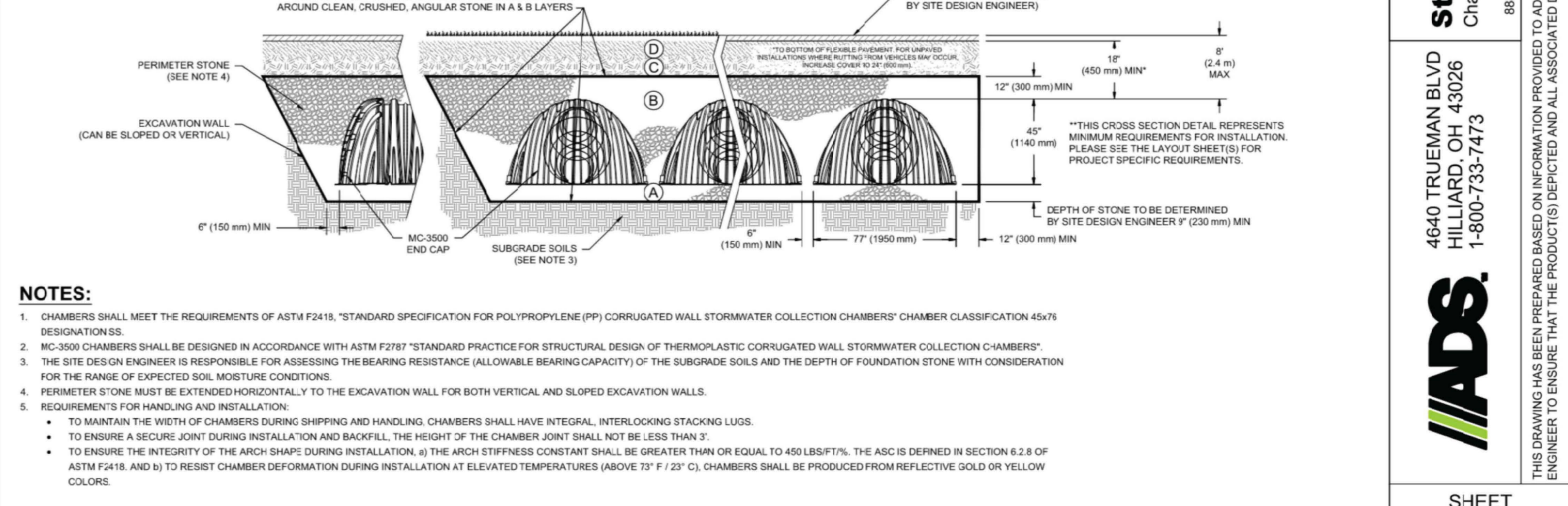
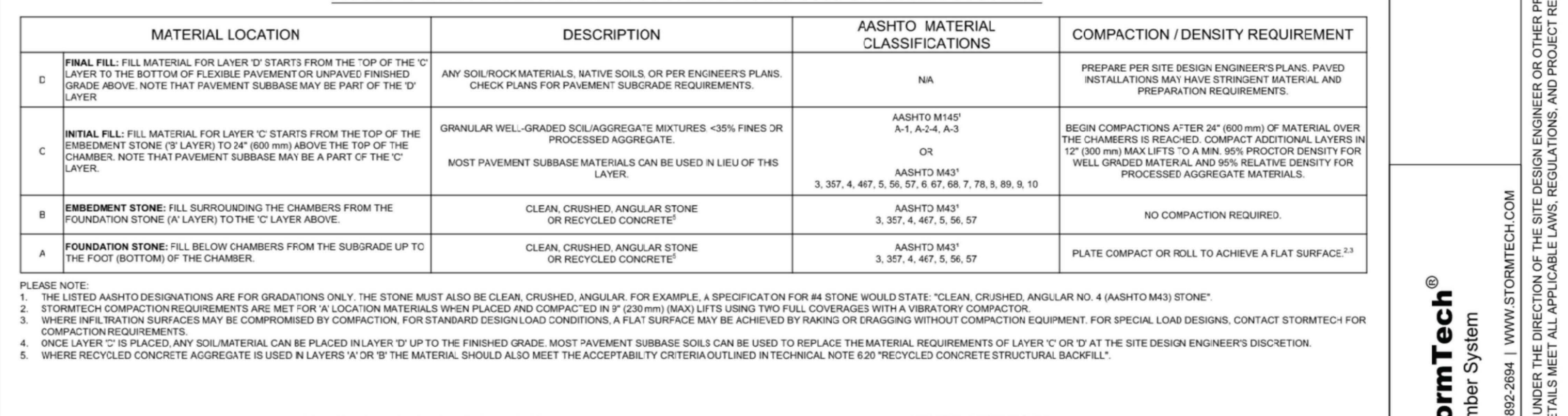
- MANHOLE SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANHOLE SIZING GUIDANCE.
- DOE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS. IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANHOLE COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.



**MC-SERIES END CAP INSERTION DETAIL**



**24-077 PUBLIC STORAGE MORENO VALLEY, CA, USA**



**MC-3500 CROSS SECTION DETAIL**

160 S. Old Springs Road  
Suite 210  
Anheim Hills, CA 92808  
714-685-6860

NO.	REVISION:	DATE:

**StormTech Chamber System**  
888-892-2894 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD  
HILLIARD, OH 43026  
1-800-733-7473

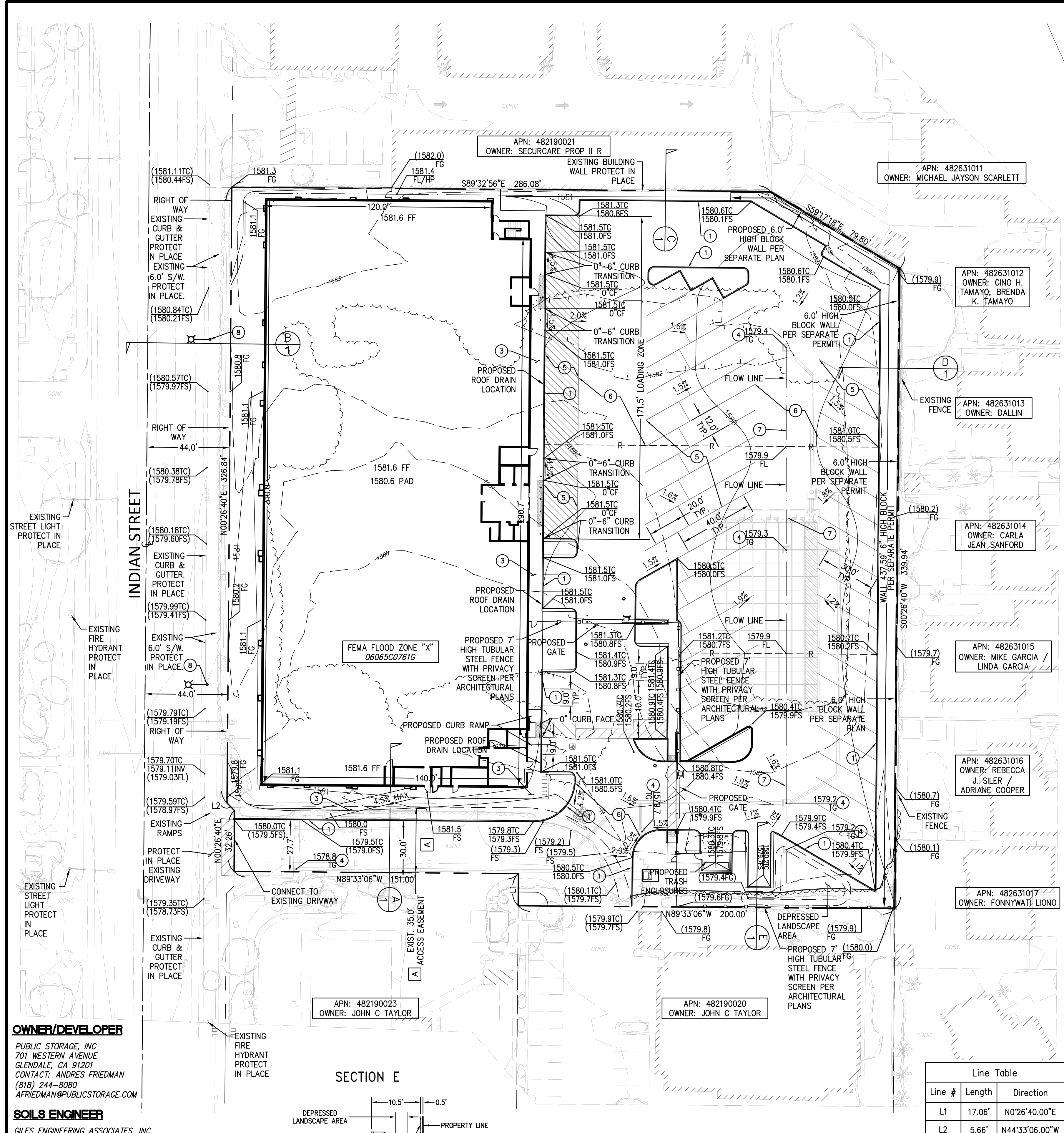
**ADS**

**PUBLIC STORAGE INDIAN STREET MORENO VALLEY, CA 92551 WQMP SITE PLAN**

PROJECT: WQMP  
DATE: 10/14/25  
CHECKED: KH DRAWN: KH  
DRAWING FILE:  
PROJECT NO.: 24-077  
SHEET NUMBER: 2 OF 2 SHEETS  
SCALE: AS SHOWN

# Appendix 2: Construction Plans

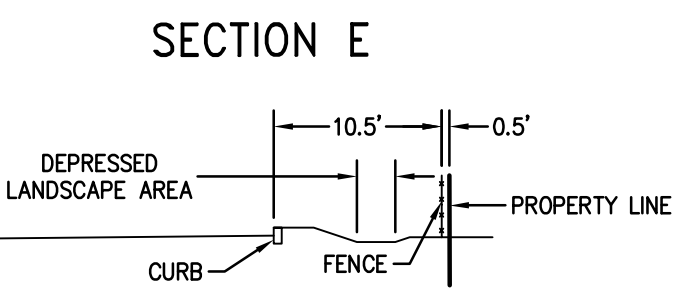
*Grading and Drainage Plans*



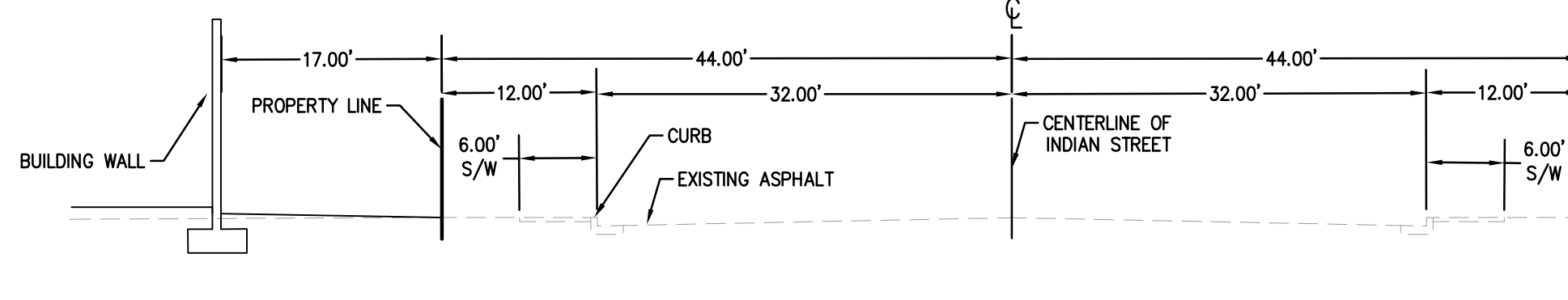
**OWNER/DEVELOPER**  
 PUBLIC STORAGE, INC  
 701 WESTERN AVENUE  
 GLENDALE, CA 91201  
 CONTACT: ANDRES FRIEDMAN  
 (818) 244-8080  
 AFRIEDMAN@PUBLICSTORAGE.COM

**SOILS ENGINEER**  
 GILES ENGINEERING ASSOCIATES, INC.  
 1965 N. MAIN STREET  
 ORANGE, CA 92665  
 CONTACT: JOHN L. MAIER  
 (714) 279-0817  
 JMAIER@GILESENGR.COM  
 REPORT DATED: MAY 23, 2024  
 PROJECT#: 20-2404001

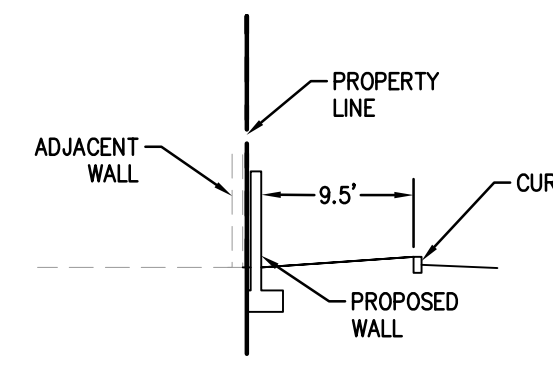
**CIVIL ENGINEER**  
 DRC ENGINEERING, INC.  
 160 SOUTH OLD SPRINGS ROAD #210  
 ANAHEIM HILLS, CA 92808  
 CONTACT: CHRIS MCKEE  
 (714) 685-6860 x356  
 CMCKEE@DRC-ENG.COM  
 PROJECT#: 24-077



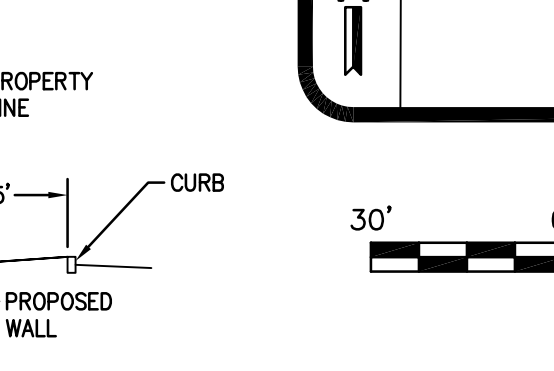
INDIAN STREET CROSS SECTION (ARTERIAL MVS1-104A-1) SECTION B



SECTION C



SECTION D



Line #	Length	Direction
L1	17.06'	N0726°40.00'E
L2	5.66'	N44°33'06.00"W

**GENERAL NOTES (LAND DEVELOPMENT DIVISION)**

- HOURS OF OPERATION: 7:00 AM - 6:00 PM (MONDAY - FRIDAY); WEEKENDS BY PRIOR APPROVAL ONLY (8:00 AM - 4:00 PM), EXCLUDING HOLIDAYS. HOURS MAY BE SHORTENED BY THE CITY ENGINEER PER MUNICIPAL CODE 8.21.050(O).
- NO WORK SHALL COMMENCE AND NO INSPECTIONS SHALL BE SCHEDULED UNTIL A PERMIT HAS BEEN ISSUED.
- INSPECTION REQUESTS SHALL BE SUBMITTED TO DLINSPECTIONS@MOVAL.ORG AT LEAST 48 HOURS IN ADVANCE. ANY NIGHT AND/OR WEEKEND INSPECTION REQUESTS REQUIRE MINIMUM 72 HOURS ADVANCED NOTICE IN ORDER TO OBTAIN PLANNING DIVISION APPROVAL.
- ALL WORK SHALL COMPLY WITH CURRENT CITY STANDARDS, APPLICABLE SECTIONS OF THE MUNICIPAL CODE AND/OR RESOLUTIONS ADOPTED BY THE CITY COUNCIL, AND STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION EXCEPT AS OTHERWISE NOTED ON THE APPROVED PLANS OR AS APPROVED BY THE CITY ENGINEER.
- ANY ALTERATION FROM THE APPROVED PLANS, EXCEPT MINOR ADJUSTMENTS IN THE FIELD TO MEET EXISTING CONDITIONS, SHALL BE SUBMITTED FOR REVIEW AND APPROVED BY THE CITY ENGINEER PRIOR TO CONSTRUCTION.
- AN "AS-BUILT" PLAN SHALL BE SUBMITTED BY THE ENGINEER OF RECORD AT THE COMPLETION OF WORK AND APPROVED BY THE CITY ENGINEER PRIOR TO OCCUPANCY RELEASE.
- ADJACENT STREETS SHALL BE CLEANED DAILY OF ALL DIRT AND/OR DEBRIS.
- SURVEY MONUMENTS SHALL BE PROTECTED IN PLACE.
- CITY APPROVAL OF THESE PLANS SHALL RELIEVE THE CONTRACTOR AND/OR DEVELOPER OF THEIR RESPONSIBILITY TO CORRECT ANY ERRORS AND/OR OMISSIONS DISCOVERED DURING CONSTRUCTION.
- CITY INSPECTION OF THE WORK SHALL NOT RELIEVE THE CONTRACTOR AND/OR THE DEVELOPER OF THEIR RESPONSIBILITY TO PERFORM THE WORK IN COMPLIANCE WITH THE APPROVED PLANS.
- CONCRETE, GUTTERS, ALLEY APPROACHES, DRIVEWAYS AND OTHER CONCRETE ITEMS SUBJECT TO VEHICULAR TRAFFIC SHALL BE BARRICADED WITH NO VEHICULAR TRAFFIC PERMITTED FOR A PERIOD NO LESS THAN SEVEN (7) DAYS FOLLOWING THE PLACEMENT OF SAID CONCRETE ITEM(S). WHEN THE GENERAL PROVISIONS CALL FOR THE USE OF SAID CONCRETE ITEM(S) FOR VEHICULAR TRAFFIC EARLIER THAN THE SEVENTH DAY FOR CONVENIENCE OF OPERATION OR WHEN THE CONTRACTOR SO DESIRES, CONCRETE CONTAINING EIGHT SACKS OF CEMENT PER CUBIC YARD SHALL BE USED UNDER THE DIRECTION OF THE CITY ENGINEER TO ALLOW TRAFFIC AFTER 72 HOURS OF PLACEMENT OF CONCRETE.
- CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR OR REPLACE ANY DAMAGED OR ALTERED PUBLIC IMPROVEMENTS AS REQUIRED BY THE CITY ENGINEER.
- CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT THE APPLICABLE AGENCY OR COMPANY TO VERIFY THE LOCATION OF ANY IRRIGATION AND/OR UTILITY LINES, SHOWN OR NOT SHOWN ON THE APPROVED PLANS PRIOR TO EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY IRRIGATION AND/OR UTILITY STRUCTURE CAUSED BY THEIR OPERATIONS.
- CONTRACTOR SHALL MAKE PROVISIONS FOR CONTRIBUTORY DRAINAGE AT ALL TIMES.
- DECLARATION OF ENGINEER OF RECORD

BY SIGNING THESE PLANS, I HEREBY DECLARE THAT THE DESIGN OF THE IMPROVEMENTS AS SHOWN ON THESE PLANS COMPLIES WITH PROFESSIONAL ENGINEERING STANDARDS AND PRACTICES AND THAT I ASSUME FULL RESPONSIBILITY FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE DESIGN OF THESE PLANS. AS THE ENGINEER IN RESPONSIBLE CHARGE OF DESIGN OF THESE IMPROVEMENTS, I ASSUME FULL RESPONSIBLE CHARGE FOR SUCH DESIGN. I UNDERSTAND AND ACKNOWLEDGE THAT THE REVIEW OF THESE PLANS BY THE CITY MORENO VALLEY IS FOR THE LIMITED PURPOSE OF ENSURING THAT THE PLANS COMPLY WITH CITY PROCEDURES, STANDARDS, APPLICABLE POLICIES AND ORDINANCES. THE REVIEW IS NOT A DETERMINATION OF THE TECHNICAL ADEQUACY OF THE DESIGN OF THE IMPROVEMENTS, SUCH REVIEW DOES NOT, THEREFORE, RELIEVE ME OR MY RESPONSIBILITY FOR THE DESIGN AND IN THE EVENT OF DISCREPANCIES ARISING DURING CONSTRUCTION, I SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISE THE PLANS FOR CITY ENGINEER APPROVAL.

AS THE ENGINEER OF RECORD (EOR), I AGREE TO INDEMNIFY AND HOLD HARMLESS THE CITY OF MORENO VALLEY, THE MORENO VALLEY HOUSING AUTHORITY, AND THE MORENO VALLEY COMMUNITY SERVICES DISTRICT (CSD), ITS OFFICER, OFFICIALS, EMPLOYEES, AGENTS AND VOLUNTEERS FROM ANY AND ALL LIABILITY OF CLAIMS, DAMAGES, OR INJURIES TO ANY PERSON OR PROPERTY, WHICH ARISE FROM THE NEGLIGENT ACTS, ERRORS, OR OMISSIONS OF THE ENGINEER OF RECORD. I HAVE READ AND INFORMED THE DEVELOPER THAT APPROVAL OF THESE PLANS DOES NOT RELIEVE THEM FROM THE REQUIREMENTS OF THE CONDITIONS OF APPROVAL (ATTACHED HEREIN OR IN OTHER APPROVED PLANS).

I ALSO HEREBY DECLARE THAT I HAVE COMPARED THESE PLANS WITH ALL APPLICABLE ADA TITLE II AND TITLE 24 REQUIREMENTS FOR THIS PROJECT AND THESE PLANS ARE IN FULL COMPLIANCE.

**EASEMENT**

- EASEMENT(S) FOR VEHICULAR AND PEDESTRIAN INGRESS-EGRESS AND RIGHTS INCIDENTAL THERETO AS RESERVED IN A DOCUMENT RECORDED AUGUST 16, 1999 AS RECORDING NO. 99-267289 OF OFFICIAL RECORDS (DOCUMENT AFFECTS - PLOTTED HEREON AS [A])
- MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED "EASEMENT MAINTENANCE AGREEMENT" RECORDED FEBRUARY 9, 2016 AS RECORDING NO. 2016-053619 OF OFFICIAL RECORDS (DOCUMENT AFFECTS - FUTURE CROSS ACCESS EASEMENT PLOTTED HEREON AS [A])

**LEGEND**

- BOUNDARY LINE
- CENTERLINE
- CURB LINE
- CURB AND GUTTER
- FLOW LINE
- SAWCUT LINE
- REDWOOD HEADER
- 1% RATE OF GRADE
- DAYLIGHT LINE
- RIDGE LINE
- PROPOSED ELEVATIONS
- EXISTING ELEVATIONS
- PROPOSED CONTOUR
- EXISTING CONTOUR
- ADA PATH OF TRAVEL
- RETAINING WALL
- OFF-SITE ST. LIGHT
- FIRE HYDRANT
- EX. VEGETATION

**SYMBOL LEGEND**

- FIRE HYDRANT
- GATE
- LIGHT POLE
- PALM TREE
- SIGN
- STREET LIGHT
- TREE
- MANHOLES
- SEWER
- UNKNOWN UTILITY
- VALVES
- GAS
- WATER

**ABBREVIATIONS**

- CONC CONCRETE
- L/S LANDSCAPING VEGETATION
- PL PROPERTY LINE
- PR PROPOSED
- TE TRASH ENCLOSURE

- GRADING CONSTRUCTION NOTES**
- CONSTRUCT 6" CURB.
  - CONSTRUCT 6" CURB AND GUTTER.
  - CONSTRUCT 4" PCC SIDEWALK.
  - INSTALL STORM DRAIN INLET. SEE CONCEPTUAL UTILITY PLAN
  - INSTALL 3" AC/4" AB
  - INSTALL 3" AC/6" AB
  - INSTALL 36" CONC V-GUTTER
  - INSTALL ARTERIAL HIGHWAY LIGHTING STREET LIGHT PER CITY OF MORENO VALLEY STANDARD NO. MWLT-400C-0

**PROJECT INFORMATION**  
 ASSESSOR'S PARCEL NUMBER(S): 482-190-022

**LEGAL DESCRIPTION**  
 THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF MORENO VALLEY, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:  
 PARCEL 1 OF PARCEL MAP NO. 34050, IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 237, PAGES 13 AND 14 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

**GROSS AND NET LAND AREA**  
 THE GROSS LAND AREA IS: 130,790 SF / 3.003 ACRES  
 THE NET LAND AREA IS: 124,280 SF / 2.853 ACRES

**EARTHWORK**  
 STATEMENT OF QUANTITIES  
 NET CUT (CY): 4970  
 NET FILL (CY): 760  
 TOTAL REQUIRED EXPORT (CY): 4210  
 NOTE: THE QUANTITIES AS SHOWN HEREON ARE FOR PERMIT AND/OR BONDING PURPOSES ONLY. THE GRADING CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF QUANTITIES PRIOR TO THE START OF GRADING. THE ABOVE CUT AND FILL FIGURES REPRESENT RAW VOLUMES ONLY. THERE IS NO CONSIDERATION TAKEN FOR SHRINKAGE, SUBSIDENCE, OR ANY OTHER LOSS FACTOR.

**EXISTING AND PROPOSE IMPERVIOUS AREA**  
 EXISTING IMPERVIOUS AREA: N/A  
 PROPOSED IMPERVIOUS AREA: 43,400 SF

**FEMA FLOOD ZONE DESIGNATIONS**  
 THE LAND SHOWN ON THIS SURVEY LIES ENTIRELY WITHIN FLOOD ZONE "X" (UN-SHADED), BEING DESCRIBED AS "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN" PER FLOOD INSURANCE RATE MAP (FIRM) - COMMUNITY PANEL NUMBER 06065C0761G, DATED AUGUST 28, 2008.

**TOPOGRAPHIC SOURCE AND DATE**  
 INLAND AERIAL SURVEYS, INC; APRIL 9, 2024

**UTILITY PURVEYORS**  
 WATER - EASTERN MUNICIPAL WATER DISTRICT  
 2270 TRUMBLE ROAD, PERRIS, CA 92570  
 TEL: 951-928-3777

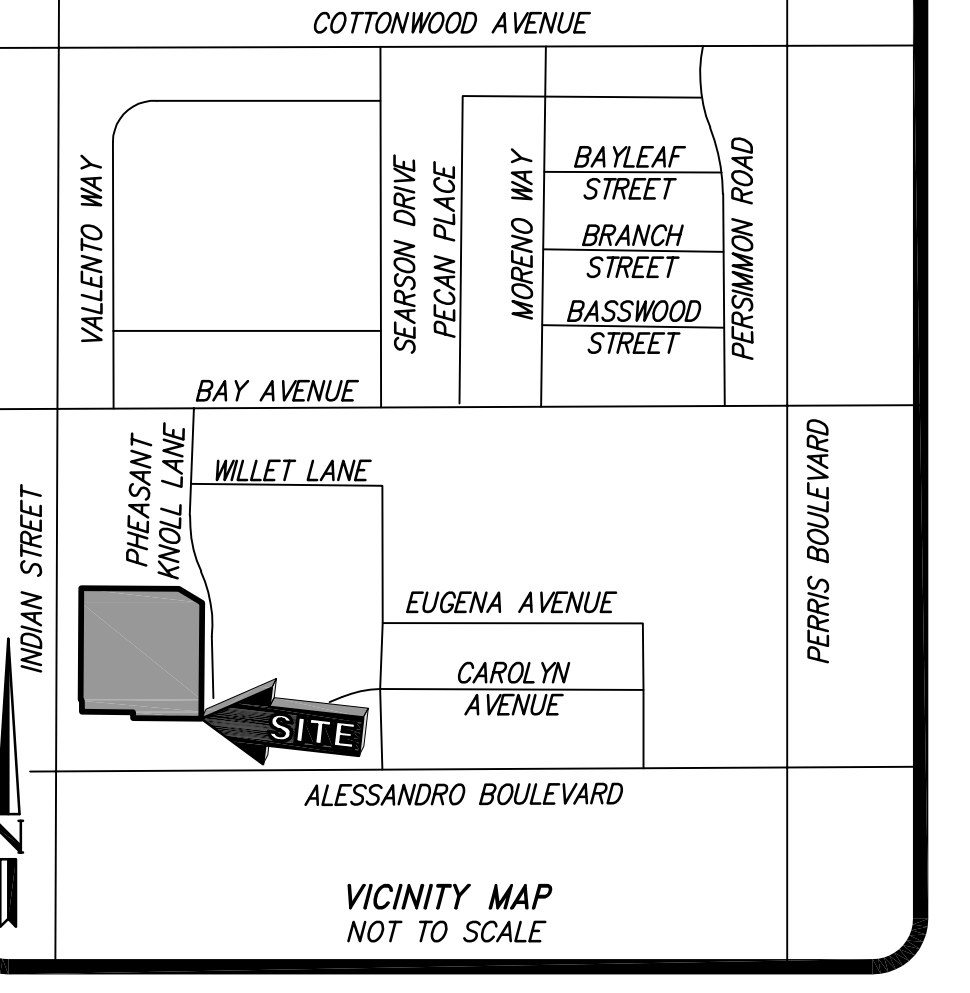
**SEWER - EASTERN MUNICIPAL WATER DISTRICT**  
 2270 TRUMBLE ROAD, PERRIS, CA 92570  
 TEL: 951-928-3777

**GAS - SOUTHERN CALIFORNIA GAS COMPANY**  
 4495 HOWARD AVENUE, RIVERSIDE, CA 92507  
 TEL: 909-335-7862

**ELECTRICITY - MORENO VALLEY CITY HALL**  
 14177 FREDERICK STREET, MORENO VALLEY, CA 92552  
 TEL: 900-413-3000

**COMMUNICATION - FRONTIER COMMUNICATIONS**  
 1400 E. PHILLIPS BOULEVARD, POMONA, CA 71766  
 TEL: 760-333-2531

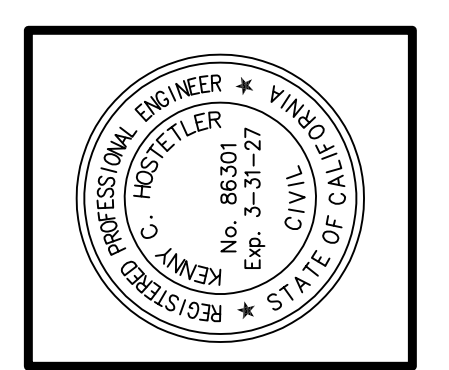
**TELEPHONE - CHARTER COMMUNICATIONS**  
 7337 CENTRAL AVENUE, RIVERSIDE, CA 92504  
 TEL: 909-335-7862



30' 0' 30' 60' 90'  
 GRAPHIC SCALE: 1" = 30'

PREPARED BY: **DRC Engineering, Inc.**  
 Civil Engineering/Land Surveying/Land Planning  
 160 S. Old Springs Road  
 Suite 210  
 Anaheim Hills, CA 92808  
 714-685-6860

DATE: F.C.E. 68501



NO.	REVISION:

**PUBLIC STORAGE**  
**ALESSANDRO BLVD & INDIAN ST**  
**MORENO VALLEY, CALIFORNIA**  
 DRAWING NAME: **CONCEPTUAL GRADING PLAN**

PROJECT: PRELIMINARY  
 DATE: 10/14/2025  
 CHECKED: CM DRAWN: KH  
 DRAWING FILE: 24077pg101  
 PROJECT NO.: 24-077  
 SHEET NUMBER: 1  
 OF 2 SHEETS  
 SCALE: 1" = 30'

ISSUE: PRELIMINARY  
 DATE: 10/14/2025  
 CHECKED: CM DRAWN: KH  
 DRAWING FILE: 24077pg101  
 PROJECT NO.: 24-077  
 SHEET NUMBER: 1  
 OF 2 SHEETS  
 SCALE: 1" = 30'

NOT FOR CONSTRUCTION



# Appendix 3: Soils Information

*Geotechnical Study and Other Infiltration Testing Data*



# **Geotechnical Engineering Exploration and Analysis**

**Proposed Public Storage Facility  
SEQ Indian Street and Alessandro Boulevard  
Moreno Valley, California**

**Prepared for:**

**Public Storage  
Glendale, California**

**May 23, 2024**

**Project No. 2G-2404001**



**GILES**  
ENGINEERING ASSOCIATES, INC.



# GILES

## ENGINEERING ASSOCIATES, INC.

GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION MATERIALS CONSULTANTS

- Dallas, TX
- Los Angeles, CA
- Manassas, VA
- Milwaukee, WI

May 23, 2024

Public Storage, Inc.  
701 Western Avenue  
Glendale California 91201

Attention: Mr. Joe Tomlinson  
Vice President of Construction

Subject: Geotechnical Engineering Exploration and Analysis  
Proposed Public Storage Facility  
SEQ Indian Street and Alessandro Boulevard  
Moreno Valley, California  
Project No. 2G-2404001

Dear Mr. Tomlinson:

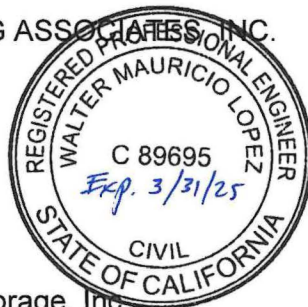
In accordance with your request and authorization, a *Geotechnical Engineering Exploration and Analysis* report has been prepared for the above-referenced project. Conclusions and recommendations developed from the exploration and analysis are discussed in the accompanying report.

We appreciate the opportunity to be of service on this project. If we may be of additional assistance, should geotechnical related problems occur or to provide construction observation and testing services, please do not hesitate to call at any time.

Respectfully submitted,

GILES ENGINEERING ASSOCIATES, INC.

Walter M. Lopez, P.E.  
Project Engineer II



John L. Maier, P.E., G.E.  
Branch Manager



Distribution: Public Storage, Inc.

Attn.: Mr. Joe Tomlinson (email: [jtomlinson@publicstorage.com](mailto:jtomlinson@publicstorage.com))

Attn.: Ms. Cherry Miao (email: [cmiao@publicstorage.com](mailto:cmiao@publicstorage.com))

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PROPOSED PUBLIC STORAGE FACILITY  
SEQ INDIAN STREET AND ALESSANDRO BOULEVARD  
MORENO VALLEY, CALIFORNIA  
PROJECT NO. 2G-2404001

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### APPENDICES

Appendix A – Figures (7), Boring Logs (15), Liquefaction Analysis (1) and Dry Settlement (1)

Appendix B – Field Procedures

Appendix C – Laboratory Testing and Classification

Appendix D – General Information (*Modified* Guideline Specifications) and *Important Information About Your Geotechnical Report*



# GEOTECHNICAL ENGINEERING EXPLORATION AND ANALYSIS

PROPOSED PUBLIC STORAGE FACILITY  
SEQ INDIAN STREET AND ALESSANDRO BOULEVARD  
MORENO VALLEY, CALIFORNIA  
PROJECT NO. 2G-2404001

## EXECUTIVE SUMMARY OUTLINE

The executive summary is provided solely for the purpose of overview. Any party who relies on this report must read the full report. The executive summary omits a number of details, any one of which could be crucial to the proper application of this report.

### **Subsurface Conditions**

- Site Class designation D is recommended for seismic design considerations.
- Our review of the *Geologic Map of the Sunnymead/South ½ of Redlands Quadrangles (Dibblee, Jr., 2003)* indicates that the subject site is underlain by Quaternary Surficial Deposits (Qa) consisting of alluvial sand, gravel and clay of valley areas, covered with thick soil.
- Fill and possible fill soils were encountered in the test borings to depths of approximately zero to 3 feet below grade. Fill and native soils have very similar characteristics, and it was difficult to determine the exact geologic contact. Possible fill consisted of medium stiff to hard, moist, sandy silt, trace fine gravel, and medium dense silty sand, fine to medium grained, trace clay, with some mica.
- Beneath the possible fill, native soils were encountered within our test borings, which were generally loose to dense, silty sand, poorly graded sand with silt, and clayey sand, fine to medium grained, some coarse, some fine gravel, and stiff to hard sandy silt, silty clay, and sandy clay, fine sand, moist, some mica, and various amount of fine gravel and some mica.
- Groundwater was encountered at approximately 36 feet below ground surface in the Test Boring B-8 drilled to a maximum depth of 51.5 feet bgs.
- The expansion index (EI) test of the upper soils indicates a very low expansion potential.
- Based on our screening of corrosivity of the upper soils, the results from the minimum resistivity test generally indicate that the tested soils have a **moderately corrosive potential** when in contact with ferrous materials and chloride. The test results for pH indicated the **tested soil was neutral** and the near surface soils contain approximately 0.0207 percent of water-soluble sulfates; therefore, **no special sulfate resistant cement is considered necessary for concrete.**

### **Site Development**

- It is our understanding that Public Storage will be developing this site by constructing one, 3-story building, with approximately 130,500 GSF with concrete slab-on-grade floor supported by spread footings or a mat foundation, and paved driveways and parking lot areas. The proposed building will have no basement level.
- New Building: Due to the variable and low strength characteristics of the near surface onsite soils and the estimated seismic-induced seismic dry sand settlement, and to develop uniformity of support, it is recommended that the soils within the proposed new building areas and an appropriate lateral distance beyond (5 feet minimum) be over-excavated to a depth of at least 5 feet below the proposed grade or 3 feet below bottom of foundations and floor slab, whichever is deeper. For the planned subgrade, the existing soils should be proofrolled to remove any unstable materials and the surface compacted to an in-place density of at least 90% of its maximum dry density per ASTM D-1557. The existing soils are considered suitable for foundation and floor support with the recommended 3-foot structural fill layer for the foundations only, and the existing

soils are also considered suitable for pavement support with recommended proofroll and geotechnical inspection/testing. The soils exposed after cutting to the structural fill subgrade should be examined by the geotechnical engineer to document that the soils are suitable for building support. Prior to placement of fill, the exposed surfaces approved for fill placement should be scarified to a depth of at least 6 to 8 inches, moisture conditioned above optimum moisture content and then recompacted to at least 90% of the maximum dry density as determined by Modified Proctor (ASTM D 1557).

### **Building Foundation**

- The proposed structure may be supported by a shallow spread footing foundation system or a mat foundation for a maximum, net allowable soil bearing pressure of 3,500 pounds per square foot (psf) underlain by a minimum 3-foot structural compacted fill layer. Structural loads supported by a mat foundation may be designed for a maximum modulus of subgrade reaction (Ks) of 75 pounds per square inch per inch (psfi/in.).
- Foundation reinforcement should be determined by the structural engineer.

### **Building Floor Slab**

- It is recommended that an on-grade slab be a minimum 4-inch-thick slab-on-grade or turned-down slab, underlain by a minimum 4-inch-thick granular base supported on a properly prepared subgrade consisting of a minimum 1-foot structural fill layer.
- A minimum 15-mil vapor barrier is recommended to be directly below the floor slab or base course where required to protect moisture sensitive floor coverings.

### **New Pavement**

- Asphalt Pavements: 3 inches of asphaltic concrete underlain by 4 or 6 inches of base course in parking stall and drive lane areas, respectively.
- Portland Cement Concrete: 6 inches in thickness underlain by 4 inches of base course in high stress areas such as entrance/exit aprons, drive-thru lane and the trash enclosure-loading zone.

### **Construction Considerations**

- Due to anticipated on-site soils, loose to medium dense sandy soils, shallow excavations, up to 5 feet in vertical height, may be adequately sloped for bank stability, where sufficient space is available, temporarily unsurcharged embankments could be sloped back at a 2:1 (h:v) slope gradient. Deeper excavations or excavations where adequate back sloping cannot be performed may require some form of external support such as shoring or bracing.

## **1.0 SCOPE OF SERVICES**

This report provides the results of the *Geotechnical Engineering Exploration and Analysis* that Giles Engineering Associates, Inc. ("Giles") conducted regarding the proposed development. The *Geotechnical Engineering Exploration and Analysis* included several separate, but related, service areas referenced hereafter as the Geotechnical Subsurface Exploration Program, Geotechnical Laboratory Services, and Geotechnical Engineering Services. The scope of each service area was narrow and limited, as directed by our client and in consideration of the proposed project. The scope of each service area is briefly explained in this report.

Geotechnical-related recommendations for design and construction of the foundation and ground-bearing floor slab for the proposed buildings are provided in this report. Geotechnical-related recommendations are also provided for the proposed driveways. Site preparation recommendations are also given; however, those recommendations are only preliminary since the means and methods of site preparation will depend on factors that were unknown when this report was prepared. Those factors include the weather before and during construction, the water table at the time of construction, subsurface conditions that are exposed during construction, and finalized details of the proposed development.

## **2.0 SITES AND PROJECT DESCRIPTION**

### **2.1 Site Description**

The subject property is at the southeast quadrangle of Indian Street and Alessandro Boulevard, in the city of Moreno Valley, Riverside County, California. Based on internet research, the subject property has a history of being an undeveloped vacant lot, covered with soils and some vegetation. The site is bounded on the north by an existing storage facility, on the east by residential structures, on the south a gas station, commercial buildings and Alessandro Blvd further south, and on the west by Indian Street. The neighboring development consists of a mixture of residential structures and commercial structures.

Based on Google Earth website, the site gently slopes with an approximately 4-ft elevation difference across the site, sloping toward the south (to approximate El. 1579) from the north area (approximately El. 1583).

### **2.2 Proposed Project Description**

It is our understanding that Public Storage will be developing this site by constructing one, 3-story building, with approximately 130,500 GSF with concrete slab-on-grade floor supported by spread footings or a mat foundation, and paved driveways and parking lot areas. The proposed building will have no basement level. A Conceptual Site Plan was provided to Giles. Structural loads were not available at the time this report was prepared, but we have estimated maximum building loads, based

on a 10-foot by 10-foot column spacing, to be about 75 to 100 kips for interior columns and 2 to 3 kips per foot for walls. When design loading conditions are final, we should be notified to re-evaluate the conclusions and recommendations contained in this report. The structure is anticipated to be concrete, masonry, and steel.

It is anticipated that the finished floor elevation of the new building will be near or at existing grade. The finished floor elevation is anticipated to be approximately at El. 1583. Therefore, site grading is anticipated to include minor cut and fills to establish the necessary site grade to accommodate the assumed floor elevation, exclusive of site preparation or over-excavation requirements necessary to create a stable site suited for the proposed development.

### **3.0 SUBSURFACE EXPLORATION**

#### **3.1 Subsurface Exploration**

Our subsurface exploration consisted of the drilling of 15 test borings (B-1 through B-15) to depths of approximately 10 to 51.5 feet below existing ground surface utilizing a truck rig with hollow-stem auger drilling equipment. The approximate test boring locations are shown in the Test Boring Location Plan (Figure 1). The Test Boring Location Plan and Test Boring Logs (Records of Subsurface Exploration) are enclosed in Appendix A. Field and laboratory test procedures are enclosed in Appendix B and C, respectively. The terms and symbols used on the Test Boring Logs are defined on the General Notes in Appendix D.

Standard split-spoon tests (SS), also called Standard Penetration Test (SPT), were performed at selected depth intervals in accordance with the American Society for Testing Materials (ASTM) Standard Procedure D 1586. This method consists of mechanically driving an unlined standard split-barrel sampler 18 inches into the soil with successive 30-inch drops of the 140-pound automatic trip hammer. Blow counts for each 6-inch driving increment were recorded on the exploration logs. The number of blows required to drive the standard split-spoon sampler for the last 12 of the 18 inches was identified as the uncorrected standard penetration resistance (N). Disturbed soil samples from the unlined standard split-spoon samplers were placed in plastic bags and transported to our laboratory for testing. A representative bulk sample, consisting of composite soil materials from the upper soils, was obtained from all borings.

Our subsurface exploration included also the collection of relatively undisturbed soil samples of subsurface soil materials at selected depth intervals from the test borings for laboratory testing purposes. Relatively undisturbed samples were collected (per ASTM D 3550) using a 3-inch outside diameter, modified California split-spoon soil sampler (CS) lined with 1-inch-high brass rings. The sampler was driven with successive 30-inch drops of a hydraulically operated, 140-pound automatic trip hammer. Blow counts for each 6-inch driving increment were recorded on the field exploration logs. The central portions of the driven core samples were placed in sealed containers and transported to our laboratory for testing.

At the conclusion of drilling activities, each borehole was backfilled. Even with this service, however, it is important to note that some boreholes backfill settlement or expansion can and will occur over time. This settlement/expansion can create a hazard and should be carefully monitored by the client and/or property owner. The settlement/expansion can lead to the formation of a "trip joint" representing a threat of injury to persons or animals utilizing or accessing the subject property. Giles has not included a cost for monitoring borehole settlement/expansion after the initial drilling activities and will not be performing this service.

### **3.2 Subsurface Conditions**

The subsurface conditions as subsequently described have been simplified somewhat for ease of report interpretation. A more detailed description of the subsurface conditions at the test boring locations is provided by the logs of the test borings enclosed in Appendix A of this report.

#### Site Geology

Our review of the *Geologic Map of the Sunnymead/South ½ of Redlands Quadrangles (Dibblee, Jr., 2003)* indicates that the subject site is underlain by Quaternary Surficial Deposits (Qa) consisting of alluvial sand, gravel and clay of valley areas, covered with thick soil.

#### Soil

Fill and possible fill soils were encountered in the test borings to depths of approximately zero to 3 feet below grade. Fill and native soils have very similar characteristics, and it was difficult to determine the exact geologic contact. Possible fill consisted of medium stiff to hard, moist, sandy silt, trace fine gravel, and medium dense silty sand, fine to medium grained, trace clay, with some mica.

Beneath the possible fill, native soils were encountered within our test borings, which were generally loose to dense, silty sand, poorly graded sand with silt, and clayey sand, fine to medium grained, some coarse, some fine gravel, and stiff to hard sandy silt, silty clay, and sandy clay, fine sand, moist, some mica, and various amount of fine gravel.

#### Groundwater

Groundwater was encountered at approximately 36 feet below ground in the deep boring (B-8) during our field exploration. Based on a review of GeoTracker website, groundwater was found at 35 feet below grade from a well located approximately 400 feet southeast of our subject site. The historic groundwater level has not been mapped in this area.

Fluctuations of the groundwater table, localized zones of perched water, and rise in soil moisture content should be anticipated during and after the rainy season. Irrigation of landscape areas on or adjacent to the site could also cause fluctuations of local or shallow perched groundwater levels.

### 3.3 Percolation Testing

It is our understanding that an on-site below grade storm water infiltration system is being considered for the subject site. Therefore, two percolation tests were performed to assess the infiltration characteristics of the site soils.

The percolation testing consisted of drilling an 8-inch-diameter hole using a hollow-stem auger, installing a 2-inch-diameter slotted pvc casing with a solid end cap and then surrounding the casing with a granular filter pack. The test holes (B-10 and B-12) were then pre-soaked to a minimum depth of 1 foot above the bottom of the boring. After pre-soaking, test water was added to the casing and refilled after each consecutive percolation test reading. The drop in water level over time is the percolation rate at the test location. The percolation test procedure outlined in the Riverside County Department of Environmental Health was used as a guide in our testing. A summary Table of the test results of the percolation tests is provided below.

The drop in water level over time is the pre-adjusted percolation rate at the test location. The percolation rate was reduced to account for the discharge of water from the sides and bottom of the boring. The Porchet Method, noted below, was used to calculate the design infiltration rate.

$$\text{Tested Infiltration Rate} = \Delta H (60r) / \Delta t (r + 2H_{\text{avg}})$$

Where:            r is the radius of the test hole (in)  
                        $\Delta H$  is the change in height over the time interval (in)  
                        $\Delta t$  is the time interval (min)  
                        $H_{\text{avg}}$  is the average head height over the time interval.

The results obtained from our percolation testing are summarized below. The infiltration rates noted below have not been reduced to account for a factor of safety.

Test Number	Test Depth (feet)	Design Infiltration Rate (in/hr)	Soil Type
B-10	10	4.38	(SP) – Poorly-graded Sand
B-12	10	2.83	(SP) – Poorly-graded Sand

It should be noted that the infiltration rate of the on-site soils represents a specific area and depth tested and may fluctuate throughout other parts of the site.

### 4.0 LABORATORY TESTING

Several laboratory tests were performed on selected samples considered representative of those encountered in order to evaluate the engineering properties of the on-site soils. The following is a brief description of our laboratory test results.

### In Situ Moisture and Density

Tests were performed on select samples from the test borings to determine the subsoils dry density and natural moisture contents in accordance with Test Method ASTM D 2216. The results of these tests are included in the Test Boring Logs enclosed in Appendix A.

### Expansive Potential

To evaluate the expansion potential of the near surface soils encountered during our subsurface exploration, a representative bulk soil sample collected from the upper soils from the test borings was subjected to Expansion Index (EI) testing in accordance with Test Method ASTM D 4829. The result of our expansion index (EI) test indicates that the near surface sample has a very low expansion potential (EI < 5).

### Sieve Analysis

Sieve Analyses (Passing No. 200 Sieve) were performed on selected samples to assist in soil classification. These tests were performed in accordance with Test Method ASTM D 1140. The results of the Passing No. 200 Sieve tests are presented in Test Boring Logs in Appendix A.

### Soluble Sulfate Analysis and Soil Corrosivity

A representative bulk sample of the near surface soils which may contact shallow buried utilities and structural concrete was used to perform to determine the corrosion potential for buried ferrous metal conduits and the concentrations present of water-soluble sulfate which could result in chemical attack of cement. The following table presents the results of our laboratory testing.

Parameter	Bulk Sample 0 to 5 feet
pH	7.1
Chloride	223 ppm
Sulfate	0.0207%
Resistivity	8,100 ohm-cm

The chloride content of near-surface soils was determined for a selected sample in accordance with California Test Method No. 422. The results of this test indicated that **tested on-site soils have a moderate exposure to chloride.**

The results of limited testing of soil pH and minimum resistivity were determined in accordance with California Test Method No. 643. The test results for pH indicated the **tested soil was neutral.** The results from the minimum resistivity test generally indicate that the tested soils have a **moderately corrosive potential** when in contact with ferrous materials. Therefore, special protection for underground cast iron pipe or ductile pipe may be warranted depending on the actual materials in contact with the pipe. We recommend that a corrosion engineer review these results in order to provide specific recommendations for corrosion protection as well as appropriate recommendations for other types of buried metal structures.

A representative sample of the near surface soils which may contact shallow buried utilities and structural concrete was performed to determine the concentrations present of water-soluble sulfate which could result in chemical attack of cement. Our laboratory test data indicated that **near surface soils contain approximately 0.0207 percent of water-soluble sulfates**. Based on Section 1904.1 of the California Building Code (CBC), concrete that may be exposed to sulfate containing soils shall comply with the provisions of ACI 318, Section 4.3. Therefore, according to Table 4.3.1 of the ACI 318 a negligible exposure to sulfate can be expected for concrete placed in contact with the tested on-site soils. **No special sulfate resistant cement is considered necessary for concrete** which will be in contact with the tested on-site soils.

## **5.0 GEOLOGIC AND SEISMIC HAZARDS**

### **5.1 Liquefaction**

According to the City of Moreno Valley Safety Elements, Map S-2, Liquefaction Hazards, the site is located within a low to moderate liquefaction susceptibility zone. During our field exploration, drilled to a maximum depth of 51.5 feet bgs, groundwater was encountered at approximately 36 feet below ground surface (bgs). Based GeoTracker, groundwater was found be about 35 feet bgs from a nearby well. Silt and Clay soil types interbedded with sandy layers were found at those depths based on our recent field exploration. Therefore, based on encountered groundwater level and soil type a liquefaction analysis for this site was performed.

### **5.2 Active Fault Zones**

Based on the City of Moreno Valley, Riverside County Seismic and Geologic Hazards, dated 2019, Map S-1, Fault Zones and the Special Studies Zones for the Sunnymead Quadrangle (CGS, 1974), the site is not located within any active faults zone. The potential for fault rupture through the site is, therefore, considered to be low. The site may however be subject to strong groundshaking during seismic activity.

## **6.0 CONCLUSIONS AND RECOMMENDATIONS**

Conditions imposed by the proposed development have been evaluated on the basis of the assumed floor elevation and engineering characteristics of the subsurface materials encountered during our subsurface investigation and their anticipated behavior both during and after construction. Conclusions and recommendations presented for the design of building foundations, floor slab, and pavement along with site preparation recommendations and construction considerations are discussed in the following sections of this report.

From a soils engineering point of view, the subject property is considered geotechnically suitable for the proposed new development provided the following recommendations are incorporated in the design and construction of the project.

We recommend that Giles Engineering Associates, Inc. be involved in the review of the grading and foundation plans for the site to ensure our recommendations are interpreted correctly. Based on the results of our review, modifications to our recommendations or the plans may be warranted.

#### Effect of Proposed Grading and Construction on Adjacent Property

It is our opinion that the proposed construction and grading will be safe against geotechnical hazards from landslides, settlement, or slippage and the proposed work will not adversely affect the geologic stability of the adjacent property provided grading and construction are performed in compliance with the local city code and in accordance with the recommendations presented herein.

### **6.1 Seismic Design Considerations**

#### Faulting/Seismic Design Parameters

The site is not located within any active fault zone. The potential for fault rupture through the site is, therefore, considered to be low. The site may however be subject to strong groundshaking during seismic activity. The proposed structure should be designed in accordance with the current version of the *California Building Code (CBC)* and applicable local codes. In accordance with *ASCE 7*, Chapter 20, a Site Classification D is recommended for this site based upon the mapped geological features of the site also verified by test borings.

According to the maps of known active fault near-source zones to be used with the CBC, the San Jacinto fault and its branches are the closest known active faults and located about 4.9 and 6.8 miles from our subject site. The San Jacinto fault would probably generate the most severe site ground motions at the site with an anticipated maximum moment magnitude ( $M_w$ ) of 7.88 (Hanks).

The proposed structure should be designed in accordance with the current version of the *California Building Code (CBC)*, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures ASCE 7*, and applicable local codes. The following values are determined by using the SEAOC/OSHPD Seismic Design Map Tool based upon the *CBC 2022* and *ASCE 7-16*.

<b>CBC 2022, Earthquake Loads</b>	
Site Class Definition (Table 20.3-1 from ASCE 7-16)	D
Mapped Spectral Response Acceleration Parameter, $S_s$ (for 0.2 second)	1.579
Mapped Spectral Response Acceleration Parameter, $S_1$ (for 1.0 second)	0.613
Site Coefficient, $F_a$ short period	1.00
Site Coefficient, $F_v$ 1-second period	1.70
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter, $S_{MS}$	1.579
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter, $S_{M1}$	1.042
Design Spectral Response Acceleration Parameter, $S_{DS}$	1.052
Design Spectral Response Acceleration Parameter, $S_{D1}$	0.695
MCEG Peak Ground Acceleration adjusted for site class effects, $PGA_M$	0.737

According to Section 11.4.8 of ASCE 7-16 for structural engineering considerations, a ground motion hazard analysis is required and should be performed in accordance with Section 21.2 for structures on Site Class D with  $S_1$  greater than or equal to 0.2. However, as an exception to performing the ground motion hazard analysis, the value of the Seismic Response Coefficient ( $C_s$ ) must be determined by Equation (12.8-2) for values of the fundamental period of the building ( $T$ )  $\leq 1.5T_s$ , and taken as 1.5 times the value computed in accordance with either Equation (12.8-3) for  $T_L \geq 1.5T_s$ , or Equation (12.8-4) for  $T > T_L$ .

#### Liquefaction

A Seismic Hazard Evaluation Report for the area where the subject site is located has not yet been prepared by the CGS (California Geological Survey). However, based on a review of the Moreno Valley Safety Elements, the site is located within a low to moderate liquefaction potential. Based on a review of groundwater information on the State of California GeoTracker website, the depth to groundwater in the vicinity of the site is approximately 35 feet below grade. Accordingly, a detailed liquefaction analysis was considered necessary and performed for this site.

Liquefaction analysis was performed based on the current California Building Code (2022 CBC) and was performed utilizing the Standard Penetration Test (SPT) data from Test Boring B-8. The NCEER method (1998) was applied as presented by Youd, et.al (2001). The peak ground acceleration (PGA) and modal magnitude were obtained from the USGS Seismic Ground Motion Design Parameter Tool and USGS Probabilistic Seismic Hazards Deaggregation Tool, respectively. As per ASCE 7-16 guidelines, the maximum considered earthquake geometric mean ( $MCE_G$ ) peak ground acceleration adjusted for the site effects ( $PGA_M$ ) equals to 0.737g and a predominant mean earthquake magnitude of 7.38 was used in our analysis.

The on-site fine-grained soils were evaluated to determine susceptibility to liquefaction during ground shaking in accordance with the criteria outlined within SP117A and the parameters and soil profile mentioned above. Based on our field exploration, laboratory test results, and soil type, the results of

our liquefaction evaluation indicate that the ground settlement resulting from the design-level earthquake will be negligible. The results of our liquefaction analysis are provided as Plate A-1 of Appendix A.

#### Seismic-Induced Settlement

Seismic-induced settlement is often caused by loose to medium dense granular soils densified during ground shaking. To evaluate the site-specific potential for seismic-induced settlement above the groundwater level (assumed at 35 feet), we used the same parameters used in the liquefaction analysis based on the 2022 CBC and ASCE 7-16. Based on the results of our analysis, the seismic-induced settlement is estimated to be on the order of approximately 2.15 inches. However, as a result of over-excavating the upper 5 feet or 3-ft below bottom of the footings, the dry settlement is reduced to 0.40 inches. Therefore, differential settlement may be assumed to be negligible. The results of our analysis performed at Test Boring B-8 are presented as Plate A-2 of Appendix A.

#### Liquefaction-Induced Lateral Spreading

Lateral spreading of the ground surface during a seismic activity usually occurs along the weak shear zones within a liquefiable soil layer and has been observed to generally take place toward a free face (i.e. retaining wall, slope or channel) and to lesser extend on ground surfaces with a very gentle slope. Due to absence of any slope or channel within or near the subject site, the potential for lateral spread occurring within the site is considered to be very low.

### **6.2 Site Development Recommendations**

The recommendations for site development as subsequently described are based upon the conditions encountered at the test boring locations and the results of our laboratory testing.

#### Site Clearing and Preparation

Clearing and demolition operations should include the removal of all landscape vegetation and any existing structural features, within the area of the proposed new building and site improvements. All soils disturbed by grading operations should be removed and/or compacted to provide a competent subgrade, as determined by the project geotechnical engineer.

Should any unusual soil conditions or subsurface structures be encountered during clearing/demolition operations or during grading, they should be brought to the immediate attention of the project geotechnical consultant for corrective recommendations.

#### Existing Utilities

All existing utilities should be located. Utilities that are not reused should be capped off and removed or properly abandoned in-place in accordance with city codes and ordinances. The excavations made for removed utilities that are in the influence zone of new construction are recommended to be backfilled with structural compacted fill. Underground utilities, which are to be reused or abandoned

in-place, are recommended to be evaluated by the structural engineer and utility backfill is recommended to be evaluated by the geotechnical engineer, to determine their potential effect on the new development. If any existing utilities are to be preserved, construction operations must be carefully performed so as not to disturb or damage the existing utility.

#### Building Area

Due to the variable and low strength characteristics of the near surface onsite soils and the estimated seismic-induced seismic settlement, and to develop uniformity of support, it is recommended that the soils within the proposed new building areas and an appropriate lateral distance beyond (5 feet minimum) be over-excavated to a depth of at least 5 feet below the proposed grade or 3 feet below bottom of foundations and floor slab, whichever is deeper. For the planned subgrade, the existing soils should be proofrolled to remove any unstable materials and the surface compacted to an in-place density of at least 90% of its maximum dry density per ASTM D-1557. The existing soils are considered suitable for foundation and floor support with the recommended 3-foot structural fill layer, and soils are also suitable for pavement support with recommended proofroll and geotechnical inspection/testing. The soils exposed after cutting to the structural fill subgrade should be examined by the geotechnical engineer to document that the soils are suitable for building support. Prior to placement of fill, the exposed surfaces approved for fill placement should be scarified to a depth of at least 6 to 8 inches, moisture conditioned to above the soil's optimum moisture content, and then recompacted to at least 90% of the maximum dry density as determined by Modified Proctor (ASTM D 1557).

Positive drainage devices such as sloped concrete flatwork, earth swales, and sheet flow gradients in landscape, setback, and easement areas should be designed for the site. The drainage system should drain to a suitable discharge area. The purpose of this drainage system is to reduce water infiltration into the subgrade soils and to direct water away from buildings and site improvements.

All utility trenches backfill should be placed in lifts no greater than 8 inches in thickness, moisture conditioned above optimum moisture content and then compacted to a minimum of 90 percent of the soil's maximum density near the optimum moisture content. A representative of the project geotechnical engineer should observe and test the backfills to document adequacy of compaction.

#### Proofroll and Compact Subgrade

Following site clearing, removal or re-compaction of disturbed soils and lowering of site grades where necessary for the 3-foot structural fill layer in the building area, the subgrades within the proposed building, pavement and drive areas should be proofrolled in the presence of the geotechnical engineer with appropriate rubber-tire mounted heavy construction equipment or a loaded truck to detect very loose/soft yielding soil which should be removed to a stable subgrade, or stabilized in place. Any unsuitable materials discovered should be removed and backfilled with structural fill. Following proofrolling and completion of any necessary over-excavation, the subgrades in the building, parking

lot and drive areas should be scarified to a depth of 6 to 8 inches, moisture conditioned above the soil's optimum moisture content, and recompacted to at least 90 percent of the Modified Proctor (ASTM D1557) maximum density. The upper 1 foot of the pavement subgrade should have minimum in-place density of at least 95% of the maximum dry density. Low areas and excavations may then be backfilled in lifts with suitable low-expansive structural compacted fill. The selection, placement and compaction of structural fill should be performed in accordance with the project specifications.

The Guide Specifications included in Appendix D (Modified Proctor) of this report are recommended to be used, at a minimum, as an aid in developing the project specifications. The floor slab subgrade may need to be recompacted prior to slab construction due to weather and equipment traffic effects on the previously compacted soil.

#### Reuse of On-site Soil

On-site material may be reused as structural compacted fill (if needed) within any new construction area provided they do not contain oversized materials and significant quantities of organic matter or other deleterious materials. All subgrade soil compaction as well as the selection, placement and compaction of new fill soils should be performed in accordance with the project specifications under engineering-controlled conditions.

#### Subgrade Protection

The near surface soils that are expected to comprise the subgrade are sensitive to water and disturbance from construction activities. Unstable soil conditions will develop if the soils are exposed to moisture increases or are disturbed (rutted) by construction traffic. If unstable soil conditions occur, recommendations for stabilization should be provided by the geotechnical engineer at the time of grading/construction based on the conditions encountered. The site should be graded to prevent water from ponding within construction areas and/or flowing into excavations. Accumulated water must be removed immediately along with any unstable soil. Foundation concrete should be placed and excavations backfilled as soon as possible to protect the bearing grade. The degree of subgrade instability and associated remedial construction is dependent, in part, upon precautions taken by the contractor to protect the subgrade during site development.

Silt fences or other appropriate erosion control devices should be installed in accordance with local, state and federal requirements at the perimeter of the development areas to control sediment from erosion. Since silt fences or other erosion control measures are temporary structures, careful and continuous monitoring and periodic maintenance to remove accumulated soil and/or replacement should be anticipated.

#### Fill Placement

All fill should be placed in 8-inch-thick maximum loose lift, moisture conditioned above the soil's optimum moisture content and then compacted to at least 90 percent, or 95 percent in the upper 12 inches of pavement subgrade of the Modified Proctor maximum density. A representative of the

project geotechnical consultant should be present on-site during grading operations to document proper placement and compaction of all fill, as well as to verify compliance with the other geotechnical recommendations presented herein.

#### Import Structural Fill

Any soils imported to the site (if required) for use as structural fill should consist of very low (EI less than 20) expansive soils. Materials designated for import should be submitted to the project geotechnical engineer no less than three working days for evaluation. In addition to expansion criteria, soils imported to the site should exhibit adequate shear strength characteristics for the recommended allowable soil bearing pressure, soluble sulfate content and corrosivity and pavement support characteristics.

### **6.3 Construction Considerations**

#### Construction Dewatering

Groundwater was encountered at approximately 36 feet bgs during our subsurface exploration to the maximum depth explored (51.5 feet). However, the site may be susceptible to a shallower perched water table due to seasonal precipitation and runoff characteristics of the site. Conventional filtered sump pumps placed in excavations are expected to be suitable for dewatering should any excess water conditions be observed.

#### Soil Excavation

Some localized slope stability problems may be encountered in steep, unbraced excavations considering the nature of the subsoils. All excavations must be performed in accordance with CAL-OSHA requirements, which is the responsibility of the contractor. Due to anticipated on-site soils, loose to medium dense sandy soils, shallow excavations, up to 5 feet in vertical height, may be adequately sloped for bank stability, where sufficient space is available, temporarily unsurcharged embankments could be sloped back at a 2:1 (h:v) slope gradient. Deeper excavations or excavations where adequate back sloping cannot be performed may require some form of external support such as shoring or bracing.

### **6.4 Foundation Recommendations**

#### Vertical Load Capacity – Shallow Foundation

Upon completion of the recommended building pad preparation, it is our opinion the proposed structures may be supported by a shallow foundation system and/or mat slab. Foundations underlain by a minimum 3-foot structural fill layer may be designed for a maximum, net, allowable soil-bearing pressure of 3,500 pounds per square foot (psf). Structural loads supported by a mat foundation may be designed for a maximum modulus of subgrade reaction (Ks) of 75 pounds per square inch per inch

(psf/in.). Minimum foundation widths for walls and columns should be 18 and 24 inches, respectively, for bearing considerations, regardless of actual soil pressure. The maximum bearing value applies to combined dead and sustained live loads. This allowable soil bearing pressure may be increased by one-third for short term wind and/or seismic loads.

#### Lateral Load Resistance

Lateral load resistance will be developed by a combination of friction acting at the base of foundations and slabs and the passive earth pressure developed by footings below grade. Passive pressure and friction may be used in combination, without reduction, in determining the total resistance to lateral loads. A one-third increase in the passive pressure value may be used for short duration wind or seismic loads.

A coefficient of friction of 0.35 may be used with dead load forces for footings placed on newly placed compacted fill soil. An allowable passive earth pressure of 400 psf per foot of footing depth (pcf) below the lowest adjacent grade may be used for the sides of footings placed against newly placed structural fill. The maximum recommended allowable passive pressure is 3,500 psf.

#### Foundation Embedment

The California Building Code (CBC) requires a minimum 12-inch foundation embedment depth. However, it is recommended that exterior foundations extend at least 18 inches below the adjacent exterior grade for bearing capacity and to provide greater protection of the moisture sensitive bearing soils. Interior footings may be supported at nominal depth below the floor. All footings must be protected against weather and water damage during and after construction and must be supported within suitable bearing materials.

#### Estimated Foundation Movement

Post-construction total and differential settlement of a shallow foundation system designed and constructed in accordance with the recommendations provided in this report are estimated to be less than 1 and ½ inch, respectively. The estimated differential movement is anticipated to result in an angular distortion of about 0.002 inches per inch on the basis of a minimum clear span of 20 feet for a standard foundation; and 0.001 in./in. on the basis of a minimum clear span of 40 feet for a mat foundation and 0.001 in/in.

#### Reinforcing

The determination of the actual quantity of steel reinforcing and dimensions should be performed by the project structural engineer.

#### Bearing Material Criteria

Soil suitable to serve as the structural fill subgrade should exhibit at least a loose relative density (average N value of at least 10) for non-cohesive soils, and an unconfined compressive strength of 1.75 tsf for cohesive soils, for the recommended 3,500 psf allowable soil bearing pressure. For

design and construction estimating purposes, suitable structural fill subgrade soils are expected to be encountered at the recommended 3-foot structural fill depths following the recommended site preparation activities. However, field testing by the Geotechnical Engineer within the structural fill subgrade and the structural fill soils is recommended to document that the foundation support soils possess the minimum strength parameters noted above. Testing may consist of Dynamic Cone Penetration tests (per ASTM Special Publication 399), nuclear gauge, sand cone test, other tests as deemed suitable by the Geotechnical Engineer. If unsuitable bearing soils are encountered, they should be recompacted in-place, if feasible, or excavated to a suitable bearing soil subgrade and to a lateral extent as defined by Item No. 3 of the enclosed Guide Specifications, with the excavation backfilled with structural compacted fill to develop a uniform bearing grade.

## **6.5 Floor Slab Recommendations**

### Subgrade

The floor slab subgrade should be prepared in accordance with the appropriate recommendations presented in the Site Development Recommendations section of this report including a minimum 2-foot structural fill layer. Foundation, utility trenches and other below-slab excavations should be backfilled with structural compacted fill in accordance with the project specifications.

### Design (Conventional Slab-on-Grade)

The floor of the proposed building is recommended to be designed as a conventional slab-on-grade where the floor slab is independent of the foundations. The at-grade floor slab may be designed based on a maximum modulus of subgrade reaction ( $k_s$ ) of 175 pounds per cubic inch (pci), supported on a properly prepared subgrade consisting of a minimum 3-foot structural fill layer. If desired, the floor slab may be poured monolithically with foundations where the foundations consist of thickened sections thereby using a turned-down slab construction technique. The slab is recommended to be a minimum of 4 inches in thickness. A qualified structural engineer should perform the actual design of the slab to ensure proper thickness and reinforcing.

The floor slab is recommended to be underlain by a 4-inch-thick layer of granular base, which is not included as a portion of the recommended structural fill layer recommended in Section 6.2 Building Area. A 15-mil synthetic sheet should be placed below the floor slab to serve as a vapor retarder where required to protect moisture sensitive floor coverings (i.e. tile, or carpet, etc.) and control moisture through the floor slab. It is recommended that a structural engineer or architect specify the vapor retarder location with careful consideration of concrete curing and the effects of moisture. The vapor retarder is recommended to be in accordance with ASTM E 1745, which is entitled: *Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs*. If materials underlying the synthetic sheet contain sharp, angular particles, a layer of sand approximately 2 inches thick or a geotextile should be provided to protect it from puncture. An additional 2-inch-thick layer of sand may be needed between the slab and the vapor retarder to promote proper curing. Proper curing techniques are recommended to reduce the potential for shrinkage cracking and slab curling.

### Estimated Settlement

Post-construction total and differential movements of the floor slab designed and constructed in accordance with the recommendations provided in this report are estimated to be less than  $\frac{1}{2}$  and  $\frac{1}{3}$  inch, respectively. Movements on the order of those estimated for foundations should be expected when the foundation and floor slab are structurally connected or constructed monolithically. The estimated differential movement is anticipated to occur across the short dimension of the structure.

## **6.6 New Pavement**

The following recommendations for the new pavement are intended for vehicular traffic associated with the restaurant development within the subject property.

### New Pavement Subgrades

Following completion of the recommended subgrade preparation procedures, the subgrade in areas of new pavement construction is expected to consist of existing on-site soil that exhibit a very low expansion potential. An R-value of 30 has been assumed in the preparation of the pavement design. It should, however, be recognized that the City of Moreno Valley may require a specific R-value test to verify the use of the following design. It is recommended that this testing, if required, be conducted following completion of rough grading in the proposed pavement areas so that the R-value test results are indicative of the actual pavement subgrade soils. Alternatively, a minimum code pavement section may be required if a specific R-value test is not performed. To use this R-value, all fill added to the pavement subgrade must have pavement support characteristics at least equivalent to the existing soils and must be placed and compacted in accordance with the project specifications.

### Asphalt Pavements

The following table presents recommended thicknesses for a new flexible pavement structure consisting of asphaltic concrete over a granular base, along with the appropriate CALTRANS specifications for proper materials and placement procedures. An alternate pavement section has been provided for use in parking stall areas due to the anticipated lower traffic intensity in these areas. However, care must be used so that truck traffic is excluded from areas where the thinner pavement section is used, since premature pavement distress may occur. In the event that heavy vehicle traffic cannot be excluded from the specific areas, the pavement section recommended for drive lanes should be used throughout the parking lot.

<b>ASPHALT PAVEMENTS</b>			
<b>Materials</b>	<b>Thickness (inches)</b>		<b>CALTRANS Specifications</b>
	<b>Parking Stalls (TI=4.0)</b>	<b>Drive Lanes (TI=5.0)</b>	
Asphaltic Concrete Surface Course (b)	1	1	Section 39, (a)
Asphaltic Concrete Binder Course (b)	2	2	Section 39, (a)
Crushed Aggregate Base Course	4	6	Section 26, Class 2 (R-value at least 78)
<b>NOTES:</b>			
(a) Compaction to density between 95 and 100 percent of the 50-Blow Marshall Density			
(b) The surface and binder course may be combined as a single layer placed in one lift if similar materials are utilized.			

Pavement recommendations are based upon CALTRANS design parameters for a twenty-year design period and assume proper drainage and construction monitoring. It is, therefore, recommended that the geotechnical engineer monitors and tests subgrade preparation, and that the subgrade be evaluated immediately before pavement construction.

#### Portland Concrete Pavements

Portland Cement Concrete pavements are recommended in areas where traffic is concentrated such as the entrance/exit aprons as well as areas subjected to heavy loads such as the trash enclosure loading zone. The preparation of the subgrade soils within concrete pavement areas should be performed as previously described in this report. Portland Cement Concrete pavements in high stress areas are recommended to be at least 6 inches thick containing No. 3 bars at 18-inch on-center both ways placed at mid-height. The pavement should be constructed in accordance with Section 40 of the CALTRANS Standard Specifications. A minimum 4-inch-thick layer of base course (CALTRANS Class 2) is recommended below the concrete pavement. This base course should be compacted to at least 95% of the material's maximum dry density.

The maximum joint spacing within all of the Portland Cement Concrete pavements is recommended to be 15 feet or less to control shrinkage cracking. Load transfer reinforcing is recommended at construction joints perpendicular to traffic flow if construction joints are not properly keyed. In this event, 3/4-inch diameter smooth dowel bars, 18 inches in length placed at 12 inches on-center are recommended where joints are perpendicular to the anticipated traffic flow. Expansion joints are recommended only where the pavement abuts fixed objects such as light standard foundations. Tie bars are recommended at the first joint within the perimeter of the concrete pavement area. Tie bars are recommended to be No. 4 bars at 42-inch on-center spacings and at least 48 inches in length.

### General Considerations

Pavement recommendations assume proper drainage and construction monitoring and are based on traffic loads as indicated previously. Pavement designs are based on either PCA or CALTRANS design parameters for twenty (20) year design period. However, these designs are also based on a routine pavement maintenance program and significant asphalt concrete pavement rehabilitation after about 8 to 10 years, in order to obtain a reasonable pavement service life. Due to the presence of variable strength characteristics of the near surface on-site soils, some increased pavement maintenance should be expected.

#### **6.7 Recommended Construction Materials Testing Services**

The report was prepared assuming that Giles will perform Construction Materials Testing (CMT) services during construction of the proposed development. In general, CMT services are recommended (and expected) to at least include observation and testing of foundation and pavement support soil and other construction materials. It might be necessary for Giles to provide supplemental geotechnical recommendations based on the results of CMT services and specific details of the project not known at this time.

#### **6.8 Basis of Report**

This report is based on Giles' proposal, which is dated April 2, 2024 and is referenced by Giles' proposal number 2GP-2403019-R. The actual services for the project varied somewhat from those described in the proposal because of the conditions that were encountered while performing the services and in consideration of the proposed project.

This report is strictly based on the project description given earlier in this report. Giles must be notified if any parts of the project description or our assumptions are not accurate so that this report can be amended, if needed. This report is based on the assumption that the facility will be designed and constructed according to the codes that govern construction at the site.

The conclusions and recommendations in this report are based on estimated subsurface conditions as shown on the *Records of Subsurface Exploration*. Giles must be notified if the subsurface conditions that are encountered during construction of the proposed development differ from those shown on the *Records of Subsurface Exploration* because this report will likely need to be revised. General comments and limitations of this report are given in the appendix.

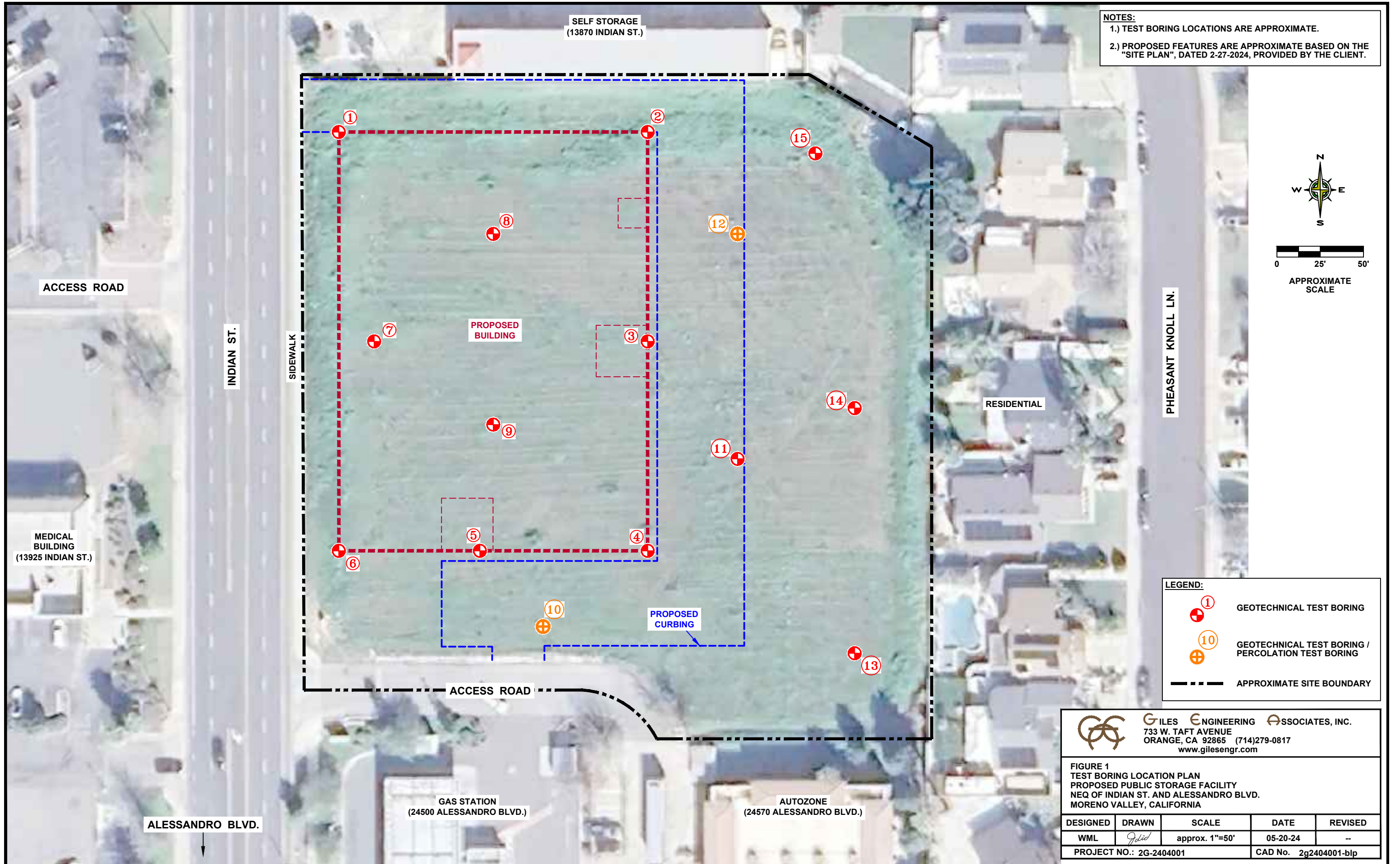
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## APPENDIX A

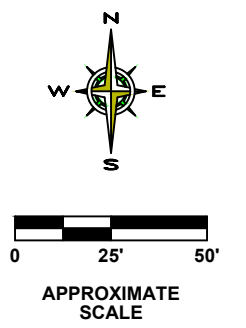
### FIGURES AND TEST BORING LOGS

The Test Boring Location Plan contained herein was prepared based upon information supplied by *Giles'* client, or others, along with *Giles'* field measurements and observations. The diagram is presented for conceptual purposes only and is intended to assist the reader in report interpretation.

The Test Boring Logs and related information enclosed herein depict the subsurface (soil and water) conditions encountered at the specific boring locations on the date that the exploration was performed. Subsurface conditions may differ between boring locations and within areas of the site that were not explored with test borings. The subsurface conditions may also change at the boring locations over the passage of time.



**NOTES:**  
 1.) TEST BORING LOCATIONS ARE APPROXIMATE.  
 2.) PROPOSED FEATURES ARE APPROXIMATE BASED ON THE "SITE PLAN", DATED 2-27-2024, PROVIDED BY THE CLIENT.



**LEGEND:**

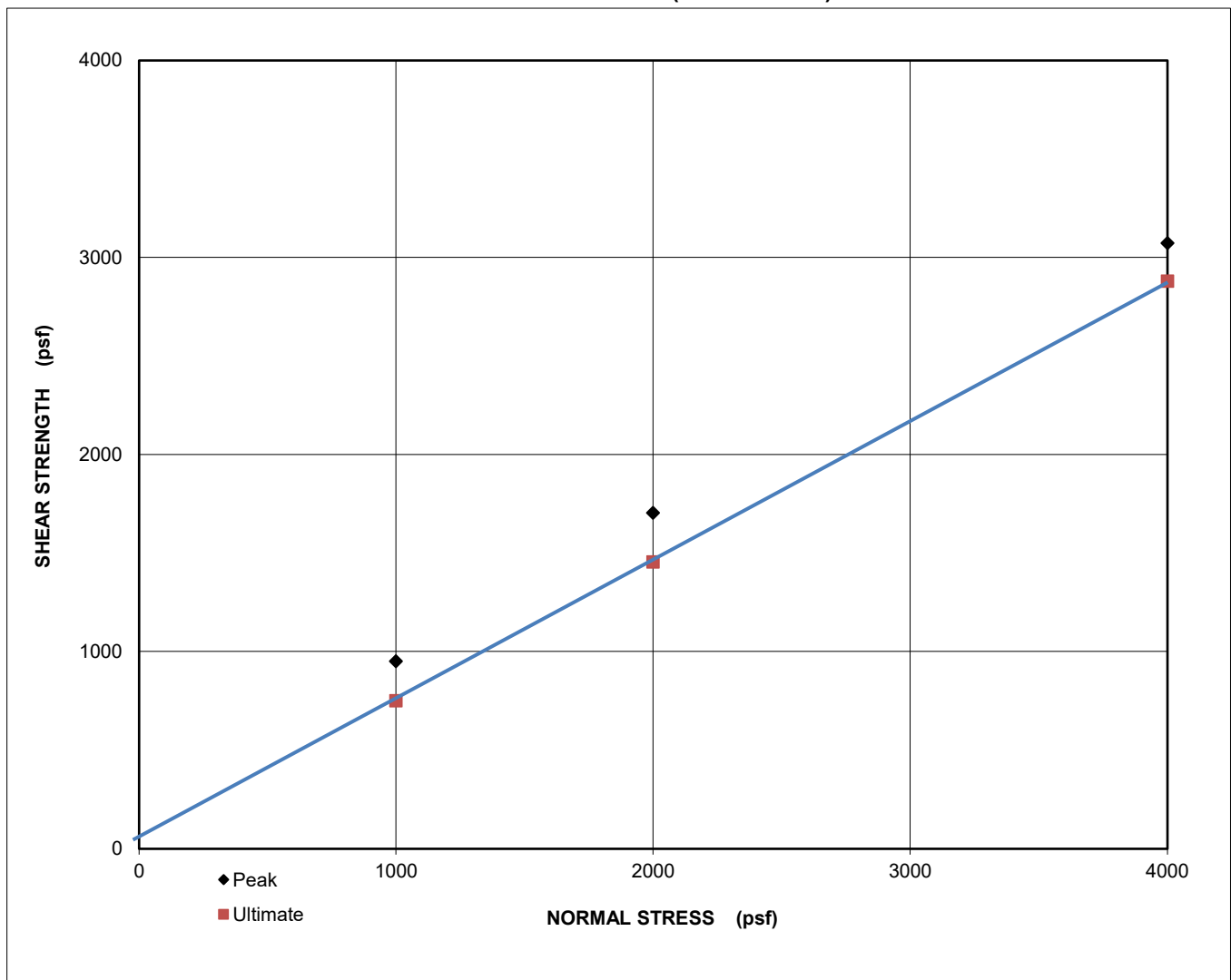
- ⊕ ① GEOTECHNICAL TEST BORING
- ⊕ ⑩ GEOTECHNICAL TEST BORING / PERCOLATION TEST BORING
- APPROXIMATE SITE BOUNDARY

**GILES ENGINEERING ASSOCIATES, INC.**  
 733 W. TAFT AVENUE  
 ORANGE, CA 92865 (714)279-0817  
 www.gilesengr.com

**FIGURE 1**  
 TEST BORING LOCATION PLAN  
 PROPOSED PUBLIC STORAGE FACILITY  
 NEQ OF INDIAN ST. AND ALESSANDRO BLVD.  
 MORENO VALLEY, CALIFORNIA

DESIGNED	DRAWN	SCALE	DATE	REVISED
WML	<i>Jed</i>	approx. 1"=50'	05-20-24	--
PROJECT NO.: 2G-2404001			CAD No. 2g2404001-blp	

**DIRECT SHEAR TEST (ASTM D3080)**



Boring No. **B-6** Depth **3.5 -ft**

Soil Type: (SP-SM) - Poorly-graded Sand with Silt

Sample Condition: Saturated

Initial Specimen Properties:

Diameter (in.)	2.4
Height (in.)	1.0
In-Situ Moisture Content (%)	4.1
Remolded Density (pcf)	N/A
Dry Density (pcf)	104.3
LL	n/a
PL	n/a
C (psf)	40
PHI (degrees)-Ultimate	35

PROJECT: **Public Storage Facility**

Moreno Valley, CA

CLIENT: **Public Storage**

PROJECT NO.: **2G-2404001**

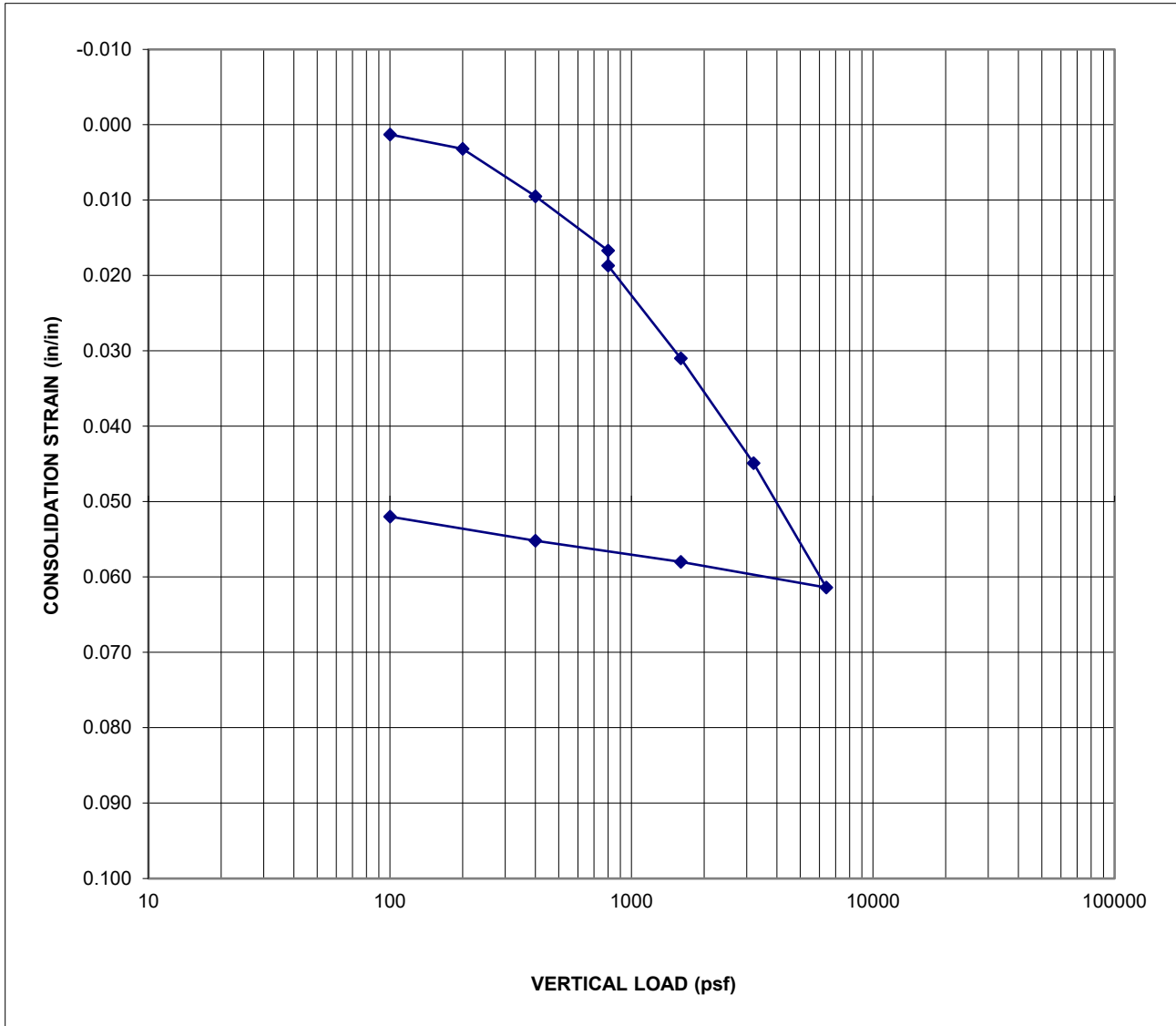
DATE: May 2024

**GILES**

ENGINEERING ASSOCIATES, INC.

GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION MATERIALS CONSULTANTS

**CONSOLIDATION / SWELL / COLLAPSE TEST ASTM D2435/ASTM D5333**

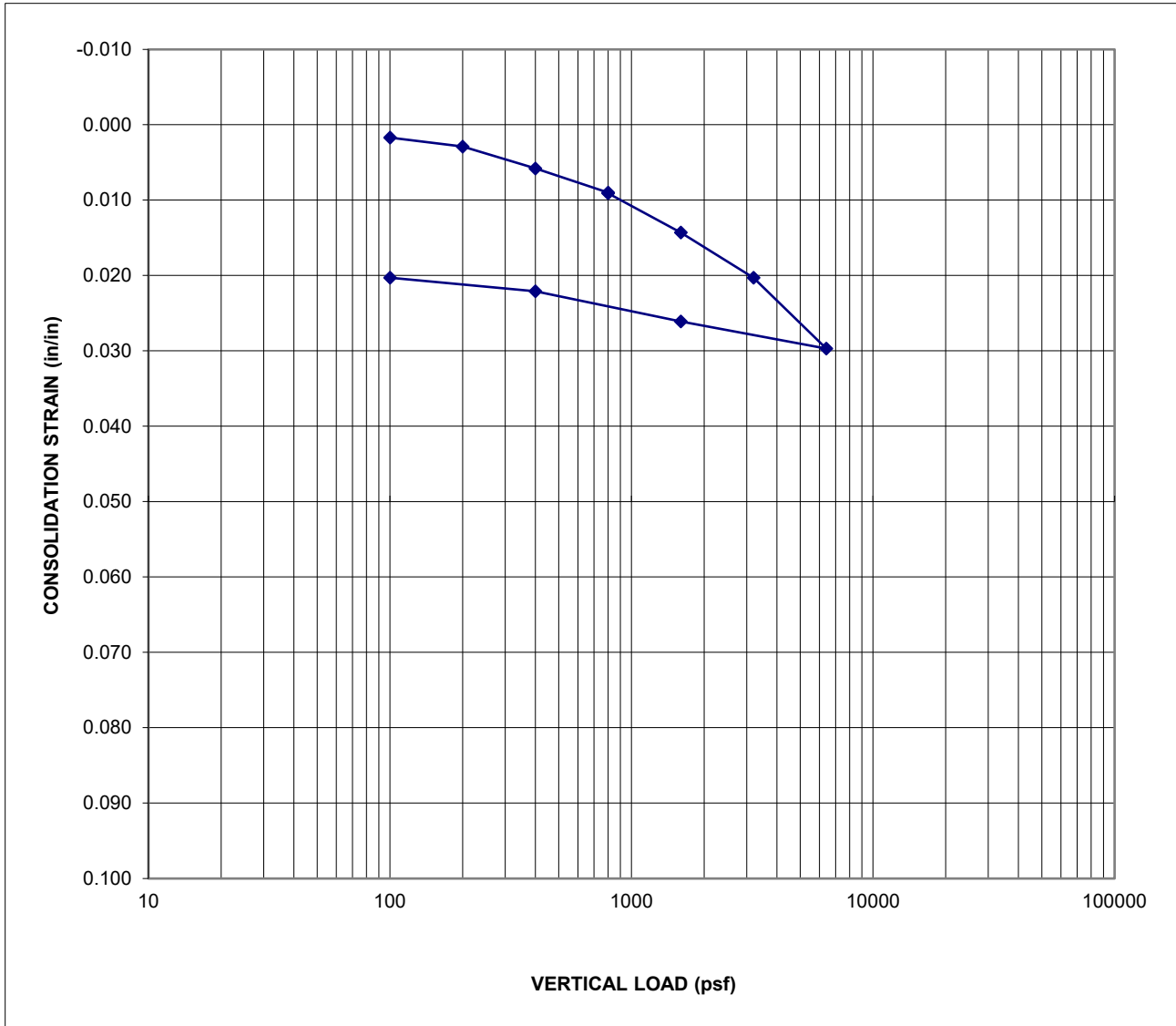


Classification	(SP-SM) - Poorly-graded Sand with Silt		
Boring No.	<b>B-6</b>		
Sample No.	2-CS	Initial Moisture Content (%)	4.1
Depth (ft.)	3.5 ft	Final Moisture Content (%)	13.2
Elevation (ft.)	1576	Natural Density (pcf)	111.2
Liquid Limit	N/A	Initial Dry Density (pcf)	106.8
Plastic Limit	N/A	Final Dry Density (pcf)	107.0
Specimen Diameter (in.)	2.42	Collapse at 800 psf	0.20%
Initial Specimen Thickness (in.)	1.00		

Sample inundated with water at 800 psf pressure

Project: <b>Public Storage Facility</b> Moreno Valley, CA Client: <b>Public Storage</b> Project No.: <b>2G-2404001</b> Figure No.: <b>3</b>	<b>GILES ENGINEERING ASSOCIATES, INC.</b> -GEOTECHNICAL, ENVIRONMENTAL, AND CONSTRUCTION MATERIALS- 733 W. TAFT AVENUE, ORANGE, CALIFORNIA OFFICE: 714-279-0817 FAX : 714-279-9687
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**CONSOLIDATION / SWELL / COLLAPSE TEST ASTM D2435/ASTM D5333**

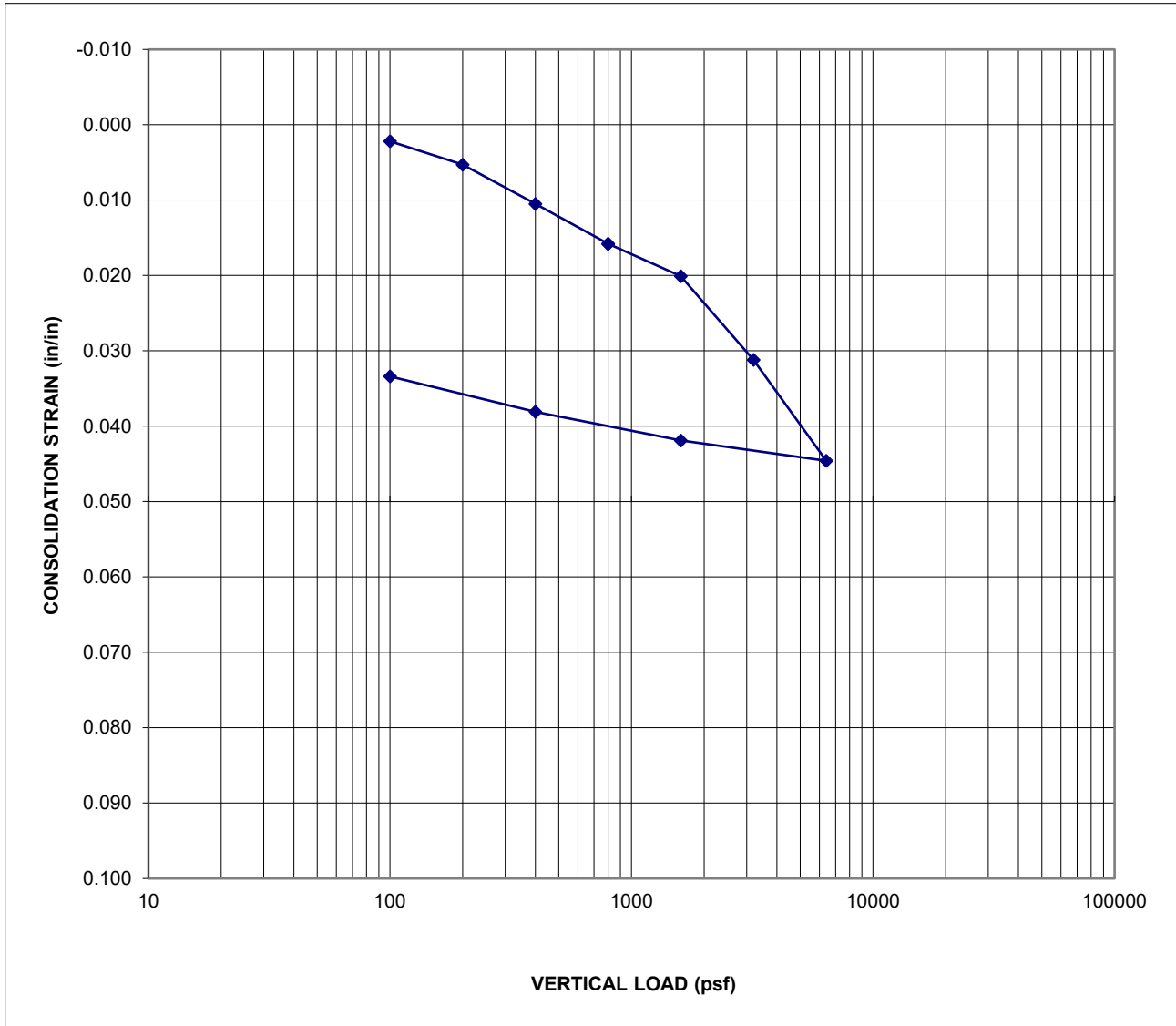


Classification	(SM) - Silty Sand		
Boring No.	<b>B-14</b>		
Sample No.	<b>2-CS</b>	Initial Moisture Content (%)	<b>9.3</b>
Depth (ft.)	<b>3.5 ft</b>	Final Moisture Content (%)	<b>13.5</b>
Elevation (ft.)	<b>1579</b>	Natural Density (pcf)	<b>127.6</b>
Liquid Limit	<b>N/A</b>	Initial Dry Density (pcf)	<b>116.8</b>
Plastic Limit	<b>N/A</b>	Final Dry Density (pcf)	<b>116.8</b>
Specimen Diameter (in.)	<b>2.42</b>	Collapse at 800 psf	<b>0.01%</b>
Initial Specimen Thickness (in.)	<b>1.00</b>		

Sample inundated with water at 800 psf pressure

<p>Project: <b>Public Storage Facility</b> Moreno Valley, CA</p> <p>Client: <b>Public Storage</b></p> <p>Project No.: <b>2G-2404001</b></p> <p>Figure No.: <b>4</b></p>	<p><b>GILES ENGINEERING ASSOCIATES, INC.</b></p> <p>-GEOTECHNICAL, ENVIRONMENTAL, AND CONSTRUCTION MATERIALS-</p> <p>733 W. TAFT AVENUE, ORANGE, CALIFORNIA</p> <p>OFFICE: 714-279-0817 FAX : 714-279-9687</p>
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**CONSOLIDATION / SWELL / COLLAPSE TEST ASTM D2435/ASTM D5333**

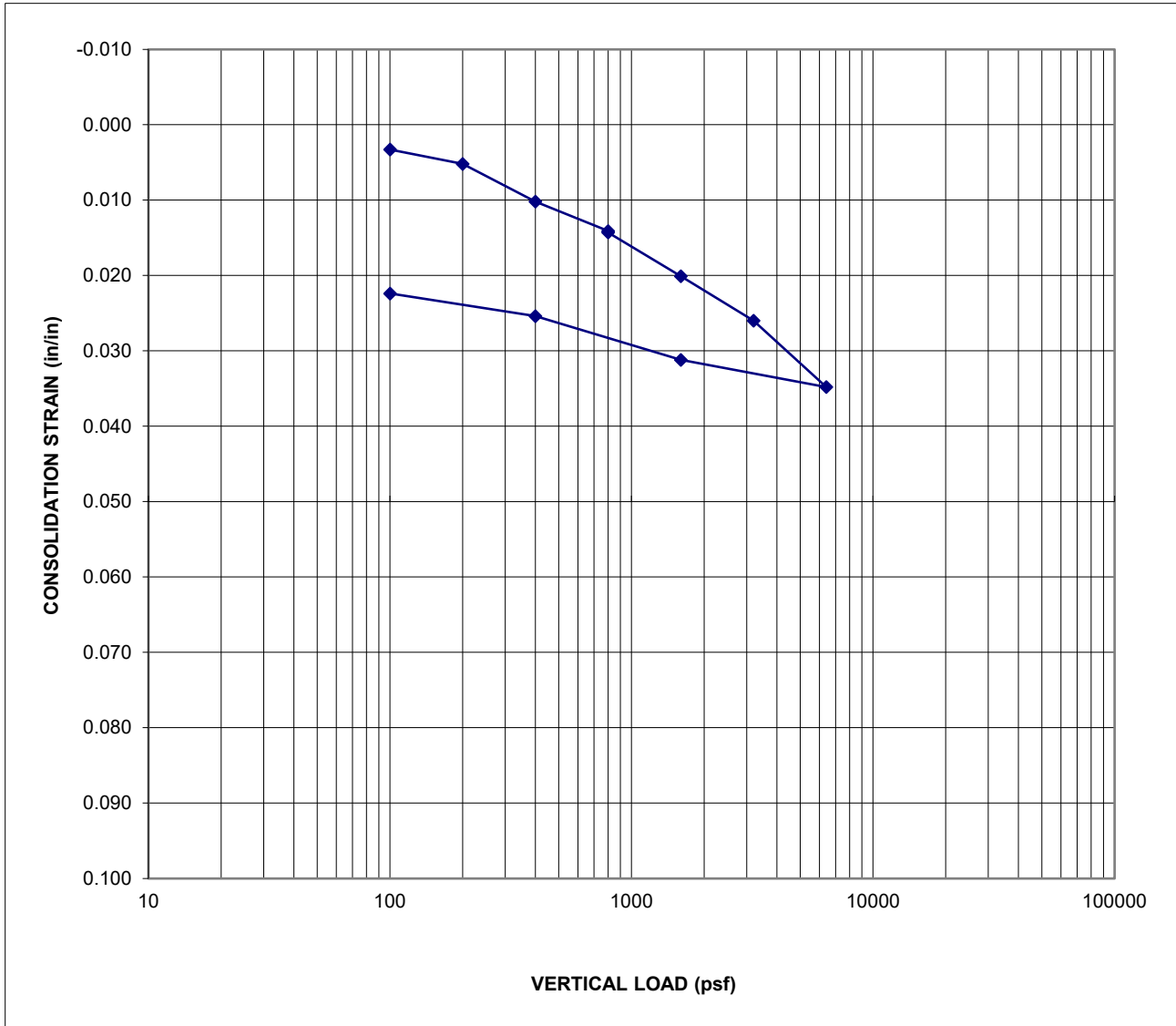


Classification	(SM) - Silty Sand		
Boring No.	<b>B-15</b>		
Sample No.	3-CS	Initial Moisture Content (%)	3.8
Depth (ft.)	6 ft	Final Moisture Content (%)	13.5
Elevation (ft.)	1577	Natural Density (pcf)	115.4
Liquid Limit	N/A	Initial Dry Density (pcf)	111.2
Plastic Limit	N/A	Final Dry Density (pcf)	111.2
Specimen Diameter (in.)	2.42	Collapse at 800 psf	0.00%
Initial Specimen Thickness (in.)	1.00		

Sample inundated with water at 800 psf pressure

<p>Project: <b>Public Storage Facility</b> Moreno Valley, CA</p> <p>Client: <b>Public Storage</b></p> <p>Project No.: <b>2G-2404001</b></p> <p>Figure No.: <b>5</b></p>	<p><b>GILES ENGINEERING ASSOCIATES, INC.</b></p> <p>-GEOTECHNICAL, ENVIRONMENTAL, AND CONSTRUCTION MATERIALS-</p> <p>733 W. TAFT AVENUE, ORANGE, CALIFORNIA</p> <p>OFFICE: 714-279-0817 FAX : 714-279-9687</p>
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**CONSOLIDATION / SWELL / COLLAPSE TEST ASTM D2435/ASTM D5333**

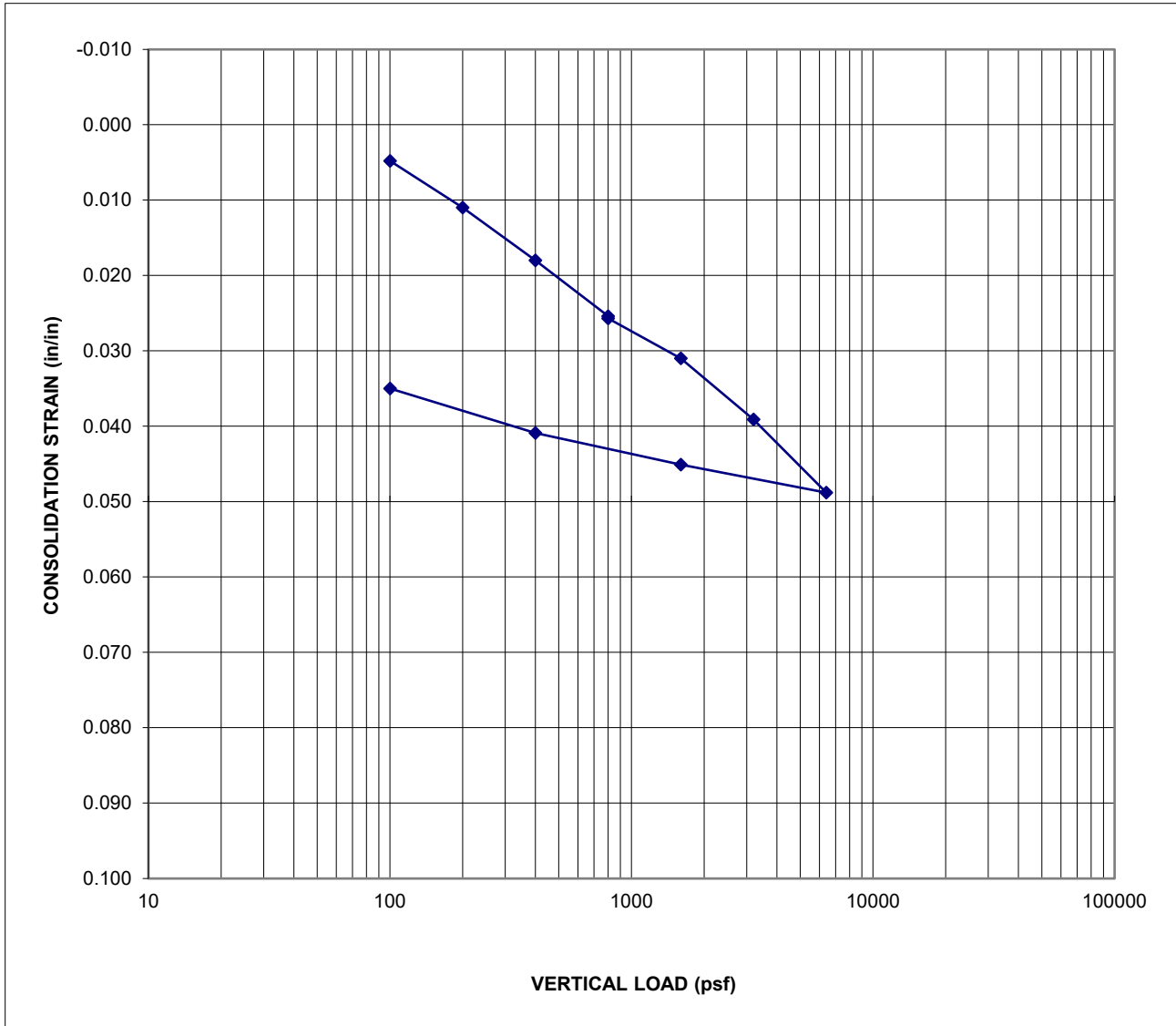


Classification	(SC) - Clayey Sand		
Boring No.	<b>B-1</b>		
Sample No.	<b>4-CS</b>	Initial Moisture Content (%)	<b>10.0</b>
Depth (ft.)	<b>10 ft</b>	Final Moisture Content (%)	<b>12.2</b>
Elevation (ft.)	<b>1573</b>	Natural Density (pcf)	<b>137.1</b>
Liquid Limit	<b>N/A</b>	Initial Dry Density (pcf)	<b>124.6</b>
Plastic Limit	<b>N/A</b>	Final Dry Density (pcf)	<b>124.6</b>
Specimen Diameter (in.)	<b>2.42</b>	Collapse at 800 psf	<b>0.02%</b>
Initial Specimen Thickness (in.)	<b>1.00</b>		

Sample inundated with water at 800 psf pressure

<p>Project: <b>Public Storage Facility</b> Moreno Valley, CA</p> <p>Client: <b>Public Storage</b></p> <p>Project No.: <b>2G-2404001</b></p> <p>Figure No.: <b>6</b></p>	<p><b>GILES ENGINEERING ASSOCIATES, INC.</b></p> <p>-GEOTECHNICAL, ENVIRONMENTAL, AND CONSTRUCTION MATERIALS-</p> <p>733 W. TAFT AVENUE, ORANGE, CALIFORNIA</p> <p>OFFICE: 714-279-0817 FAX : 714-279-9687</p>
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**CONSOLIDATION / SWELL / COLLAPSE TEST ASTM D2435/ASTM D5333**



Classification	(SM) - Silty Sand		
Boring No.	<b>B-13</b>		
Sample No.	4-CS	Initial Moisture Content (%)	2.4
Depth (ft.)	10 ft	Final Moisture Content (%)	12.3
Elevation (ft.)	1571	Natural Density (pcf)	118.8
Liquid Limit	N/A	Initial Dry Density (pcf)	116.0
Plastic Limit	N/A	Final Dry Density (pcf)	116.0
Specimen Diameter (in.)	2.42	Collapse at 800 psf	0.03%
Initial Specimen Thickness (in.)	1.00		






Sample inundated with water at 800 psf pressure

<p>Project: <b>Public Storage Facility</b> Moreno Valley, CA</p> <p>Client: <b>Public Storage</b></p> <p>Project No.: <b>2G-2404001</b></p> <p>Figure No.: <b>7</b></p>	<p><b>GILES ENGINEERING ASSOCIATES, INC.</b></p> <p>-GEOTECHNICAL, ENVIRONMENTAL, AND CONSTRUCTION MATERIALS-</p> <p>733 W. TAFT AVENUE, ORANGE, CALIFORNIA</p> <p>OFFICE: 714-279-0817 FAX : 714-279-9687</p>
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<b>BORING NO. &amp; LOCATION:</b> B- 1	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1583 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001


MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Silty Sand, fine to medium grained, trace fine gravel, trace clay- Moist	5	1580	1-SS	21				7		P <sub>200</sub> =18%
			2-SS	13				7		
Brown, Clayey Sand, fine to medium grained, some coarse- Moist		1575	3-SS	4				6		
Fine grained, some medium	10	1570	4-CS	40				10		Dd=121.0 pcf
			5-SS	28		4.5		11		

Boring Terminated at about 16.5 feet (EL. 1566.5')

Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test CS= California Split Spoon Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After ___ Hours: ___ ft.	
	Cave Depth After ___ Hours: ___ ft.	

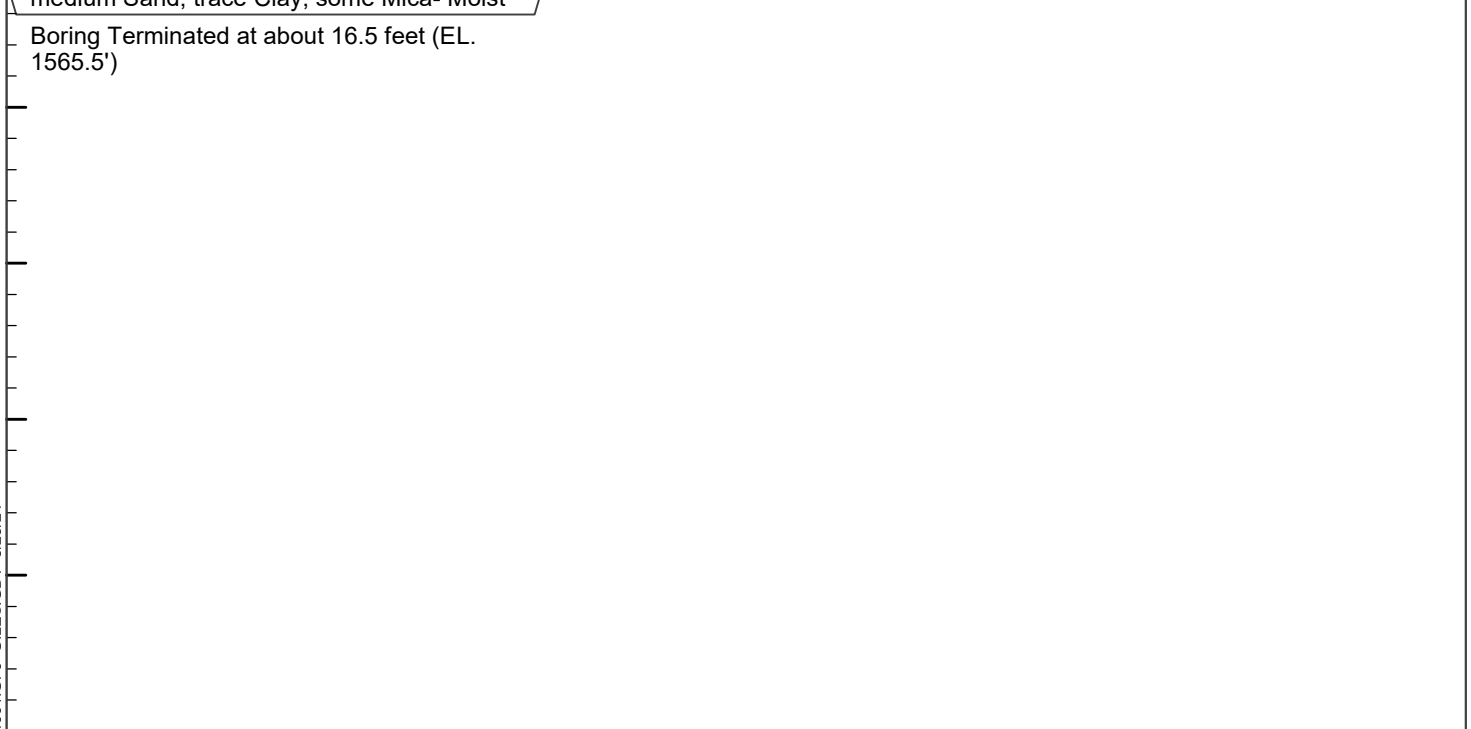
Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.






GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24

<b>BORING NO. &amp; LOCATION:</b> B- 2	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1582 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Silty Sand, fine to medium grained, some coarse, some Mica- Moist	1580		1-SS	9		1.5		8		
Brown, fine grained, some Mica- Moist	5		2-SS	13				7		
Light Brown, Sand, fine to medium grained, some coarse grain- Moist	1575		3-SS	7				3		P <sub>200</sub> =3%
Light Brown, Silty Sand, fine to medium grained, some coarse, some fine gravel- Moist	1570		4-SS	11				3		
Dark Brown, Sandy Silt, fine Sand, trace medium Sand, trace Clay, some Mica- Moist	15		5-SS	26		3.75		12		


Boring Terminated at about 16.5 feet (EL. 1565.5')



Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After __ Hours: __ ft.	
	Cave Depth After __ Hours: __ ft.	

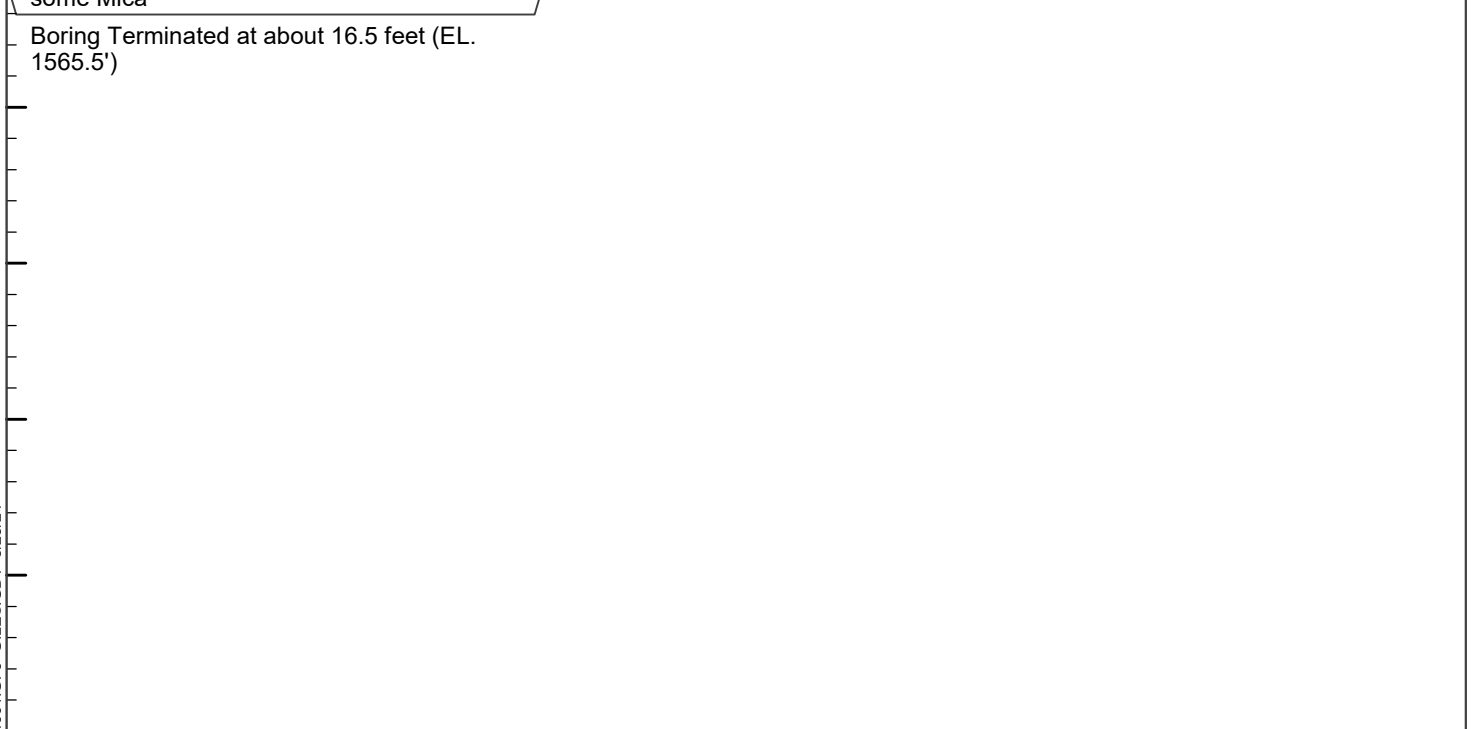
Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.






GILES LOG REPORT\_2G-2404001.GPJ GILES.GDT 5/23/24

<b>BORING NO. &amp; LOCATION:</b> B- 3	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1582 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Sandy Silt, fine Sand, some medium, trace Clay, some Mica- Moist	1580		1-SS	2				15		
Brown, Silty Sand, fine to medium grained, trace Clay- Moist	5		2-SS	4				14		
Orange, Brown, fine to medium grained, some coarse	1575		3-SS	4				11		
Trace Gravel	10		4-SS	7				12		
	1570									
Yellowish Brown, fine to medium grained, some Mica	15		5-SS	13				16		


Boring Terminated at about 16.5 feet (EL. 1565.5')



Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After __ Hours: __ ft.	
	Cave Depth After __ Hours: __ ft.	

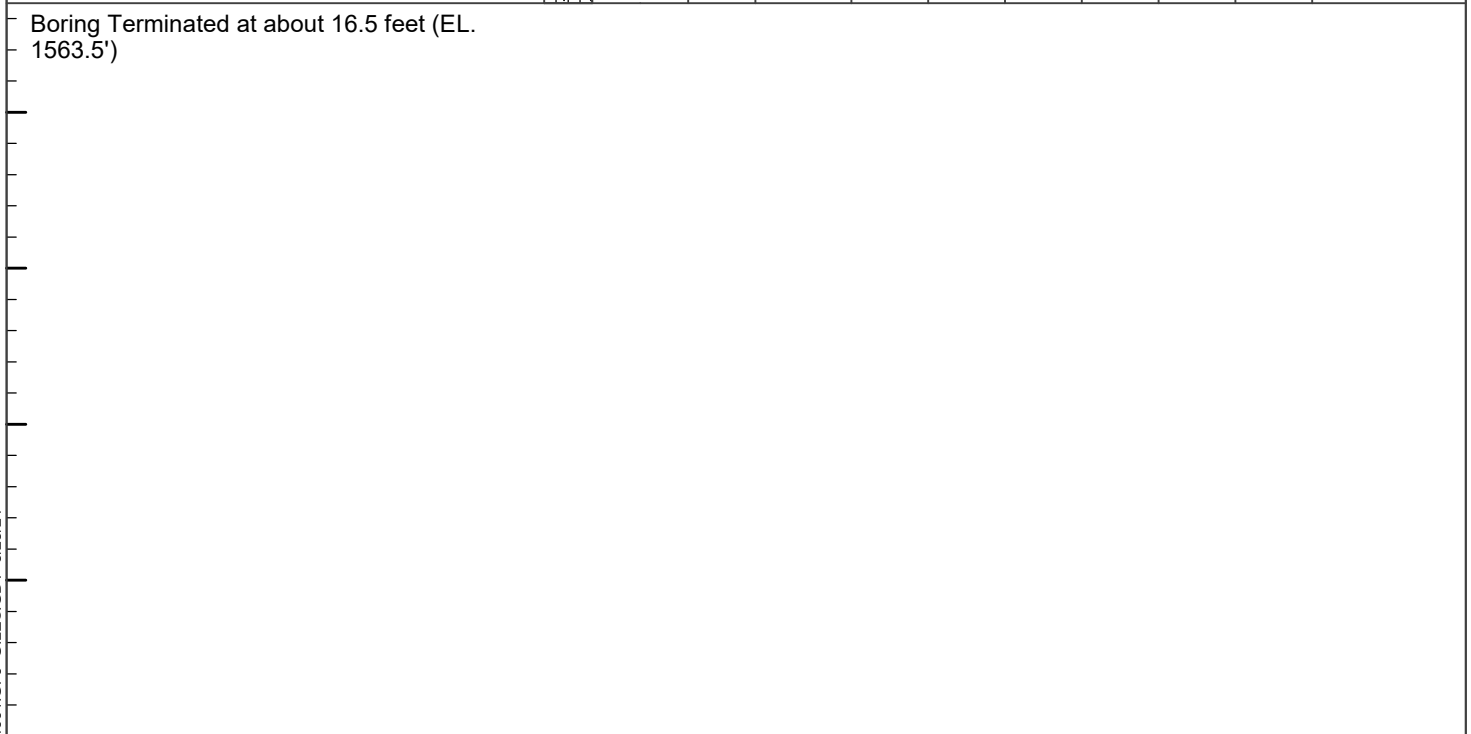
Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.






GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24

<b>BORING NO. &amp; LOCATION:</b> B- 4	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1580 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Orange, Brown, Silty Sand, fine to medium grained, trace Clay- Moist			1-SS	3				16		
Light Brown, poorly-graded Sand, fine to medium grained, some coarse, trace Gravel- Moist	5	1575	2-SS	7				11		P <sub>200</sub> =5%
Brownish Gray, fine to coarse grained, some Silt, some fine Gravel- Moist			3-CS	17				5		Dd=103.4 pcf
Brown, Sandy Silt, fine Sand, some Mica- Moist	10	1570	4-SS	18		1.5		19		
Some Clay- Moist	15	1565	5-SS	25		2.25		21		


Boring Terminated at about 16.5 feet (EL. 1563.5')








Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test CS= California Split Spoon Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After ___ Hours: ___ ft.	
	Cave Depth After ___ Hours: ___ ft.	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24


<b>BORING NO. &amp; LOCATION:</b> B- 5	<b>TEST BORING LOG</b>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1579 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Silty Sand, fine to medium grained, trace fine Gravel and Clay- Moist			1-SS	4				8		
Light Brown	5	1575	2-SS	5				6		
Orange Brown, some Clay, fine to medium grained			3-SS	7				7		
Yellowish Brown, poorly graded sand with Silt, some coarse grained, trace fine Gravel- slightly Moist	10	1570	4-SS	19				3		
Brown, Clayey Silt, some fine Sand, some Mica- Moist	15	1565	5-SS	17		4.0		13		
Yellowish Brown, Sandy Clay, some Silt, fine Sand, some Mica- Moist	20	1560	6-SS	17		2.5		11		
Boring Terminated at about 20 feet (EL. 1559')										

Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After ___ Hours: ___ ft.	
	Cave Depth After ___ Hours: ___ ft.	

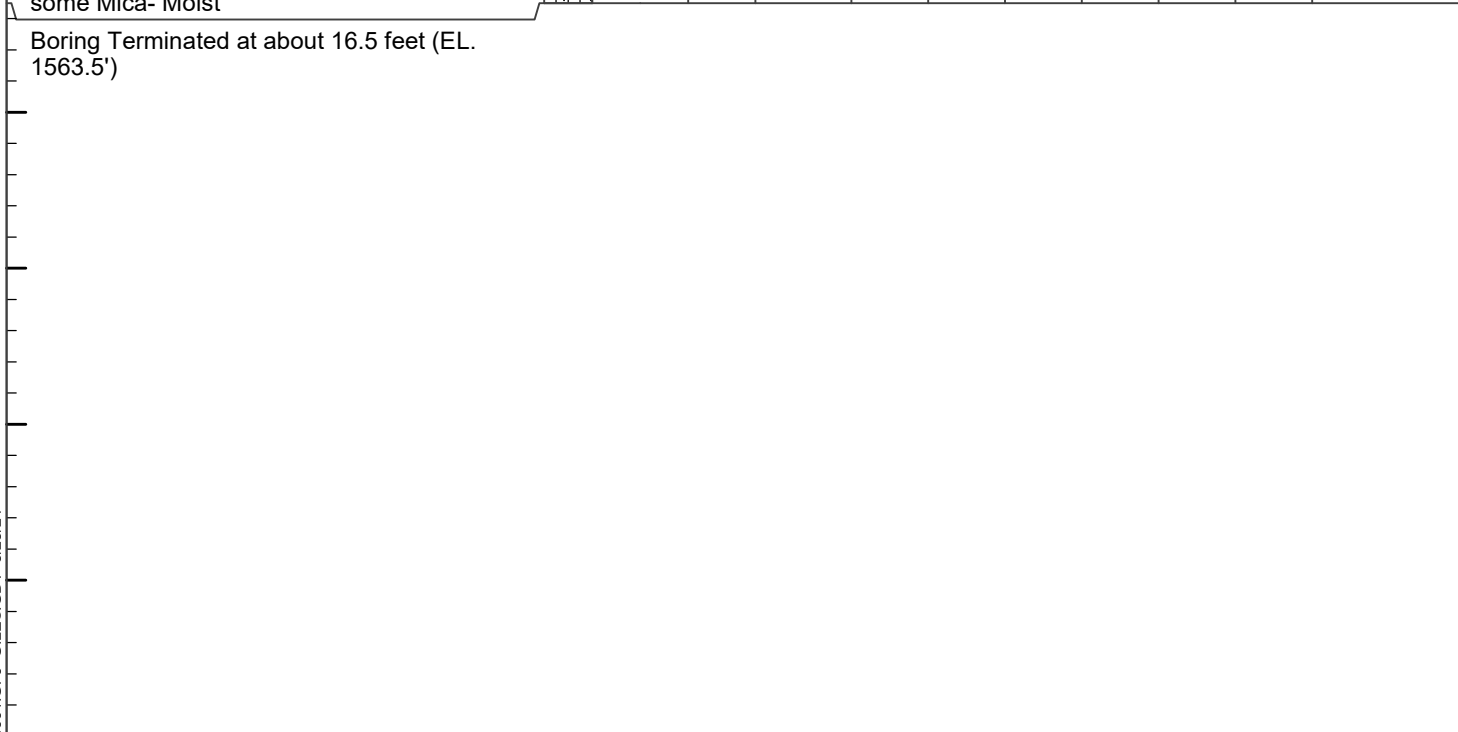
Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.






GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24

<b>BORING NO. &amp; LOCATION:</b> B- 6	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1580 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Silty Sand, fine to medium grained, some coarse, trace Clay- Moist			1-SS	7				7		Dd=104.3 pcf
Light Brown			2-CS	8			4			
Orange Brown, fine to medium grained, some coarse grained, trace fine Gravel	5	1575	3-SS	8			6			
Light Brown, trace fine Gravel- slightly Moist	10	1570	4-SS	9			4			
Brown, Sandy Silt, fine Sand, some Clay, some Mica- Moist	15	1565	5-SS	25		2.0	13			


Boring Terminated at about 16.5 feet (EL. 1563.5')



Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test CS= California Split Spoon Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After ___ Hours: ___ ft.	
	Cave Depth After ___ Hours: ___ ft.	






Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT: 2G-2404001.GPJ GILES.GDT 5/23/24

<b>BORING NO. &amp; LOCATION:</b> B- 7	<b>TEST BORING LOG</b>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1581 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001


MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Silty Sand, fine to medium grained, some coarse, trace fine Gravel, some Mica-Moist	1580		1-SS	2				9		
Light Brown	5		2-SS	4				5		
Light Brown, Sandy Silt, fine Sand, trace fine Gravel, some Mica- Moist	1575		3-SS	9		1.0		7		
Some Clay	10		4-SS	25		2.5		9		
Brown, Sandy Clay, some Silt, fine Sand, some Mica- Moist	15	1565	5-SS	28		4.5		13		

Boring Terminated at about 16.5 feet (EL. 1564.5')






Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After __ Hours: __ ft.	
	Cave Depth After __ Hours: __ ft.	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24


<b>BORING NO. &amp; LOCATION:</b> B- 8	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1583 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Silty Sand, fine to medium grained, some coarse, some Mica, trace Clay- very Moist  Orange Brown  More coarse grained, trace fine Gravel			1-SS	8				9		
		1580								
		5	2-SS	6				7		
			3-SS	14				5		
		1575								
	10		4-SS	12				5		
		1570								
Brown, Sandy Silt, fine Sand, trace fine Gravel, some Mica- Moist			5-SS	58				9		
		1565								
Yellowish Brown, Sandy Clay, fine Sand, some Mica- Moist			6-SS	20		4.5		13		
		1560								
Yellowish Brown, Silty Sand, fine to medium grained, trace coarse- slightly Moist			7-SS	18				4		
		1555								
Light Brown, Sandy Silt, fine Sand, some Mica, weakly cemented- Moist			8-SS	22				10		
		1550								
Olive Brown, Lean Clay, trace fine Sand, trace Silt, moderately plastic- very Moist			9-SS	31		1.0		23		
		1545								
	40									






Water Observation Data		Remarks:
	Water Encountered During Drilling: 36 ft.	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After __ Hours: __ ft.	
	Cave Depth After __ Hours: __ ft.	

GILES LOG REPORT: 2G-2404001.GPJ GILES.GDT 5/23/24

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.


<b>BORING NO. &amp; LOCATION:</b> B- 8	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1583 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Light Brown, Clayey Sand, fine to medium grained, trace coarse- very Moist	1540		10-SS	23				12		P <sub>200</sub> =16%
Brown, Lean Clay, trace fine Sand, trace Silt, moderately plastic- Very Moist	1535	45	11-SS	22		4.0		19		P <sub>200</sub> =51%
Brown, Sandy Clay, fine Sand, some medium grained- very Moist	50		12-SS	32		3.25		14		
Boring Terminated at about 50 feet (EL. 1533')										

Water Observation Data		Remarks:
	Water Encountered During Drilling: 36 ft.	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After ___ Hours: ___ ft.	
	Cave Depth After ___ Hours: ___ ft.	






Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24


<b>BORING NO. &amp; LOCATION:</b> B- 9	<b>TEST BORING LOG</b>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1580 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Orange Brown, Silty Sand, fine to medium grained- Moist			1-SS	4				7		
Light Brown, fine to medium grained, trace coarse, trace fine Gravel	5	1575	2-SS	6				6		
More coarse grained			3-SS	13				4		
Brownish Gray, poorly graded Sand with Silt, fine to medium grained, some coarse, trace fine Gravel- slightly Moist	10	1570	4-SS	22				4		
Brown, Sandy Clay, fine Sand, trace Calcium Carbonate- Moist	15	1565	5-SS	21		>4.5		12		

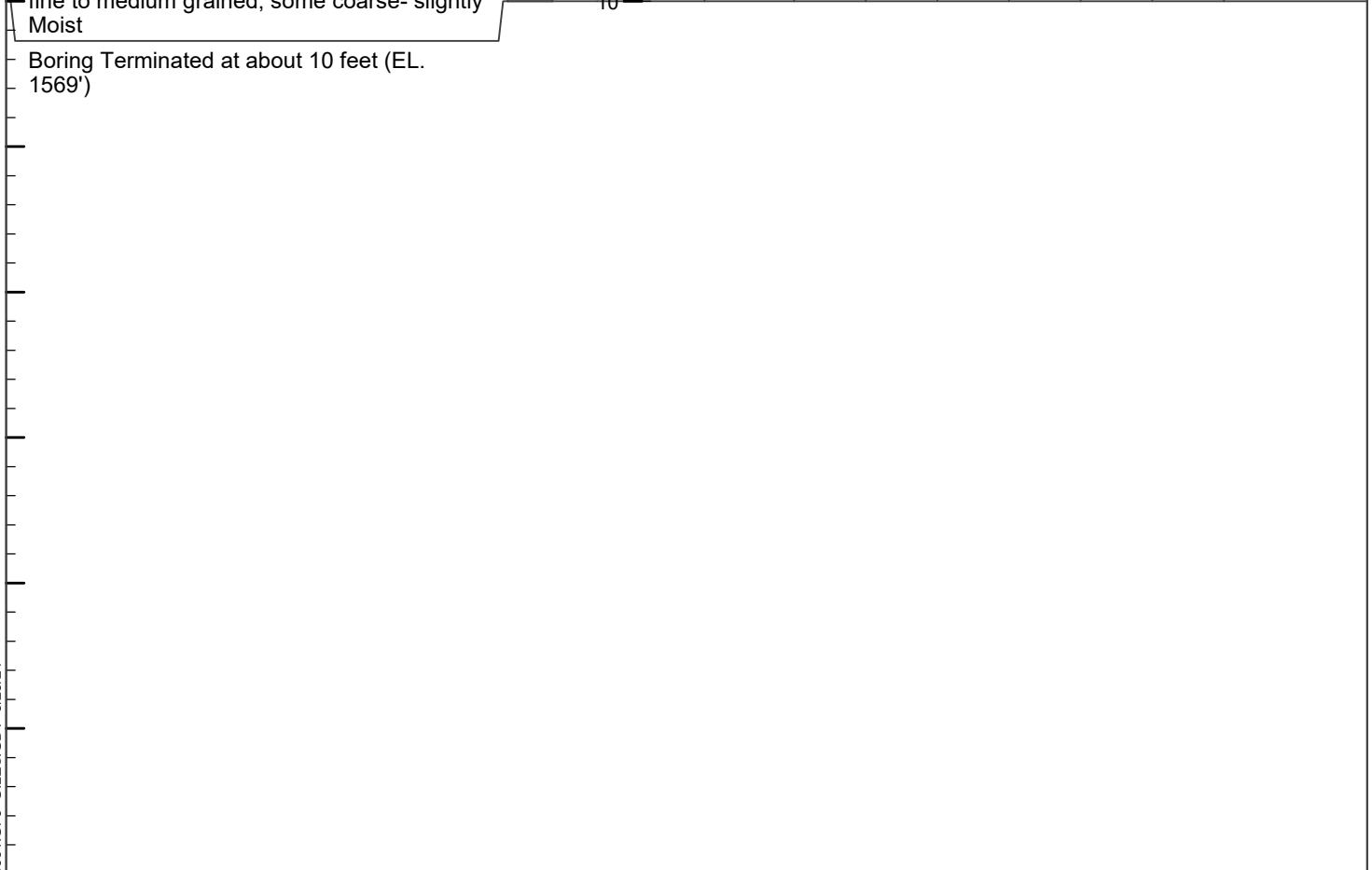
Boring Terminated at about 16.5 feet (EL. 1563.5')

Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After ___ Hours: ___ ft.	
	Cave Depth After ___ Hours: ___ ft.	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

<b>BORING NO. &amp; LOCATION:</b> B-10	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1579 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001


MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Silty Sand, fine to medium grained, trace coarse, trace Clay- Moist			1-SS	3				7		
More fine Gravel		1575	2-SS	6				6		
Light Brown, fine to medium grained, some coarse grained, trace fine Gravel			3-SS	10				5		
Light Brown, poorly graded Sand, some Silt, fine to medium grained, some coarse- slightly Moist		1570	4-SS	16						P <sub>200</sub> =4%



Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After __ Hours: __ ft.	
	Cave Depth After __ Hours: __ ft.	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.






GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24

<b>BORING NO. &amp; LOCATION:</b> B-11	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1582 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001


MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Sandy Silt, fine Sand, trace medium Sand, some Mica, weakly cemented, fine Gravel- Moist (Possible Fill)	1580		1-SS	13		3.0		10		
Brown, Sandy Silt, fine Sand, trace fine Gravel, trace Clay- Moist (Native)	5		2-SS	3				9		
	1575		3-SS	4				8		
Light Brown, Silty Sand, fine to medium grained, trace coarse- Moist	10		4-SS	6				5		

Boring Terminated at about 11.5 feet (EL. 1570.5')








Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After __ Hours: __ ft.	
	Cave Depth After __ Hours: __ ft.	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.


<b>BORING NO. &amp; LOCATION:</b> B-12	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1582 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Dark Brown, Sandy Silt, fine Sand, some medium- Moist	1580		1-SS	7				10		
	5		2-SS	2		1.25		10		
Brown, Silty Sand, fine grained, trace medium, some Mica- Moist	1575		3-SS	5				7		
Yellow, Brown, poorly graded Sand, some Silt, fine to medium grained, some coarse- Moist	10		4-SS	4				3		P <sub>200</sub> =3%
Boring Terminated at about 10 feet (EL. 1572')										

Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After __ Hours: __ ft.	
	Cave Depth After __ Hours: __ ft.	






Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24

<b>BORING NO. &amp; LOCATION:</b> B-13	<b>TEST BORING LOG</b>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1581 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001


MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Brown, Sandy Silt, fine to medium Sand, trace fine Gravel- Moist (Possible Fill)	1580		1-SS	41		2.5		7		
Brown, Sandy Silt, some Clay, fine Sand, some Mica- Moist (Native)	5	1575	2-SS	2		1.25		10		
Light Brown, Silty Sand, fine to medium grained, some coarse (No Recovery)	10	1570	4-SS	21				2		Dd=112.5 pcf
Yellow, Brown, fine to medium grained, some coarse, some fine Gravel- slightly Moist	15	1565	5-SS	18						

Boring Terminated at about 16.5 feet (EL. 1564.5')

Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After __ Hours: __ ft.	
	Cave Depth After __ Hours: __ ft.	






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GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24

<b>BORING NO. &amp; LOCATION:</b> B-14	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1583 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001


MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Dark Brown, Silty Sand, fine to medium grained, some coarse, trace Clay, some Mica- Moist (Possible Fill)	15	1580	1-SS	15				3		
Brown, Silty Sand, fine to medium grained, some coarse, some Clay- Moist  No Recovery	8		2-CS	8				9		
	N/A		3-SS	N/A						
	9	1575	4-SS	9				3		
Light Brown- slightly Moist	15	1570	5-SS	37		2.0		15		
Brown, Sandy Silt, fine Sand, some Mica, trace Clay- Moist										

Boring Terminated at about 16.5 feet (EL. 1566.5')

Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test CS= California Split Spoon Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After ___ Hours: ___ ft.	
	Cave Depth After ___ Hours: ___ ft.	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.






GILES LOG REPORT 2G-2404001.GPJ GILES.GDT 5/23/24

<b>BORING NO. &amp; LOCATION:</b> B-15	<h1>TEST BORING LOG</h1>	 <b>GILES ENGINEERING ASSOCIATES, INC.</b>	
<b>SURFACE ELEVATION:</b> 1583 feet			PUBLIC STORAGE FACILITY
<b>COMPLETION DATE:</b> 04/17/24			NEQ OF INDIAN STREET & ALESSANDRO BOULEVARD MORENO VALLEY, CALIFORNIA
<b>FIELD REP:</b> DOUGLAS CALLEJAS			PROJECT NO: 2G-2404001

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q <sub>u</sub> (tsf)	Q <sub>p</sub> (tsf)	Q <sub>s</sub> (tsf)	W (%)	PID	NOTES
Dark Brown, Sandy Silt, fine Sand, trace fine Gravel, some mica- Moist (Possible Fill)			1-SS	6		1.0		10		Dd=115.6 pcf
		1580								
Brown, Sandy Silt, fine Sand -Moist (Native)	5		2-SS	4				5		
Light Brown, Silty Sand, fine grained, trace Clay, fine Gravel- Moist		1575	3-CS	11				4		
	10									
Yellow Brown, fine to medium grained, some coarse- slightly Moist		1570	4-SS	7				3		
	15									
Brown, Sandy Clay, fine Sand, weakly cemented- Moist			5-SS	31		2.75		9		

Boring Terminated at about 16.5 feet (EL. 1566.5')



Water Observation Data		Remarks:
	Water Encountered During Drilling: None	SS= Standard Penetration Test CS= California Split Spoon Drilling Equipment used: Hollow stem auger; 8-in diameter Elevations based on Google Earth
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After ___ Hours: ___ ft.	
	Cave Depth After ___ Hours: ___ ft.	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

Project name (number):	ZG-240401 PS - Moreno Valley
Engineer:	WL
Reviewer:	
Date:	05/22/24

Soil boring number:	B-8 (A)
Approximate borehole diameter (inch):	8.0 (B)
Soil boring ground surface elevation (ft):	100.0 (C)
Groundwater depth during field exploration (ft):	36.0 (D)
Design groundwater depth (ft):	35.0 (E)
Design fillcut, H (ft). (Positive for fill, negative for cut)	0.0 (F)
Unit weight of fillcut material (pcf):	120 (G)
SPT hammer energy ratio (ER): (Enter percentage)	81.5 (H)
Liner used in sampler? (Yes or No)	No (I)
Plasticity index cutoff value for liquefaction (%)	12 (J)
Peak horizontal ground acceleration (a <sub>max</sub> /g):	0.737 (K)
Design earthquake magnitude (M <sub>w</sub> ):	7.38 (L)
Factor of safety criterion: (1.0 or higher)	1.3 (M)
Risk Level	2% in 50 yrs

Total Settlement  
0.0

Hammer Energy Ratios		
Hammer Type	Range	Recommend*
Safety	42% - 72%	60%
Donut	30% - 60%	50%
Automatic-Trip	48% - 78%	80%

1) after recommendations by NCEER, 1997  
2) for good-quality equipment and procedures conforming to ASTM D-1686.

# PLATE A-1

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	
Interval Bottom Depth (ft)	Interval Soil Type	Total Unit Weight (pcf)	Field SPT N Value N <sub>60</sub>	Estimated Fines Content FC (%)	Estimated Plasticity Index (%)	Relative Density Dr (%)	Restricted Relative Density D <sub>r</sub> (%)	Interval Bottom Elevation (ft)	Interval Thickness (ft)	Effective Unit Weight (pcf)	Field Total Overburden (tsf)	Design Total Overburden (tsf)	Field Effective Overburden (tsf)	Design Effective Overburden (tsf)	Effective Overburden Correction C <sub>e</sub>	Hammer Energy Correction C <sub>e</sub>	Borehole Diameter Correction C <sub>b</sub>	Rod Length Correction C <sub>r</sub>	Sampling Method Correction C <sub>s</sub>	Energy Correction Only N <sub>60</sub>	No Fines Correction (N <sub>60</sub> ) <sub>cs</sub>	Clean Sand (N <sub>60</sub> ) <sub>cs</sub>	Factor of Safety FS	Liquefaction Susceptibility	Comments	Tokimatsu Cyclic Stress Ratio CSR <sub>7.5</sub>	Ishihara & Yoshimine (1992) Volumetric Strain (%)	Seismic Settlement (inches)	Tokimatsu & Seed (1987) Volumetric Strain (%)	Seismic Settlement (inches)	Elevation Feet
0											0.00	0.00	0.00	0.00	1.7	1.36	1.15	0.75	1.15	11	18	18	0.47	NO	Above GWT	0.46	0.00	0.00	0.00	0.00	98.5
0.5		120	8			59	59	99.5	0.5	57.6	0.03	0.03	0.03	0.03	1.7	1.36	1.15	0.75	1.15	11	18	18	0.47	NO	Above GWT	0.459	0.00	0.00	0.00	0.00	98.0
1		120	8			59	59	99.0	0.5	57.6	0.060	0.060	0.060	0.060	1.70	1.36	1.15	0.75	1.15	11	18	18	0.47	NO	Above GWT	0.458	0.00	0.00	0.00	0.00	98.5
1.5		120	8			59	59	98.5	0.5	57.6	0.090	0.090	0.090	0.090	1.70	1.36	1.15	0.75	1.15	11	18	18	0.47	NO	Above GWT	0.458	0.00	0.00	0.00	0.00	98.5
2		120	8			59	59	98.0	0.5	57.6	0.120	0.120	0.120	0.120	1.68	1.36	1.15	0.75	1.15	11	18	18	0.47	NO	Above GWT	0.458	0.00	0.00	0.00	0.00	98.0
2.5		120	8			58	58	97.5	0.5	57.6	0.15	0.15	0.15	0.15	1.64	1.36	1.15	0.75	1.15	11	18	18	0.46	NO	Above GWT	0.46	0.00	0.00	0.00	0.00	97.5
3		120	8			58	58	97.0	0.5	57.6	0.180	0.180	0.180	0.180	1.61	1.36	1.15	0.75	1.15	11	17	17	0.44	NO	Above GWT	0.457	0.00	0.00	0.00	0.00	97.0
3.5		120	8			57	57	96.5	0.5	57.6	0.210	0.210	0.210	0.210	1.57	1.36	1.15	0.75	1.15	11	17	17	0.43	NO	Above GWT	0.456	0.00	0.00	0.00	0.00	96.5
4		120	6	13		53	53	96.0	0.5	57.6	0.240	0.240	0.240	0.240	1.54	1.36	1.15	0.75	1.15	8	12	15	0.38	NO	Above GWT	0.456	0.00	0.00	0.00	0.00	96.0
4.5		120	6	13		53	53	95.5	0.5	57.6	0.270	0.270	0.270	0.270	1.51	1.36	1.15	0.75	1.15	8	12	15	0.37	NO	Above GWT	0.455	0.00	0.00	0.00	0.00	95.5
5		120	6	13		52	52	95.0	0.5	57.6	0.300	0.300	0.300	0.300	1.48	1.36	1.15	0.75	1.15	8	12	14	0.37	NO	Above GWT	0.454	0.00	0.00	0.00	0.00	95.0
5.5		120	6	13		52	52	94.5	0.5	57.6	0.330	0.330	0.330	0.330	1.46	1.36	1.15	0.75	1.15	8	12	14	0.36	NO	Above GWT	0.454	0.00	0.00	0.00	0.00	94.5
6		120	6	13		52	52	94.0	0.5	57.6	0.360	0.360	0.360	0.360	1.43	1.36	1.15	0.75	1.15	8	12	14	0.36	NO	Above GWT	0.453	0.00	0.00	0.00	0.00	94.0
6.5		120	14	13		75	75	93.5	0.5	57.6	0.390	0.390	0.390	0.390	1.40	1.36	1.15	0.75	1.15	19	26	29	3.71	NO	Large factor of safety	0.453	0.00	0.00	0.00	0.00	93.5
7		120	14	13		71	71	93.0	0.5	57.6	0.420	0.420	0.420	0.420	1.38	1.36	1.15	0.75	1.15	19	26	26	0.97	NO	Above GWT	0.452	0.00	0.00	0.00	0.00	93.0
7.5		120	14	13		70	70	92.5	0.5	57.6	0.450	0.450	0.450	0.450	1.35	1.36	1.15	0.75	1.15	19	26	26	0.90	NO	Above GWT	0.452	0.00	0.00	0.00	0.00	92.5
8		120	14	13		69	69	92.0	0.5	57.6	0.480	0.480	0.480	0.480	1.33	1.36	1.15	0.75	1.15	19	25	25	0.85	NO	Above GWT	0.451	0.00	0.00	0.00	0.00	92.0
8.5		120	14	13		69	69	91.5	0.5	57.6	0.510	0.510	0.510	0.510	1.31	1.36	1.15	0.75	1.15	19	25	25	0.81	NO	Above GWT	0.451	0.00	0.00	0.00	0.00	91.5
9		120	14	13		68	68	91.0	0.5	57.6	0.540	0.540	0.540	0.540	1.29	1.36	1.15	0.75	1.15	19	24	24	0.78	NO	Above GWT	0.450	0.00	0.00	0.00	0.00	91.0
9.5		120	14	13		68	68	90.5	0.5	57.6	0.570	0.570	0.570	0.570	1.27	1.36	1.15	0.75	1.15	19	24	24	0.75	NO	Above GWT	0.450	0.00	0.00	0.00	0.00	90.5
10		120	12	7		69	69	90.0	0.5	57.6	0.600	0.600	0.600	0.600	1.25	1.36	1.15	0.80	1.15	19	25	25	0.85	NO	Above GWT	0.449	0.00	0.00	0.00	0.00	90.0
10.5		120	12	7		64	64	89.5	0.5	57.6	0.630	0.630	0.630	0.630	1.23	1.36	1.15	0.80	1.15	16	21	21	0.60	NO	Above GWT	0.449	0.00	0.00	0.00	0.00	89.5
11		120	12	7		64	64	89.0	0.5	57.6	0.660	0.660	0.660	0.660	1.21	1.36	1.15	0.80	1.15	16	21	21	0.59	NO	Above GWT	0.448	0.00	0.00	0.00	0.00	89.0
11.5		120	12	7		63	63	88.5	0.5	57.6	0.690	0.690	0.690	0.690	1.19	1.36	1.15	0.80	1.15	16	20	21	0.58	NO	Above GWT	0.448	0.00	0.00	0.00	0.00	88.5
12		120	12	7		63	63	88.0	0.5	57.6	0.720	0.720	0.720	0.720	1.17	1.36	1.15	0.80	1.15	16	20	20	0.56	NO	Above GWT	0.447	0.00	0.00	0.00	0.00	88.0
12.5		120	12	7		62	62	87.5	0.5	57.6	0.750	0.750	0.750	0.750	1.15	1.36	1.15	0.80	1.15	16	20	20	0.55	NO	Above GWT	0.446	0.00	0.00	0.00	0.00	87.5
13		120	12	7		62	62	87.0	0.5	57.6	0.780	0.780	0.780	0.780	1.14	1.36	1.15	0.80	1.15	16	20	20	0.54	NO	Above GWT	0.446	0.00	0.00	0.00	0.00	87.0
13.5		120	12	7		63	63	86.5	0.5	57.6	0.810	0.810	0.810	0.810	1.12	1.36	1.15	0.85	1.15	16	21	21	0.58	NO	Above GWT	0.445	0.00	0.00	0.00	0.00	86.5
14		120	12	7		63	63	86.0	0.5	57.6	0.840	0.840	0.840	0.840	1.10	1.36	1.15	0.85	1.15	16	20	21	0.57	NO	Above GWT	0.445	0.00	0.00	0.00	0.00	86.0
14.5		120	12	7		62	62	85.5	0.5	57.6	0.870	0.870	0.870	0.870	1.09	1.36	1.15	0.85	1.15	16	20	20	0.56	NO	Above GWT	0.444	0.00	0.00	0.00	0.00	85.5
15		120	12	7		62	62	85.0	0.5	57.6	0.900	0.900	0.900	0.900	1.07	1.36	1.15	0.85	1.15	16	20	20	0.55	NO	Above GWT	0.444	0.00	0.00	0.00	0.00	85.0
15.5		120	58			134	100	84.5	0.5	57.6	0.930	0.930	0.930	0.930	1.06	1.36	1.15	0.85	1.15	79	94	94	>4	NO	Large factor of safety	0.443	0.00	0.00	0.00	0.00	84.5
16		120	58			133	100	84.0	0.5	57.6	0.960	0.960	0.960	0.960	1.04	1.36	1.15	0.85	1.15	79	92	92	>4	NO	Large factor of safety	0.443	0.00	0.00	0.00	0.00	84.0
16.5		120	58			132	100	83.5	0.5	57.6	0.990	0.990	0.990	0.990	1.03	1.36	1.15	0.85	1.15	79	91	91	>4	NO	Large factor of safety	0.442	0.00	0.00	0.00	0.00	83.5
17		120	58			132	100	83.0	0.5	57.6	1.020	1.020	1.020	1.020	1.02	1.36	1.15	0.85	1.15	79	90	90	>4	NO	Large factor of safety	0.442	0.00	0.00	0.00	0.00	83.0
17.5		120	58			131	100	82.5	0.5	57.6	1.050	1.050	1.050	1.050	1.00	1.36	1.15	0.85	1.15	79	89	89	>4	NO	Large factor of safety	0.441	0.00	0.00	0.00	0.00	82.5
18		120	58			130	100	82.0	0.5	57.6	1.080	1.080	1.080	1.080	0.99	1.36	1.15	0.85	1.15	79	88	88	>4	NO	Large factor of safety	0.441	0.00	0.00	0.00	0.00	82.0
18.5		120	58			129	100	81.5	0.5	57.6	1.110	1.110	1.110	1.110	0.98	1.36	1.15	0.85	1.15	79	87	87	>4	NO	Large factor of safety	0.440	0.00	0.00	0.00	0.00	81.5
19		120	58			128	100	81.0	0.5	57.6	1.140	1.140	1.140	1.140	0.97	1.36	1.15	0.85	1.15	79	86	86	>4	NO	Large factor of safety	0.439	0.00	0.00	0.00	0.00	81.0
19.5		120	58			127	100	80.5	0.5	57.6	1.170	1.170	1.170	1.170	0.95	1.36	1.15	0.85	1.15	79	85	85	>4	NO	Large factor of safety	0.439	0.00	0.00	0.00	0.00	80.5
20		120	58			126	100	80.0	0.5	5																					

File No.: 2G-2404001  
 Project: PS - Moreno Valley

**PLATE A-2**

**EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS IN DRY SANDY SOILS**

INPUT:

Boring No.: B-8  
 Groundwater Depth: 35.0 feet

EARTHQUAKE INFORMATION:

Earthquake Magnitude:	7.38
Peak Horiz. Acceleration (g):	0.74

Depth of Base of Strata (ft)	Thickness of Layer (ft)	USCS Classification	Depth of Mid-point of Layer (ft)	Soil Unit Weight (pcf)	Overburden Pressure at Mid-point (tsf)	Mean Effective Pressure at Mid-point (tsf)	Average Cyclic Shear Stress [Tav] [N1]60	Corrected [N1]60	Maximum Shear Mod. [Gmax] (tsf)	From Tbl. 4-4			From Tbl. 4-5			Corrected Vol. Strains [Ec] [S] (inches)
										[geff]*[Geff] [Gmax] [geff]	[geff]*100% [E15] (%)	Volumetric Strain [E15] (%)	Number of Strain Cycles [Nc]	Corrected Vol. Strains [Ec]		
5.0	5.0	SM	2.5	120.0	0.15	0.10	0.072	12.0	324.427	2.11E-04	1.00E-02	1.00E+00	1.50E+00	14.0524	1.4566	1.75
10.0	5.0	SM	7.5	120.0	0.45	0.30	0.214	27.0	736.330	2.53E-04	1.25E-03	1.25E-01	7.90E-02	14.0524	0.0767	0.09
15.0	5.0	SP-SM	12.5	120.0	0.75	0.50	0.354	18.0	830.424	3.42E-04	1.40E-03	1.40E-01	1.60E-01	14.0524	0.1554	0.19
20.0	5.0	ML	17.5	120.0	1.05	0.70	0.488	86.0	1654.902	2.20E-04	4.90E-04	4.90E-02	1.50E-03	14.0524	0.0015	0.00
25.0	5.0	CL	22.5	120.0	1.35	0.90	0.616	31.0	1335.465	3.23E-04	8.10E-04	8.10E-02	1.00E-04	14.0524	0.0001	0.00
30.0	5.0	SM	27.5	120.0	1.65	1.11	0.735	26.0	1392.338	3.49E-04	8.20E-04	8.20E-02	6.00E-02	14.0524	0.0583	0.07
35.0	5.0	ML	32.5	120.0	1.95	1.31	0.845	30.0	1587.581	3.35E-04	7.70E-04	7.70E-02	4.15E-02	14.0524	0.0403	0.05

\*\* Clay layers not included in the dry sand settlement analysis, unlikely to be affected by seismic ground shakings  
 Reference: Tokimatsu, K., and Seed H.B. (1987). Evaluation of Settlement in Sands due to Earthquake Shaking." Journal Geotechnical Engineer Division, ASCE, 113 (8), 861-878.

Total Earthquake-Induced Settlements in Dry Sandy Soils (inches) = 2.15  
 Total Earthquake-Induced Settlements in Dry Sandy Soils (inches) = **0.40**  
 (By R&R 5-ft)

## **APPENDIX B**

### **FIELD PROCEDURES**

The field operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) designation D

420 entitled "Standard Guide for Sampling Rock and Rock" and/or other relevant specifications. Soil samples were preserved and transported to *Giles'* laboratory in general accordance with the procedures recommended by ASTM designation D 4220 entitled "Standard Practice for Preserving and Transporting Soil Samples." Brief descriptions of the sampling, testing and field procedures commonly performed by *Giles* are provided herein.

## GENERAL FIELD PROCEDURES

### Test Boring Elevations

The ground surface elevations reported on the Test Boring Logs are referenced to the assumed benchmark shown on the Boring Location Plan (Figure 1). Unless otherwise noted, the elevations were determined with a conventional hand-level and are accurate to within about 1 foot.

### Test Boring Locations

The test borings were located on-site based on the existing site features and/or apparent property lines. Dimensions illustrating the approximate boring locations are reported on the Boring Location Plan (Figure 1).

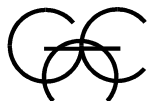
### Water Level Measurement

The water levels reported on the Test Boring Logs represent the depth of “free” water encountered during drilling and/or after the drilling tools were removed from the borehole. Water levels measured within a granular (sand and gravel) soil profile are typically indicative of the water table elevation. It is usually not possible to accurately identify the water table elevation with cohesive (clayey) soils, since the rate of seepage is slow. The water table elevation within cohesive soils must therefore be determined over a period of time with groundwater observation wells.

It must be recognized that the water table may fluctuate seasonally and during periods of heavy precipitation. Depending on the subsurface conditions, water may also become perched above the water table, especially during wet periods.

### Borehole Backfilling Procedures

Each borehole was backfilled upon completion of the field operations. If potential contamination was encountered, and/or if required by state or local regulations, boreholes were backfilled with an “impervious” material (such as bentonite slurry). Borings that penetrated pavements, sidewalks, etc. were “capped” with Portland Cement concrete, asphaltic concrete, or a similar surface material. It must, however, be recognized that the backfill material may settle, and the surface cap may subside, over a period of time. Further backfilling and/or re-surfacing by *Giles’* client or the property owner may be required.



## FIELD SAMPLING AND TESTING PROCEDURES

### Auger Sampling (AU)

Soil samples are removed from the auger flights as an auger is withdrawn above the ground surface. Such samples are used to determine general soil types and identify approximate soil stratifications. Auger samples are highly disturbed and are therefore not typically used for geotechnical strength testing.

### Split-Barrel Sampling (SS) – (ASTM D-1586)

A split-barrel sampler with a 2-inch outside diameter is driven into the subsoil with a 140-pound hammer free-falling a vertical distance of 30 inches. The summation of hammer-blows required to drive the sampler the final 12-inches of an 18-inch sample interval is defined as the “Standard Penetration Resistance” or N-value is an index of the relative density of granular soils and the comparative consistency of cohesive soils. A soil sample is collected from each SPT interval.

### Shelby Tube Sampling (ST) – (ASTM D-1587)

A relatively undisturbed soil sample is collected by hydraulically advancing a thin-walled Shelby Tube sampler into a soil mass. Shelby Tubes have a sharp cutting edge and are commonly 2 to 5 inches in diameter.

### Bulk Sample (BS)

A relatively large volume of soils is collected with a shovel or other manually-operated tool. The sample is typically transported to *Giles’* materials laboratory in a sealed bag or bucket.

### Dynamic Cone Penetration Test (DC) – (ASTM STP 399)

This test is conducted by driving a 1.5-inch-diameter cone into the subsoil using a 15-pound steel ring (hammer), free-falling a vertical distance of 20 inches. The number of hammer-blows required to drive the cone 1¾ inches is an indication of the soil strength and density, and is defined as “N”. The Dynamic Cone Penetration test is commonly conducted in hand auger borings, test pits and within excavated trenches.

- Continued -



### Ring-Lined Barrel Sampling – (ASTM D 3550)

In this procedure, a ring-lined barrel sampler is used to collect soil samples for classification and laboratory testing. This method provides samples that fit directly into laboratory test instruments without additional handling/disturbance.

### Sampling and Testing Procedures

The field testing and sampling operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) and/or other relevant specifications. Results of the field testing (i.e. N-values) are reported on the Test Boring Logs. Explanations of the terms and symbols shown on the logs are provided on the appendix enclosure entitled “General Notes”.



## **APPENDIX C**

### **LABORATORY TESTING AND CLASSIFICATION**

The laboratory testing was conducted under the supervision of a geotechnical engineer in accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) and/or other relevant specifications. Brief descriptions of laboratory tests commonly performed by *Giles* are provided herein.

## LABORATORY TESTING AND CLASSIFICATION

### Photoionization Detector (PID)

In this procedure, soil samples are “scanned” in *Giles’* analytical laboratory using a Photoionization Detector (PID). The instrument is equipped with an 11.7 eV lamp calibrated to a Benzene Standard and is capable of detecting a minute concentration of **certain** Volatile Organic Compound (VOC) vapors, such as those commonly associated with petroleum products and some solvents. Results of the PID analysis are expressed in HNu (manufacturer’s) units rather than actual concentration.

### Moisture Content (w) (ASTM D 2216)

Moisture content is defined as the ratio of the weight of water contained within a soil sample to the weight of the dry solids within the sample. Moisture content is expressed as a percentage.

### Unconfined Compressive Strength (qu) (ASTM D 2166)

An axial load is applied at a uniform rate to a cylindrical soil sample. The unconfined compressive strength is the maximum stress obtained or the stress when 15% axial strain is reached, whichever occurs first.

### Calibrated Penetrometer Resistance (qp)

The small, cylindrical tip of a hand-held penetrometer is pressed into a soil sample to a prescribed depth to measure the soils capacity to resist penetration. This test is used to evaluate unconfined compressive strength.

### Vane-Shear Strength (qs)

The blades of a vane are inserted into the flat surface of a soil sample and the vane is rotated until failure occurs. The maximum shear resistance measured immediately prior to failure is taken as the vane-shear strength.

### Loss-on-Ignition (ASTM D 2974; Method C)

The Loss-on-Ignition (L.O.I.) test is used to determine the organic content of a soil sample. The procedure is conducted by heating a dry soil sample to 440°C in order to burn-off or “ash” organic matter present within the sample. The L.O.I. value is the ratio of the weight loss due to ignition compared to the initial weight of the dry sample. L.O.I. is expressed as a percentage.



### Particle Size Distribution (ASTB D 421, D 422, and D 1140)

This test is performed to determine the distribution of specific particle sizes (diameters) within a soil sample. The distribution of coarse-grained soil particles (sand and gravel) is determined from a “sieve analysis,” which is conducted by passing the sample through a series of nested sieves. The distribution of fine-grained soil particles (silt and clay) is determined from a “hydrometer analysis” which is based on the sedimentation of particles suspended in water.

### Consolidation Test (ASTM D 2435)

In this procedure, a series of cumulative vertical loads are applied to a small, laterally confined soil sample. During each load increment, vertical compression (consolidation) of the sample is measured over a period of time. Results of this test are used to estimate settlement and time rate of settlement.

### Classification of Samples

Each soil sample was visually-manually classified, based on texture and plasticity, in general accordance with the Unified Soil Classification System (ASTM D-2488-75). The classifications are reported on the Test Boring Logs.

### Laboratory Testing

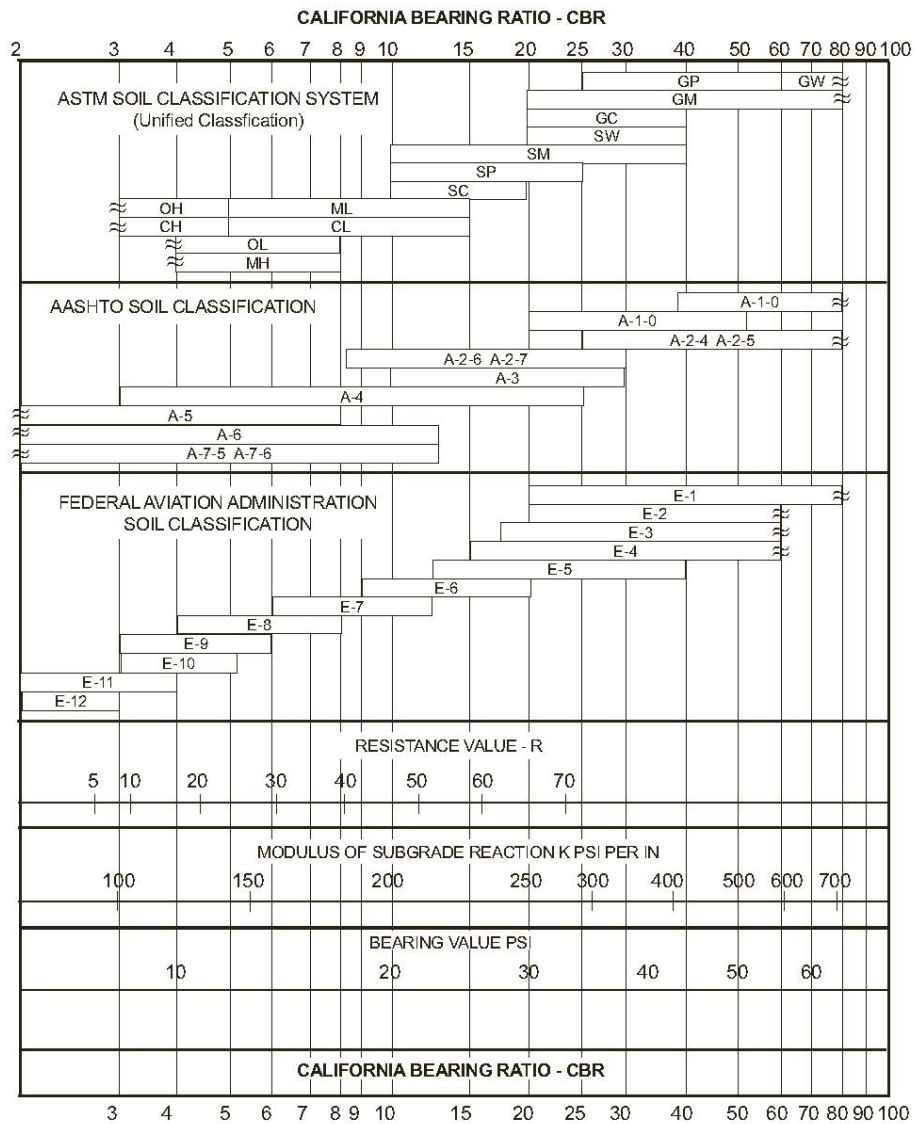
The laboratory testing operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) and/or other relevant specifications. Results of the laboratory tests are provided on the Test Boring Logs or other appendix enclosures. Explanation of the terms and symbols used on the logs is provided on the appendix enclosure entitled “General Notes.”



## California Bearing Ratio (CBR) Test ASTM D-1833

The CBR test is used for evaluation of a soil subgrade for pavement design. The test consists of measuring the force required for a 3-square-inch cylindrical piston to penetrate 0.1 or 0.2 inch into a compacted soil sample. The result is expressed as a percent of force required to penetrate a standard compacted crushed stone.

Unless a CBR test has been specifically requested by the client, the CBR is estimated from published charts, based on soil classification and strength characteristics. A typical correlation chart is below.



## **APPENDIX D**

### **GENERAL INFORMATION**

**GUIDE SPECIFICATIONS FOR SUBGRADE AND PREPARATION  
FOR FILL, FOUNDATION, FLOOR SLAB AND PAVEMENT SUPPORT;  
AND SELECTION, PLACEMENT AND COMPACTION OF FILL SOILS  
USING MODIFIED PROCTOR PROCEDURES**

1. Construction monitoring and testing of subgrades and grades for fill, foundation, floor slab and pavement; and fill selection, placement and compaction shall be performed by an experienced soils engineer and/or his representatives.
2. All compacted fill, subgrades, and grades shall be (a) underlain by suitable bearing material, (b) free of all organic frozen, or other deleterious material, and (c) observed, tested and approved by qualified engineering personnel representing an experienced soils engineer. Preparation of subgrades after stripping vegetation, organic or other unsuitable materials shall consist of (a) proofrolling to detect soft, wet, yielding soils or other unstable materials that must be undercut, (b) scarifying top 6 to 8 inches, (c) moisture conditioning the soils as required, and (d) recompaction to same minimum in-situ density required for similar material indicated under Item 5. Note: Compaction requirements for pavement subgrade are higher than other areas. Weather and construction equipment may damage compacted fill surface and reworking and retesting may be necessary for proper performance.
3. In overexcavation and fill areas, the compacted fill must extend (a) a minimum 1 foot lateral distance beyond the exterior edge of the foundation at bearing grade or pavement at subgrade and down to compacted fill subgrade on a maximum 0.5(H):1(v) slope, (b) 1 foot above footing grade outside the building, and (c) to floor subgrade inside the building. Fill shall be placed and compacted on a 5(H):1(V) slope or must be stepped or benched as required to flatten if not specifically approved by qualified personnel under the direction of an experienced soils engineer.
4. The compacted fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as "contaminated", and shall be low-expansive with a maximum Liquid Limit (ASTM D-423) and Plasticity Index (ASTM D-424) of 30 and 15, respectively, unless specifically tested and found to have low expansive properties and approved by an experienced soils engineer. The top 12 inches of compacted fill should have a maximum 3 inch particle diameter and all underlying compacted fill a maximum 6 inch diameter unless specifically approved by an experienced soils engineer. All fill material must be tested and approved under the direction of an experienced soils engineer prior to placement. If the fill is to provide non-frost susceptible characteristics, it must be classified as a clean GW, GP, SW or SP per Unified Soils Classification System (ASTM D-2487).
5. For structural fill depths less than 20 feet, the density of the structural compacted fill and scarified subgrade and grades shall not be less than 90 percent of the maximum dry density as determined by Modified Proctor (ASTM D-1557) with the exception of the top 12 inches of pavement subgrade which shall have a minimum in-situ density of 95 percent of maximum dry density, or 5 percent higher than underlying structural fill materials. Where the structural fill depth is greater than 20 feet, the portion below 20 feet should have a minimum in-place density of 95 percent of its maximum dry density or 5 percent higher than the top 20 feet. Cohesive soils shall not vary by more than -1 to +3 percent moisture content and granular soil  $\pm 3$  percent from the optimum when placed and compacted or recompacted, unless specifically recommended/approved by the soils engineer observing the placement and compaction. Cohesive soils with moderate to high expansion potentials ( $PI > 15$ ) should, however, be placed, compacted and maintained prior to construction at a  $3 \pm 1$  percent moisture content above optimum moisture content to limit future heave. Fill shall be placed in layers with a maximum loose thickness of 8 inches for foundations and 10 inches for floor slabs and pavements, unless specifically approved by the soils engineer taking into consideration the type of materials and compaction equipment being used. The compaction equipment should consist of suitable mechanical equipment specifically designed for soil compaction. Bulldozers or similar tracked vehicles are typically not suitable for compaction.
6. Excavation, filing, subgrade grade preparation shall be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working platform. Springs or water seepage encountered during grade/foundation construction must be called to the soils engineer's attention immediately for possible construction procedure revision or inclusion of an underdrain system.
7. Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls (i.e. basement walls and retaining walls) must be properly tested and approved by an experienced soils engineer with consideration for the lateral pressure used in the wall design.
8. Wherever, in the opinion of the soils engineer or the Owner's Representatives, an unstable condition is being created either by cutting or filling, the work should not proceed into that area until an appropriate geotechnical exploration and analysis has been performed and the grading plan revised, if found necessary.



## GENERAL COMMENTS

The soil samples obtained during the subsurface exploration will be retained for a period of thirty days. If no instructions are received, they will be disposed of at that time.

This report has been prepared exclusively for the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. Copies of this report may be provided to contractor(s), with contract documents, to disclose information relative to this project. The report, however, has not been prepared to serve as the plans and specifications for actual construction without the appropriate interpretation by the project architect, structural engineer, and/or civil engineer. Reproduction and distribution of this report must be authorized by the client and *Giles*.

This report has been based on assumed conditions/characteristics of the proposed development where specific information was not available. It is recommended that the architect, civil engineer and structural engineer along with any other design professionals involved in this project carefully review these assumptions to ensure they are consistent with the actual planned development. When discrepancies exist, they should be brought to our attention to ensure they do not affect the conclusions and recommendations provided herein. The project plans and specifications may also be submitted to *Giles* for review to ensure that the geotechnical related conclusions and recommendations provided herein have been correctly interpreted.

The analysis of this site was based on a subsoil profile interpolated from a limited subsurface exploration. If the actual conditions encountered during construction vary from those indicated by the borings, *Giles* must be contacted immediately to determine if the conditions alter the recommendations contained herein.

The conclusions and recommendations presented in this report have been promulgated in accordance with generally accepted professional engineering practices in the field of geotechnical engineering. No other warranty is either expressed or implied.



CHARACTERISTICS AND RATINGS OF UNIFIED SOIL SYSTEM CLASSES FOR SOIL CONSTRUCTION *									
Class	Compaction Characteristics	Max. Dry Density Standard Proctor (pcf)	Compressibility and Expansion	Drainage and Permeability	Value as an Embankment Material	Value as Subgrade When Not Subject to Frost	Value as Base Course	Value as Temporary Pavement	
								With Dust Palliative	With Bituminous Treatment
GW	Good: tractor, rubber-tired, steel wheel or vibratory roller	125-135	Almost none	Good drainage, pervious	Very stable	Excellent	Good	Fair to poor	Excellent
GP	Good: tractor, rubber-tired, steel wheel or vibratory roller	115-125	Almost none	Good drainage, pervious	Reasonably stable	Excellent to good	Poor to fair	Poor	
GM	Good: rubber-tired or light sheepsfoot roller	120-135	Slight	Poor drainage, semipervious	Reasonably stable	Excellent to good	Fair to poor	Poor	Poor to fair
GC	Good to fair: rubber-tired or sheepsfoot roller	115-130	Slight	Poor drainage, impervious	Reasonably stable	Good	Good to fair **	Excellent	Excellent
SW	Good: tractor, rubber-tired or vibratory roller	110-130	Almost none	Good drainage, pervious	Very stable	Good	Fair to poor	Fair to poor	Good
SP	Good: tractor, rubber-tired or vibratory roller	100-120	Almost none	Good drainage, pervious	Reasonably stable when dense	Good to fair	Poor	Poor	Poor to fair
SM	Good: rubber-tired or sheepsfoot roller	110-125	Slight	Poor drainage, impervious	Reasonably stable when dense	Good to fair	Poor	Poor	Poor to fair
SC	Good to fair: rubber-tired or sheepsfoot roller	105-125	Slight to medium	Poor drainage, impervious	Reasonably stable	Good to fair	Fair to poor	Excellent	Excellent
ML	Good to poor: rubber-tired or sheepsfoot roller	95-120	Slight to medium	Poor drainage, impervious	Poor stability, high density required	Fair to poor	Not suitable	Poor	Poor
CL	Good to fair: sheepsfoot or rubber-tired roller	95-120	Medium	No drainage, impervious	Good stability	Fair to poor	Not suitable	Poor	Poor
OL	Fair to poor: sheepsfoot or rubber-tired roller	80-100	Medium to high	Poor drainage, impervious	Unstable, should not be used	Poor	Not suitable	Not suitable	Not suitable
MH	Fair to poor: sheepsfoot or rubber-tired roller	70-95	High	Poor drainage, impervious	Poor stability, should not be used	Poor	Not suitable	Very poor	Not suitable
CH	Fair to poor: sheepsfoot roller	80-105	Very high	No drainage, impervious	Fair stability, may soften on expansion	Poor to very poor	Not suitable	Very poor	Not suitable
OH	Fair to poor: sheepsfoot roller	65-100	High	No drainage, impervious	Unstable, should not be used	Very poor	Not suitable	Not suitable	Not suitable
Pt	Not suitable		Very high	Fair to poor drainage	Should not be used	Not suitable	Not suitable	Not suitable	Not suitable

\* "The Unified Classification: Appendix A - Characteristics of Soil, Groups Pertaining to Roads and Airfields, and Appendix B - Characteristics of Soil Groups Pertaining to Embankments and Foundations," Technical Memorandum 357, U.S. Waterways Experiment Station, Vicksburg, 1953.

\*\* Not suitable if subject to frost.



# UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

Major Divisions		Group Symbols	Typical Names	Laboratory Classification Criteria					
Coarse-grained soils (more than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent: GW, GP, SW, SP More than 12 percent: GM, GC, SM, SC Borderline cases requiring dual symbols <sup>b</sup>	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3  Not meeting all gradation requirements for GW			
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines					
		Gravels with fines (appreciable amount of fines)	GM <sup>a</sup>	d			Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4  Limits plotting within shaded area, above "A" line with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols	
				u					
			GC	Clayey gravels, gravel-sand-clay mixtures			Atterberg limits above "A" line or P.I. greater than 7		
			Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)					SW
	SP	Poorly graded sands, gravelly sands, little or no fines							
	Sands with fines (Appreciable amount of fines)	SM <sup>a</sup>		d			Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4  Limits plotting within shaded area, above "A" line with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols	
				u					
		SC		Clayey sands, sand-clay mixtures			Atterberg limits above "A" line or P.I. greater than 7		
		Fine-grained soils (More than half material is smaller than No. 200 sieve size)		Sils and clays (Liquid limit less than 50)					ML
	CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays						
OH			Organic silts and organic silty clays of low plasticity						
Sils and clays (Liquid limit greater than 50)	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						
Pt	Peat and other highly organic soils								

<sup>a</sup> Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits, suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u is used when L.L. is greater than 28.

<sup>b</sup> Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example GW-GC, well-graded gravel-sand mixture with clay binder.

## GENERAL NOTES

### SAMPLE IDENTIFICATION

All samples are visually classified in general accordance with the Unified Soil Classification System (ASTM D-2487-75 or D-2488-75)

### DESCRIPTIVE TERM (% BY DRY WEIGHT)

Trace:	1-10%
Little:	11-20%
Some:	21-35%
And/Adjective	36-50%

### PARTICLE SIZE (DIAMETER)

Boulders:	8 inch and larger
Cobbles:	3 inch to 8 inch
Gravel:	coarse - ¾ to 3 inch fine – No. 4 (4.76 mm) to ¾ inch
Sand:	coarse – No. 4 (4.76 mm) to No. 10 (2.0 mm) medium – No. 10 (2.0 mm) to No. 40 (0.42 mm) fine – No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt:	No. 200 (0.074 mm) and smaller (non-plastic)
Clay:	No 200 (0.074 mm) and smaller (plastic)

### SOIL PROPERTY SYMBOLS

Dd:	Dry Density (pcf)
LL:	Liquid Limit, percent
PL:	Plastic Limit, percent
PI:	Plasticity Index (LL-PL)
LOI:	Loss on Ignition, percent
Gs:	Specific Gravity
K:	Coefficient of Permeability
w:	Moisture content, percent
qp:	Calibrated Penetrometer Resistance, tsf
qs:	Vane-Shear Strength, tsf
qu:	Unconfined Compressive Strength, tsf
qc:	Static Cone Penetrometer Resistance (correlated to Unconfined Compressive Strength, tsf)
PID:	Results of vapor analysis conducted on representative samples utilizing a Photoionization Detector calibrated to a benzene standard. Results expressed in HNU-Units. (BDL=Below Detection Limit)
N:	Penetration Resistance per 12 inch interval, or fraction thereof, for a standard 2 inch O.D. (1½ inch I.D.) split spoon sampler driven with a 140 pound weight free-falling 30 inches. Performed in general accordance with Standard Penetration Test Specifications (ASTM D-1586). N in blows per foot equals sum of N-Values where plus sign (+) is shown.
Nc:	Penetration Resistance per 1¼ inches of Dynamic Cone Penetrometer. Approximately equivalent to Standard Penetration Test N-Value in blows per foot.
Nr:	Penetration Resistance per 12 inch interval, or fraction thereof, for California Ring Sampler driven with a 140 pound weight free-falling 30 inches per ASTM D-3550. Not equivalent to Standard Penetration Test N-Value.

### DRILLING AND SAMPLING SYMBOLS

SS:	Split-Spoon
ST:	Shelby Tube – 3 inch O.D. (except where noted)
CS:	3 inch O.D. California Ring Sampler
DC:	Dynamic Cone Penetrometer per ASTM Special Technical Publication No. 399
AU:	Auger Sample
DB:	Diamond Bit
CB:	Carbide Bit
WS:	Wash Sample
RB:	Rock-Roller Bit
BS:	Bulk Sample
Note:	Depth intervals for sampling shown on Record of Subsurface Exploration are not indicative of sample recovery, but position where sampling initiated

### SOIL STRENGTH CHARACTERISTICS

#### COHESIVE (CLAYEY) SOILS

COMPARATIVE CONSISTENCY	BLOWS PER FOOT (N)	UNCONFINED COMPRESSIVE STRENGTH (TSF)
Very Soft	0 - 2	0 - 0.25
Soft	3 - 4	0.25 - 0.50
Medium Stiff	5 - 8	0.50 - 1.00
Stiff	9 - 15	1.00 - 2.00
Very Stiff	16 - 30	2.00 - 4.00
Hard	31+	4.00+

#### NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	BLOWS PER FOOT (N)
Very Loose	0 - 4
Loose	5 - 10
Firm	11 - 30
Dense	31 - 50
Very Dense	51+

DEGREE OF PLASTICITY	PI	DEGREE OF EXPANSIVE POTENTIAL	PI
None to Slight	0 - 4	Low	0 - 15
Slight	5 - 10	Medium	15 - 25
Medium	11 - 30	High	25+
High to Very High	31+		



# Important Information About Your Geotechnical Engineering Report

*Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.*

*The following information is provided to help you manage your risks.*

## **Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects**

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

## **Read the Full Report**

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## **A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors**

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## **Subsurface Conditions Can Change**

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

## **Most Geotechnical Findings Are Professional Opinions**

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## **A Report's Recommendations Are *Not* Final**

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

## **A Geotechnical Engineering Report Is Subject to Misinterpretation**

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

## **Do Not Redraw the Engineer's Logs**

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

## **Give Contractors a Complete Report and Guidance**

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time to perform additional study.* Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

## **Read Responsibility Provisions Closely**

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

## **Geoenvironmental Concerns Are Not Covered**

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

## **Obtain Professional Assistance To Deal with Mold**

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

## **Rely on Your ASFE-Member Geotechnical Engineer for Additional Assistance**

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.



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# Appendix 4: Historical Site Conditions

*Phase I Environmental Site Assessment or Other Information on Past Site Use*

# Appendix 5: LID Infeasibility

*LID Technical Infeasibility Analysis*

# Appendix 6: BMP Design Details

*BMP Sizing, Design Details and other Supporting Documentation*



PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



# 24-077 PUBLIC STORAGE

## MORENO VALLEY, CA, USA

### MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
  - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
  - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
  - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
  - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
  - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
  - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

### IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
  - STONESHOOTER LOCATED OFF THE CHAMBER BED.
  - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
  - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

### NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
  - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
  - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
  - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

**USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.**

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS:		*INVERT ABOVE BASE OF CHAMBER				
				PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
112	STORMTECH MC-3500 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	1583.00					
16	STORMTECH MC-3500 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1577.00					
12	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1576.50	PREFABRICATED END CAP	A	24" BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.06"	
9	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1576.50					
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1576.50	PREFABRICATED END CAP	B	18" BOTTOM CORED END CAP, PART#: MC3500IEPP18BC / TYP OF ALL 18" BOTTOM CONNECTIONS	1.77"	
21313	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	1576.00	FLAMP	C	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MCFLAMP		
		TOP OF MC-3500 CHAMBER:	1575.00	MANIFOLD	D	18" x 18" BOTTOM MANIFOLD, ADS N-12	1.77"	
		24" ISOLATOR ROW PLUS INVERT:	1571.42					
6264	SYSTEM AREA (SF)	18" x 18" BOTTOM MANIFOLD INVERT:	1571.40	CONCRETE STRUCTURE	E	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		20.9 CFS IN
334.1	SYSTEM PERIMETER (ft)	BOTTOM OF MC-3500 CHAMBER:	1571.25	W/WEIR				
		BOTTOM OF STONE:	1570.50					



- ISOLATOR ROW PLUS (SEE DETAIL)
- PLACE MINIMUM 17.50' OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS
- BED LIMITS

**NOTES**

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

24-077 PUBLIC STORAGE

MORENO VALLEY, CA, USA

DATE: \_\_\_\_\_

PROJECT #: \_\_\_\_\_

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CHECKED: N/A

DATE	CHK	DRW	CHK	DESCRIPTION

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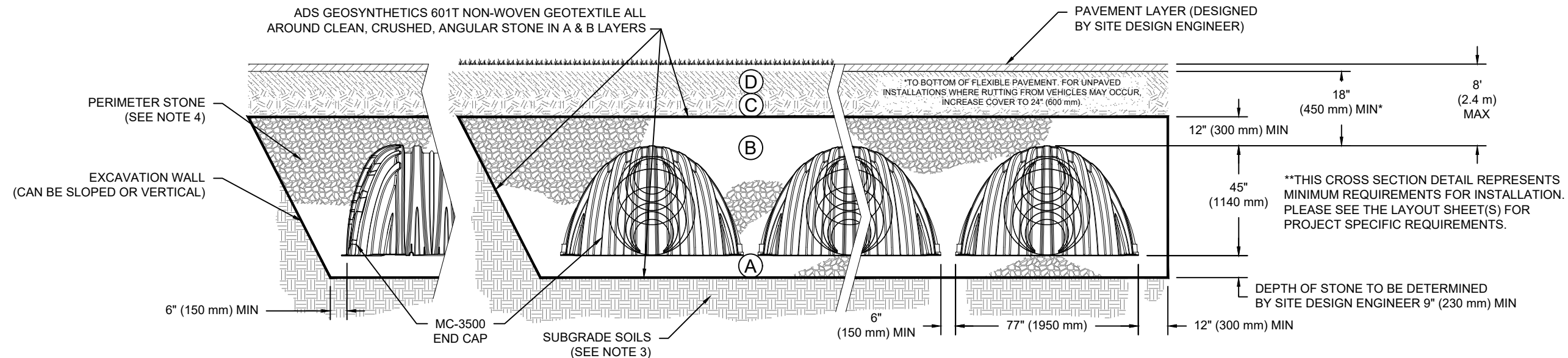
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**2 OF 5**

## ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	<b>FINAL FILL:</b> FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	<b>INITIAL FILL:</b> FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M145 <sup>1</sup> A-1, A-2-4, A-3  OR AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	<b>EMBEDMENT STONE:</b> FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	<b>FOUNDATION STONE:</b> FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. <sup>2,3</sup>

**PLEASE NOTE:**

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



**NOTES:**

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
  - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
  - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
  - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

24-077 PUBLIC STORAGE

MORENO VALLEY, CA, USA

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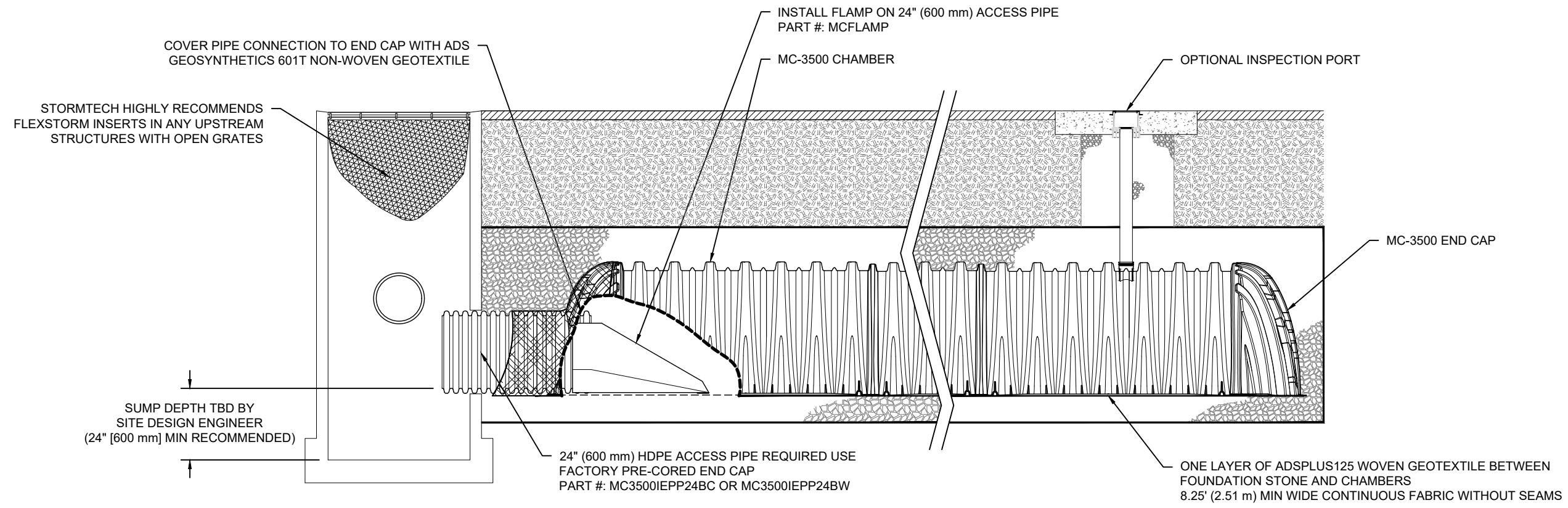
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SHEET

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**MC-3500 ISOLATOR ROW PLUS DETAIL**  
NTS

**INSPECTION & MAINTENANCE**

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
    - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
    - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
    - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
    - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
    - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
  - B. ALL ISOLATOR PLUS ROWS
    - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
    - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
      - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
      - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
    - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
  - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
  - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

**NOTES**

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

**24-077 PUBLIC STORAGE**  
MORENO VALLEY, CA, USA  
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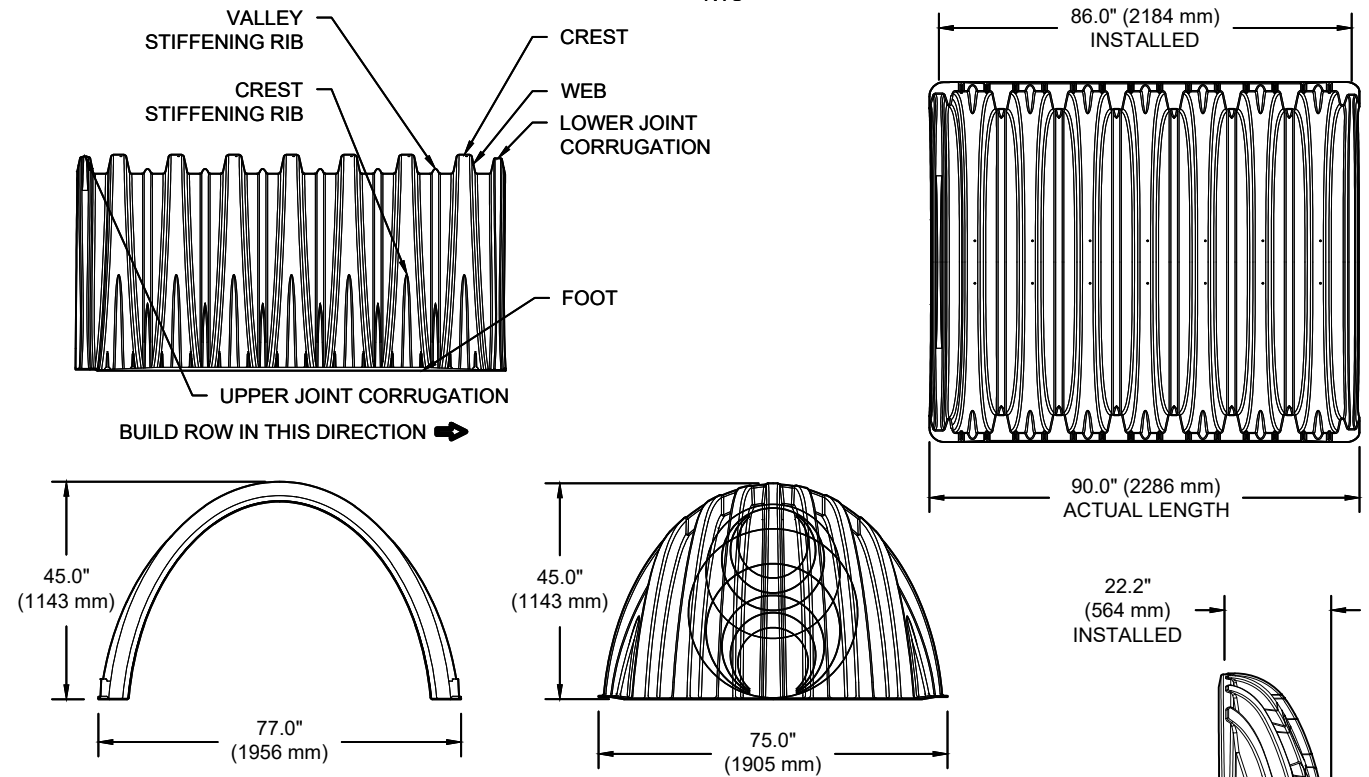
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# MC-3500 TECHNICAL SPECIFICATION

NTS



### NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m <sup>3</sup> )
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m <sup>3</sup> )
WEIGHT	134 lbs.	(60.8 kg)

### NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m <sup>3</sup> )
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m <sup>3</sup> )
WEIGHT	49 lbs.	(22.2 kg)

\*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

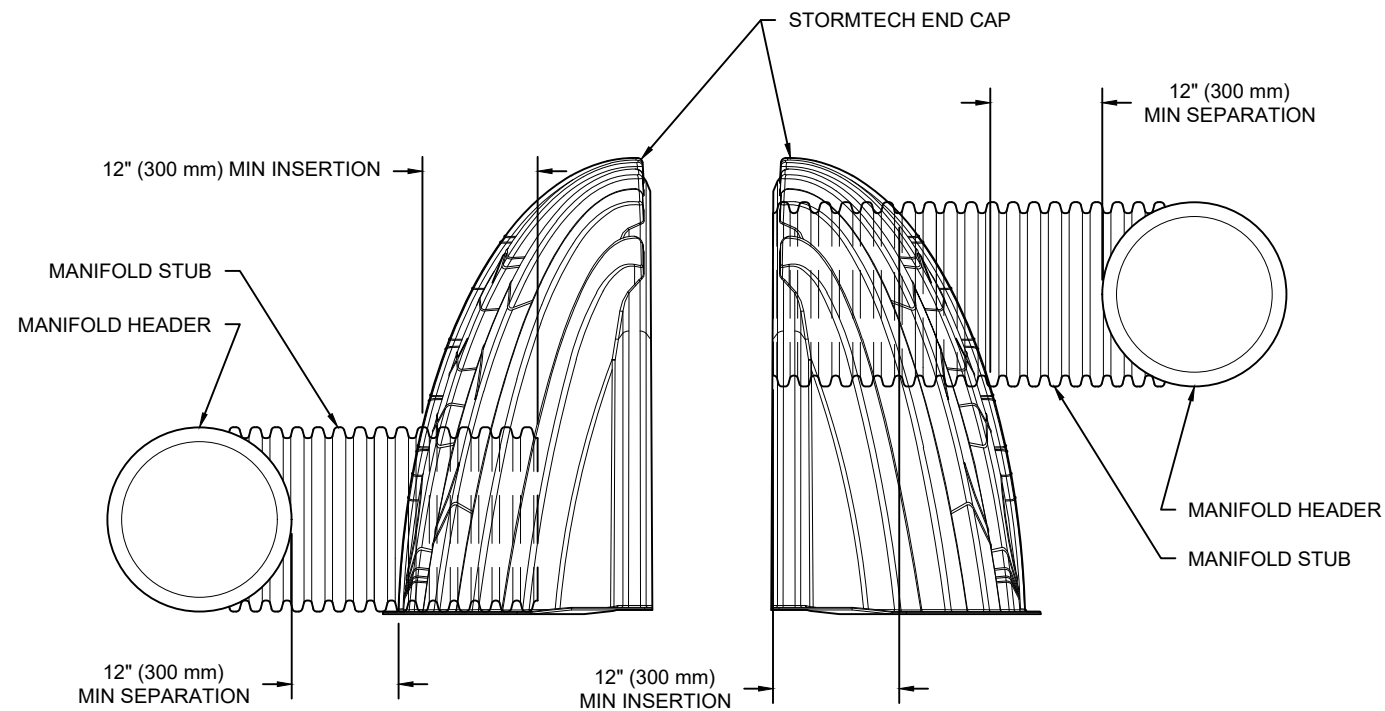
STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"  
 STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"  
 END CAPS WITH A WELDED CROWN PLATE END WITH "C"  
 END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			---
MC3500IEPP18BC			1.77" (45 mm)
MC3500IEPP18BW			---
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			---
MC3500IEPP24BC			2.06" (52 mm)
MC3500IEPP24BW			---
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

# MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

NOTE: ALL DIMENSIONS ARE NOMINAL

24-077 PUBLIC STORAGE

MORENO VALLEY, CA, USA

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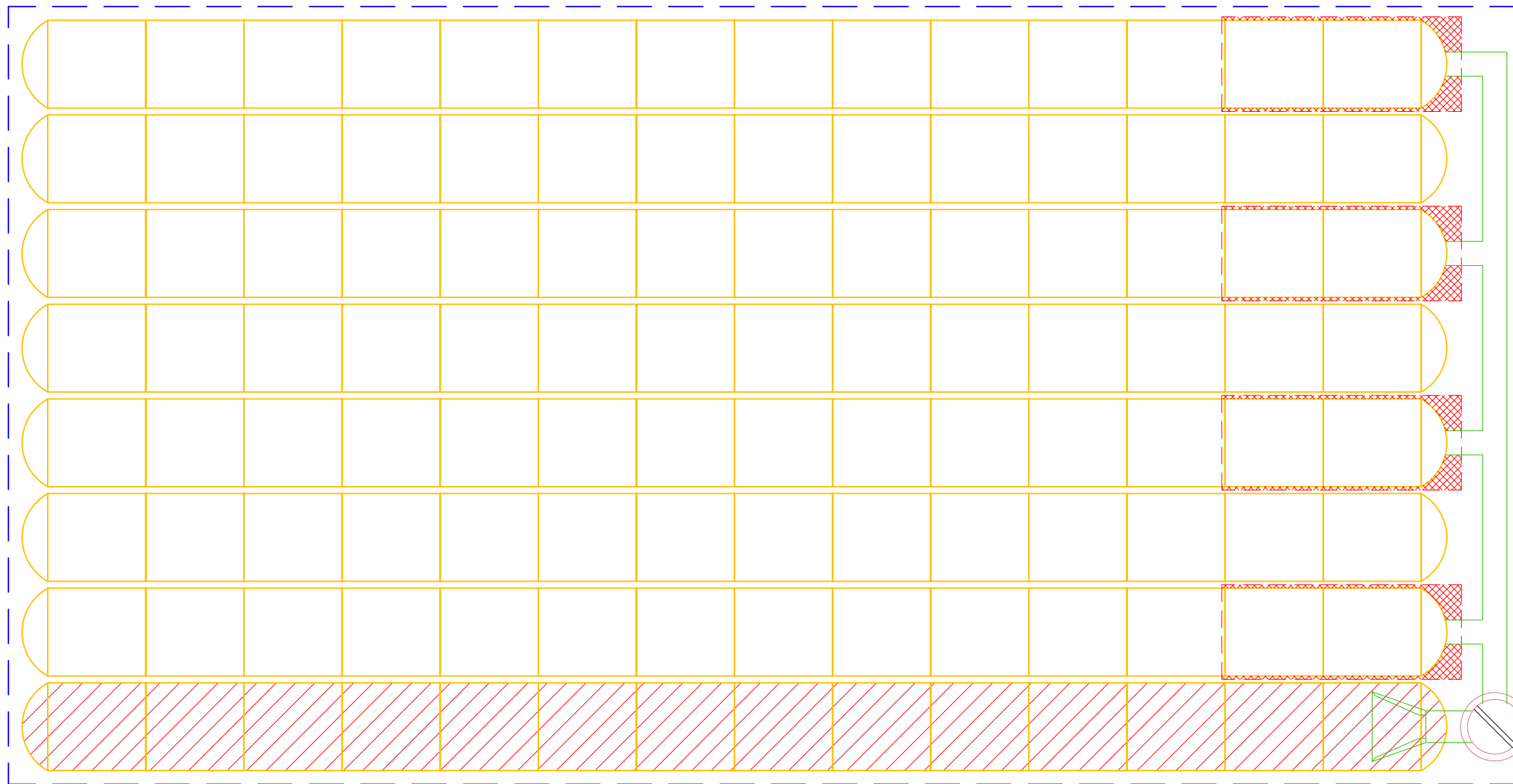
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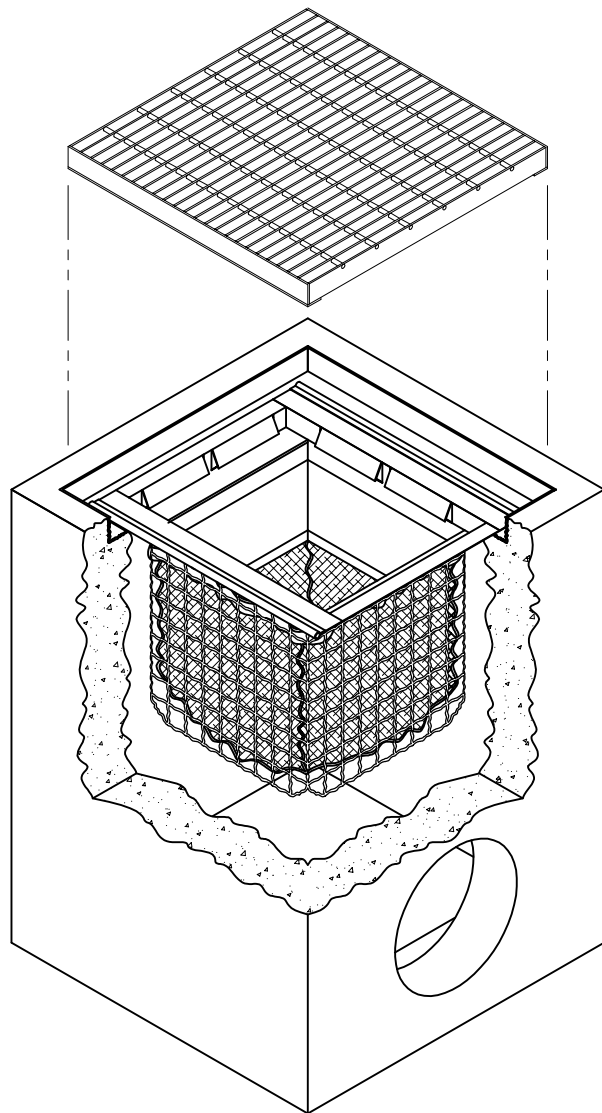


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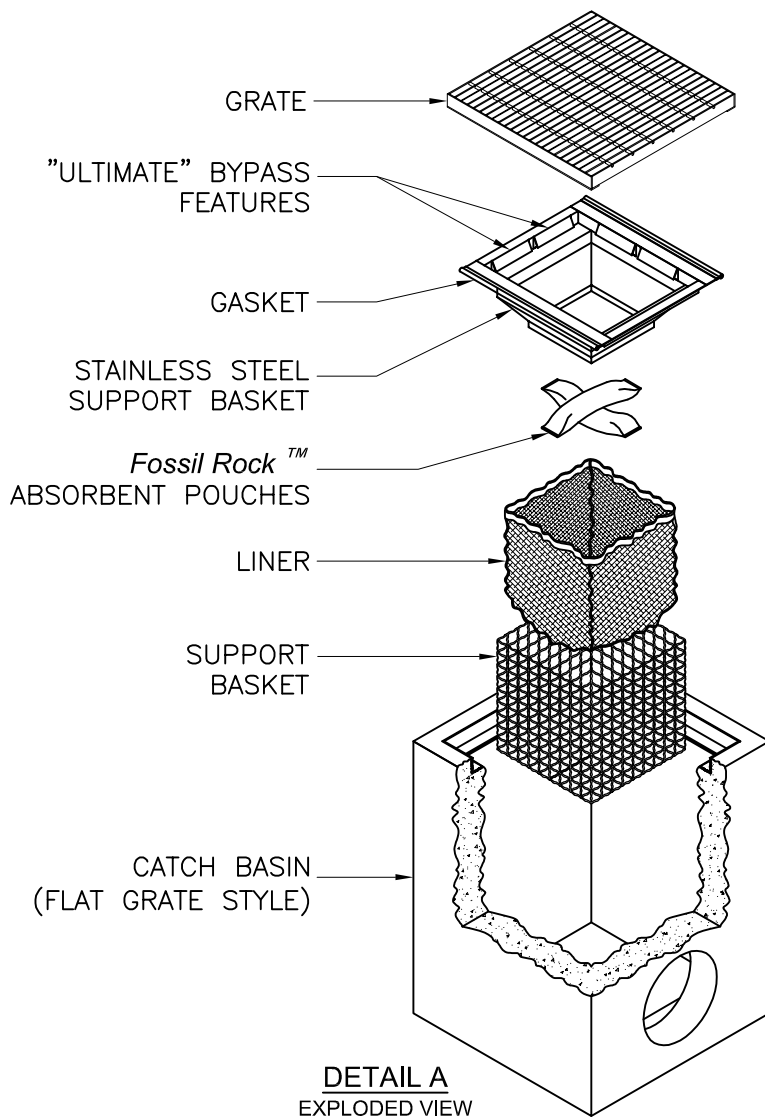
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FloGard® FILTER  
-INSTALLED INTO CATCH BASIN-



DETAIL A  
EXPLODED VIEW

NOTES:

1. Filter insert shall have a high flow bypass feature.
2. Filter support frame shall be constructed from stainless steel Type 304.
3. Filter medium shall be *Fossil Rock™*, installed and maintained in accordance with manufacturer specifications.
4. Storage capacity reflects 80% of maximum solids collection prior to impeding filtering bypass.

U.S. PATENT # 6,00,023 & 6,877,029



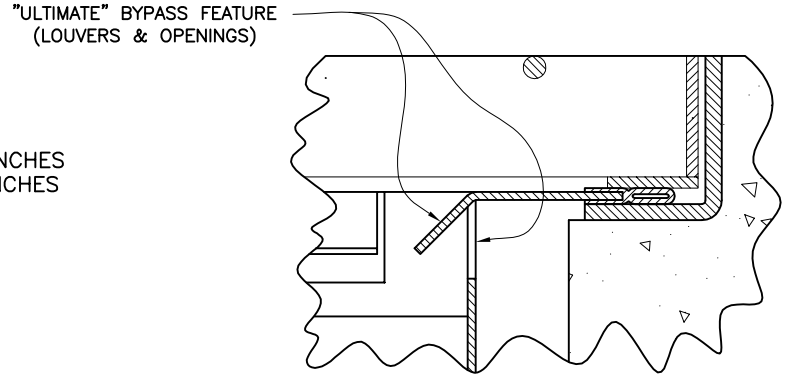
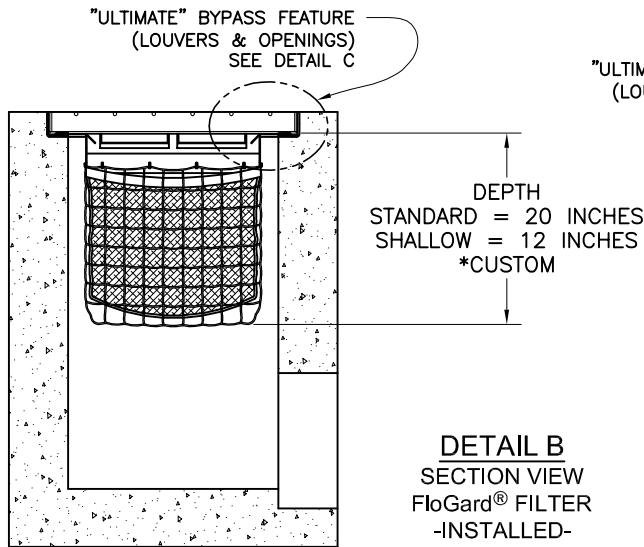
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Catch Basin Insert Filter  
Grated Inlet Style



**Oldcastle®**  
Stormwater Solutions

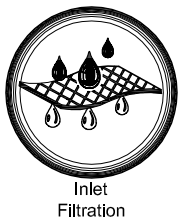
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\* MANY OTHER STANDARD & CUSTOM SIZES & DEPTHS AVAILABLE UPON REQUEST.

SPECIFIER CHART								
MODEL NO.  STANDARD DEPTH	STANDARD & SHALLOW DEPTH (Data In these columns is the same for both STANDARD & SHALLOW versions)			STANDARD DEPTH -20 Inches-		MODEL NO.  SHALLOW DEPTH	SHALLOW DEPTH -12 Inches-	
	INLET ID Inside Dimension (inch x inch)	GRATE OD Outside Dimension (inch x inch)	TOTAL BYPASS CAPACITY (cu. ft. / sec.)	SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)		SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)
FGP-12F	12 X 12	12 X 14	2.8	0.3	0.4	FGP-12F8	.15	.25
FGP-16F	16 X 16	16 X 19	4.7	0.8	0.7	FGP-16F8	.45	.4
FGP-18F	18 X 18	18 X 20	4.7	0.8	0.7	FGP-18F8	.45	.4
FGP-1824F	16 X 22	18 X 24	5.0	1.5	1.2	FGP-1824F8	.85	.7
FGP-1836F	18 X 36	18 X 40	6.9	2.3	1.6	FGP-1836F8	1.3	.9
FGP-2024F	18 X 22	20 X 24	5.9	1.2	1.0	FGP-2024F8	.7	.55
FGP-21F	22 X 22	22 X 24	6.1	2.2	1.5	FGP-21F8	1.25	.85
FGP-24F	24 X 24	24 X 27	6.1	2.2	1.5	FGP-24F8	1.25	.85
FGP-2430F	24 X 30	26 X 30	7.0	2.8	1.8	FGP-2430F8	1.6	1.05
FGP-2436F	24 X 36	24 X 40	8.0	3.4	2.0	FGP-2436F8	1.95	1.15
FGP-2448F	24 X 48	26 X 48	9.3	4.4	2.4	FGP-2448F8	2.5	1.35
FGP-28F	28 X 28	32 X 32	6.3	2.2	1.5	FGP-28F8	1.25	.85
FGP-30F	30 X 30	30 X 34	8.1	3.6	2.0	FGP-30F8	2.05	1.15
FGP-36F	36 X 36	36 X 40	9.1	4.6	2.4	FGP-36F8	2.65	1.35
FGP-3648F	36 X 48	40 X 48	11.5	6.8	3.2	FGP-3648F8	3.9	1.85
FGP-48F	48 X 48	48 X 54	13.2	9.5	3.9	FGP-48F8	5.45	2.25
FGP-SD24F	24 X 24	28 X 28	6.1	2.2	1.5	FGP-SD24F8	1.25	.85



**FloGard®**  
Catch Basin Insert Filter  
Grated Inlet Style



**Oldcastle®**  
Stormwater Solutions

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DRAWING NO. FGP-0001	REV G	ECO ECO-0142	DATE JPR 7/13/16	DATE JPR 11/3/06	SHEET 2 OF 2
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### Flowrate Calculation

Manning's Equation	Q= CiA	
Composite rational method runoff factor	0.81	
Rainfall Intensity	0.2	ft/s
Area	1	acre
Flowrate (Q)	0.162	cfs

#### Explanation

The design calculations for the 85th percentile, 24-hour storm event are based on the Rational Method,  $Q = CiA$ , for flow-based Treatment Control BMPs. According to the WQMP Guidance Document for the Santa Ana Region of Riverside County, the rainfall intensity is 0.2 inches per hour for 85th percentile. This rainfall intensity value was then used to determine the composite rational method runoff factor, based on the Riverside County Flood Control and Water Conservation District Hydrology Manual. With 90% impervious area and Soil Group A, the composite rational method runoff coefficient is determined to be 0.81. The flowrate in cfs is 0.162 cfs, the bypass capacity of a 24x24 drain inlet is 6.1. Since the drain inlet is design to capture 100 year storm event, we can determine that the size of the drain inlet is capable to capture the project site rainfall.

# Appendix 7: Hydromodification

*Supporting Detail Relating to Hydrologic Conditions of Concern*

# Appendix 8: Source Control

*Pollutant Sources/Source Control Checklist*







**STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST**

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<p><input checked="" type="checkbox"/> <b>A.</b> On-site storm drain inlets</p>	<p><input checked="" type="checkbox"/> Locations of inlets.</p>	<p><input checked="" type="checkbox"/> Mark all inlets with the words “Only Rain Down the Storm Drain” or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.</p>	<p><input checked="" type="checkbox"/> Maintain and periodically repaint or replace inlet markings.</p> <p><input checked="" type="checkbox"/> Provide stormwater pollution prevention information to new site owners, lessees, or operators.</p> <p><input checked="" type="checkbox"/> See applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></p> <p><input checked="" type="checkbox"/> Include the following in lease agreements: “Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.”</p>
<p><input checked="" type="checkbox"/> <b>B.</b> Interior floor drains and elevator shaft sump pumps</p>		<p><input checked="" type="checkbox"/> State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.</p>	<p><input checked="" type="checkbox"/> Inspect and maintain drains to prevent blockages and overflow.</p>
<p><input type="checkbox"/> <b>C.</b> Interior parking garages</p>		<p><input type="checkbox"/> State that parking garage floor drains will be plumbed to the sanitary sewer.</p>	<p><input type="checkbox"/> Inspect and maintain drains to prevent blockages and overflow.</p>

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<p><input type="checkbox"/> <b>D1.</b> Need for future indoor &amp; structural pest control</p>		<p><input type="checkbox"/> Note building design features that discourage entry of pests.</p>	<p><input type="checkbox"/> Provide Integrated Pest Management information to owners, lessees, and operators.</p>
<p><input checked="" type="checkbox"/> <b>D2.</b> Landscape/ Outdoor Pesticide Use</p>	<p><input checked="" type="checkbox"/> Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.</p> <p><input checked="" type="checkbox"/> Show self-retaining landscape areas, if any.</p> <p><input checked="" type="checkbox"/> Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)</p>	<p>State that final landscape plans will accomplish all of the following.</p> <p><input checked="" type="checkbox"/> Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.</p> <p><input checked="" type="checkbox"/> Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.</p> <p><input checked="" type="checkbox"/> Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.</p> <p><input checked="" type="checkbox"/> Consider using pest-resistant plants, especially adjacent to hardscape.</p> <p><input checked="" type="checkbox"/> To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.</p>	<p><input checked="" type="checkbox"/> Maintain landscaping using minimum or no pesticides.</p> <p><input checked="" type="checkbox"/> See applicable operational BMPs in “What you should know for....Landscape and Gardening” at <a href="http://rcflood.org/stormwater/downloads/landscapegardenbrochure.pdf">http://rcflood.org/stormwater/downloads/landscapegardenbrochure.pdf</a></p> <p><input checked="" type="checkbox"/> Provide IPM information to new owners, lessees and operators.</p>

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<p><input type="checkbox"/> <b>E.</b> Pools, spas, ponds, decorative fountains, and other water features.</p>	<p><input type="checkbox"/> Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)</p>	<p>If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.</p>	<p><input type="checkbox"/> See applicable operational BMPs in “Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain” at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a></p>
<p><input type="checkbox"/> <b>F.</b> Food service</p>	<p><input type="checkbox"/> For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.</p> <p><input type="checkbox"/> On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.</p>	<p><input type="checkbox"/> Describe the location and features of the designated cleaning area.</p> <p><input type="checkbox"/> Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.</p>	<p><input type="checkbox"/> See the brochure, “The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries” at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a></p> <p>Provide this brochure to new site owners, lessees, and operators.</p>
<p> <b>G.</b> Refuse areas</p>	<p> Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.</p> <p> If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.</p> <p><input type="checkbox"/> Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.</p>	<p> State how site refuse will be handled and provide supporting detail to what is shown on plans.</p> <p> State that signs will be posted on or near dumpsters with the words “Do not dump hazardous materials here” or similar.</p>	<p> State how the following will be implemented:</p> <p>Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post “no hazardous materials” signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, “Waste Handling and Disposal” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></p>

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<p><input type="checkbox"/> <b>H.</b> Industrial processes.</p>	<p><input type="checkbox"/> Show process area. All processing areas are indoor.</p>	<p><input type="checkbox"/> If industrial processes are to be located on site, state: “All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.”</p>	<p><input type="checkbox"/> See Fact Sheet SC-10, “Non-Stormwater Discharges” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></p> <p>See the brochure “Industrial &amp; Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities” at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a></p>

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<p><input type="checkbox"/> I. Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)</p>	<p><input type="checkbox"/> Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.</p> <p><input type="checkbox"/> Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.</p> <p><input type="checkbox"/> Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.</p>	<p>Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.</p> <p>Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:</p> <ul style="list-style-type: none"> <li>▪ Hazardous Waste Generation</li> <li>▪ Hazardous Materials Release Response and Inventory</li> <li>▪ California Accidental Release (CalARP)</li> <li>▪ Aboveground Storage Tank</li> <li>▪ Uniform Fire Code Article 80 Section 103(b) &amp; (c) 1991</li> <li>▪ Underground Storage Tank</li> </ul> <p><a href="http://www.cchealth.org/groups.hazmat/">www.cchealth.org/groups.hazmat/</a></p>	<p><input type="checkbox"/> See the Fact Sheets SC-31, “Outdoor Liquid Container Storage” and SC-33, “Outdoor Storage of Raw Materials ” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></p>

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<p><input type="checkbox"/> <b>J. Vehicle and Equipment Cleaning</b></p>	<p><input type="checkbox"/> Show on drawings as appropriate:</p> <p>(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.</p> <p>(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).</p> <p>(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.</p> <p>(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.</p>	<p><input type="checkbox"/> If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.</p>	<p>Describe operational measures to implement the following (if applicable):</p> <p><input type="checkbox"/> Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to “Outdoor Cleaning Activities and Professional Mobile Service Providers” for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a></p> <p><input type="checkbox"/> Car dealerships and similar may rinse cars with water only.</p>

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<p><input type="checkbox"/> <b>K. Vehicle/Equipment Repair and Maintenance</b></p>	<p><input type="checkbox"/> Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.</p> <p><input type="checkbox"/> Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.</p> <p><input type="checkbox"/> Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.</p>	<p><input type="checkbox"/> State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.</p> <p><input type="checkbox"/> State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.</p> <p><input type="checkbox"/> State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.</p>	<p>In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:</p> <p><input type="checkbox"/> No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.</p> <p><input type="checkbox"/> No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.</p> <p><input type="checkbox"/> No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.</p> <p>Refer to "Automotive Maintenance &amp; Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a></p> <p>Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a></p>

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<p><input type="checkbox"/> <b>L. Fuel Dispensing Areas</b></p>	<p><input type="checkbox"/> Fueling areas<sup>6</sup> shall have impervious floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.</p> <p><input type="checkbox"/> Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area<sup>1</sup>.] The canopy [or cover] shall not drain onto the fueling area.</p>		<p><input type="checkbox"/> The property owner shall dry sweep the fueling area routinely.</p> <p><input type="checkbox"/> See the Fact Sheet SD-30 , “Fueling Areas” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></p>










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<sup>6</sup> The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.



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<p><input type="checkbox"/> <b>M. Loading Docks</b></p>	<p><input type="checkbox"/> Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.</p> <p><input type="checkbox"/> Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.</p> <p><input type="checkbox"/> Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.</p>		<p><input type="checkbox"/> Move loaded and unloaded items indoors as soon as possible.</p> <p><input type="checkbox"/> See Fact Sheet SC-30, “Outdoor Loading and Unloading,” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></p>

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<p> <b>N.</b> Fire Sprinkler Test Water</p>		<p> Provide a means to drain fire sprinkler test water to the sanitary sewer.</p>	<p> See the note in Fact Sheet SC-41, “Building and Grounds Maintenance,” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></p>
<p><b>O.</b> Miscellaneous Drain or Wash Water or Other Sources</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Boiler drain lines</li> <li> Condensate drain lines</li> <li> Rooftop equipment</li> <li><input type="checkbox"/> Drainage sumps</li> <li> Roofing, gutters, and trim.</li> <li><input type="checkbox"/> Other sources</li> </ul>		<ul style="list-style-type: none"> <li><input type="checkbox"/> Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.</li> <li> Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.</li> <li> Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.</li> <li><input type="checkbox"/> Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.</li> <li> Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.</li> <li><input type="checkbox"/> Include controls for other sources as specified by local reviewer.</li> </ul>	

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<p> P. Plazas, sidewalks, and parking lots.</p>			<p> Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.</p>

# Appendix 9: O&M

*Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms*

*(To be included in Final WQMP)*

# Appendix 10: Educational Materials

*BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information*

*(To be included in Final WQMP)*