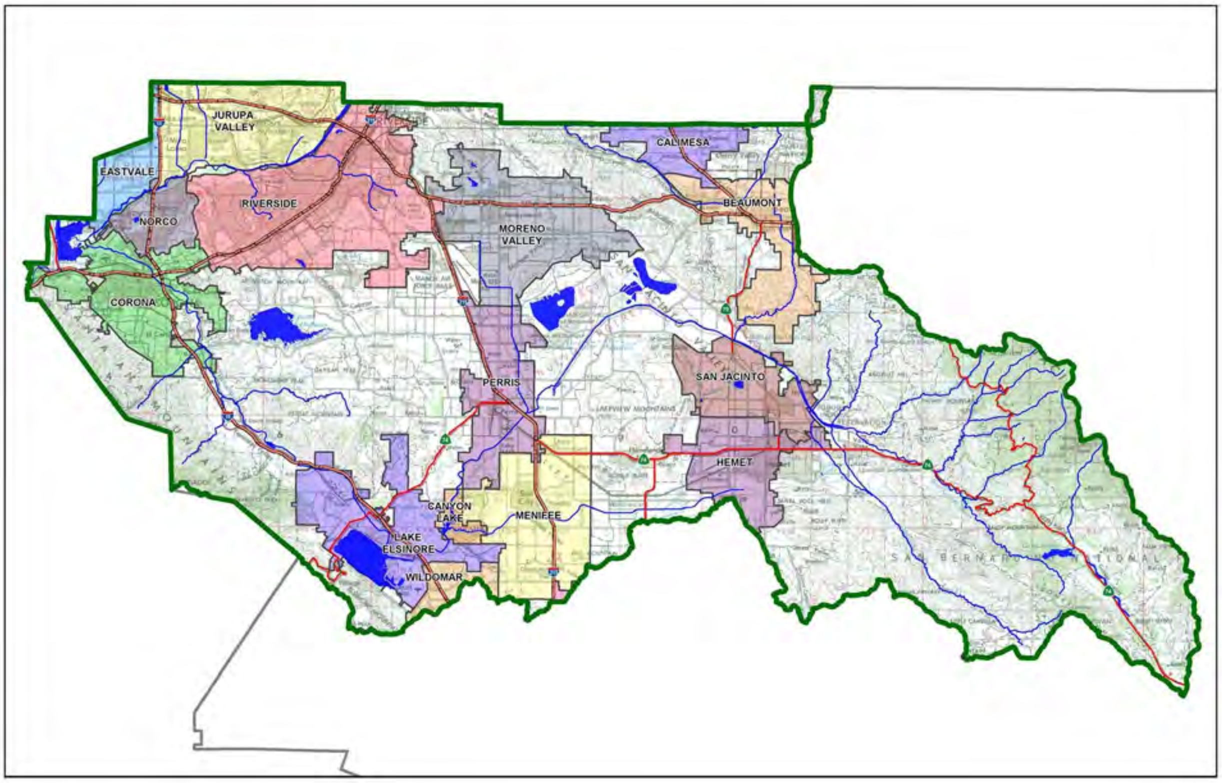
Project Specific Water Quality Management Plan

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

Project Title: Redlands West Industrial

Development No:

Design Review/Case No: 20-00020



Contact Information:

Prepared for:
Lake Creek Industrial LLC
13681 Newport Avenue, Suite 8301
Tustin, CA 92780
(786) 200 - 9681

Prepared by:
Albert A. Webb Associates
3788 McCray St
Riverside, CA 92506
(951) 686 – 1070
Attn: Teresa (Teri) Gibbs

☒ **Preliminary**
☐ **Final**

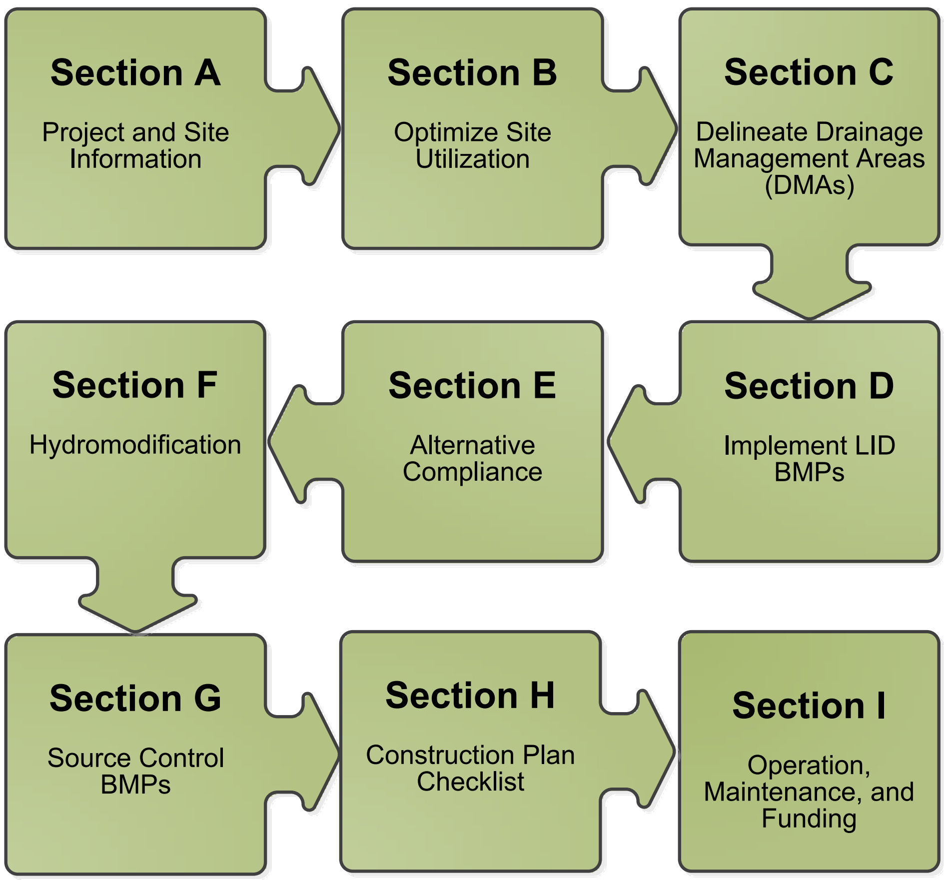
Original Date Prepared: May 2021

Revision Date(s): July 2023

Prepared for Compliance with
Regional Board Order No. **<u>R8-2010-0033</u>**

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 Redlands Ave LC, LLC by **Albert A. Webb Associates** for the **Redlands West Industrial** project.

This WQMP is intended to comply with the requirements of **City of Perris** for **Water Quality Ordinance 1194** 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 **City of Perris Water Quality Ordinance 1194**.

"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	01/14/2022 Date
Michael Johnson Owner's Printed Name	Manager Owner's Title/Position

See Attached Certificate

JAN 14 2022

[✓] Acknowledgment
[ ] Jurat
[ ] Copy Certificate

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	January 19, 2022 Date
Teresa Gibbs Preparer's Printed Name	Senior Engineer Preparer's Title/Position

Preparer's Licensure:

REGISTERED PROFESSIONAL ENGINEER
TERESA M. GIBBS
No. C84290
CIVIL
STATE OF CALIFORNIA

CALIFORNIA ALL-PURPOSE ACKNOWLEDGEMENT

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

State of California }

County of Orange

On 01. 14., 2022 before me Alka Chowhan-Patel, Notary Public, Notary Public, personally appeared

Michael Graham Johnson

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

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

WITNESS my hand and official seal.

ALKA CHOWHAN-PATEL
NOTARY PUBLIC CALIFORNIA
COMMISSION # 2260708
ORANGE COUNTY
My Comm. Exp September 30, 2022

SIGNATURE [signature]

PLACE NOTARY SEAL ABOVE

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of attached document

Title or type of document: Owner's certification

Table of Contents

List of Tables

List of Appendices

Section A: Project and Site Information

Project Information	
Type of Project:	Industrial
Planning Area:	Perris Valley Commercial Center Specific Plan
Community Name:	Perris Valley Commercial Center Specific Plan
Development Name:	Redlands West Industrial DPR 20-00020
Project Location	
Latitude & Longitude (DMS): 33° 49’ 36.95”N / 117° 13’ 07.97” W	
Project Watershed and Sub-Watershed: Santa Ana Watershed	
APN(s): 300-250-009 - 016	
Map Book and Page No.: Thomas Bros. Map Page 777, Grid H-4	
Project Characteristics	
Proposed or Potential Land Use(s)	Light Industrial
Proposed or Potential SIC Code(s)	1541 – General Contractors-Industrial Buildings and Warehouses
Area of Impervious Project Footprint (SF)	728,913 SF
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	728,913 SF
Does the project consist of offsite road improvements?	☐ Y ☒ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
Existing Site Characteristics	
Total area of existing Impervious Surfaces within the project limits (SF)	0 SF
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	B & C
What is the Water Quality Design Storm Depth for the project?	0.2 in/hr

Project Description

The Redlands West Industrial project proposes a warehouse/industrial building (approximately 297,039 SF) within the City of Perris on approximately 20.1 acres of currently vacant land. The proposed project cover will be a combination of approximately 297,039 square feet of building, 431,874 square feet of pavement, and 148,396 square feet of landscape. The project is bounded by Redlands Ave to its east, vacant land to its northeast, an existing industrial building to its northwest, an existing residential tract (TR 04417) to its west, and vacant land to its south. The surrounding roads are Rider St to the north and Placentia Ave to the south. The Redlands West project consists of a proposed industrial building along with all associated utilities, drive aisles, parking stalls, walkways, and landscaped areas.

In the existing condition, the project site generally drains from west to east but is quite flat overall (slopes under 1%). Runoff exits the site into natural conditions along Redlands Ave near the eastern boundary of the project site. Larger storm events spill over Redlands Ave and continue to flow eastwards *towards the Perris Valley Storm Drain (PVSD) Channel and ultimately discharges into the San Jacinto River.*

For the proposed conditions, runoff is captured through a series of catch basins and inlets located throughout the site. Captured flows are then directed towards proposed treatment devices for water quality requirements. Treated flows are then directed towards proposed underground storage chambers in order to mitigate the peak flow rates exiting the site. The storage chambers proposed are 45-inch tall ADS MC-3500 Stormtech chamber with varying widths of perimeter stone within an approximate footprint of 459'x37' that contribute to the total storage volume, design calculations and drawings can be found in Appendix 6. Mitigated flows are then discharged into the proposed extension of Lateral A-B-10 located along Redlands Ave via a proposed pump (preliminarily sized with a capacity of Q= 5.0 cfs) and a preliminary outlet structure. These mitigated flows are conveyed north towards the existing MDP Line A-B which ultimately discharges into the PVSD Channel.

Due to site constraints, including poor infiltration rates of the existing soil, ten (10) Modular Wetland System (MWS) treatment vaults are being proposed in tandem with any inlets to treat for water quality requirements. There are multiple MWS treatment vaults being proposed that will vary in size (4'x8', 8'x12', 8'x16', and 8'x20') to properly convey the flows from each drainage management area. The proposed MWS treatment vaults are classified as biotreatment devices per the WQMP guidelines. All captured onsite runoff will then be directed towards proposed underground storage chambers. Although the project is HCOC exempt, the underground storage chambers ensure that the capacity of MDP Line A-B is not exceeded by the development of the Redlands West project. Details regarding the reallocated capacity of MDP Line A-B can be found in the Technical Memorandum titled "Perris Valley MDP: Line A-B and Line A-C Tributary Watershed Modification" dated February 12, 2020. Mitigation design calculations and drawings can be found in the separate drainage study prepared for P20-00020.

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

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
Perris Valley Storm Drain Channel	N/A	AGR, GWR, MUN, REC1, REC2, WARM, WILD	N/A
San Jacinto River Reach 3 (HU 802.11)	N/A	AGR, GWR, MUN, REC1, REC2, WARM, WILD	N/A
San Jacinto River Reach 2 (HU 802.11)	N/A	GWR, AGR, WILD, WARM, REC1, REC2, MUN	N/A
Canyon Lake (Railroad Canyon Reservoir) (HU 802.11)	Pathogens, Nutrients	AGR, REC1, MUN, GWR, WARM, REC2, WILD	N/A
San Jacinto River Reach 1 (HU 802.32)	N/A	AGR, GWR, MUN, REC1, REC2, WARM, WILD	N/A
Lake Elsinore (HU 802.31)	PCBs, Nutrients, Organic Enrichment/Low Dissolved Oxygen, Sediment Toxicity, Unknown Toxicity	MUN, REC1, REC2, WARM, WILD, AGR, PROC	N/A

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	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage *(dependent on tenant)*	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☐ N
Other *(please list in the space below as required)* City of Perris Grading Permit	☒ Y	☐ 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.

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 existing site is very flat but generally drains from west to east. Runoff exits the site through the eastern boundary and ultimately drains towards the PVSD Channel located approximately 2000 feet east of the site. In the developed condition, a network of catch basins and inlets will collect flows. Treated flows are then conveyed towards the proposed underground storage chambers for mitigation purposes. A preliminary outlet structure and preliminarily sized pump then discharge flows towards the extension of Lateral A-B-10. From there, flows are conveyed north into the existing MDP Line A-B. MDP Line A-B ultimately conveys these flows from west to east into the PVSD Channel similar to the existing flows.

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

The existing vegetation is very minimal. The existing project site is primarily barren, so no existing vegetation is proposed to be protected.

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

Per a geotechnical investigation, the recommended design infiltration rates vary from 0.4 to 1.1 throughout the site. Due to poor infiltration capacities within the underlying soils of the project site, an infiltration-based BMP is not feasible to treat for water quality requirements. A copy of the investigation report can be found in Appendix 3.

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

The impervious area will be minimized as much as possible while maintaining safe and usable facilities onsite. Landscaped areas have been provided throughout the project site along concrete walkways, *around the proposed building, adjacent to parking areas, and in other feasible locations throughout the site.*

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

Yes, however, based on the nature of the industrial development, not all runoff can feasibly be directed towards a pervious area before being captured. Pervious landscaped areas are proposed around the proposed buildings in order to maximize the chances of runoff dispersing into landscaped areas before being captured. All inlets located onsite are provided with an MWS Treatment Vault to provide water quality treatment.

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)[1]	Area (Sq. Ft.)	DMA Type
DMA 1	Mixed Use – Concrete/Asphalt, Roofs, and Ornamental Landscaping	172,259	D-Biotreatment
DMA 2	Mixed Use – Concrete/Asphalt and Ornamental Landscaping	250,927	D-Biotreatment
DMA 3	Mixed Use – Concrete/Asphalt and Ornamental Landscaping	153,872	D-Biotreatment
DMA 4	Mixed Use – Concrete/Asphalt, Roofs, and Ornamental Landscaping	178,085	D-Biotreatment
DMA 5	Mixed Use – Concrete/Asphalt and Ornamental Landscaping	77,848	D-Biotreatment
DMA 6	Mixed Use – Concrete/Asphalt and Ornamental Landscaping	25,853	D-Biotreatment
DMA 7	Mixed Use – Concrete/Asphalt and Ornamental Landscaping	18,465	D-Biotreatment

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column

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) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
DMA 1 - Self-Retaining	LANDSCAPE	3,561	0.65	N/A	N/A	N/A
DMA 3 - Self-Retaining	LANDSCAPE	1,504	0.65	N/A	N/A	N/A

DMA 4 - Self-Retaining	LANDSCAPE	3,241	0.65			
DMA 5 - Self-Retaining	LANDSCAPE	8,050	0.65			

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

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	Runoff factor	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
DMA 1	MWS Vault (8' x 16') x 2
DMA 2	MWS Vault (8' x 16') x 2
DMA 3	MWS Vault (8' x 20')
DMA 4	MWS Vault (8' x 16') x 2
DMA 5	MWS Vault (8' x 12')
DMA 6	MWS Vault (4' x 8')
DMA 7	MWS Vault (4' x 8')
DMA 1-7	ADS Underground Storage Chambers (Not used for BMP volume calculations)

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. 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 Copermittee 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?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: **All DMAs**		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

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 neither 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: N/A

Type of Landscaping (Conservation Design or Active Turf): N/A

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: N/A

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: N/A

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: N/A

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).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
N/A	N/A

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: N/A

Project Type: N/A

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: N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-1 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: N/A

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: N/A

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).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
N/A	N/A

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.

N/A

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: N/A

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: N/A

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

Enter the factor from Table 2-3: N/A

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

Minimum required use: N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable 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).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
N/A	N/A

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, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

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	
DMA 1	☐	☐	☐	☐	☒
DMA 2	☐	☐	☐	☐	☒
DMA 3	☐	☐	☐	☐	☒
DMA 4	☐	☐	☐	☐	☒
DMA 5	☐	☐	☐	☐	☒
DMA 6	☐	☐	☐	☐	☒
DMA 7	☐	☐	☐	☐	☒

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.

The sizing information for the proposed MWS treatment vaults can be found in Table D.3. The underground chambers are intended to be used for mitigation/storage purposes only and not as a BMP. The design calculations and drawings for the underground storage chambers can be found in Appendix 6 and the separate drainage study prepared for P20-00020.

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	*BMP ID - DMA 1*		
	[A]		[B]	[C]	[A] x [C]			
DMA 1 – Concrete / Asphalt	*16857*	*Concrete or Asphalt*	*1*	*0.89*	*15036.4*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, **Q_{BMP}** (cfs)*	*Proposed Flow Rate (cfs)*
DMA 1 - L/S	*2969*	*Ornamental Landscaping*	*0.1*	*0.11*	*327.9*			
DMA 1 – Self-Retaining	*3561*	*Ornamental Landscaping*	*0.1*	*0.11*	*393.3*			
DMA 1 – Roofs	*148872*	*Roofs*	*1*	*0.89*	*132793.8*			
	$A_T = \Sigma[A]$ **172252**				Σ= [D] **148551.4**	[E] **0.2**	$[F] = \frac{[D]\times[E]}{12}$ **0.7**	[G] **0.9**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP ID - DMA 2*		
	[A]		[B]	[C]	[A] x [C]			
DMA 2 – Concrete / Asphalt	*197828*	*Concrete or Asphalt*	*1*	*0.89*	*176462.6*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, **Q_{BMP}** (cfs)*	*Proposed Flow Rate (cfs)*
DMA 2 - L/S	*53099*	*Ornamental Landscaping*	*0.1*	*0.11*	*5865.2*			
	$A_T = \Sigma[A]$ **250927**				Σ= [D] **182327.8**	[E] **0.2**	$[F] = \frac{[D]\times[E]}{12}$ **0.8**	[G] **0.9**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP ID - DMA 3*		
	[A]		[B]	[C]	[A] x [C]			
DMA 3 – Concrete / Asphalt	*106773*	*Concrete or Asphalt*	*1*	*0.89*	*95241.5*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate,* Q_{BMP} *(cfs)*	*Proposed Flow Rate (cfs)*
DMA 3 - L/S	*45595*	*Ornamental Landscaping*	*0.1*	*0.11*	*5036.3*			
DMA 3 – Self-Retaining	*1504*	*Ornamental Landscaping*	*0.1*	*0.11*	*166.1*			
	$A_T = \Sigma[A]$ **153872**				$\Sigma = [D]$ **100443.9**	[E] **0.2**	$[F] = \frac{[D]x[E]}{12}$ **0.5**	[G] **0.6**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP ID - DMA 4*		
	[A]		[B]	[C]	[A] x [C]			
DMA 4 – Concrete / Asphalt	*22246*	*Concrete or Asphalt*	*1*	*0.89*	*19843.4*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate,* Q_{BMP} *(cfs)*	*Proposed Flow Rate (cfs)*
DMA 4 - L/S	*4431*	*Ornamental Landscaping*	*0.1*	*0.11*	*489.4*			
DMA 4 – Self-Retaining	*3241*	*Ornamental Landscaping*	*0.1*	*0.11*	*358*			
DMA 4 – Roofs	*148167*	*Roofs*	*1*	*0.89*	*132165*			
	$A_T = \Sigma[A]$ **178085**				$\Sigma = [D]$ **152855.8**	[E] **0.2**	$[F] = \frac{[D]x[E]}{12}$ **0.7**	[G] **0.9**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP ID - DMA 5*
	[A]		[B]	[C]	[A] x [C]	

DMA 5 – Concrete / Asphalt	*51716*	*Concrete or Asphalt*	*1*	*0.89*	*46130.7*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate,* **Q_{BMP}** *(cfs)*	*Proposed Flow Rate (cfs)*
DMA 5 - L/S	*18082*	*Ornamental Landscaping*	*0.1*	*0.11*	*1997.3*			
DMA 5 – Self-Retaining	*8050*	*Ornamental Landscaping*	*0.1*	*0.11*	*889.2*			
	$A_T = \Sigma[A]$ **77848**				$\Sigma = [D]$ **49017.2**	[E] **0.2**	$[F] = \frac{[D]x[E]}{12}$ **0.2**	[G] **0.3**

[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

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Areas x Runoff Factor**	***BMP ID - DMA 6 (Redlands Ave)***		
	[A]		[B]	[C]	[A] x [C]			
DMA 6 – Concrete / Asphalt	*21385*	*Concrete or Asphalt*	*1*	*0.89*	*19075.4*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate,* **Q_{BMP}** *(cfs)*	*Proposed Flow Rate (cfs)*
DMA 6 - L/S	*4468*	*Ornamental Landscaping*	*0.1*	*0.11*	*493.5*			
	$A_T = \Sigma[A]$ **25853**				$\Sigma = [D]$ **19568.9**	[E] **0.2**	$[F] = \frac{[D]x[E]}{12}$ **0.1**	[G] **0.1**

[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

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Areas x Runoff Factor**	***BMP ID - DMA 7 (Redlands Ave)***		
	[A]		[B]	[C]	[A] x [C]			
DMA 7 – Concrete / Asphalt	*15069*	*Concrete or Asphalt*	*1*	*0.89*	*13441.5*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate,* **Q_{BMP}** *(cfs)*	*Proposed Flow Rate (cfs)*
DMA 7 - L/S	*3396*	*Ornamental Landscaping*	*0.1*	*0.11*	*375.1*			
	$A_T = \Sigma[A]$ **18465**				$\Sigma = [D]$ **13816.6**	[E] **0.2**	$[F] = \frac{[D]x[E]}{12}$ **0.1**	[G] **0.1**

[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

This section is for water quality treatment, which is being considered as flow based and will be treated by the proposed MWS vaults. Although this project is HCOC exempt, due to inadequate infiltration rates, the underground chambers are proposed only for storage in order to mitigate discharged flows from large storm events to an acceptable rate for Lat A-B-10. Mitigation design calculations and drawings can be found in the separate drainage study prepared for P20-00021.

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.

The sizing information for the proposed MWS treatment vaults can be found in Table D.3. The underground chambers are intended to be used for mitigation/storage purposes only and not as a BMP. The design calculations and drawings for the underground storage chambers can be found in Appendix 6 and the separate drainage study prepared for P20-00020.

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
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P[(2)]
☒ Commercial/Industrial Development	P[(3)]	P	P[(1)]	P[(1)]	P[(5)]	P[(1)]	P	P
☐ Automotive Repair Shops	N	P	N	N	P[(4, 5)]	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P[(6)]	P	P[(1)]	P[(1)]	P[(4)]	P[(1)]	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☐	☒	☐	☐	☒	☐	☐

P = Potential

N = Not Potential

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

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) 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[2]
N/A	
Total Credit Percentage[1]	

[1]Cannot Exceed 50%
[2]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_f	DMA Runoff Factor	DMA Area x Runoff Factor		***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]				
N/A						*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

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

The sizing information for the proposed MWS treatment vaults can be found in Table D.3. The underground chambers are intended to be used for mitigation/storage purposes only and not as a BMP. The design calculations and drawings for the underground storage chambers can be found in Appendix 6 and the separate drainage study prepared for P20-00020.

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[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
DMA 1-7	Bacteria/Pathogens	Medium
	Sediment	High

[1] 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.
[2] Cross Reference Table E.1 above to populate this column.
[3] 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 Copermittee 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[1] 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**
Time of Concentration	N/A	N/A	N/A
Volume (Cubic Feet)	N/A	N/A	N/A

[1] 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 Sensitivity 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:

N/A.

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Project is located within the Hydromodification exemption area based on Riverside County WAP geodatabase approved April 20, 2017. See Appendix 7.

This project is HCOC exempt, however, mitigation is still being proposed due to Line A-B not being originally sized to accept flows from this area. Calculations for storage and routing can be found in Appendix 7. Information regarding the tributary area reallocations can be found in the technical memorandum titled "Perris Valley MDP: Line A-B and Line A-C Tributary Watershed Modification" dated February 12, 2020.

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
A. On-site storm drain inlets	*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.*	*Maintain and periodically repaint or replace inlet markings.* *Provide stormwater pollution prevention information to new site owners, lessees, or operators.* *See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com*

B. Interior floor drains and elevator shaft sump	*The interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer*	*Inspect and maintain drains to prevent blockages and overflow.*
C. Landscape/Outdoor Pesticide Use	*Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.* *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.* *Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.* *Consider using pest-resistant plants, especially adjacent to hardscape.* *To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.*	*Maintain landscaping using minimum or no pesticides.* *See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater/* *Provide IPM information to new owners, lessees and operators.* *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.*
D. Refuse Areas	*Trash container storage areas shall be paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements from the surrounding area, and screened or walled to prevent off-site transport of trash.* *Trash dumpsters (containers) shall be leak proof and have attached covers or lids.* *Trash enclosures shall be roofed per City standards.* *Trash compactors shall be roofed and set on a concrete pad per City standards. The pad shall be a minimum of one foot larger all around than the trash compactor and sloped to drain to a sanitary sewer line. Connection of trash area drains to the MS4 is prohibited.* *See CASQA SD-32 BMP Fact Sheets in Appendix 10 for additional information.* *Signs shall be posted on or near dumpsters with the words "Do not dump hazardous materials here" or*	*Adequate number of receptacles shall be provided. 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, in Appendix 10, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com*

	similar.	
E. Vehicle and Equipment Cleaning	*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.*	*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 http://rcflood.org/stormwater/*
F. Plazas, Sidewalks and parking lots.		*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.*
G. Loading Docks	*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.* *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.* *Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.*	*Move loaded and unloaded items indoors as soon as possible.* *See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com*
H. Fire Sprinkler Test Water	*Water discharged from the fire sprinkler systems shall not enter the storm drain system. Discharged water from fire sprinkler testing shall be collected and used for onsite landscape or disposed of at a local waste water treatment plant.*	*See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com*
I. Fuel Dispensing Areas		*The property owner shall dry sweep the fueling area routinely.*

		See the Fact Sheet SD-30, "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

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)
DMA 1-7	MWS Treatment Vaults	PWQMP Exhibit Sheet 2

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 H will be completed and addressed during Final 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: Privately maintained by Owner.

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

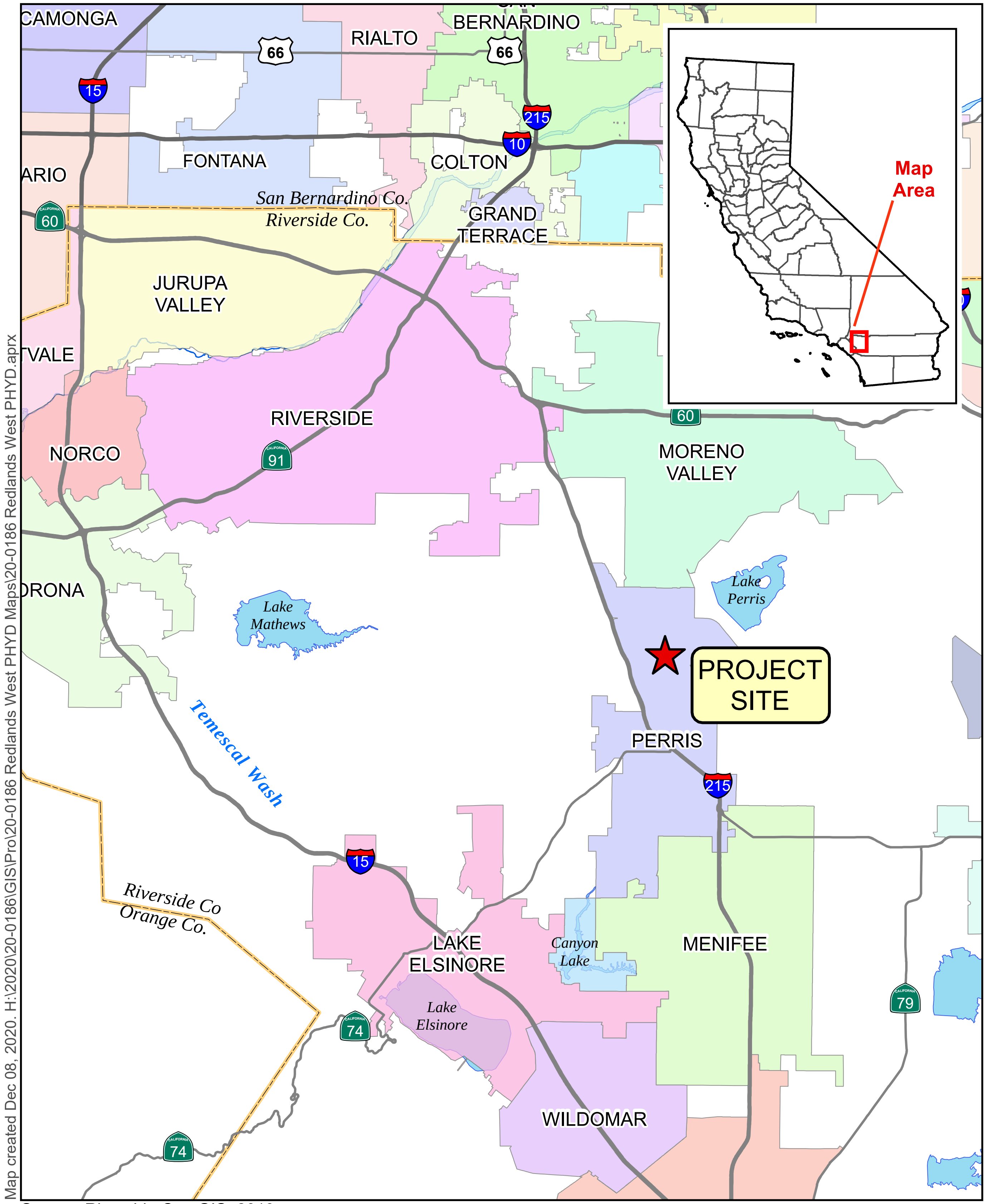
☒ Y ☐ N

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.

Section I will be completed and addressed during Final WQMP.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



Source: Riverside Co. GIS, 2019

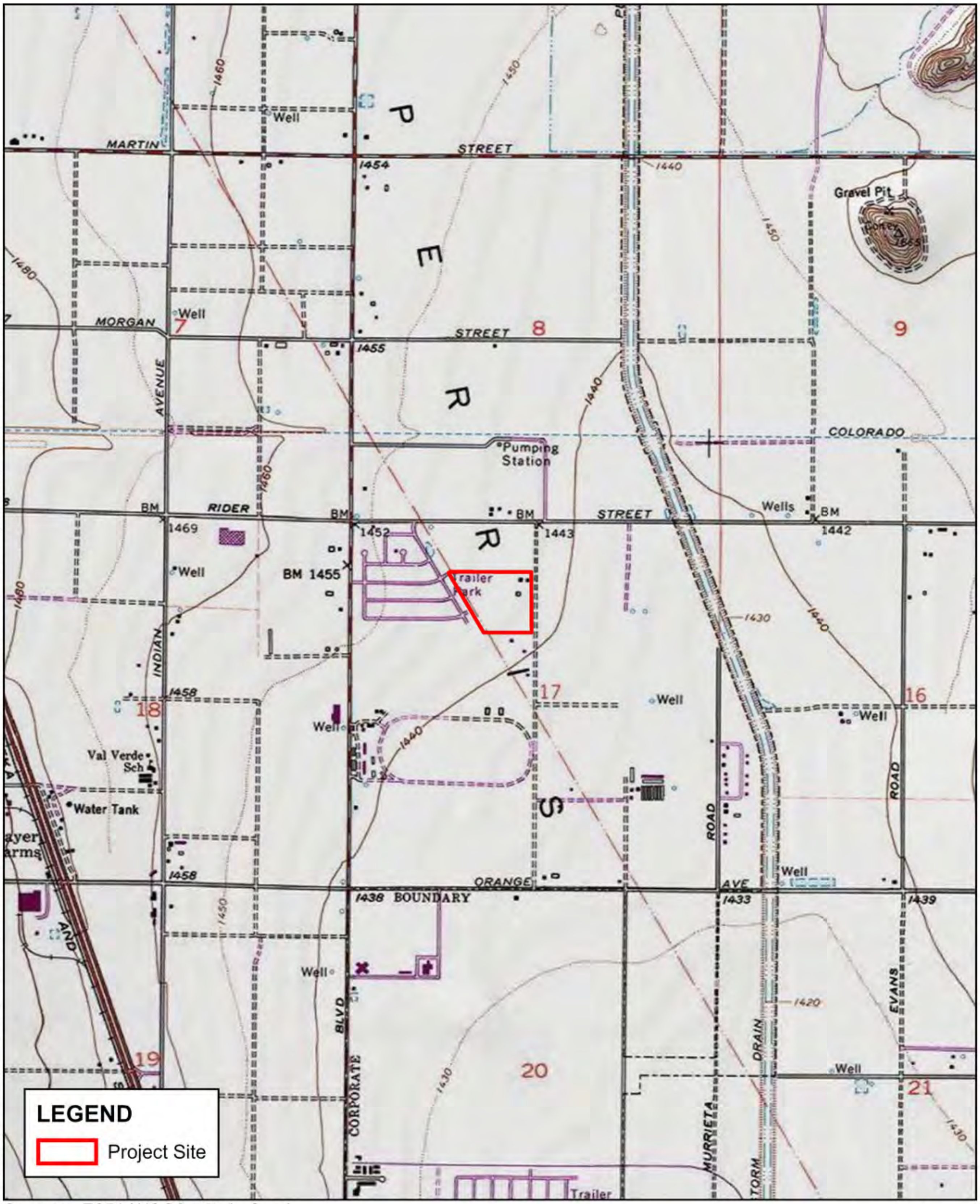
Figure 1 – Vicinity Map

20-0186 Redlands West Industrial

0 2 4 6 Miles

ALBERT A. WEBB ASSOCIATES

H:\2020\20-0186\GIS\Pro\20-0186 Redlands West PHYD Maps\20-0186 Redlands West PHYD.aprx; Map created 18 Jul 2023; wenyig



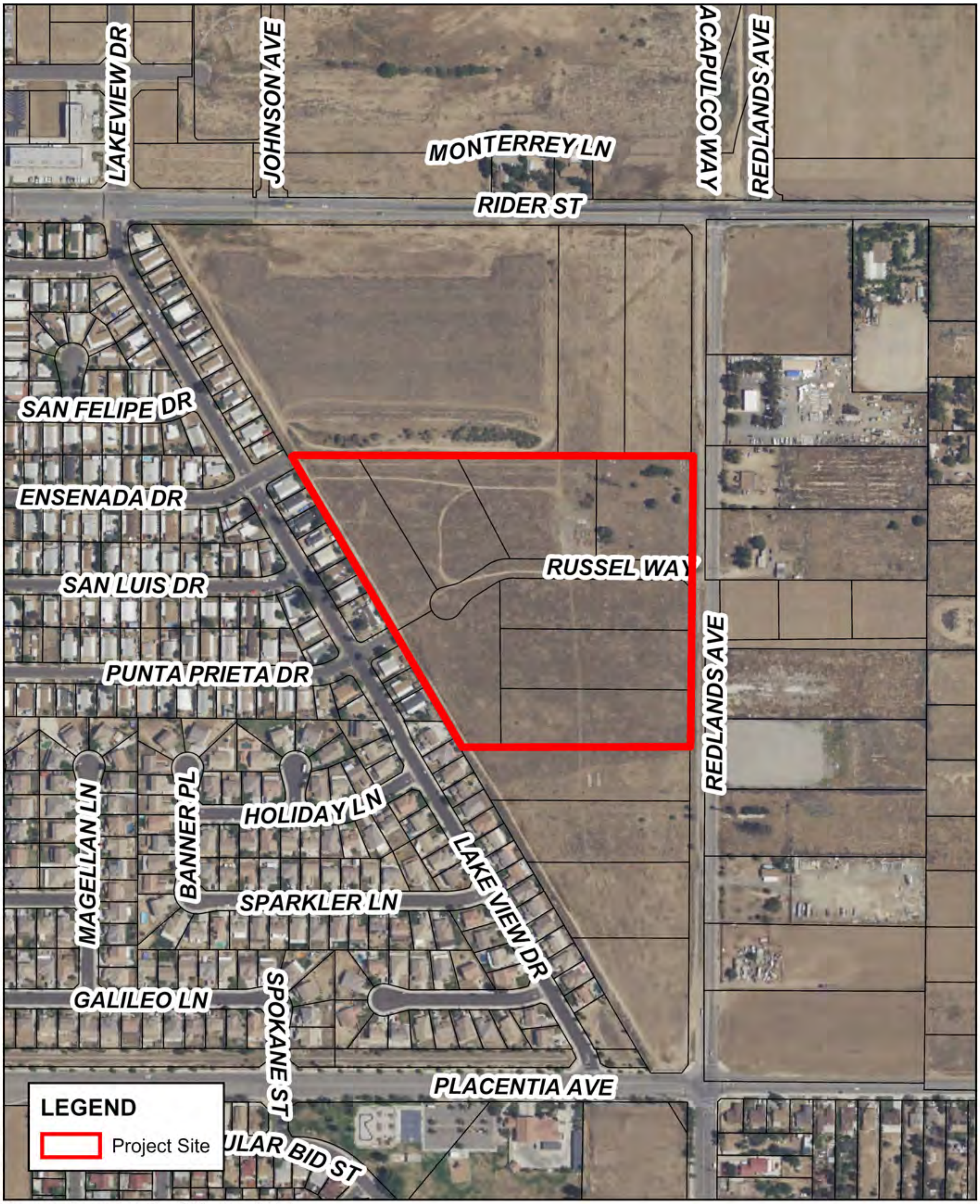
Sources: ESRI / USGS 7.5min Quad DRGs: PERRIS

0 1,000 2,000 3,000 Feet

Figure 2 - USGS Map

20-0186 Redlands West Industrial

ALBERT A. WEBB ASSOCIATES



Source: Riverside Co. GIS, Jan. 2020.

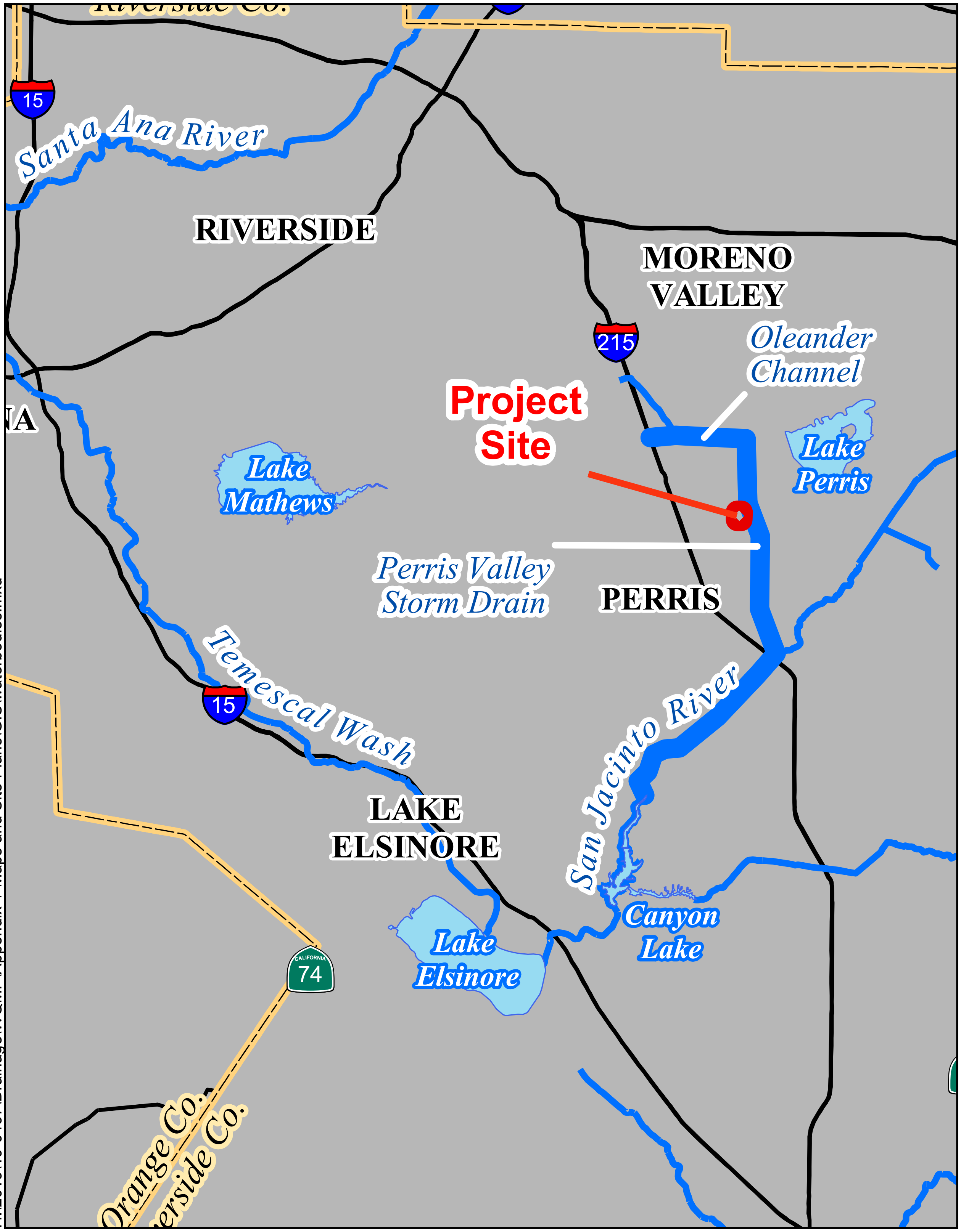
H:\2020\20-0186\GIS\Pro\20-0186 Redlands West PHYD Maps\20-0186 Redlands West PHYD.aprx; Map created 18 Jul 2023

Figure 3 - Aerial Map

20-0186 Redlands West Industrial

0 600 1,200 1,800 Feet

ALBERT A. WEBB ASSOCIATES



H:\2019\19-0137\Drainage\WQMP\Appendix 1-Maps and Site Plans\GIS\waterbodies.mxd

Sources: USGS 30 Meter DEM;
USGS Digital Line Graph

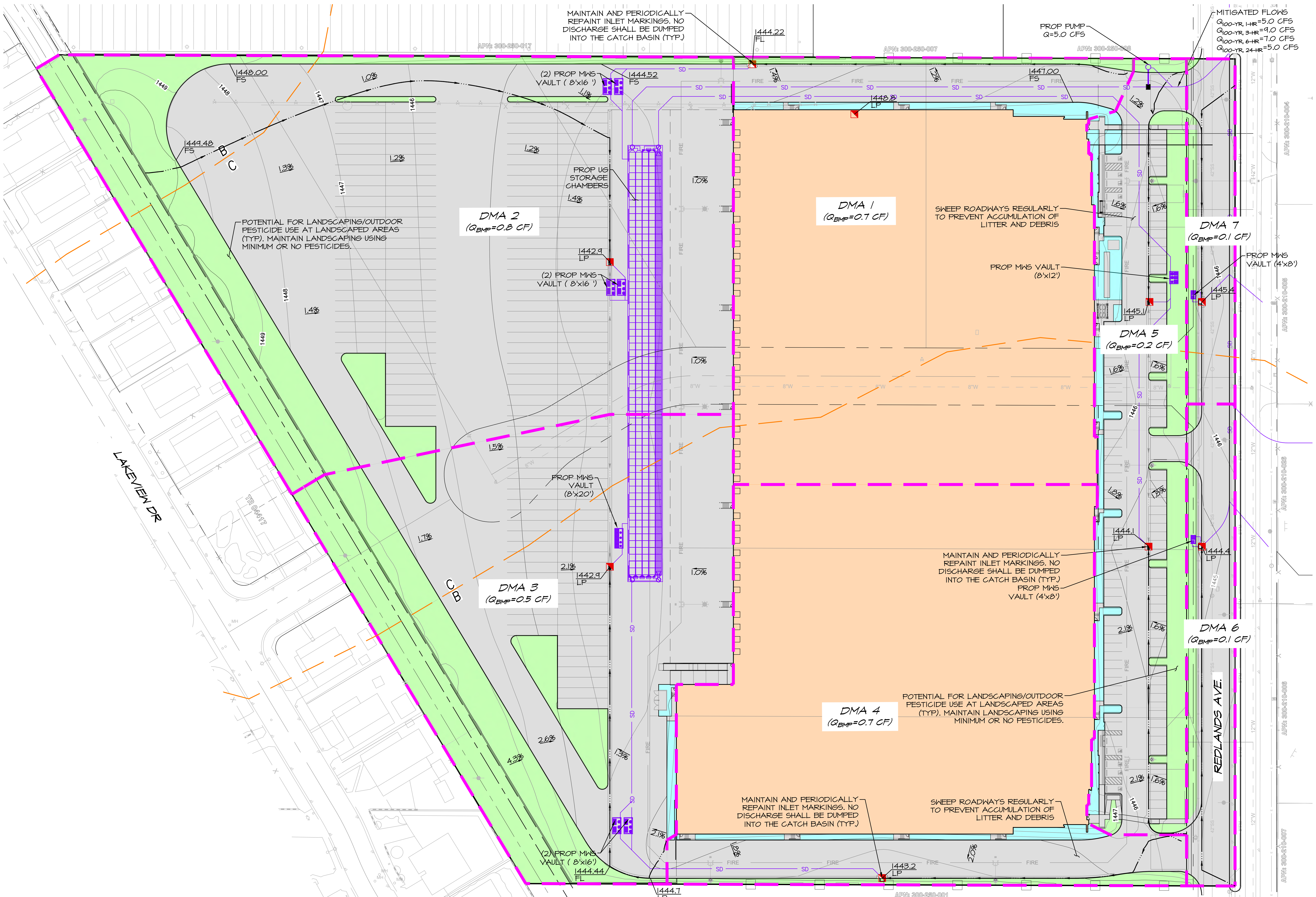
Figure 4. Receiving Waterbodies

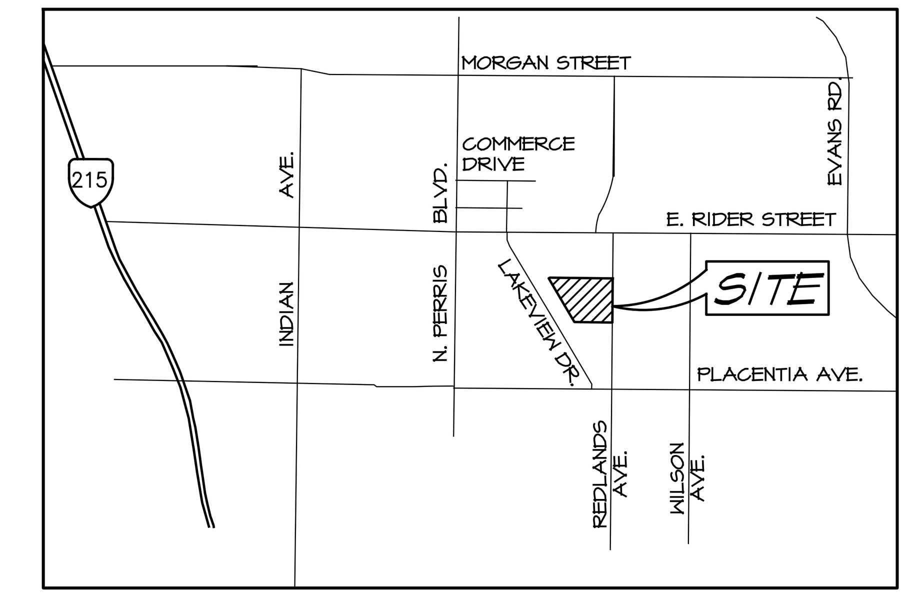
Flowpath

0 2 4 6 Miles

Albert A. WEBB Associates

PRELIMINARY WQMP EXHIBIT
REDLANDS WEST





VICINITY MAP
N.T.S.

GENERAL NOTES:

1. ALL PROPOSED STORM DRAIN CURB OPENING CATCH BASINS AND DROP INLETS SHALL BE STENCILED PER THE REQUIREMENTS OF THE CITY OF PERRIS AND THE DETAIL ON SHEET 2 (SEE CASQA SD-13).
2. ALL ROOF RUN-OFF SHALL BE DISCHARGED DIRECTLY INTO THE PROPOSED MWS TREATMENT VAULTS PER DETAIL ON SHEET 2 AND BE TREATED BY THE PROPOSED TREATMENT DEVICES BEFORE DISCHARGING INTO THE OFF-SITE MS4 STORM DRAIN FACILITY.
3. ALL ON-SITE FLOWS WILL DRAIN TO THE PROPOSED UNDERGROUND STORAGE CHAMBERS AND DISCHARGE INTO MDP LINE A-B LOCATED NORTH OF THE PROJECT SITE VIA THE EXTENSION OF THE EXISTING STUB-OUT LAT A-B-10.
4. A PROPOSED PUMP, PRELIMINARILY SIZED WITH A CAPACITY OF 5.0 CFS DISCHARGES FLOWS OFFSITE IN COMBINATION WITH A PRELIMINARY OUTLET STRUCTURE DESIGNED FOR THE UNDERGROUND CHAMBERS.
5. FOR FLOWRATES AND OTHER HYDROLOGIC INFORMATION, SEE THE PRELIMINARY DRAINAGE REPORT. NO FLOWRATES OR VOLUMES CALCULATED FOR FLOOD CONTROL PURPOSES AFFECT THIS WATER QUALITY MANAGEMENT PLAN POST CONSTRUCTION BMP EXHIBIT (FLOW RATE BASED TREATMENT).
6. NO OFF-SITE RUN-ON WILL ENTER THE PROJECT SITE.

SITE CONSTRAINTS:

1. THE USE OF INFILTRATION LID BMPs WAS FOUND INFEASIBLE FOR THE SITE DUE TO THE UNDERLYING SOILS.
2. THE USE OF HARVEST AND USE LID BMPs WAS FOUND INFEASIBLE FOR THE SITE DUE TO THE USE OF RECYCLED WATER FOR IRRIGATION PURPOSES.

LEGEND

- ROOF
- IMPERVIOUS (CONCRETE/ASPHALT)
- SELF RETAINING
- LANDSCAPE
- DMA BOUNDARY
- PROJECT BOUNDARY
- FLOWLINE
- NRCS SOIL BOUNDARY
- PROPOSED INLET

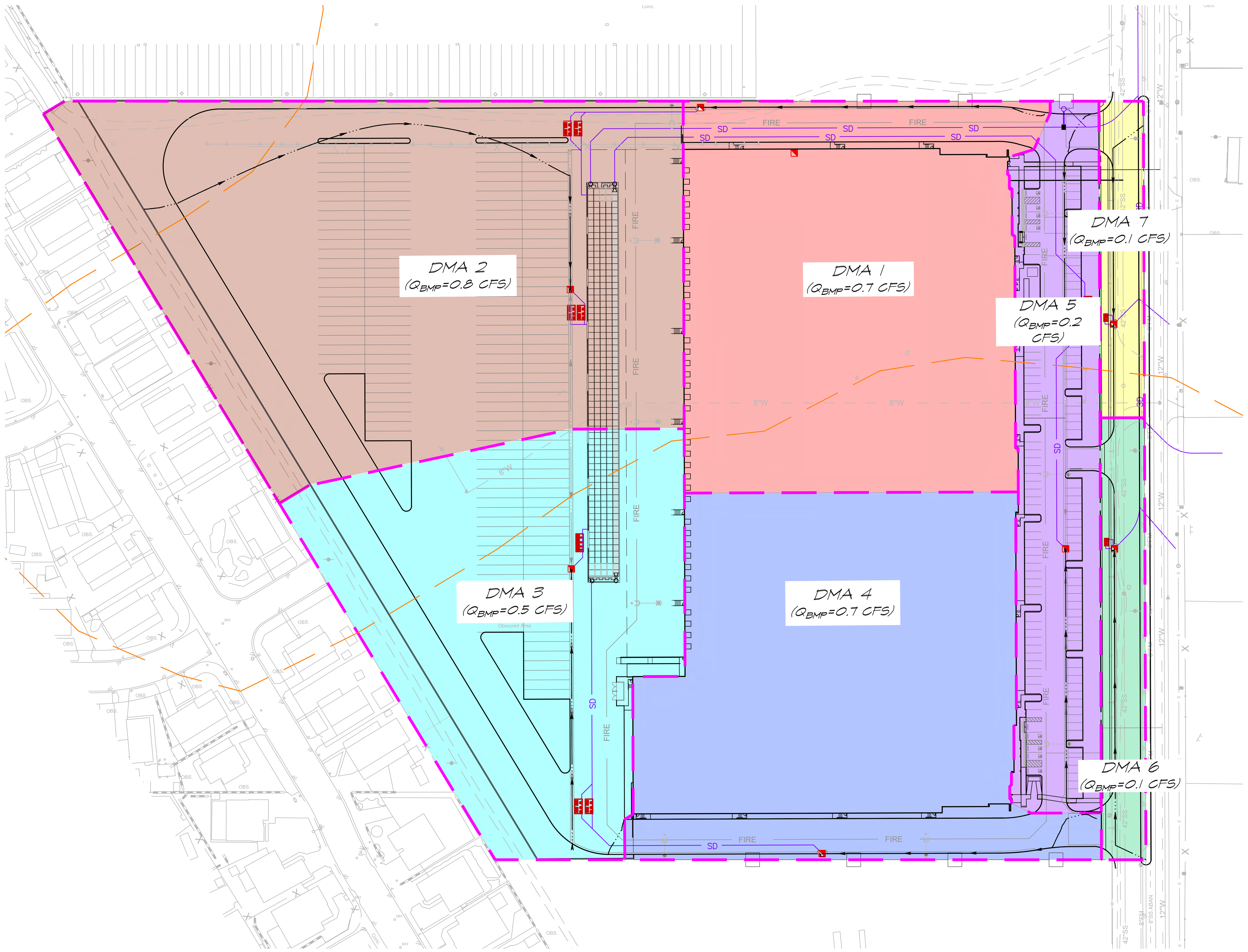
1" = 50'
50 0 50 100 150

CITY OF PERRIS, CALIFORNIA
REDLANDS WEST
P20-00020
POST CONSTRUCTION BMP SITE PLAN
PWQMP EXHIBIT

SCALE: 1"=50'	ALBERT A. WEBB ASSOCIATES	ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256	W.O. 20-0186	
DATE: 7/13/2023			SHEET 1	
DESIGNED: WG			OF 3 SHEETS	
CHECKED: JRG			DWG. NO.	
PLN CK REF:				
F.B.				

H:\2020\20-0186\DRAINAGE\PWQMP\DWG DRAWINGS\20-0186-PWQMP EXHIBIT.DWG 7/13/2023 1:47:19 PM

PRELIMINARY WQMP EXHIBIT
REDLANDS WEST



DMA MAP

DMA AREA TABLE	DMA 1	DMA 2	DMA 3	DMA 4	DMA 5	DMA 6	DMA 7
CONCRETE (SF)	16,857	197,828	106,773	22,246	51,716	21,385	15,069
LANDSCAPE (SF)	2,969	53,099	45,595	4,431	18,082	4,468	3,396
SELF-RETAINING (SF)	3,561	0	1,504	3,241	8,050	0	0
ROOF (SF)	148,872	0	0	148,167	0	0	0
QBMP (CF)	0.7	0.8	0.5	0.7	0.2	0.1	0.1
QTREAT (CF)	0.9	0.9	0.6	0.9	0.3	0.1	0.1

DMA-1
DMA-2
DMA-3
DMA-4
DMA-5
DMA-6
DMA-7

W S N E

1" = 50'
50 0 50 100 150

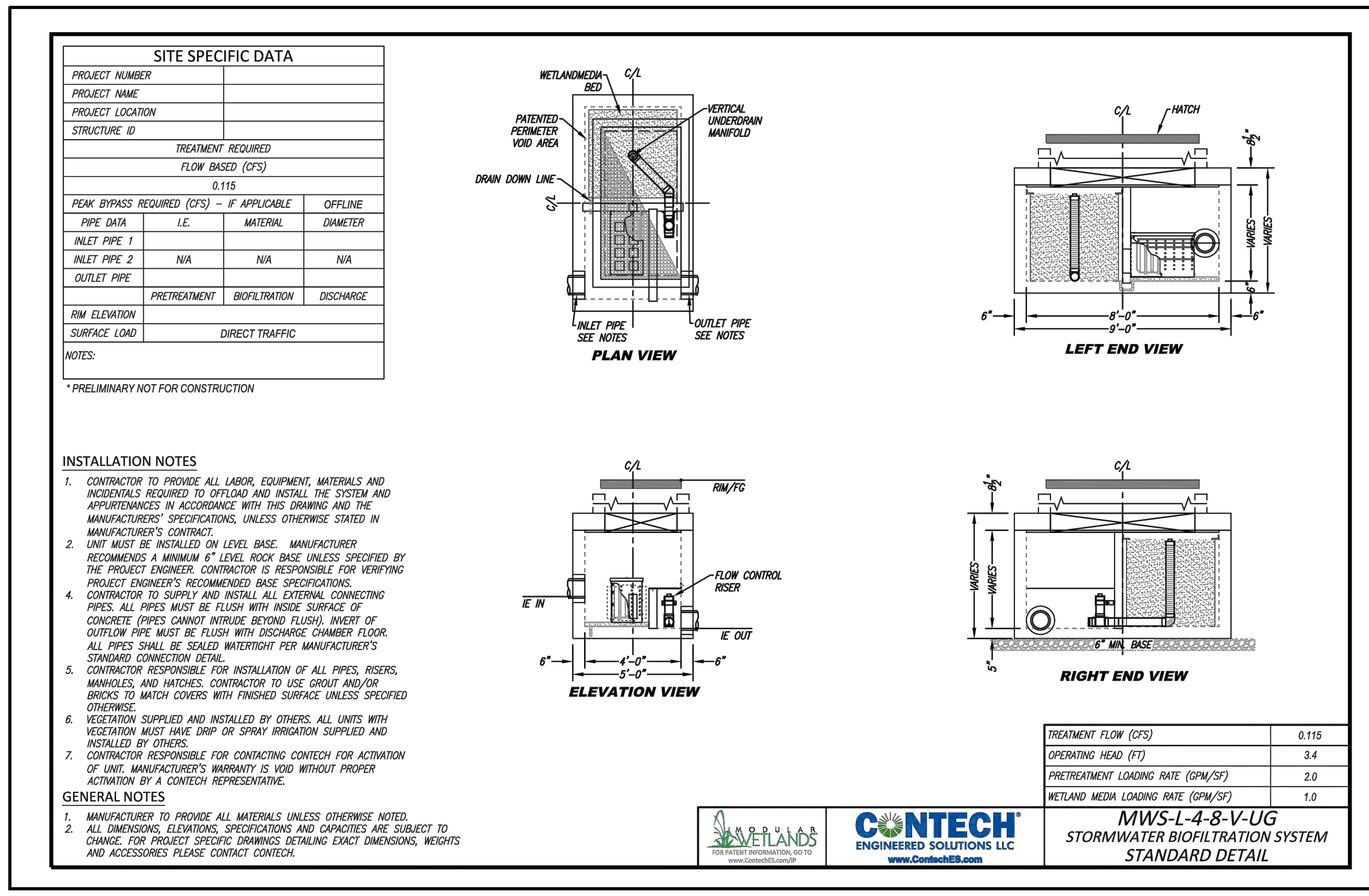
CITY OF PERRIS, CALIFORNIA

REDLANDS WEST
P20-00020
DMA MAP
PWQMP EXHIBIT

SCALE: N/A	ALBERT A. WEBB ASSOCIATES	ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256	W.O. 20-0186
DATE: 7/13/2023			SHEET 2 OF 3 SHEETS
DESIGNED: WG			
CHECKED: JRG			
PLN CK REF:			DWG. NO.
F.B.			

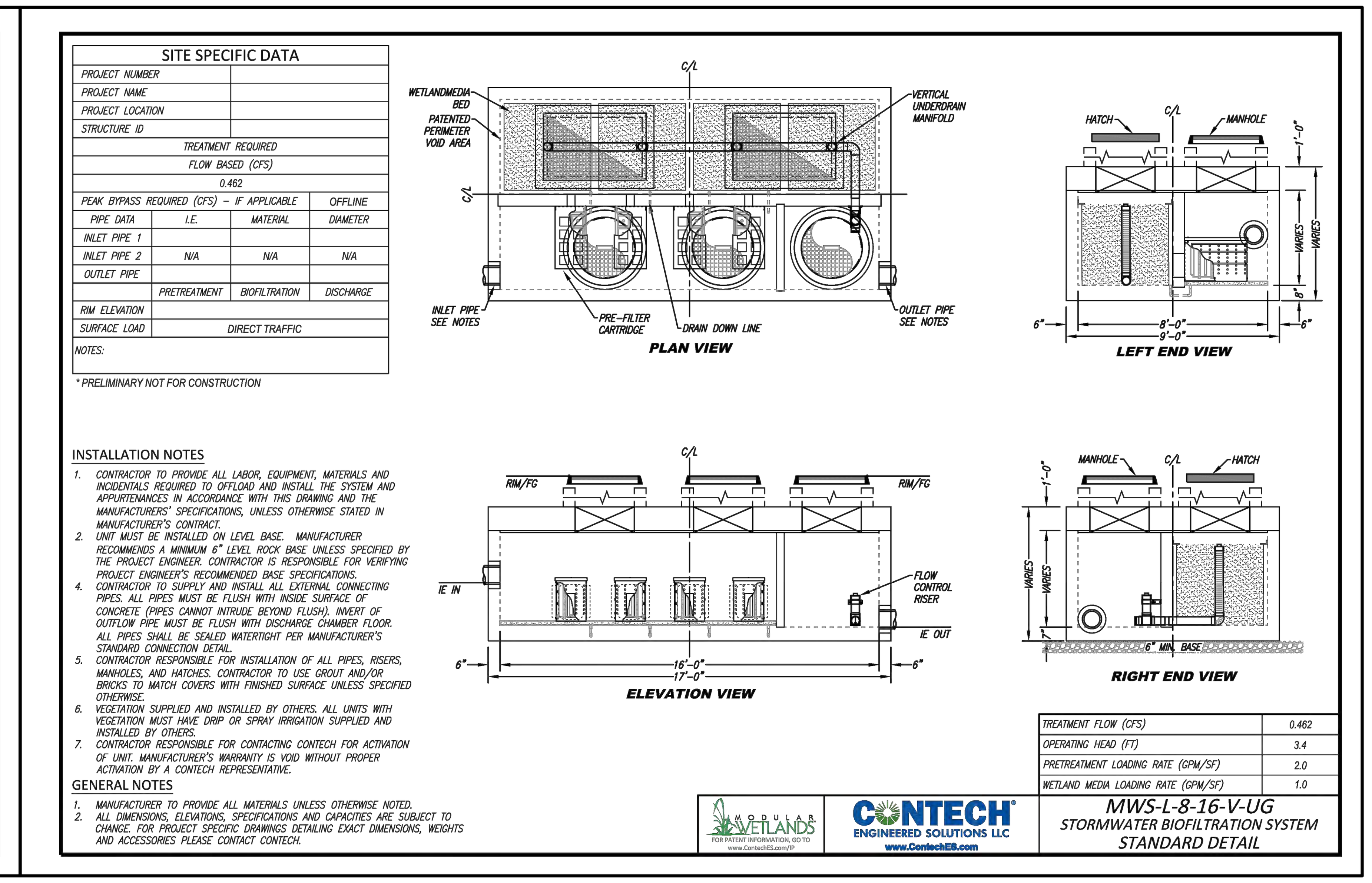
H:\2020\20-0186\DRAINAGE\PWQMP\DWG DRAWINGS\20-0186-PWQMP EXHIBIT.DWG 7/13/2023 1:47:19 PM

PRELIMINARY WQMP EXHIBIT
REDLANDS WEST



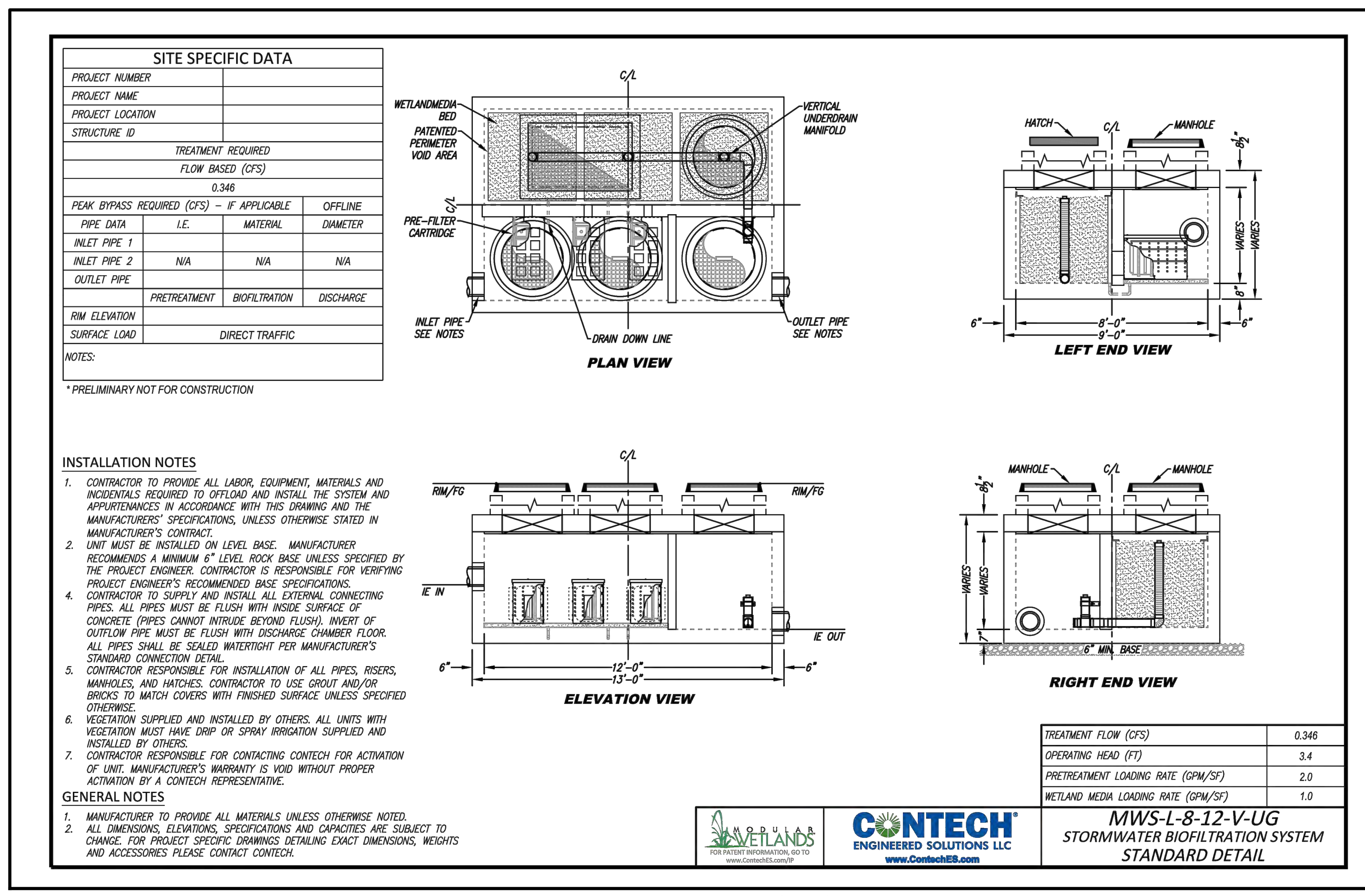
MWS VAULT - 4'x8'

DMA 6 & DMA 7



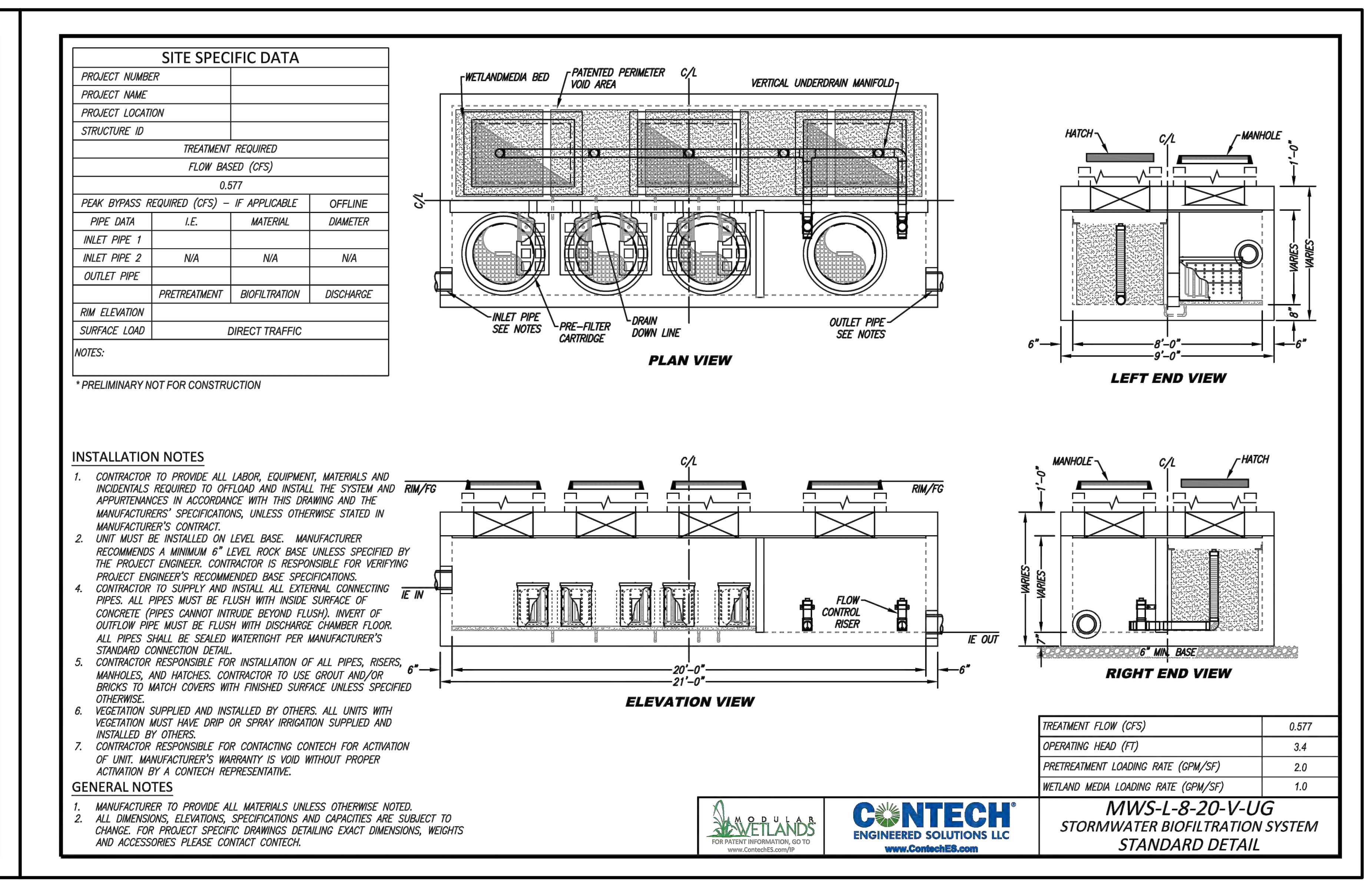
MWS VAULT - 8'x16'

DMA 1, 2, 4



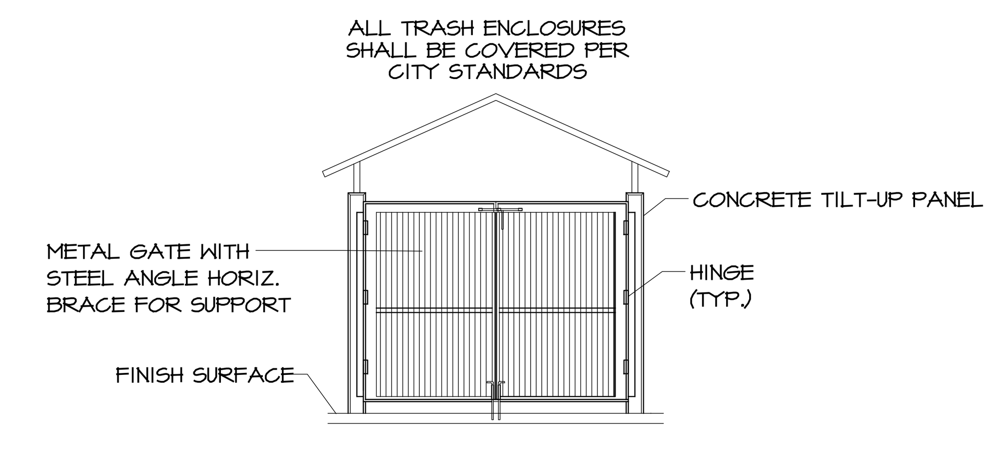
MWS VAULT - 8'x12'

DMA 5



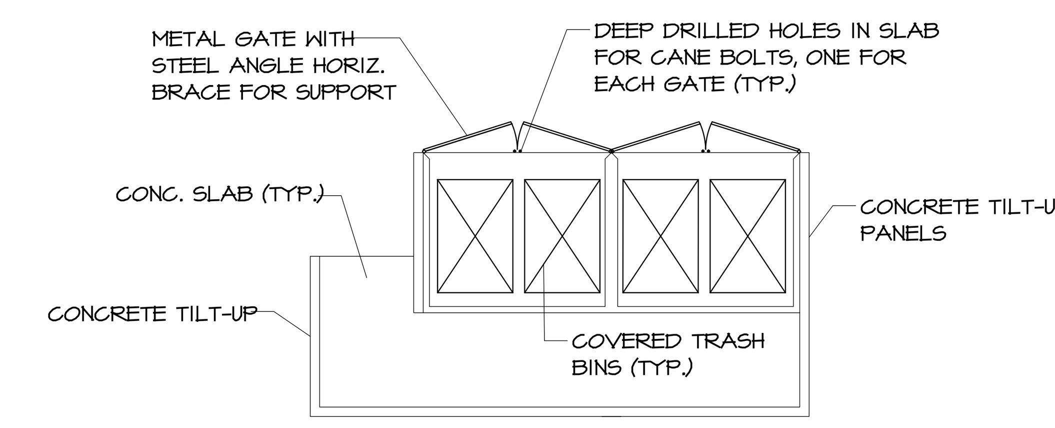
MWS VAULT - 8'x20'

DMA 3



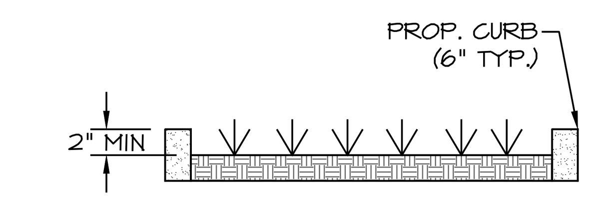
TRASH ENCLOSURE GATE ELEVATION

N.T.S.



TRASH ENCLOSURE PLAN DETAIL

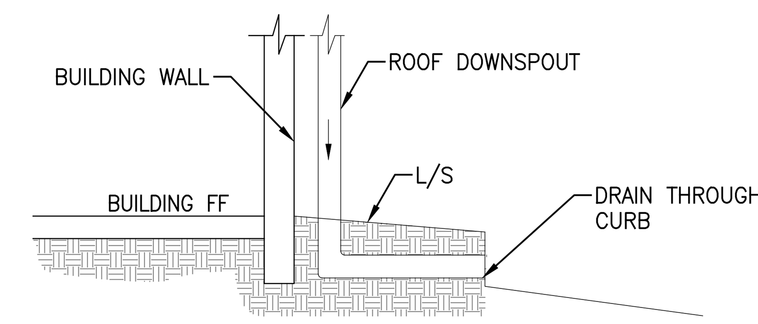
N.T.S.



SELF-RETAINING FINGER ISLAND

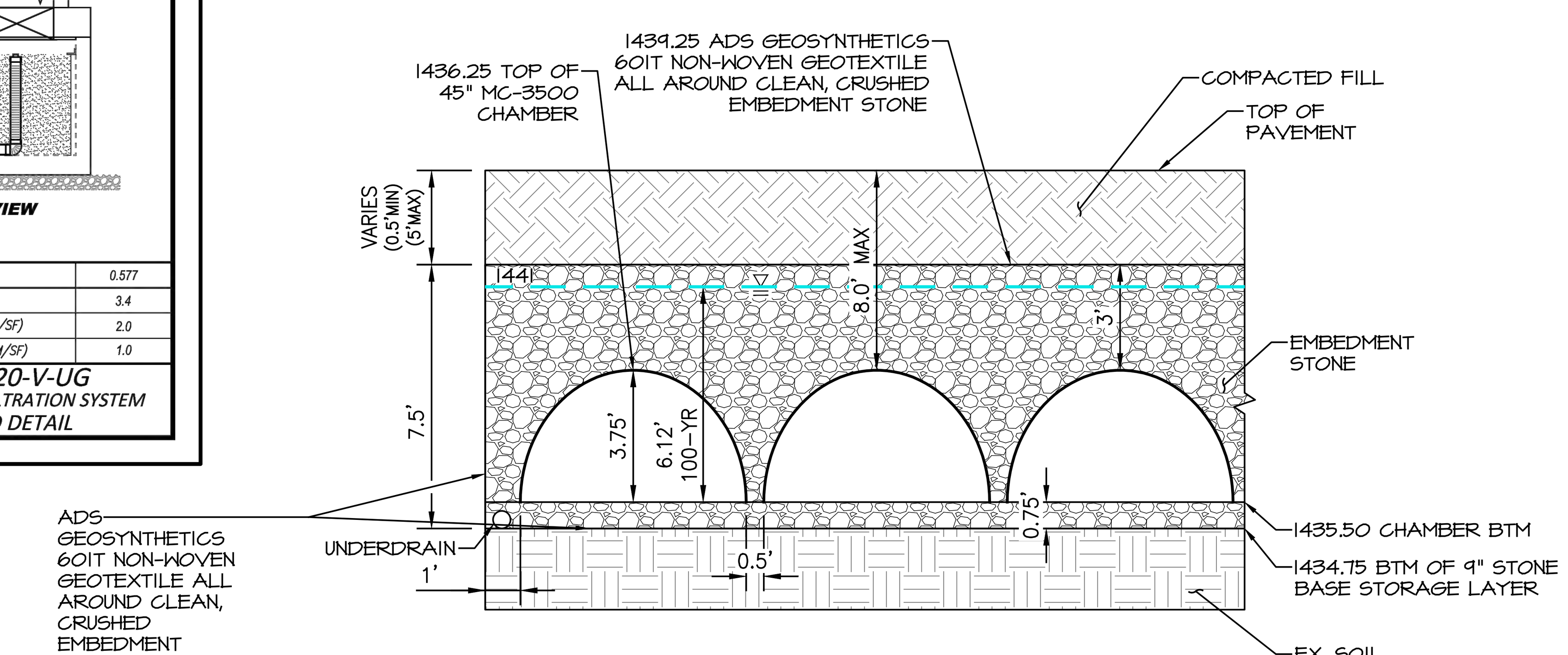
N.T.S.

ALL SELF-RETAINING AREAS WILL BE DEPRESSED A MINIMUM OF 2-INCHES



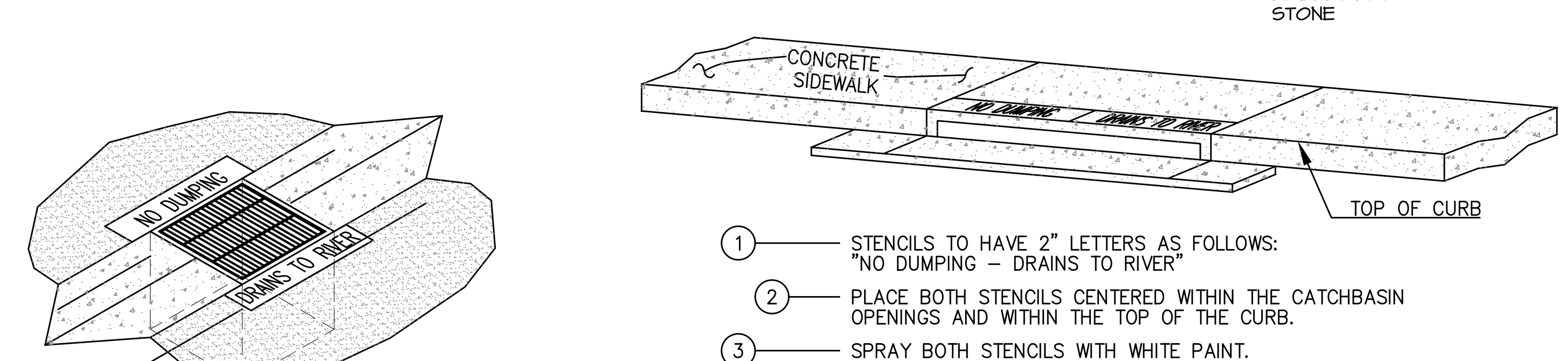
CONCEPTUAL ROOF DRAIN DETAIL

N.T.S.



UNDERGROUND STORAGE CROSS SECTION

N.T.S.



1. STENCILS TO HAVE 2" LETTERS AS FOLLOWS: "NO DUMPING – DRAINS TO RIVER"
2. PLACE BOTH STENCILS CENTERED WITHIN THE CATCHBASIN OPENINGS AND WITHIN THE TOP OF THE CURB.
3. SPRAY BOTH STENCILS WITH WHITE PAINT.
4. REMOVE STENCILS WHEN PAINT IS DRY.

CATCH BASIN STENCILING DETAIL

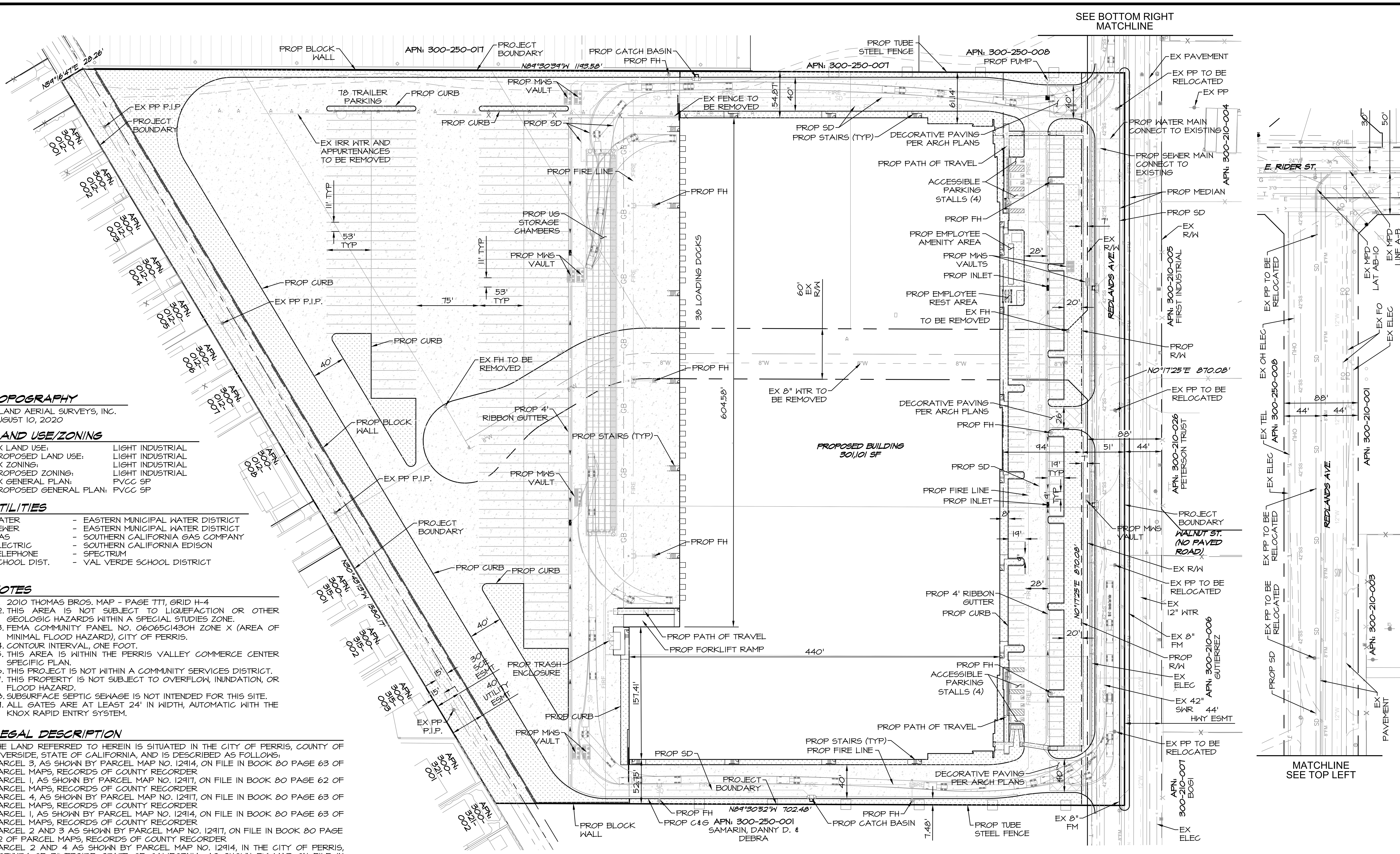
NTS

CITY OF PERRIS, CALIFORNIA		
REDLANDS WEST P20-00020 DETAILS PWQMP EXHIBIT		
SCALE: N/A DATE: 7/13/2023 DESIGNED: WG CHECKED: JRG PLN CK REF: F.B.	ALBERT A. WEBB ASSOCIATES ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256	W.O. 20-0186 SHEET 3 OF 3 SHEETS DWG. NO.

H:\2020\20-0186\DRAINAGE\PWQMP\DWG DRAWINGS\20-0186-PWQMP EXHIBIT.DWG 7/13/2023 1:47:19 PM

Appendix 2: Construction Plans

Grading and Drainage Plans



TOPOGRAPHY

INLAND AERIAL SURVEYS, INC.
AUGUST 10, 2020

LAND USE/ZONING

EX LAND USE:	LIGHT INDUSTRIAL
PROPOSED LAND USE:	LIGHT INDUSTRIAL
EX ZONING:	LIGHT INDUSTRIAL
PROPOSED ZONING:	LIGHT INDUSTRIAL
EX GENERAL PLAN:	PVCC SP
PROPOSED GENERAL PLAN:	PVCC SP

UTILITIES

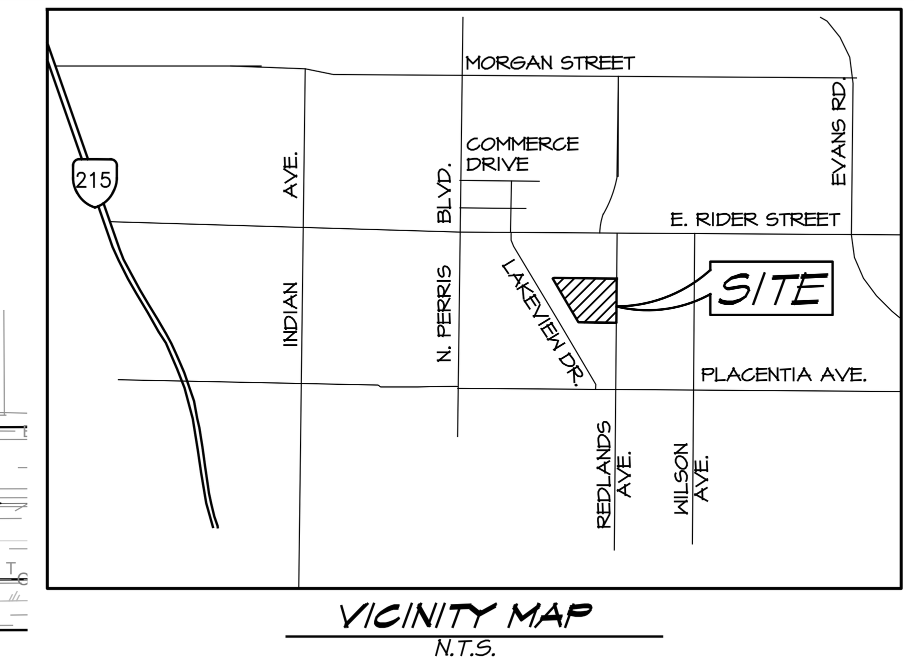
WATER	- EASTERN MUNICIPAL WATER DISTRICT
SEWER	- EASTERN MUNICIPAL WATER DISTRICT
GAS	- SOUTHERN CALIFORNIA GAS COMPANY
ELECTRIC	- SOUTHERN CALIFORNIA EDISON
TELEPHONE	- SPECTRUM
SCHOOL DIST.	- VAL VERDE SCHOOL DISTRICT

NOTES

1. 2010 THOMAS BROS. MAP - PAGE 717, GRID H-4
2. THIS AREA IS NOT SUBJECT TO LIQUEFACTION OR OTHER GEOLOGIC HAZARDS WITHIN A SPECIAL STUDIES ZONE.
3. FEMA COMMUNITY PANEL NO. 06065C1430H ZONE X (AREA OF MINIMAL FLOOD HAZARD), CITY OF PERRIS.
4. CONTOUR INTERVAL, ONE FOOT.
5. THIS AREA IS WITHIN THE PERRIS VALLEY COMMERCE CENTER SPECIFIC PLAN.
6. THIS PROJECT IS NOT WITHIN A COMMUNITY SERVICES DISTRICT.
7. THIS PROPERTY IS NOT SUBJECT TO OVERFLOW, INUNDATION, OR FLOOD HAZARD.
8. SUBSURFACE SEPTIC SEWAGE IS NOT INTENDED FOR THIS SITE.
9. ALL GATES ARE AT LEAST 24' IN WIDTH, AUTOMATIC WITH THE KNOX RAPID ENTRY SYSTEM.

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN IS SITUATED IN THE CITY OF PERRIS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:
PARCEL 3, AS SHOWN BY PARCEL MAP NO. 12914, ON FILE IN BOOK 80 PAGE 63 OF PARCEL MAPS, RECORDS OF COUNTY RECORDER
PARCEL 1, AS SHOWN BY PARCEL MAP NO. 12917, ON FILE IN BOOK 80 PAGE 62 OF PARCEL MAPS, RECORDS OF COUNTY RECORDER
PARCEL 4, AS SHOWN BY PARCEL MAP NO. 12917, ON FILE IN BOOK 80 PAGE 63 OF PARCEL MAPS, RECORDS OF COUNTY RECORDER
PARCEL 1, AS SHOWN BY PARCEL MAP NO. 12914, ON FILE IN BOOK 80 PAGE 63 OF PARCEL MAPS, RECORDS OF COUNTY RECORDER
PARCEL 2 AND 3 AS SHOWN BY PARCEL MAP NO. 12917, ON FILE IN BOOK 80 PAGE 62 OF PARCEL MAPS, RECORDS OF COUNTY RECORDER
PARCEL 2 AND 4 AS SHOWN BY PARCEL MAP NO. 12914, IN THE CITY OF PERRIS, COPUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 80 PAGE 63 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY



VICINITY MAP

N.T.S.

APPLICANT

LAKE CREEK INDUSTRIAL LLC
13681 NEWPORT AVENUE, SUITE 8301
TUSTIN, CA 92780
CONTACT: MICHAEL JOHNSON
TEL:786-200-9681

OWNER

LAKE CREEK INDUSTRIAL LLC
13681 NEWPORT AVENUE, SUITE 8301
TUSTIN, CA 92780

APN

300-250-009	300-250-013
300-250-010	300-250-014
300-250-011	300-250-015
300-250-012	300-250-016

EARTHWORK ESTIMATE

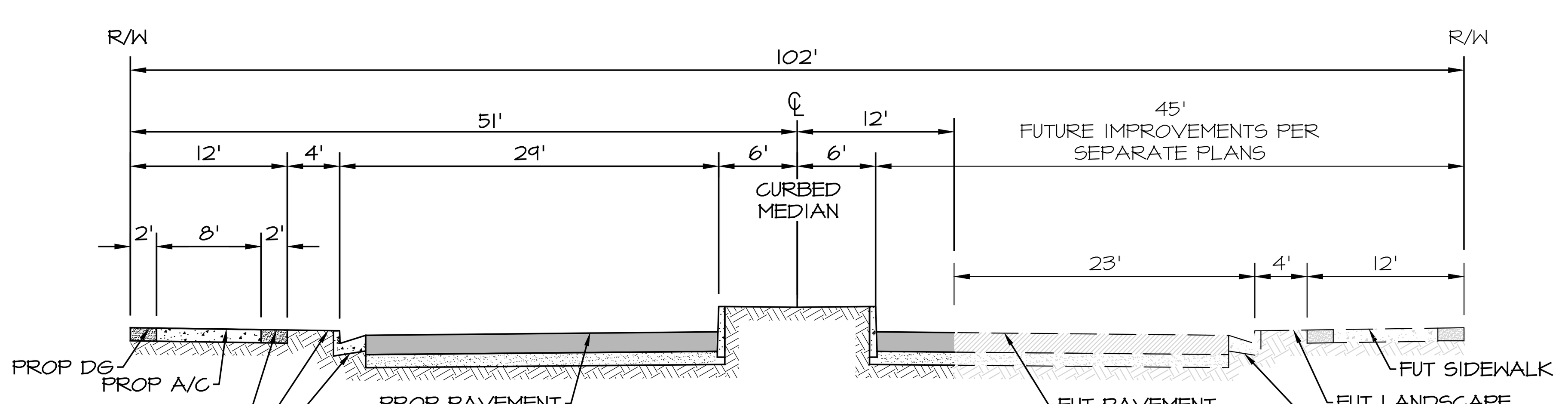
	CUT	FILL
RAW CUT/FILL	38,140 C.Y.	26,690 C.Y.
TOTAL	11,450 C.Y. EXPORT	

PROJECT DATA

SITE AREA	877,309 SF 20.1 ACRES GROSS AREA 20.0 ACRES NET AREA
BUILDING AREA	
WAREHOUSE	301,101 SF
LOT COVERAGE	35.56%
PARKING REQUIRED	
8,000 OFFICE PARKING (LESS THAN 10%)	00 STALLS
0-20K SF (1/1000 SF)	20 STALLS
20K-40K SF (1/2000 SF)	10 STALLS
40K+ SF (1/5000 SF)	53 STALLS
TOTAL PARKING REQUIRED	83 STALLS
PARKING PROVIDED	
ACCESSIBLE STALLS	8 STALLS
STANDARD STALLS	112 STALLS
TOTAL PROVIDED	120 STALLS
LANDSCAPING	
AREA	148,396 SF
AREA REQUIRED	12.0%
AREA PROVIDED	17.0%
GROSS IMPERVIOUS AREA	
AREA	728,913 SF

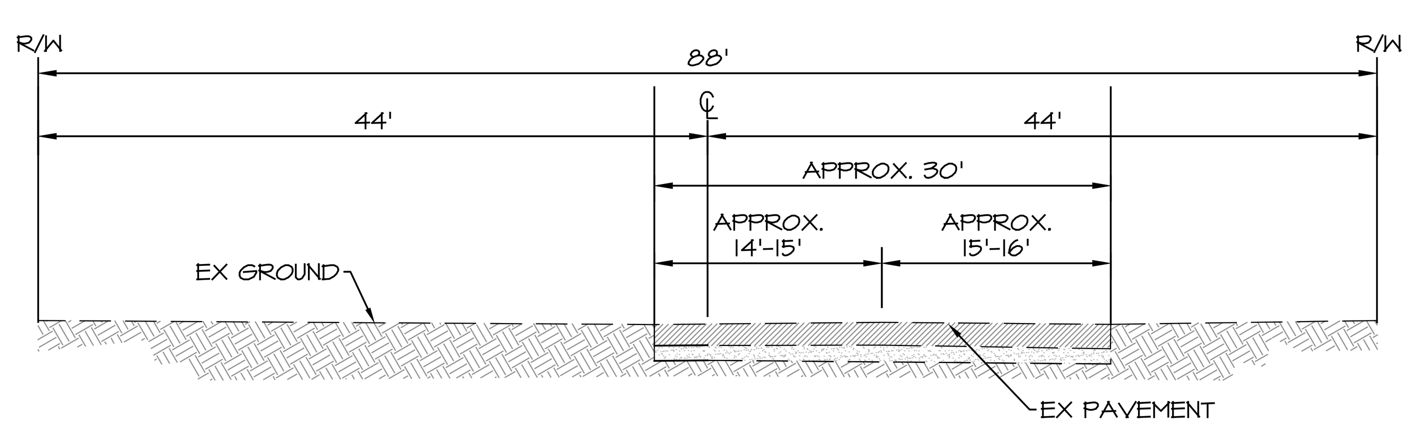
LEGEND

- PROPOSED CONCRETE/ASPHALT
- PROPOSED LANDSCAPE
- PROPOSED 14' HIGH BLOCK WALL (PER ARCHITECT PLANS)
- PROPOSED 8' HIGH CHAIN LINK FENCE (PER ARCHITECT PLANS)
- PROPOSED MWS WATER QUALITY TREATMENT VAULT (SIZE VARIES)
- EX POWER POLE
- PROP FIRE LINE
- EX STORM DRAIN
- PROP STORM DRAIN
- PROP GRADE BREAK
- PROP FH



TYPICAL SECTION REDLANDS AVE.

(ALONG PROJECT FRONTAGE)
SECONDARY ARTERIAL
NTS



EXISTING TYPICAL SECTION REDLANDS AVE.

(OUTSIDE PROJECT FRONTAGE)
SECONDARY ARTERIAL
NTS

N
W E
S
1" = 60'
60 0 60

SHEET INDEX

1. CONCEPTUAL SITE PLAN
2. CONCEPTUAL GRADING PLAN
3. CONCEPTUAL UTILITY PLAN

REVISIONS	DATE	BY			
			SCALE: 1"=60'		
			DATE: 7/18/23		
			DESIGNED: RH		
			CHECKED: JRG		
			PLN CK REF:		
			F.B.		

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256
PLOT DATE: 18-Jul-23

CITY OF PERRIS
DEVELOPMENT PLAN REVIEW
DPR 20-00020

W.O. 20-0186
SHEET 1 OF 3 SHEETS
DWG. NO.

H:\2020\20-0186\DRAWINGS\ENTITLEMENT\DPR\20-186-C-DPR.DWG 7/18/2023 9:38:38 AM

REVISIONS	DATE	BY

SCALE: 1"=60'
DATE: 7/18/23
DESIGNED: RH
CHECKED: JRG
PLN CK REF:
F.B.

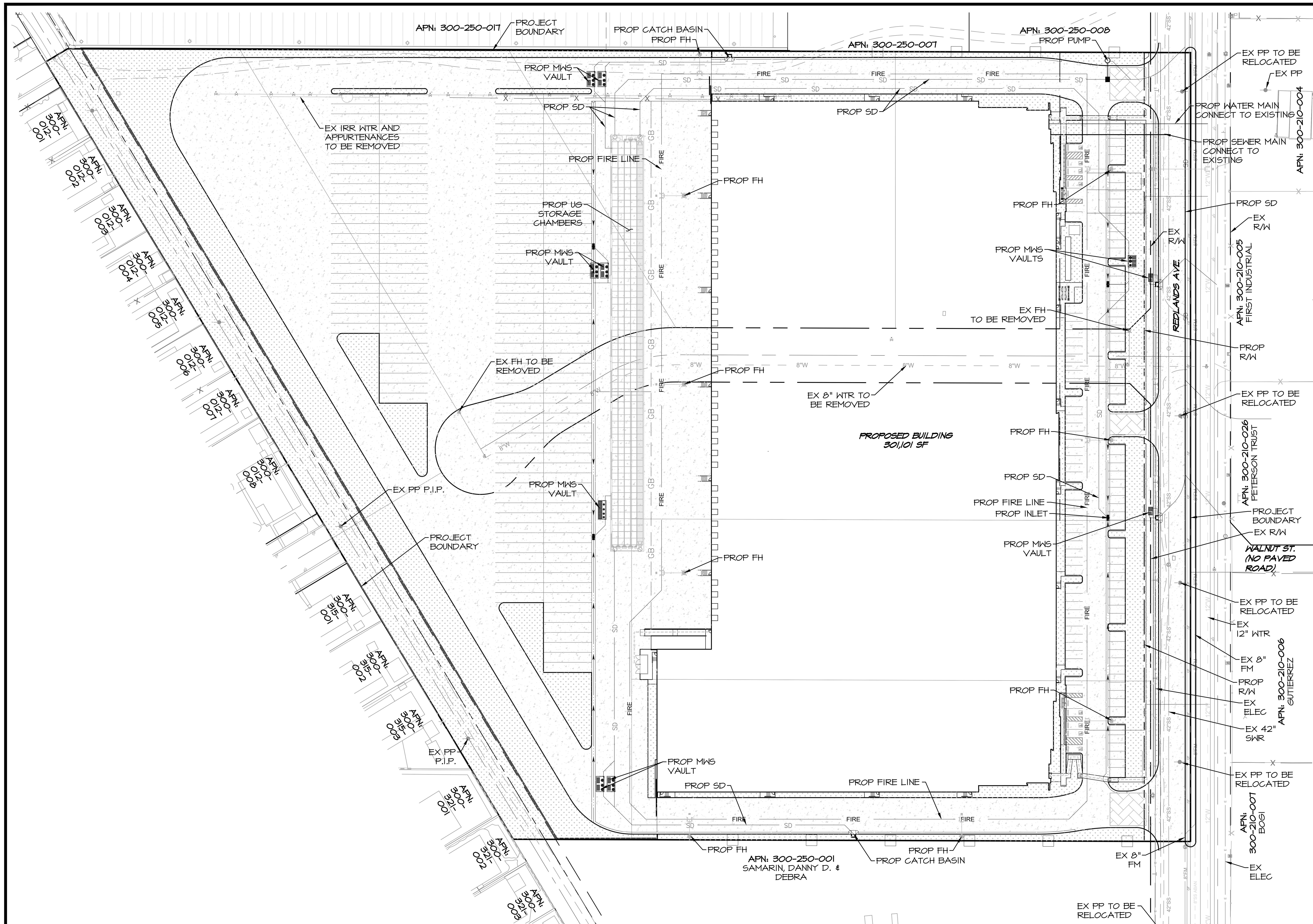
ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256

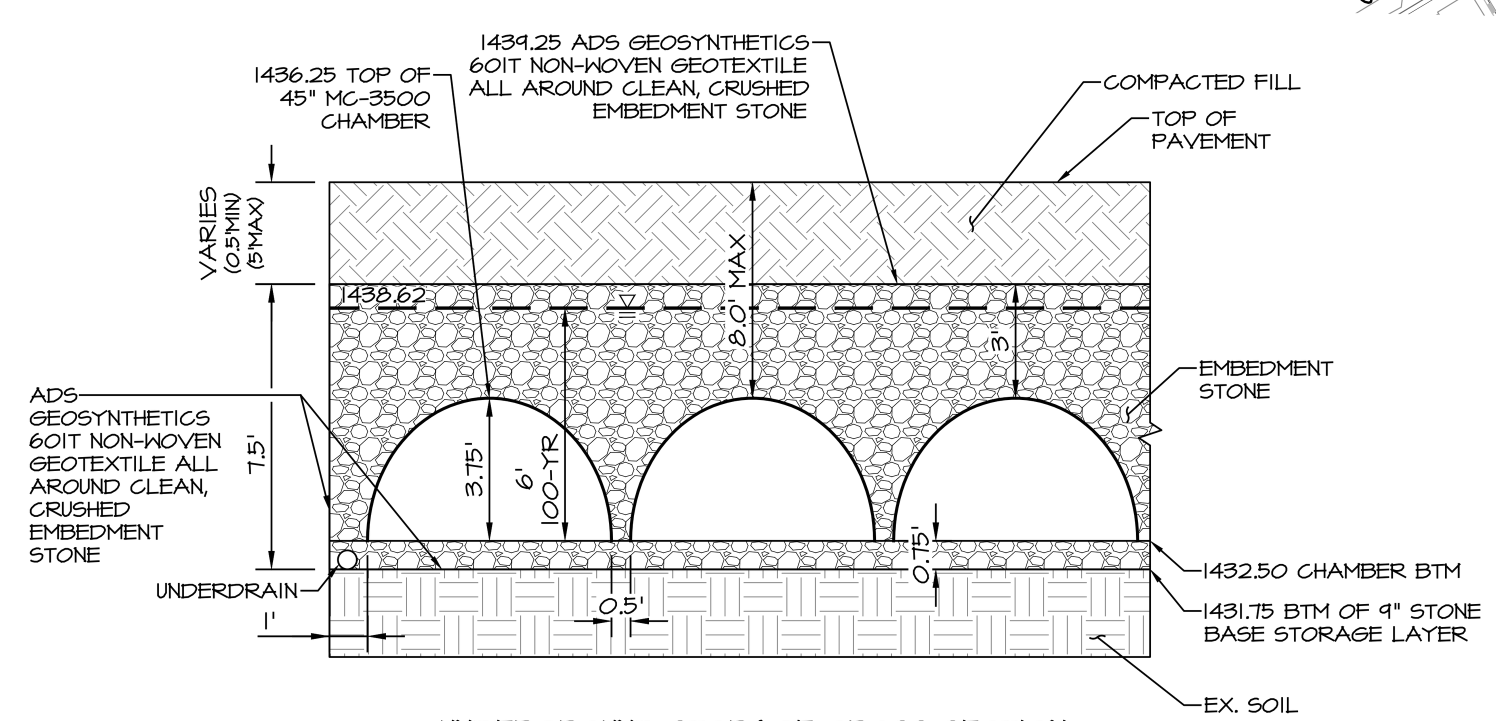
PLOT DATE: 18-Jul-23

CITY OF FERRIS
DEVELOPMENT PLAN REVIEW
DPR 20-00020
CONCEPTUAL GRADING & DRAINAGE PLAN

W.O. 20-0186
SHEET 2 OF 3 SHEETS
DWG. NO.

H:\2020\20-0186\DRAWINGS\ENTITLEMENT\DPR\20-186-C-DPR.DWG 7/18/2023 9:38:38 AM





UNDERGROUND STORAGE CROSS SECTION

N.T.S.

			SCALE: 1"=60'	ALBERT A. WEBB ASSOCIATES	CITY OF FERRIS	W.O. 20-0186
			DATE: 7/18/23	ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256	DEVELOPMENT PLAN REVIEW	SHEET 3
			DESIGNED: RH		DPR 20-00020	OF 3 SHEETS
			CHECKED: JRG	PLOT DATE: 18-Jul-23	CONCEPTUAL UTILITY PLAN	DWG. NO.
			PLN CK REF:			
REVISIONS	DATE	BY	F.B.			

H:\2020\20-0186\DRAWINGS\ENTITLEMENT\DPR\20-186-C-DPR.DWG 7/18/2023 9:38:38 AM

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

October 30, 2020

Lake Creek Industrial, LLC
1302 Brittany Cross Road
Santa Ana, California 92705

Attention: Mr. Bob Kubichek

Project No.: 20G179-2

Subject: Results of Infiltration Testing
Proposed Redlands West Development
Redlands Avenue, South of Rider Street
Perris, California

References: Geotechnical Investigation, Proposed Warehouse, Redlands Avenue, South of Rider Street, Perris, California, prepared for Black Creek Group by Southern California Geotechnical, Inc. (SCG), SCG Project No. 19G213-1, dated October 25, 2019.

Results of Infiltration Testing, Proposed Warehouse, Redlands Avenue, South of Rider Street, Perris, California, prepared for Black Creek Group, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 19G213-2, dated October 31, 2019.

Mr. Kubichek:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 20P209R, dated June 17, 2020 and Change Order No. 20G179-CO, dated October 1, 2020. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the on-site soils. The infiltration testing was performed in general accordance with the guidelines published in Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A, prepared for the Riverside County Department of Environmental Health (RCDEH), dated December, 2013.

Site and Project Description

The subject site is located on the west side of Redlands Avenue, 720± feet south of Rider Street in Perris, California. The site is bounded to the north by an existing warehouse and a vacant lot, to the west by a Southern California Edison easement, to the south by a vacant lot, and to the east by Redlands Avenue. The general location of the site is illustrated on the Site Location Map, enclosed as Plate 1 of this report.

The subject site consists of eight (8) rectangular to trapezoidal-shaped parcels which total 18.07± acres. The site is currently vacant and undeveloped. Ground surface cover consists of exposed soil with moderate native grass and weed growth, and localized areas of scattered debris and trash, such as clothes, tires, and concrete fragments.

Detailed topographic information was not available at the time of this report. However, based on topographic information obtained from Google Earth, the overall site topography slopes gently downward to the south at a gradient of less than 1± percent.

Proposed Development

The most current preliminary site plan, prepared by RGA, was provided to our office by the client. The plan indicates that the new development will consist of one (1) new commercial/industrial building, 305,780± ft² in size, located in the eastern region of the subject site. Dock-high doors and a truck court will be constructed on the west side of the proposed building. The new building is expected to be surrounded by asphaltic concrete pavements in the parking and drive areas and Portland cement concrete pavements in the loading dock areas. Several landscaped planters and concrete flatwork are also expected to be included throughout the site.

The proposed development will include on-site infiltration to dispose of storm water. Based on the infiltration test exhibit provided by Webb Associates, the project civil engineer, the infiltration system will consist of a below-grade chamber system located in the eastern area of the site. The bottom of the chamber system will be 10± feet below the existing site grades.

Previous Studies

SCG previously conducted a geotechnical investigation at the subject site referenced above. As part of this investigation, seven (7) borings were advanced to depths of 15 to 25± feet below the existing site grades. Native alluvial soils were encountered at the ground surface of all boring locations, extending to at least the maximum depth explored of 25± feet. The near-surface alluvium, in the upper 3 to 9± feet, generally consisted of loose to dense silty fine sands and fine sandy silts with variable amounts of medium to coarse sands and clay content. At greater depths, the alluvial soils generally consisted of stiff to hard clayey silts, medium stiff to very stiff silty clays, and medium dense to dense fine sandy silts. Three (3) of the borings encountered soil strata consisting of medium dense fine to coarse sands at depths ranging from 5½ to 9± feet. Groundwater was not encountered during the drilling of any of the borings.

SCG previously conducted infiltration testing at the subject site, referenced above. The infiltration testing was performed in general accordance with the ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer. As part of this investigation, subsurface exploration for the infiltration testing consisted of three (3) backhoe-excavated, trenches, (identified as I-1 through I-3), each extending to a depth of 10± feet below existing site grades. Native alluvium was encountered at the ground surface at all three (3) of the infiltration trench locations. The near-surface alluvial soils, extending from the ground surface to 1± foot below the existing site grades, consisted of loose silty fine to medium sands with trace to little coarse sand. At greater depths, the alluvial soils generally consisted of medium dense to very dense silty fine sands and fine to medium sandy silts with variable amounts of medium to coarse sands and clay content, and loose to medium dense fine to coarse sands, extending to at least the maximum depth explored of 10± feet below the existing site grades. Based on the results of Infiltration Test Nos. I-1 and I-2, we recommend an infiltration rate of 0.3 inches per hour be used for the design of the proposed below-grade chamber system located in the south-central area of the site. Based on the results of Infiltration Test No. I-3, we previously recommended an infiltration rate of 1.3 inches per hour be used for the design of the proposed chamber system located in the east-central area of the site. Infiltration test results are summarized as follows:

Infiltration Test No.	Soil Description	Infiltration Rate (inches/hour)
I-1	Fine to medium Sandy Silt, little Clay, little coarse Sand	0.4
I-2	Fine to medium Sandy Silt, little Clay, trace to little coarse Sand	0.3
I-3	Fine to medium Sandy Silt, trace Clay, trace coarse Sand	1.3

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the infiltration testing consisted of six (6) infiltration test borings advanced to depths of 10± feet below the existing site grades. The infiltration borings were advanced using a truck-mounted drilling rig, equipped with 8-inch diameter hollow stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration test borings (identified as I-1 through I-6) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of the infiltration borings, the bottom of each test boring was covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into each test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

Geotechnical Conditions

Native alluvium was encountered at the ground surface at all six (6) infiltration testing locations. In general, the alluvial soils consist of loose to very dense silty fine to medium sands with trace coarse sands and fine sandy silts extending to at least the maximum depth explored of 10± feet below the existing site grades. The Boring Logs, which illustrate the conditions encountered at the infiltration test locations, are included with this report.

Infiltration Testing

As previously mentioned, the infiltration testing was performed in general accordance with the guidelines published in Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A.

Pre-soaking

In accordance with the county infiltration standards, both of the infiltration test borings were pre-soaked prior to the infiltration testing. The pre-soaking process consisted of filling the test borings by inverting a full 5-gallon bottle of clear water supported over each hole so that the water level reaches a level of at least 5 times the hole's radius above the gravel at the bottom of each hole. The pre-soaking was completed after all of the water had percolated through each test hole or after 15 hours since initiating the pre-soak.

Infiltration Testing

Following the pre-soaking process of the infiltration test borings, SCG performed the infiltration testing. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of each test hole, and less than or equal to the water level used during the pre-soaking process. In accordance with the Riverside County guidelines, since "non-sandy soils" were encountered at the bottom of all infiltration test borings (where less than 6 inches of water infiltrated into the surrounding soils for two consecutive 25-minute readings), readings were taken at 30-minute intervals for a total of 6 hours at the six (6) test locations. After each reading, the borings were refilled to the correct water level above the gravel at the bottom of each test hole. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates from the test are tabulated in inches per hour. In accordance with the typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration tests be used as the design infiltration rate. The rates are summarized below:

Infiltration Test No.	Soil Description	Infiltration Rate (inches/hour)
I-1	Silty fine to medium Sand, trace coarse Sand	0.9
I-2	Silty fine to medium Sand, trace coarse Sand	0.4
I-3	Silty fine to medium Sand, trace coarse Sand	0.5
I-4	Fine Sandy Silt, trace medium Sand	0.6
I-5	Fine Sandy Silt	1.1
I-6	Fine Sandy Silt	1.1

Laboratory Testing

Grain Size Analysis

The grain size distribution of selected soils from the base of each infiltration test boring has been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-6 of this report.

Design Recommendations

A total of six (6) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range from 0.4 to 1.1 inches per hour due to the varying relative densities, and the silt content of the soil encountered at the bottom of each infiltration boring.

Based on the infiltration test results, we recommend a design infiltration rate of 0.4 inches per hour to be used for the proposed infiltration/detention system located in the northern portion of the subject site and 0.6 inches per hour to be used in the southern portion.

The design of the proposed storm water infiltration systems should be performed by the project civil engineer, in accordance with the City of Perris and/or County of Riverside guidelines. However, it is recommended that the systems be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the systems. The presence of such materials would decrease the effective infiltration rates. It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rates recommended above are based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rates. It should be noted that the recommended infiltration rates are based on infiltration testing at six (6) discrete locations and the overall infiltration rates of the storm water infiltration systems could vary considerably.

Construction Considerations

The infiltration rates presented in this report are specific to the tested locations and tested depths. Infiltration rates can be significantly reduced if the soils are exposed to excessive disturbance or compaction during construction. Therefore, the subgrade soils within proposed infiltration system areas should not be overexcavated, undercut or compacted in any significant manner. It is recommended that a note to this effect be added to the project plans and/or specifications.

Infiltration versus Permeability

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. The infiltration rates presented herein were determined in accordance with the ASTM Test Method D-3385-03 standard, and are considered valid for the time and place of the actual test. Changes in soil moisture content will affect these infiltration rates. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration areas could potentially be damaged due to saturation of subgrade soils. The proposed infiltration systems for the site should be located at least 25 feet away from any structures, including retaining walls. Even with this provision of locating the infiltration systems at least 25 feet from any building, it is possible that infiltrating water into the subsurface soils could have an adverse effect on any proposed or existing structure. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

General Comments

This report has been prepared as an instrument of service for use by 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. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rates contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

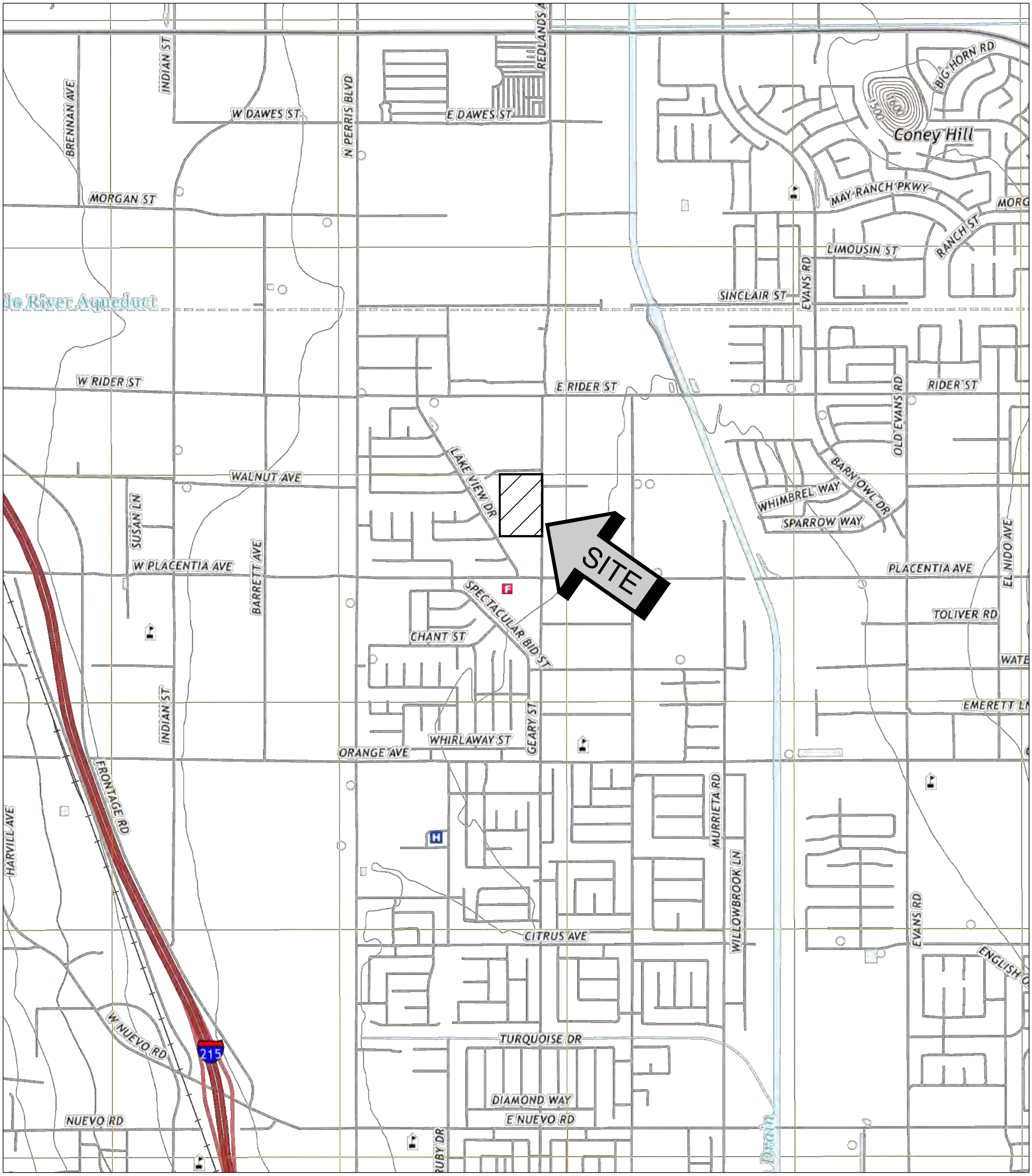
Jose Zuniga
Staff Engineer

Robert G. Trazo, M.Sc., GE 2655
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER ROBERT TRAZO No. 2655 GEOTECHNICAL STATE OF CALIFORNIA

Distribution: (1) Addressee

Enclosures:
- Plate 1 - Site Location Map
- Plate 2 - Infiltration Test Location Plan
- Boring Log Legend and Logs (8 pages)
- Infiltration Test Results Spreadsheets (6 pages)
- Grain Size Distribution Graphs (6 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE PERRIS QUADRANGLE, RIVERSIDE COUNTY, CALIFORNIA, 2018.

SITE LOCATION MAP

PROPOSED REDLANDS WEST DEVELOPMENT

PERRIS, CALIFORNIA

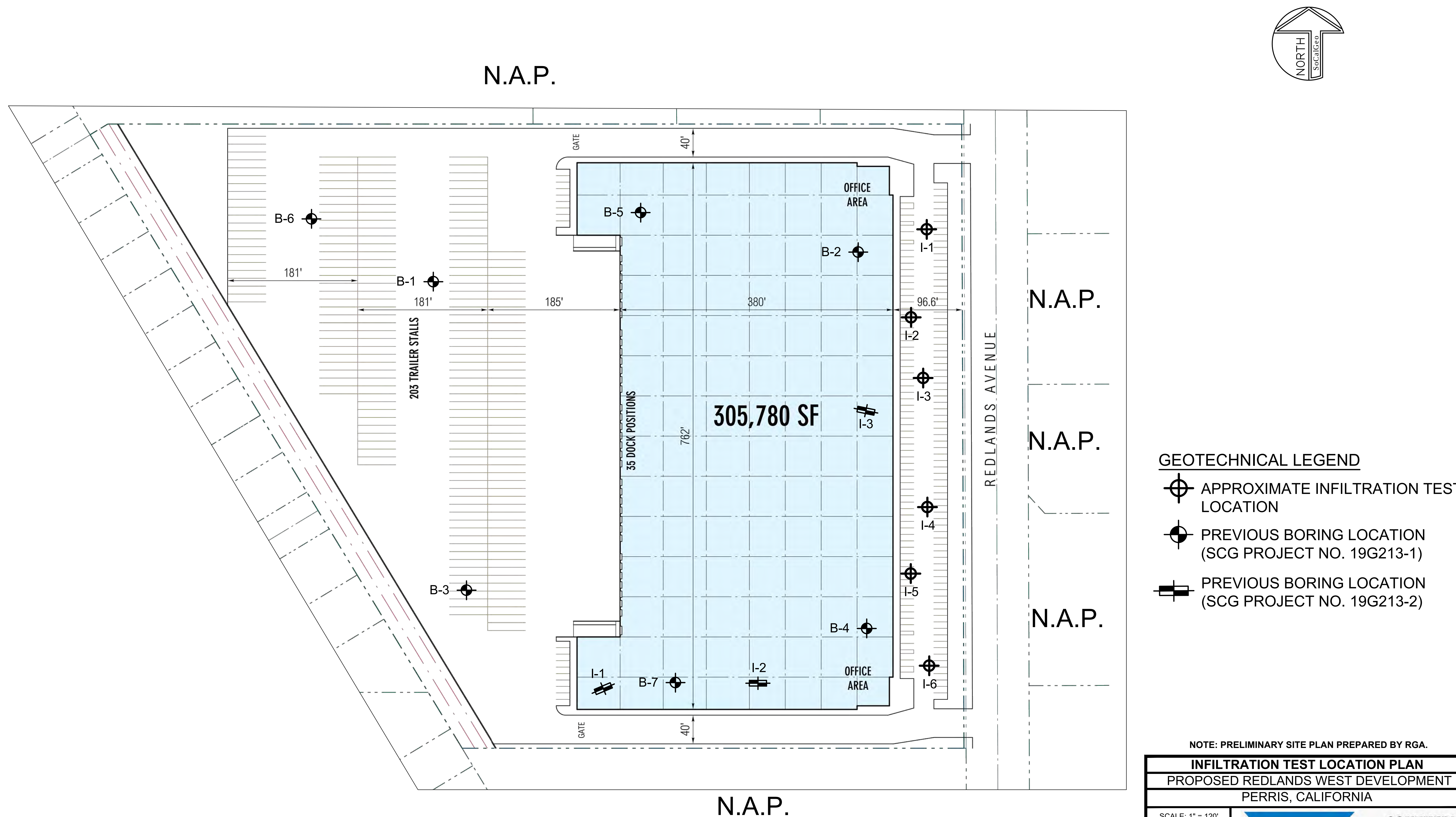
SCALE: 1" = 2000'

DRAWN: JAZ
CHKD: RGT

SCG PROJECT
20G179-2

PLATE 1

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL



NOTE: PRELIMINARY SITE PLAN PREPARED BY RGA.

INFILTRATION TEST LOCATION PLAN

PROPOSED REDLANDS WEST DEVELOPMENT

PERRIS, CALIFORNIA

SCALE: 1" = 120'

DRAWN: JAZ
CHKD: RGT

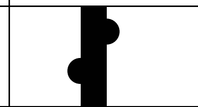
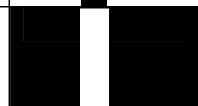
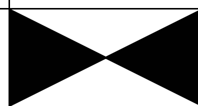
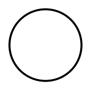
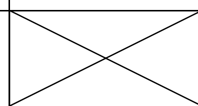
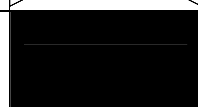
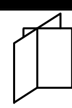
SCG PROJECT
20G179-2

PLATE 2

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3” indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BORING NO. I-1

JOB NO.: 20G179-2
PROJECT: Proposed Redlands West Development
LOCATION: Perris, California
DRILLING DATE: 10/7/20
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jose Zuniga
WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: ---

SURFACE ELEVATION: --- MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown Silty fine Sand, medium dense - dry to damp							
	X	17					4					
	X	63			@ 3.5 feet, very dense		5					
5												
	X	26			Brown Silty fine Sand, trace fine to coarse Gravel, medium dense - dry		1					
	X	15			Brown Silty fine to medium Sand, trace coarse Sand, medium dense - dry to damp		5			33		
10					Boring Terminated at 10'							

TBL 20G179-2.GPJ SOCALGEO.GDT 10/30/20

TEST BORING LOG

BORING NO. I-2

JOB NO.: 20G179-2
PROJECT: Proposed Redlands West Development
LOCATION: Perris, California

DRILLING DATE: 10/7/20
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jose Zuniga

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: ---

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					<u>ALLUVIUM:</u> Brown Silty fine to medium Sand, trace coarse Sand, medium dense - damp							
	X	13					4					
	X	10			@ 3.5 feet, loose to medium dense		4					
5												
	X	25			@ 6.0 feet, medium dense		5					
	X	19					6			35		
10					Boring Terminated at 10'							

TBL 20G179-2.GPJ SOCALGEO.GDT 10/30/20

SOUTHERN CALIFORNIA GEOTECHNICAL

A California Corporation

BORING NO. I-3

JOB NO.: 20G179-2
PROJECT: Proposed Redlands West Development
LOCATION: Perris, California

DRILLING DATE: 10/7/20
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jose Zuniga

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: ---

SURFACE ELEVATION: --- MSL

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown Silty fine Sand, cemented, medium dense - dry to damp							
	X	24					4					
	X	58			@ 3.5 feet, very dense		5					
5												
					Brown Silty fine to medium Sand, trace coarse Sand, loose - dry to damp							
	X	8					3					
	X	18			@ 8.5 feet, medium dense, damp		11			46		
10					Boring Terminated at 10'							

TBL 20G179-2.GPJ SOCALGEO.GDT 10/30/20

BORING NO. I-4

JOB NO.: 20G179-2
PROJECT: Proposed Redlands West Development
LOCATION: Perris, California

DRILLING DATE: 10/7/20
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jose Zuniga

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: ---

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown Silty fine Sand, medium dense - dry to damp							
	X	21					4					
	X	27					5					
5					Brown fine to coarse Sand, little Silt, medium dense - dry to damp							
	X	14					6					
					Brown fine Sandy Silt, trace medium Sand, medium dense - damp							
	X	22					11			66		
10					Boring Terminated at 10'							

TBL 20G179-2.GPJ SOCALGEO.GDT 10/30/20

TEST BORING LOG **PLATE B-4**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-5

JOB NO.: 20G179-2
PROJECT: Proposed Redlands West Development
LOCATION: Perris, California

DRILLING DATE: 10/7/20
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jose Zuniga

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: ---

SURFACE ELEVATION: --- MSL

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown Silty fine Sand, little to some medium Sand, loose to medium dense - dry to damp							
	X	10					4					
	X	27			@ 3.5 feet, cemented, medium dense - damp		12					
5					Brown fine Sandy Silt, medium dense - damp							
	X	15					8					
	X	10			@ 8.5 feet, loose to medium dense, damp to moist		14			81		
10					Boring Terminated at 10'							

TBL 20G179-2.GPJ SOCALGEO.GDT 10/30/20

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-6

JOB NO.: 20G179-2
PROJECT: Proposed Redlands West Development
LOCATION: Perris, California

DRILLING DATE: 10/7/20
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jose Zuniga

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: ---

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
					ALLUVIUM: Brown Silty fine to medium Sand, cemented, dense - dry to damp							
	X	35					4					
	X	68			@ 3.5 feet, very dense		4					
5												
	X	15			@ 3.5 feet, medium dense		5					
					Brown fine Sandy Silt, cemented, medium dense - damp to moist							
	X	29					14			78		
10					Boring Terminated at 10'							

TBL 20G179-2.GPJ SOCALGEO.GDT 10/30/20

INFILTRATION CALCULATIONS

Project Name	Proposed Redlands West Development
Project Location	Perris, California
Project Number	20G179-2
Engineer	Jose Zuniga

Test Hole Radius	4	(in)
Test Depth	10	(ft)

Infiltration Test Hole	I-1

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	7:57 AM	25.0	8.19	0.51	1.56	1.42	Pre-Soak
	Final	8:22 AM		8.70				
P2	Initial	8:24 AM	25.0	8.74	0.32	1.10	1.21	
	Final	8:49 AM		9.06				
1	Initial	8:54 AM	30.0	8.35	0.45	1.43	1.13	Infiltration Testing
	Final	9:24 AM		8.80				
2	Initial	9:27 AM	30.0	8.21	0.42	1.58	0.96	
	Final	9:57 AM		8.63				
3	Initial	11:00 AM	30.0	8.26	0.40	1.54	0.94	
	Final	11:30 AM		8.66				
4	Initial	11:32 AM	30.0	8.66	0.32	1.18	0.95	
	Final	12:02 PM		8.98				
5	Initial	12:03 PM	30.0	8.44	0.39	1.37	1.02	
	Final	12:33 PM		8.83				
6	Initial	12:34 PM	30.0	8.16	0.38	1.65	0.84	
	Final	1:04 PM		8.54				
7	Initial	1:06 PM	30.0	8.11	0.36	1.71	0.77	
	Final	1:36 PM		8.47				
8	Initial	1:38 PM	30.0	7.88	0.42	1.91	0.81	
	Final	2:08 PM		8.30				
9	Initial	2:10 PM	30.0	7.87	0.40	1.93	0.76	
	Final	2:40 PM		8.27				
10	Initial	2:42 PM	30.0	7.70	0.48	2.06	0.86	
	Final	3:12 PM		8.18				
11	Initial	3:14 PM	30.0	7.92	0.42	1.87	0.82	
	Final	3:44 PM		8.34				
12	Initial	3:46 PM	30.0	7.98	0.41	1.82	0.83	
	Final	4:16 PM		8.39				
13	Initial	4:18 PM	30.0	8.04	0.43	1.75	0.90	
	Final	4:48 PM		8.47				

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed Redlands West Development
Project Location	Perris, California
Project Number	20G179-2
Engineer	Jose Zuniga

Test Hole Radius	4	(in)
Test Depth	10	(ft)

Infiltration Test Hole	I-2

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	7:53 AM	25.0	8.30	0.16	1.62	0.43	Pre-Soak
	Final	8:18 AM		8.46				
P2	Initial	8:20 AM	25.0	8.47	0.12	1.47	0.35	
	Final	8:45 AM		8.59				
1	Initial	9:32 AM	30.0	8.32	0.14	1.61	0.32	Infiltration Testing
	Final	10:02 AM		8.46				
2	Initial	10:03 AM	30.0	8.18	0.17	1.74	0.36	
	Final	10:33 AM		8.35				
3	Initial	10:33 AM	30.0	8.35	0.11	1.60	0.25	
	Final	11:03 AM		8.46				
4	Initial	11:04 AM	30.0	8.17	0.17	1.75	0.36	
	Final	11:34 AM		8.34				
5	Initial	11:35 AM	30.0	8.11	0.14	1.82	0.28	
	Final	12:05 PM		8.25				
6	Initial	12:06 PM	30.0	8.10	0.16	1.82	0.32	
	Final	12:36 PM		8.26				
7	Initial	12:38 PM	30.0	8.01	0.17	1.91	0.33	
	Final	1:08 PM		8.18				
8	Initial	1:09 PM	30.0	8.06	0.16	1.86	0.32	
	Final	1:39 PM		8.22				
9	Initial	1:41 PM	30.0	8.00	0.19	1.91	0.37	
	Final	2:11 PM		8.19				
10	Initial	2:12 PM	30.0	8.05	0.17	1.87	0.33	
	Final	2:42 PM		8.22				
11	Initial	2:43 PM	30.0	8.00	0.18	1.91	0.35	
	Final	3:13 PM		8.18				
12	Initial	3:15 PM	30.0	8.05	0.18	1.86	0.36	
	Final	3:45 PM		8.23				

Per County Standards, Infiltration Rate calculated as follows:

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

Where:
- Q = Infiltration Rate (in inches per hour)
- ΔH = Change in Height (Water Level) over the time interval
- r = Test Hole (Borehole) Radius
- Δt = Time Interval
- H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed Redlands West Development
Project Location	Perris, California
Project Number	20G179-2
Engineer	Jose Zuniga

Test Hole Radius	4	(in)
Test Depth	10	(ft)

Infiltration Test Hole	I-3

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	7:44 AM	25.0	8.18	0.15	1.75	0.38	Pre-Soak
	Final	8:09 AM		8.33				
P2	Initial	8:10 AM	25.0	8.34	0.11	1.61	0.30	
	Final	8:35 AM		8.45				
1	Initial	8:37 AM	30.0	7.91	0.34	1.92	0.65	Infiltration Testing
	Final	9:07 AM		8.25				
2	Initial	9:37 AM	30.0	8.08	0.18	1.83	0.36	
	Final	10:07 AM		8.26				
3	Initial	10:08 AM	30.0	7.90	0.30	1.95	0.57	
	Final	10:38 AM		8.20				
4	Initial	10:39 AM	30.0	8.20	0.15	1.73	0.32	
	Final	11:09 AM		8.35				
5	Initial	11:10 AM	30.0	7.97	0.22	1.92	0.42	
	Final	11:40 AM		8.19				
6	Initial	11:41 AM	30.0	8.03	0.19	1.88	0.37	
	Final	12:11 PM		8.22				
7	Initial	12:11 PM	30.0	7.96	0.24	1.92	0.46	
	Final	12:41 PM		8.20				
8	Initial	12:43 PM	30.0	8.00	0.20	1.90	0.39	
	Final	1:13 PM		8.20				
9	Initial	1:14 PM	30.0	7.93	0.24	1.95	0.45	
	Final	1:44 PM		8.17				
10	Initial	1:45 PM	30.0	7.90	0.26	1.97	0.49	
	Final	2:15 PM		8.16				
11	Initial	2:17 PM	30.0	7.94	0.26	1.93	0.50	
	Final	2:47 PM		8.20				
12	Initial	2:48 PM	30.0	7.95	0.25	1.93	0.48	
	Final	3:18 PM		8.20				

Per County Standards, Infiltration Rate calculated as follows:

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

Where:
- Q = Infiltration Rate (in inches per hour)
- ΔH = Change in Height (Water Level) over the time interval
- r = Test Hole (Borehole) Radius
- Δt = Time Interval
- H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed Redlands West Development
Project Location	Perris, California
Project Number	20G179-2
Engineer	Jose Zuniga

Test Hole Radius	4	(in)
Test Depth	10	(ft)

Infiltration Test Hole	I-4

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	7:32 AM	25.0	8.46	0.14	1.47	0.41	Pre-Soak
	Final	7:57 AM		8.60				
P2	Initial	7:59 AM	25.0	8.60	0.05	1.38	0.16	
	Final	8:24 AM		8.65				
1	Initial	8:28 AM	30.0	8.15	0.30	1.70	0.64	Infiltration Testing
	Final	8:58 AM		8.45				
2	Initial	9:42 AM	30.0	8.25	0.20	1.65	0.44	
	Final	10:12 AM		8.45				
3	Initial	10:13 AM	30.0	8.21	0.21	1.69	0.45	
	Final	10:43 AM		8.42				
4	Initial	10:44 AM	30.0	8.17	0.23	1.72	0.49	
	Final	11:14 AM		8.40				
5	Initial	11:15 AM	30.0	8.00	0.33	1.84	0.66	
	Final	11:45 AM		8.33				
6	Initial	11:46 AM	30.0	8.15	0.24	1.73	0.51	
	Final	12:16 PM		8.39				
7	Initial	12:17 PM	30.0	8.10	0.26	1.77	0.54	
	Final	12:47 PM		8.36				
8	Initial	12:48 PM	30.0	8.15	0.25	1.73	0.53	
	Final	1:18 PM		8.40				
9	Initial	1:20 PM	30.0	8.00	0.30	1.85	0.60	
	Final	1:50 PM		8.30				
10	Initial	1:51 PM	30.0	8.04	0.31	1.81	0.63	
	Final	2:21 PM		8.35				
11	Initial	2:22 PM	30.0	8.05	0.30	1.80	0.61	
	Final	2:52 PM		8.35				
12	Initial	2:53 PM	30.0	8.10	0.28	1.76	0.58	
	Final	3:23 PM		8.38				

Per County Standards, Infiltration Rate calculated as follows:

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

Where:
- Q = Infiltration Rate (in inches per hour)
- ΔH = Change in Height (Water Level) over the time interval
- r = Test Hole (Borehole) Radius
- Δt = Time Interval
- H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed Redlands West Development
Project Location	Perris, California
Project Number	20G179-2
Engineer	Jose Zuniga

Test Hole Radius	4	(in)
Test Depth	10	(ft)

Infiltration Test Hole	I-5

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	7:38 AM	25.0	8.54	0.46	1.23	1.58	Pre-Soak
	Final	8:03 AM		9.00				
P2	Initial	8:05 AM	25.0	9.00	0.24	0.88	1.10	
	Final	8:30 AM		9.24				
1	Initial	8:32 AM	30.0	8.44	0.41	1.36	1.08	Infiltration Testing
	Final	9:02 AM		8.85				
2	Initial	9:47 AM	30.0	8.66	0.25	1.22	0.72	
	Final	10:17 AM		8.91				
3	Initial	10:18 AM	30.0	8.59	0.28	1.27	0.78	
	Final	10:48 AM		8.87				
4	Initial	10:49 AM	30.0	8.54	0.30	1.31	0.81	
	Final	11:19 AM		8.84				
5	Initial	11:20 AM	30.0	8.00	0.72	1.64	1.59	
	Final	11:50 AM		8.72				
6	Initial	11:51 AM	30.0	8.17	0.54	1.56	1.25	
	Final	12:21 PM		8.71				
7	Initial	12:23 PM	30.0	8.05	0.64	1.63	1.42	
	Final	12:53 PM		8.69				
8	Initial	12:55 PM	30.0	8.07	0.58	1.64	1.28	
	Final	1:25 PM		8.65				
9	Initial	1:27 PM	30.0	7.98	0.66	1.69	1.42	
	Final	1:57 PM		8.64				
10	Initial	2:00 PM	30.0	8.10	0.54	1.63	1.20	
	Final	2:30 PM		8.64				
11	Initial	2:32 PM	30.0	7.95	0.55	1.78	1.13	
	Final	3:02 PM		8.50				
12	Initial	3:08 PM	30.0	7.98	0.54	1.75	1.13	
	Final	3:38 PM		8.52				

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed Redlands West Development
Project Location	Perris, California
Project Number	20G179-2
Engineer	Jose Zuniga

Test Hole Radius	4	(in)
Test Depth	10	(ft)

Infiltration Test Hole	I-6

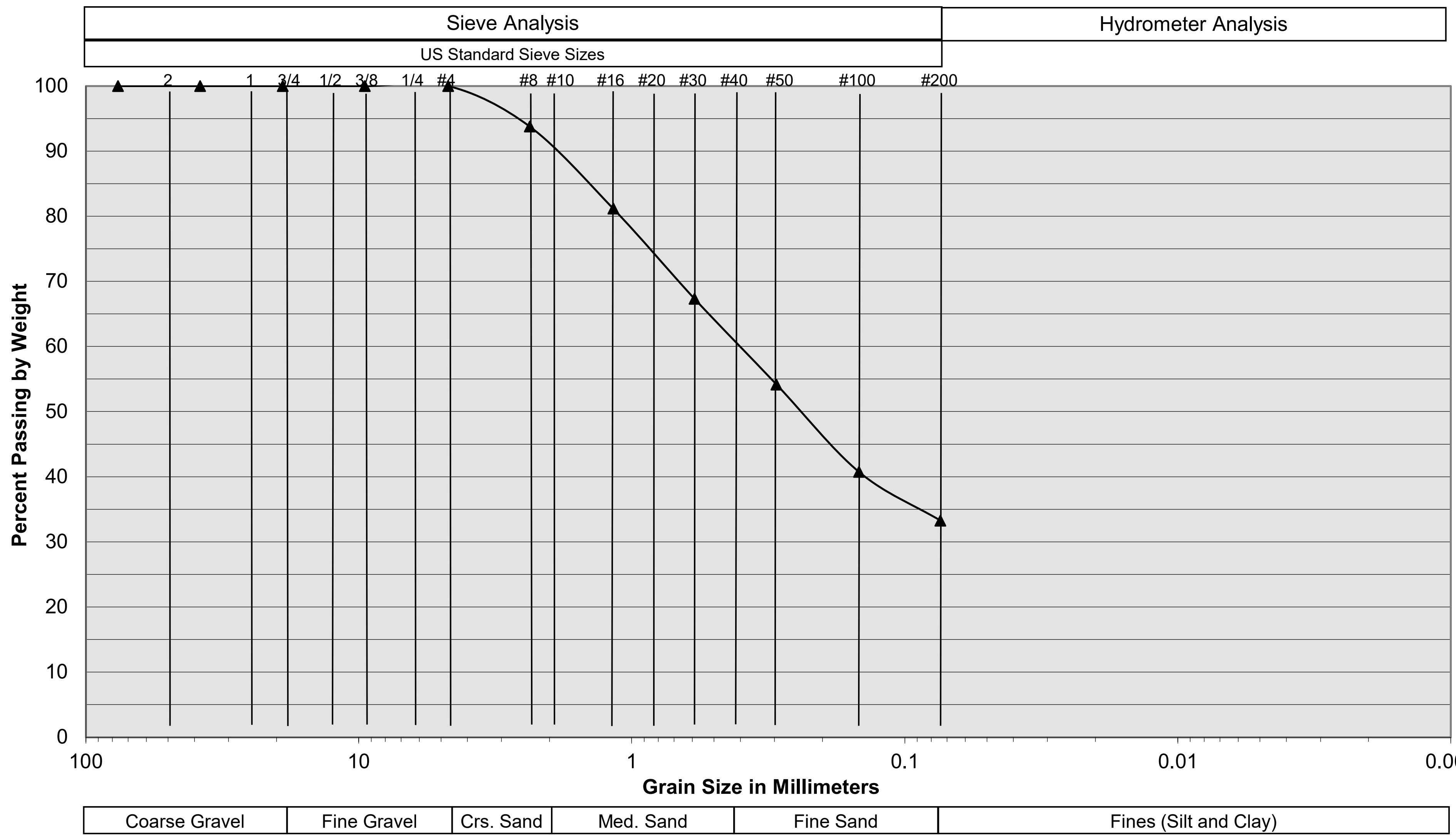
Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	7:23 AM	25.0	8.54	0.46	1.23	1.58	Pre-Soak
	Final	7:48 AM		9.00				
P2	Initial	7:48 AM	25.0	9.00	0.24	0.88	1.10	
	Final	8:13 AM		9.24				
1	Initial	8:15 AM	30.0	8.44	0.41	1.36	1.08	Infiltration Testing
	Final	8:45 AM		8.85				
2	Initial	9:52 AM	30.0	8.66	0.25	1.22	0.72	
	Final	10:22 AM		8.91				
3	Initial	10:22 AM	30.0	8.59	0.28	1.27	0.78	
	Final	10:52 AM		8.87				
4	Initial	10:52 AM	30.0	8.54	0.30	1.31	0.81	
	Final	11:22 AM		8.84				
5	Initial	11:22 AM	30.0	8.00	0.72	1.64	1.59	
	Final	11:52 AM		8.72				
6	Initial	11:55 AM	30.0	8.17	0.54	1.56	1.25	
	Final	12:25 PM		8.71				
7	Initial	12:26 PM	30.0	8.05	0.64	1.63	1.42	
	Final	12:56 PM		8.69				
8	Initial	12:57 PM	30.0	8.07	0.58	1.64	1.28	
	Final	1:27 PM		8.65				
9	Initial	1:28 PM	30.0	7.98	0.66	1.69	1.42	
	Final	1:58 PM		8.64				
10	Initial	1:59 PM	30.0	8.10	0.54	1.63	1.20	
	Final	2:29 PM		8.64				
11	Initial	2:33 PM	30.0	7.95	0.55	1.78	1.13	
	Final	3:03 PM		8.50				
12	Initial	3:09 PM	30.0	7.98	0.54	1.75	1.13	
	Final	3:39 PM		8.52				

Per County Standards, Infiltration Rate calculated as follows:

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

Where:
- Q = Infiltration Rate (in inches per hour)
- ΔH = Change in Height (Water Level) over the time interval
- r = Test Hole (Borehole) Radius
- Δt = Time Interval
- H_{avg} = Average Head Height over the time interval

Grain Size Distribution

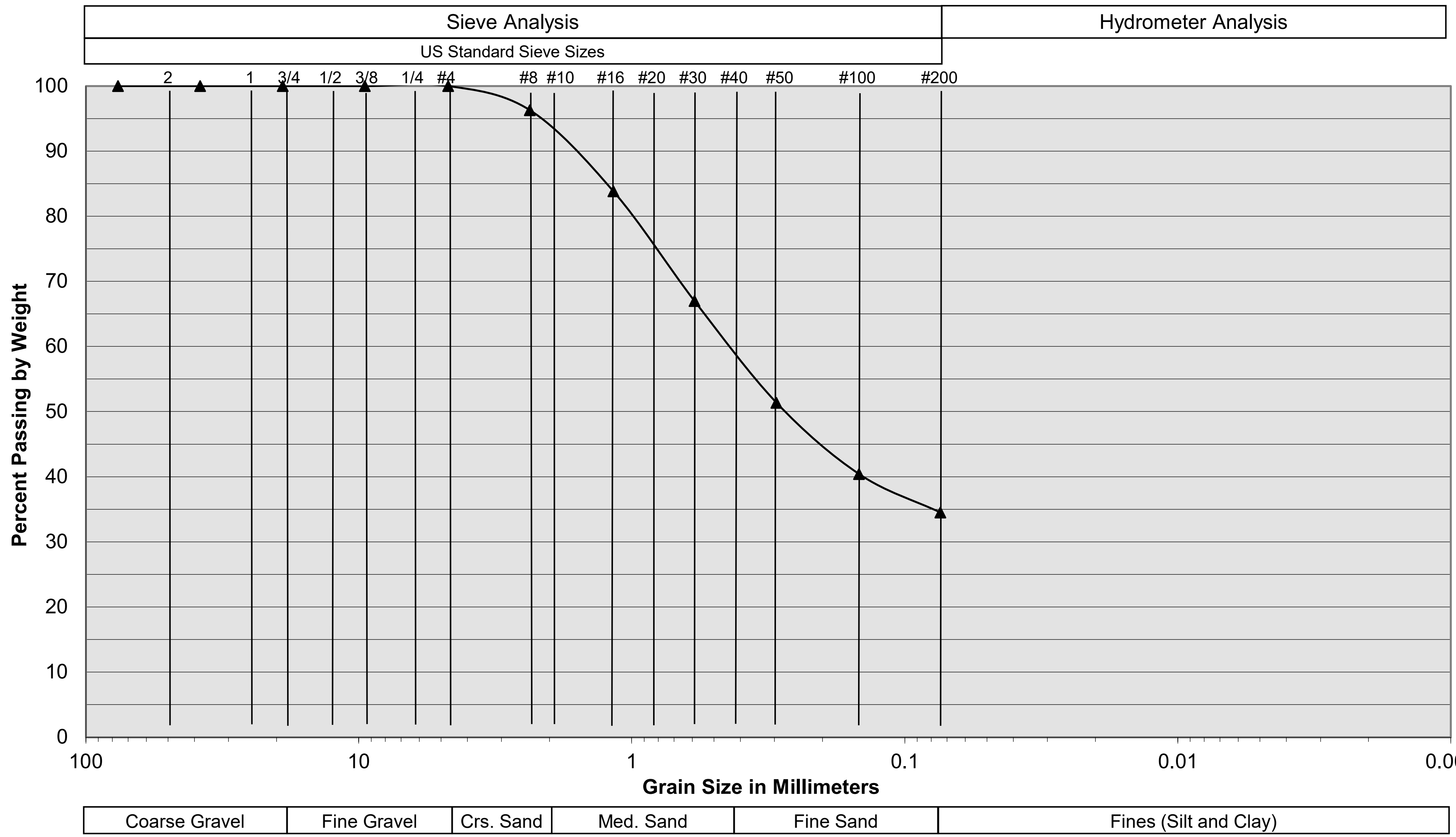


Sample Description	I-1 @ 8½ feet
Soil Classification	Brown Sity fine to medium Sand, trace coarse Sand

Proposed Redlands West Development
Perris, CA
Project No. 20G179-2
PLATE C-1

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL A California Corporation

Grain Size Distribution

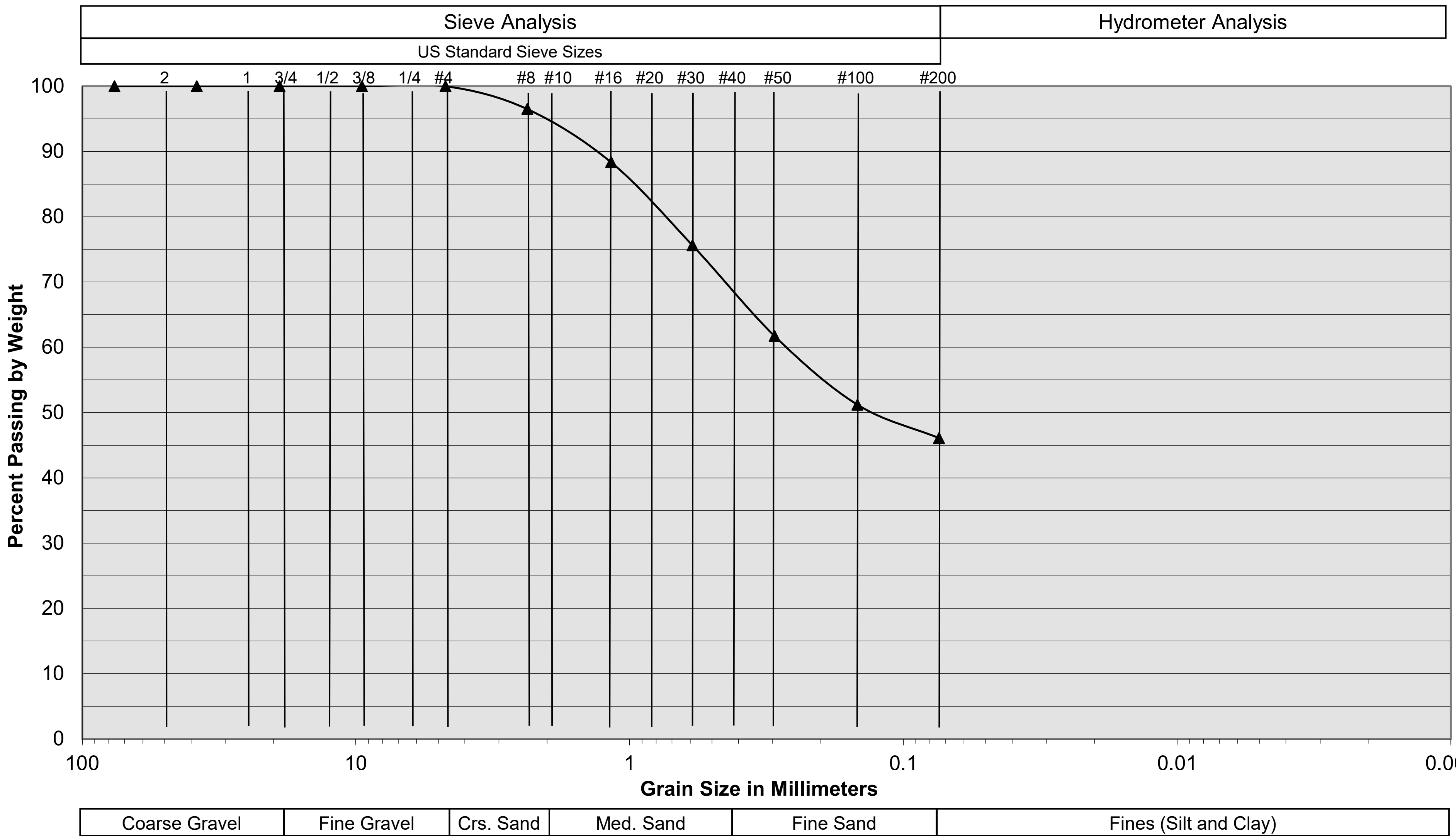


Sample Description	I-2 @ 8½ feet
Soil Classification	Brown Silty fine to medium Sand, trace coarse Sand

Proposed Redlands West Development
Perris, CA
Project No. 20G179-2
PLATE C-2

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

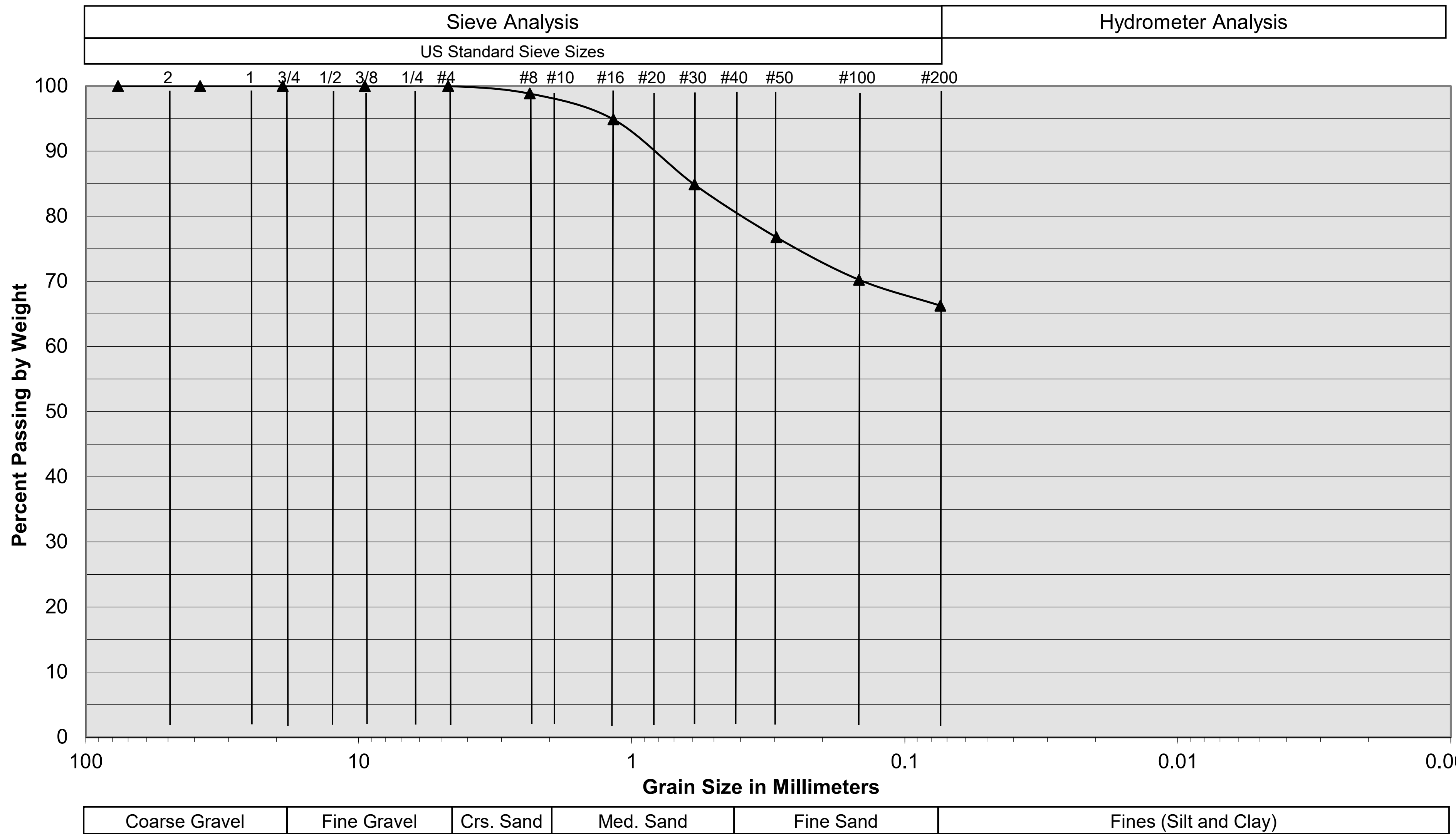


Sample Description	I-3 @ 8½ feet
Soil Classification	Brown Silty fine to medium Sand, trace coarse Sand

Proposed Redlands West Development
Perris, CA
Project No. 20G179-2
PLATE C-3

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

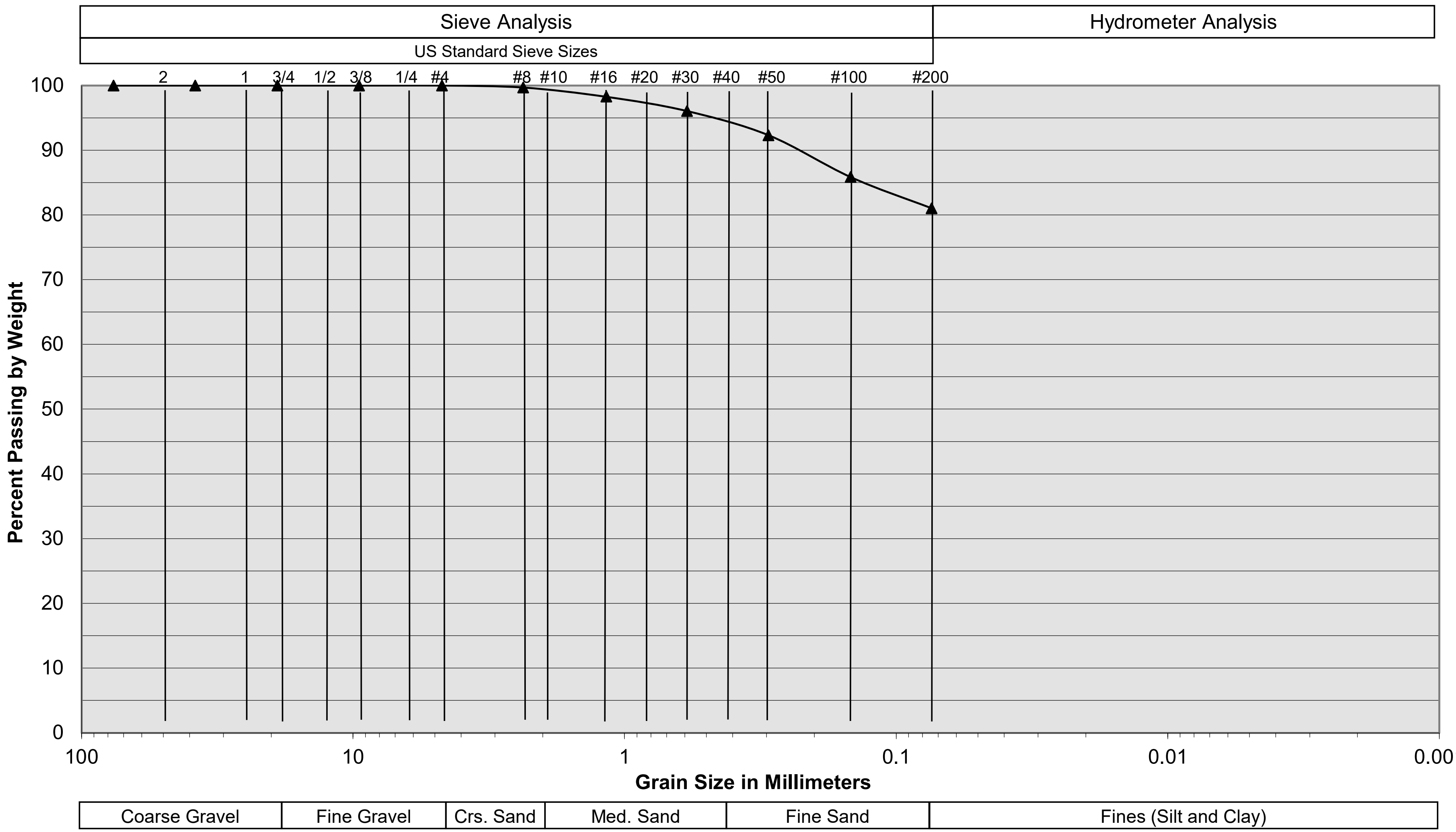


Sample Description	I-4 @ 8½ feet
Soil Classification	Brown fine Sandy Silt, trace medium Sand

Proposed Redlands West Development
Perris, CA
Project No. 20G179-2
PLATE C-4

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

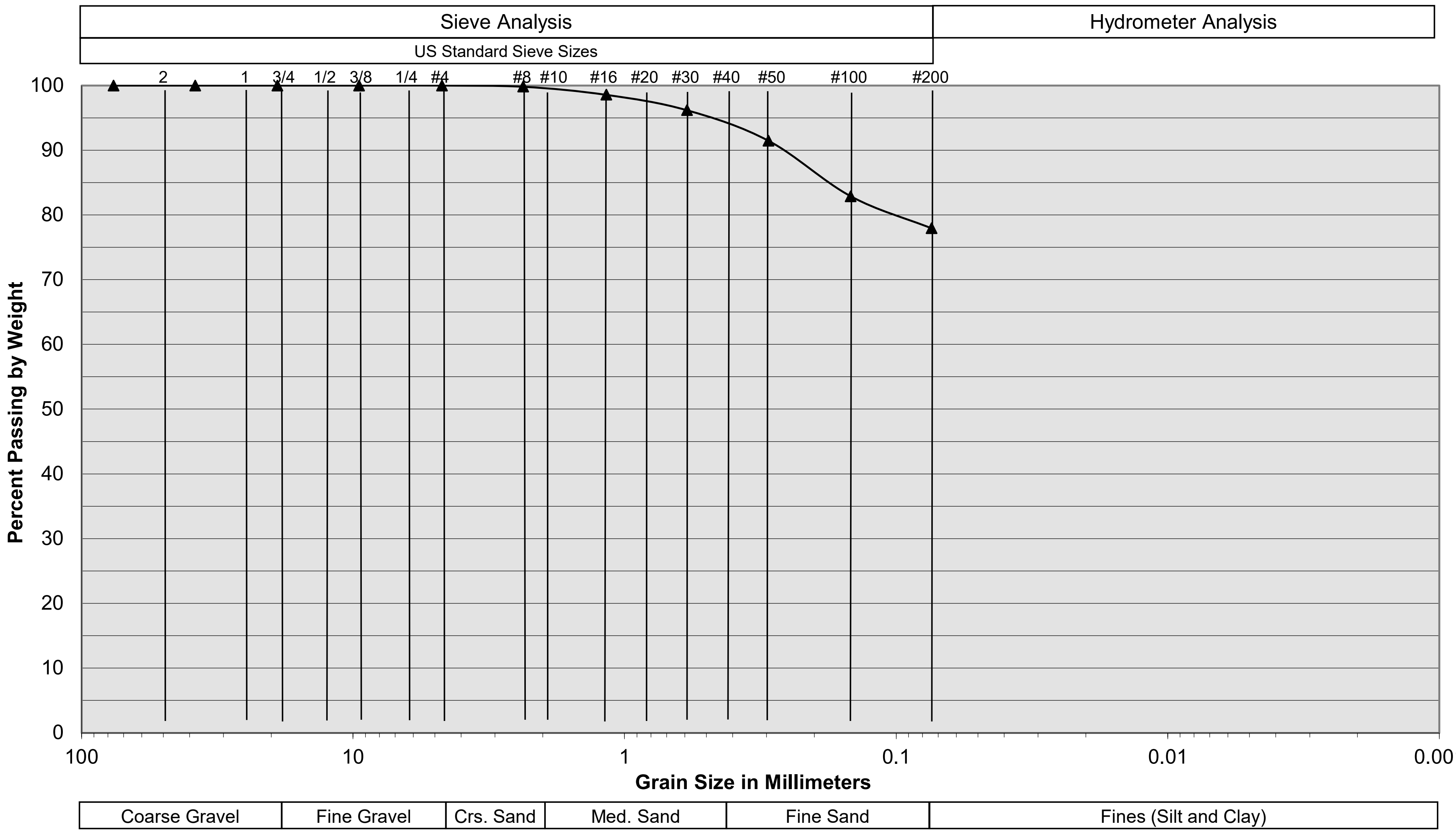


Sample Description	I-5 @ 8½ feet
Soil Classification	Brown fine Sandy Silt

Proposed Redlands West Development
Perris, CA
Project No. 20G179-2
PLATE C-5

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-6 @ 8½ feet
Soil Classification	Brown fine Sandy Silt

Proposed Redlands West Development
Perris, CA
Project No. 20G179-2
PLATE C-6

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL A California Corporation

Appendix 4: Historical Site Conditions

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

N/A

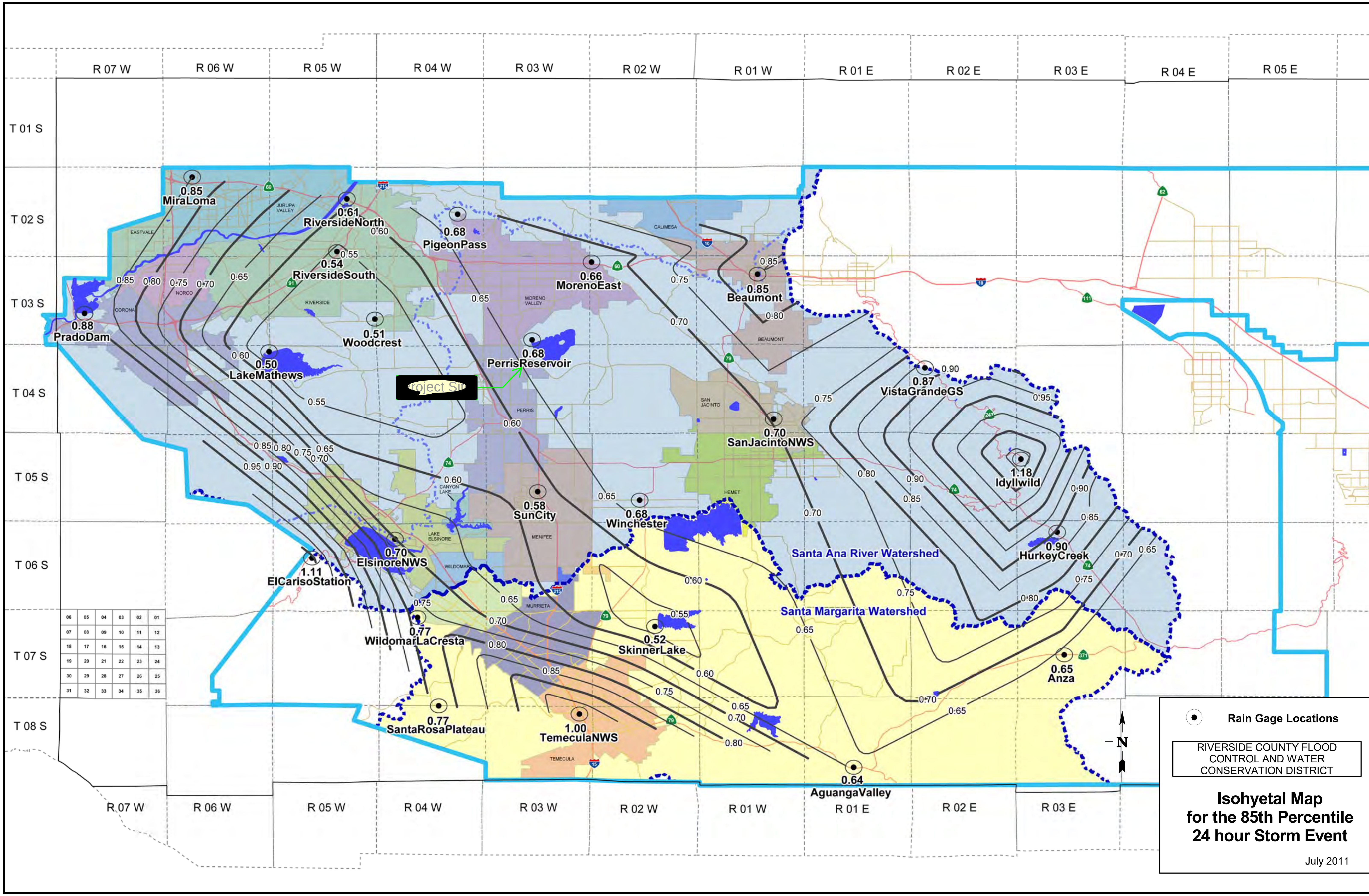
Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation


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
0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.68 PerrisReservoir
0.50 LakeMathews
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley
Santa Ana River Watershed
Santa Margarita Watershed
Rain Gage Locations
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
Isohyetal Map for the 85th Percentile 24 hour Storm Event
July 2011

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Albert A Webb Associates
Date: 7/13/2023
Designed by: RH
Case No:
Company Project Number/Name: 20-0186 Redlands West

BMP Identification

BMP NAME / ID: Basin 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.65 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA - Roofs	*297,039*	*Roofs*	*1*	*0.89*	*264958.8*			
DMA - Concrete / Asphalt	*431,874*	*Concrete or Asphalt*	*1*	*0.89*	*385231.6*			
DMA - Landscape	*148,396*	*Ornamental Landscaping*	*0.1*	*0.11*	*16391.5*			
	877309	***Total***			666581.9	0.65	*36106.5*	*38000*

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Albert A. Webb Associates
Date: 7/13/2023
Designed by: WG
Case No:
Company Project Number/Name: 20-0186 Redlands West

BMP Identification

BMP NAME / ID: DMA 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
DMAs	DMA 1 - Concrete / Asphalt	16,857	Concrete or Asphalt	1	0.89	15036.4			
	DMA 1 - Landscape	2,969	Ornamental Landscaping	0.1	0.110458	327.9			
	DMA 1 - Self-Retaining	3,561	Ornamental Landscaping	0.1	0.110458	393.3			
	DMA 1- Roofs	148872	Roofs	1	0.892	132793.8			
		172259	Total			148551.4	0.20	0.7	0.9

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP} (Rev. 10-2011)	Legend:	Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Albert A. Webb Associates
Date: 7/13/2023
Designed by: WG
Case No:
Company Project Number/Name: 20-0186 Redlands West

BMP Identification

BMP NAME / ID: DMA 2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA 2 - Concrete / Asphalt	*197,828*	*Concrete or Asphalt*	*1*	*0.89*	*176462.6*			
DMA 2 - Landscape	*53,099*	*Ornamental Landscaping*	*0.1*	*0.110458*	*5865.2*			
	250927	***Total***			**182327.8**	**0.20**	***0.8***	***0.9***

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Albert A. Webb Associates — Date: 7/13/2023

Designed by: WG — Case No:

Company Project Number/Name: 20-0186 Redlands West

BMP Identification

BMP NAME / ID: DMA 3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imprevious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA 3 - Concrete / Asphalt	*106773*	*Concrete or Asphalt*	*1*	*0.89*	*95241.5*			
DMA 3 - Landscape	*45595*	*Ornamental Landscaping*	*0.1*	*0.110458*	*5036.3*			
DMA 3 - Self-Retaining	*1504*	*Ornamental Landscaping*	*0.1*	*0.110458*	*166.1*			
	153872		***Total***		**100443.9**	**0.20**	***0.5***	***0.6***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Albert A. Webb Associates
Date: 7/13/2023
Designed by: WG
Case No:
Company Project Number/Name: 20-0186 Redlands West

BMP Identification

BMP NAME / ID: DMA 4

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA 4 - Concrete / Asphalt	*22246*	*Concrete or Asphalt*	*1*	*0.89*	*19843.4*			
DMA 4 - Landscape	*4431*	*Ornamental Landscaping*	*0.1*	*0.110458*	*489.4*			
DMA 4 - Self-Retaining	*3241*	*Ornamental Landscaping*	*0.1*	*0.110458*	*358*			
DMA 4- Roofs	*148167*	*Roofs*	*1*	*0.892*	*132165*			
	178085	***Total***			**152855.8**	**0.20**	**0.7**	**0.9**

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Albert A. Webb Associates Date: 7/13/2023
Designed by: WG Case No:
Company Project Number/Name: 20-0186 Redlands West

BMP Identification

BMP NAME / ID: DMA 5

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*DMA 5 - Concrete / Asphalt*	*51,716*	*Concrete or Asphalt*	*1*	*0.89*	*46130.7*			
	DMA 5 - Landscape	*18,082*	*Ornamental Landscaping*	*0.1*	*0.110458*	*1997.3*			
	DMA 5 - Self-Retaining	*8,050*	*Ornamental Landscaping*	*0.1*	*0.110458*	*889.2*			
		77848	***Total***			**49017.2**	**0.20**	***0.2***	***0.3***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Albert A. Webb Associates
Date: 7/13/2023
Designed by: WG
Case No:
Company Project Number/Name: 20-0186 Redlands West

BMP Identification

BMP NAME / ID: DMA 6

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA 6 - Concrete / Asphalt	*21385*	*Concrete or Asphalt*	*1*	*0.89*	*19075.4*			
DMA 6 - Landscape	*4468*	*Ornamental Landscaping*	*0.1*	*0.110458*	*493.5*			
	25853	**Total**			**19568.9**	**0.20**	**0.1**	**0.1**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Albert A. Webb Associates
Date: 7/13/2023

Designed by: WG
Case No:

Company Project Number/Name: 20-0186 Redlands West

BMP Identification

BMP NAME / ID: DMA 7

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA 7 - Concrete / Asphalt	*15069*	*Concrete or Asphalt*	*1*	*0.89*	*13441.5*			
DMA 7 - Landscape	*3396*	*Ornamental Landscaping*	*0.1*	*0.110458*	*375.1*			
	18465	***Total***			**13816.6**	**0.20**	***0.1***	***0.1***

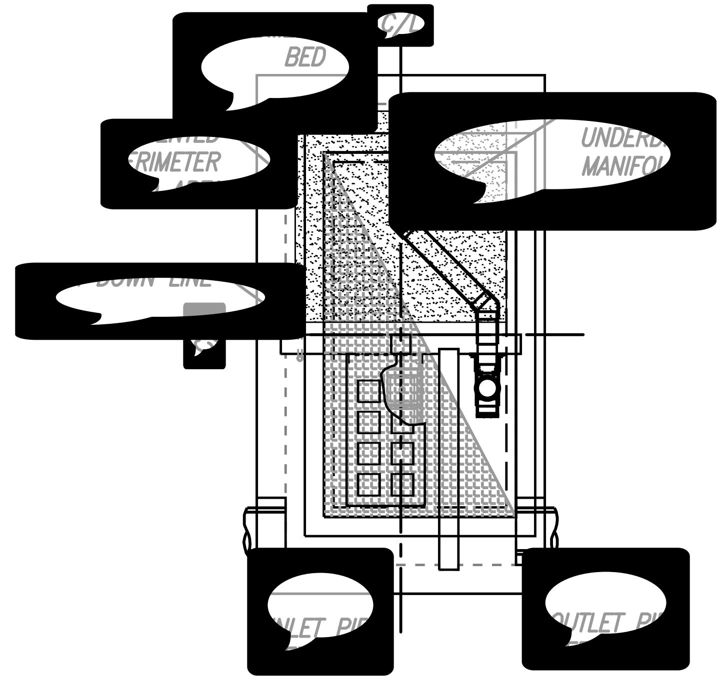
DMAs

Notes:

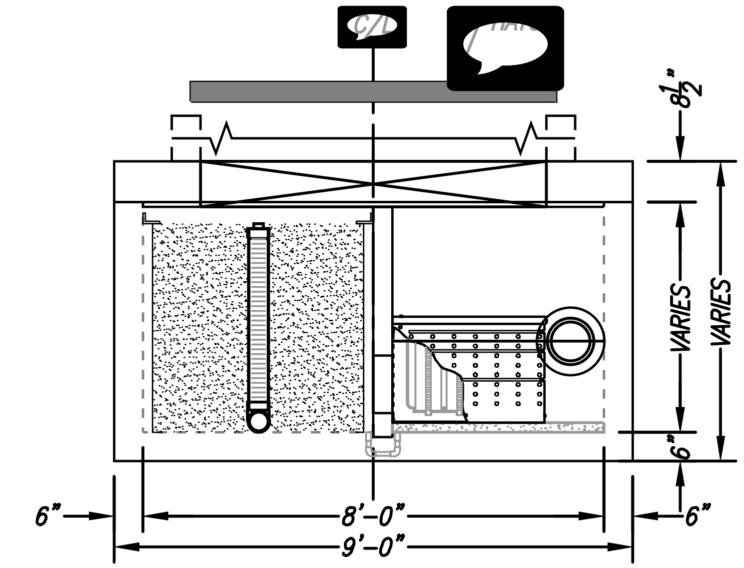
SITE SPECIFIC DATA

[redacted]			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
0.115			
[redacted]			OFFLINE
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]			
[redacted]	N/A	N/A	N/A
[redacted]			
	[redacted]	[redacted]	[redacted]
[redacted]			
[redacted]	DIRECT TRAFFIC		
[redacted]			

* PRELIMINARY NOT FOR CONSTRUCTION



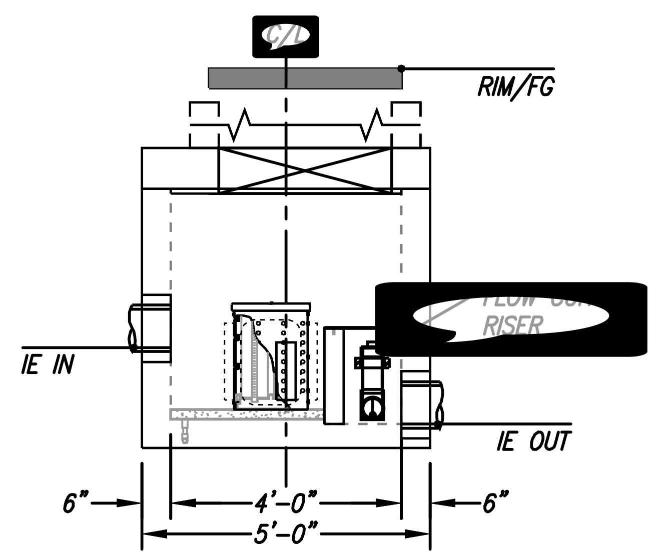
PLAN VIEW



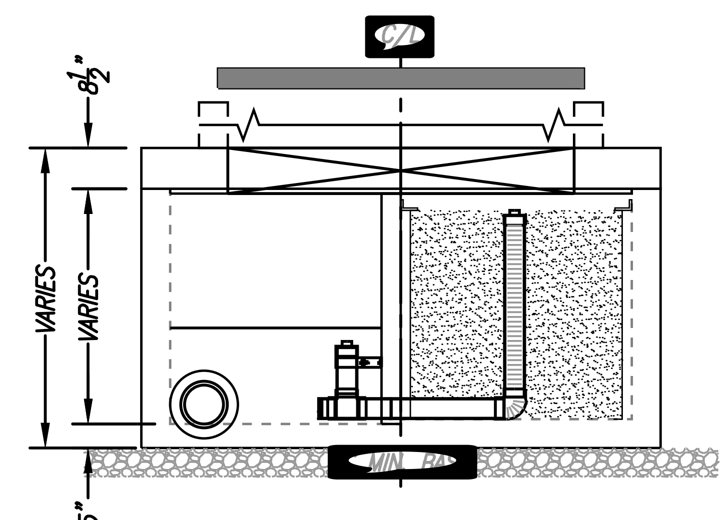
LEFT END VIEW

INSTALLATION NOTES

1 [redacted]



ELEVATION VIEW



RIGHT END VIEW

GENERAL NOTES

[redacted]

[redacted]	0.115
[redacted]	3.4
[redacted]	2.0
[redacted]	1.0

MODULAR WETLANDS

FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH® ENGINEERED SOLUTIONS LLC

www.ContechES.com

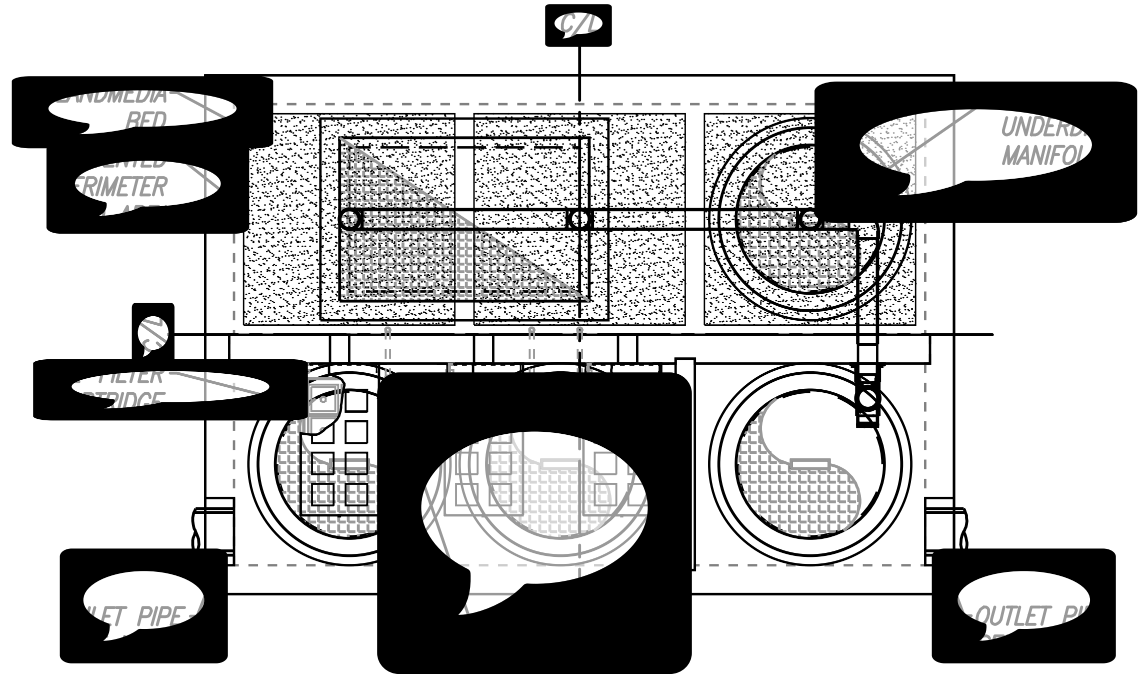
MWS-L-4-8-V-UG

STORMWATER BIOFILTRATION SYSTEM

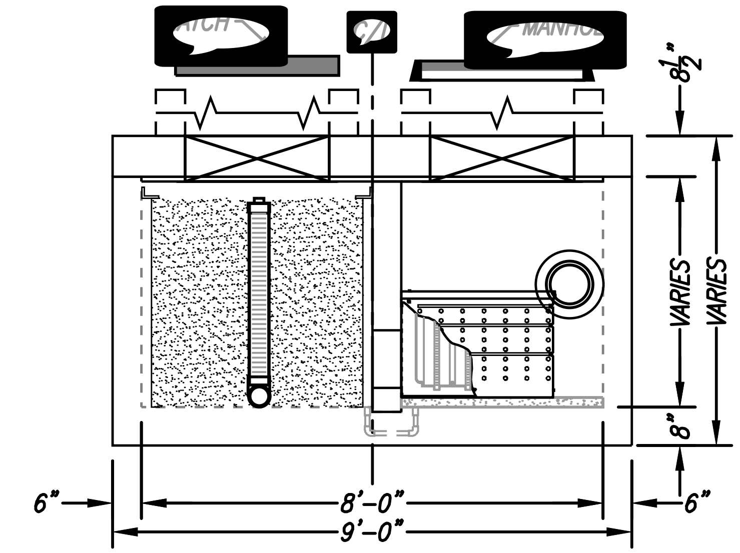
STANDARD DETAIL

SITE SPECIFIC DATA			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
0.346			
[redacted]			OFFLINE
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]			
[redacted]	N/A	N/A	N/A
[redacted]			
	[redacted]	[redacted]	[redacted]
[redacted]			
[redacted]	DIRECT TRAFFIC		
[redacted]			

* PRELIMINARY NOT FOR CONSTRUCTION



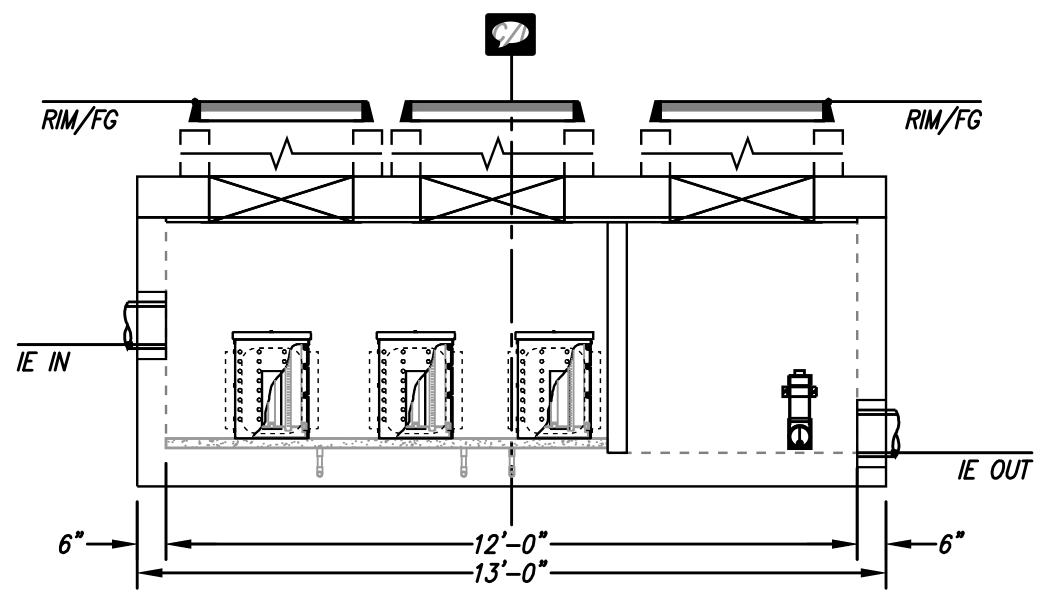
PLAN VIEW



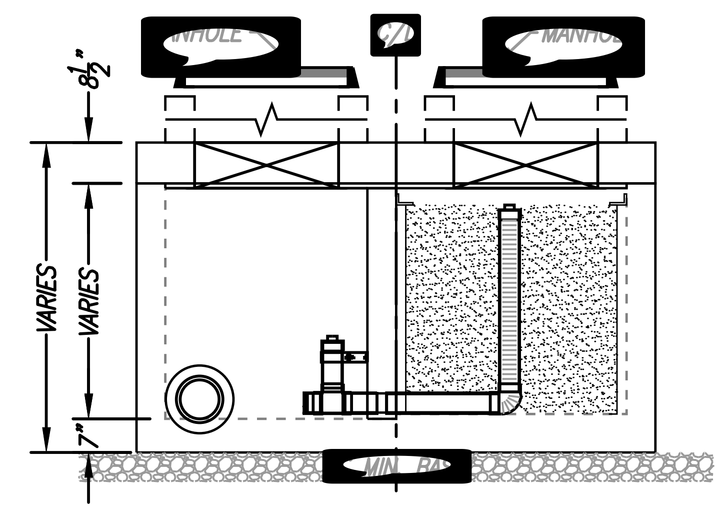
LEFT END VIEW

INSTALLATION NOTES

[redacted]



ELEVATION VIEW



RIGHT END VIEW

GENERAL NOTES

[redacted]

[redacted]	0.346
[redacted]	3.4
[redacted]	2.0
[redacted]	1.0

MODULAR WETLANDS

FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH® ENGINEERED SOLUTIONS LLC

www.ContechES.com

MWS-L-8-12-V-UG

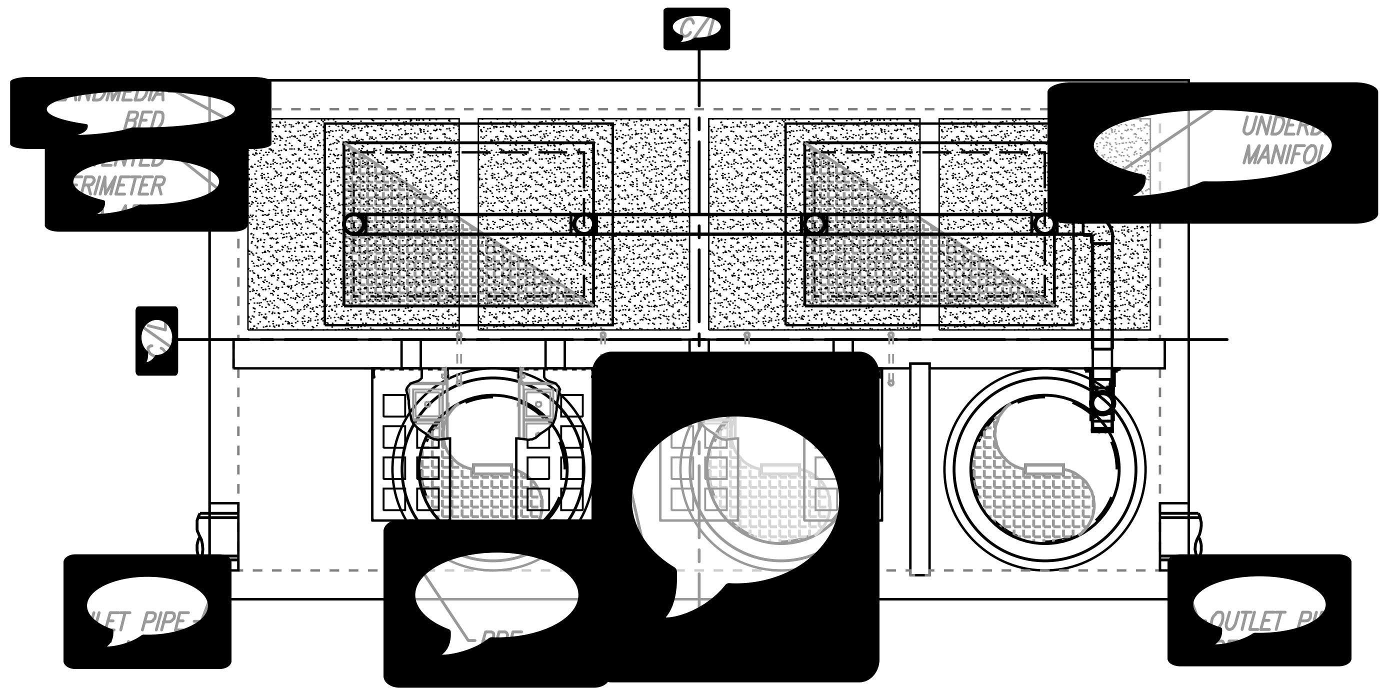
STORMWATER BIOFILTRATION SYSTEM

STANDARD DETAIL

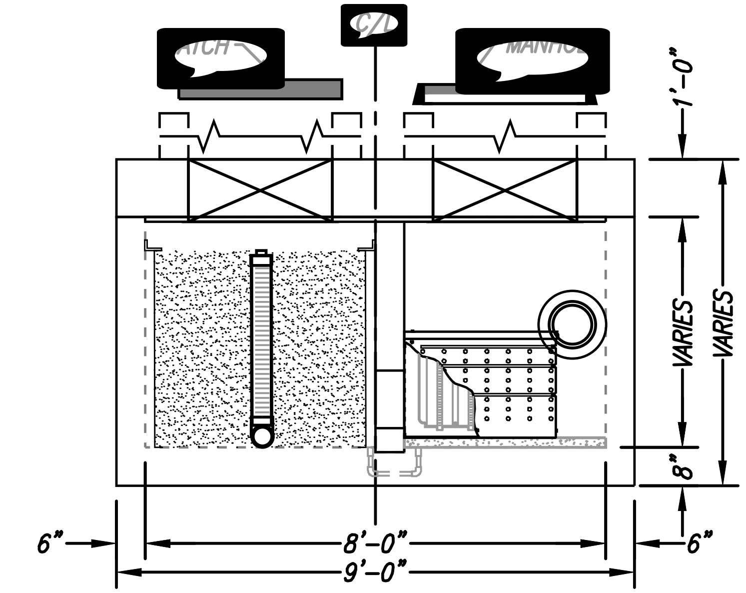
SITE SPECIFIC DATA

[redacted]			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
0.462			
[redacted]			OFFLINE
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]			
[redacted]	N/A	N/A	N/A
[redacted]			
	[redacted]	[redacted]	[redacted]
[redacted]			
[redacted]	DIRECT TRAFFIC		
[redacted]			

* PRELIMINARY NOT FOR CONSTRUCTION



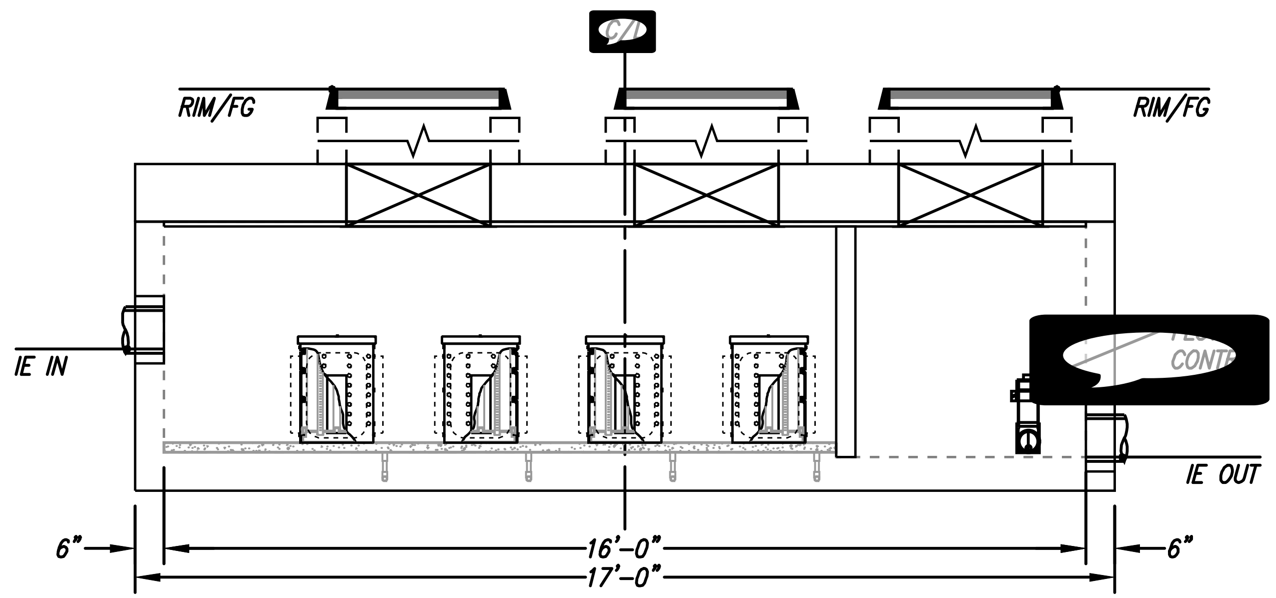
PLAN VIEW



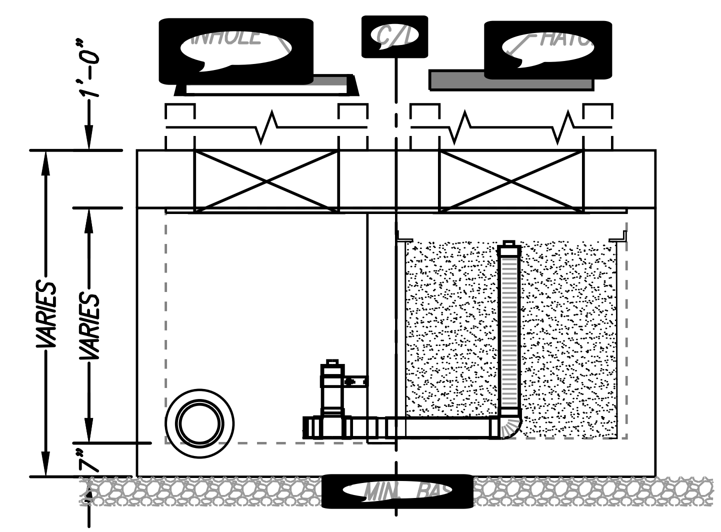
LEFT END VIEW

INSTALLATION NOTES

1 [redacted]



ELEVATION VIEW



RIGHT END VIEW

[redacted]	0.462
[redacted]	3.4
[redacted]	2.0
[redacted]	1.0

GENERAL NOTES

[redacted]

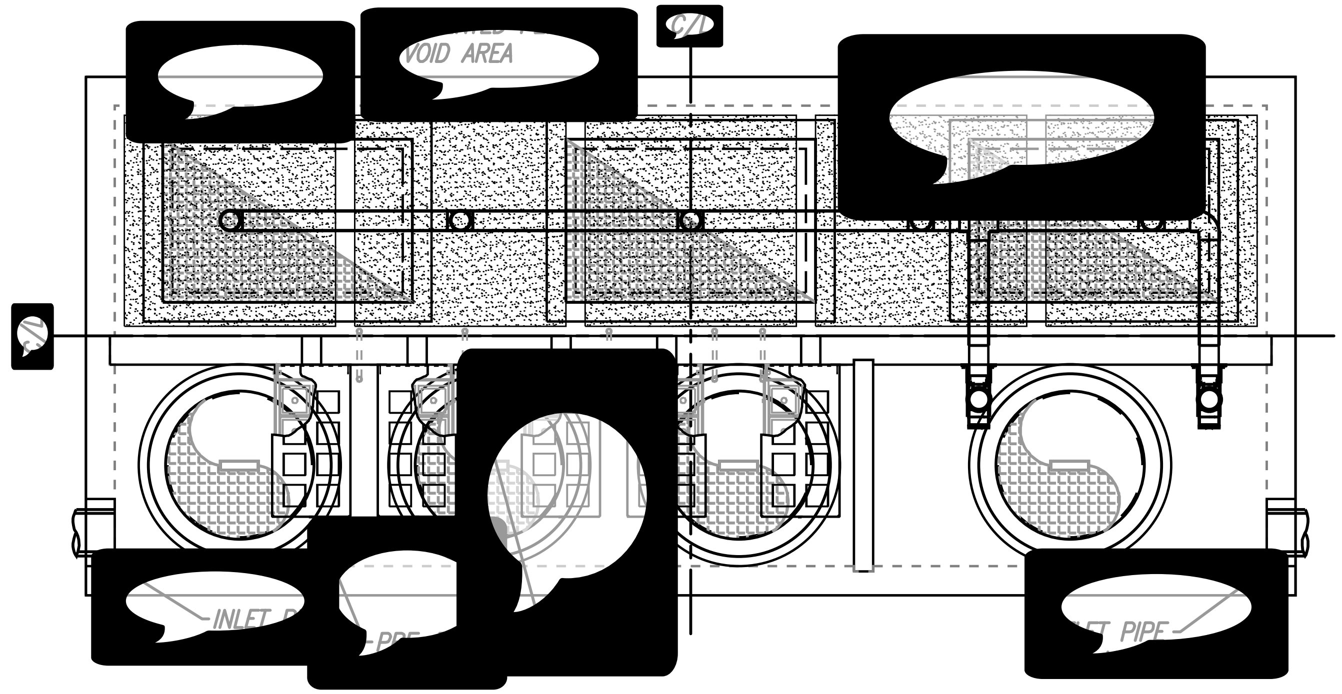
MODULAR WETLANDS
FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com

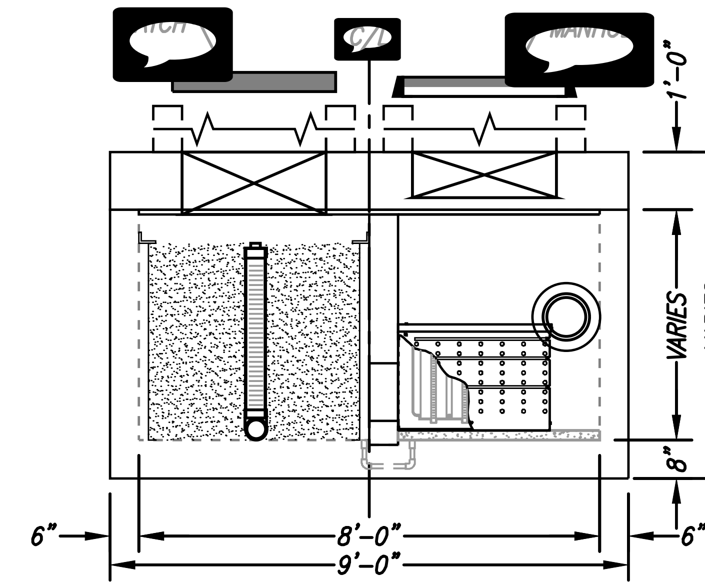
MWS-L-8-16-V-UG
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

SITE SPECIFIC DATA			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
[redacted]			
0.577			
[redacted]			OFFLINE
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]			
[redacted]	N/A	N/A	N/A
[redacted]			
	[redacted]	[redacted]	[redacted]
[redacted]			
[redacted]	DIRECT TRAFFIC		
[redacted]			

* PRELIMINARY NOT FOR CONSTRUCTION



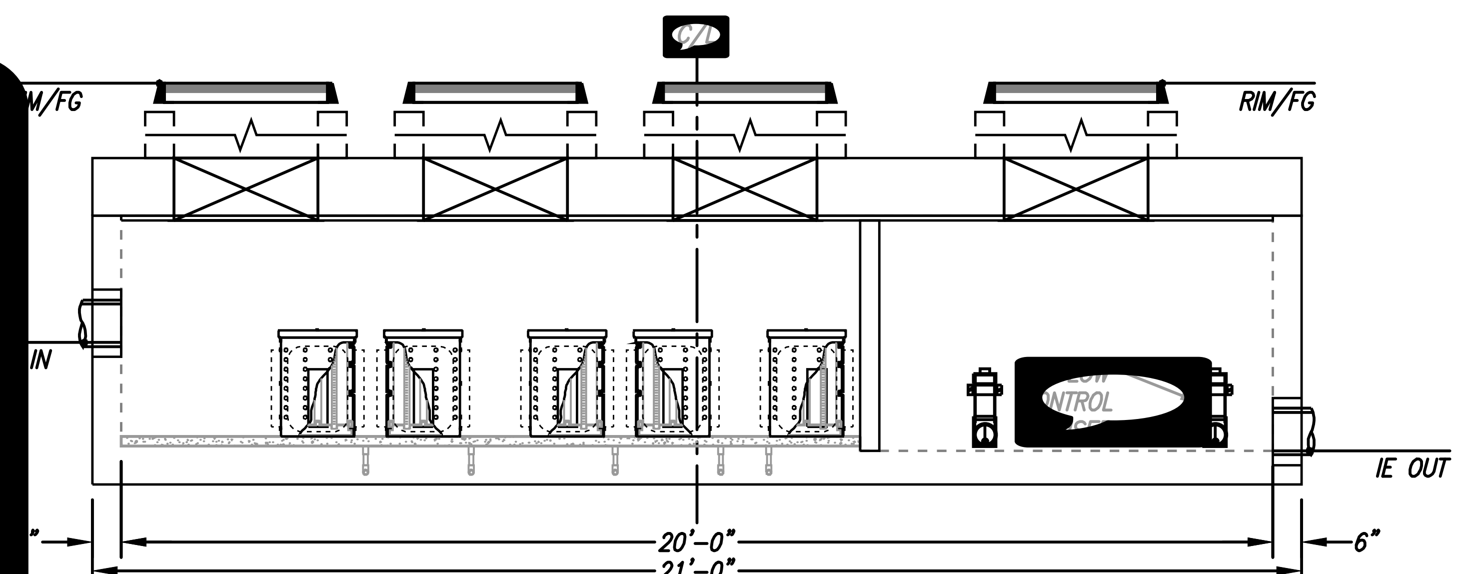
PLAN VIEW



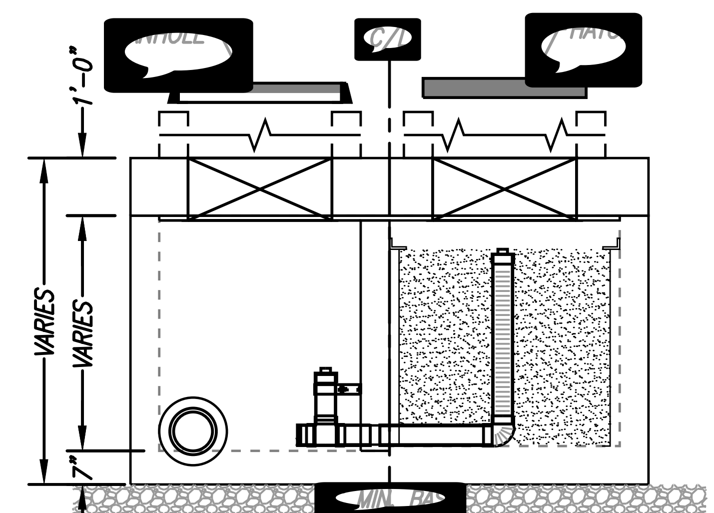
LEFT END VIEW

INSTALLATION NOTES

[redacted]



ELEVATION VIEW



RIGHT END VIEW

GENERAL NOTES

[redacted]

[redacted]	0.577
[redacted]	3.4
[redacted]	2.0
[redacted]	1.0

MODULAR WETLANDS
FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com

MWS-L-8-20-V-UG
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

CONTECH®
ENGINEERED SOLUTIONS

Modular Wetlands® Linear Stormwater Biofiltration

The experts you need to solve your stormwater challenges

Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team

STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.

STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.

REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.

SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions

Restoring Nature's Presence in Urban Areas – Modular Wetlands® Linear

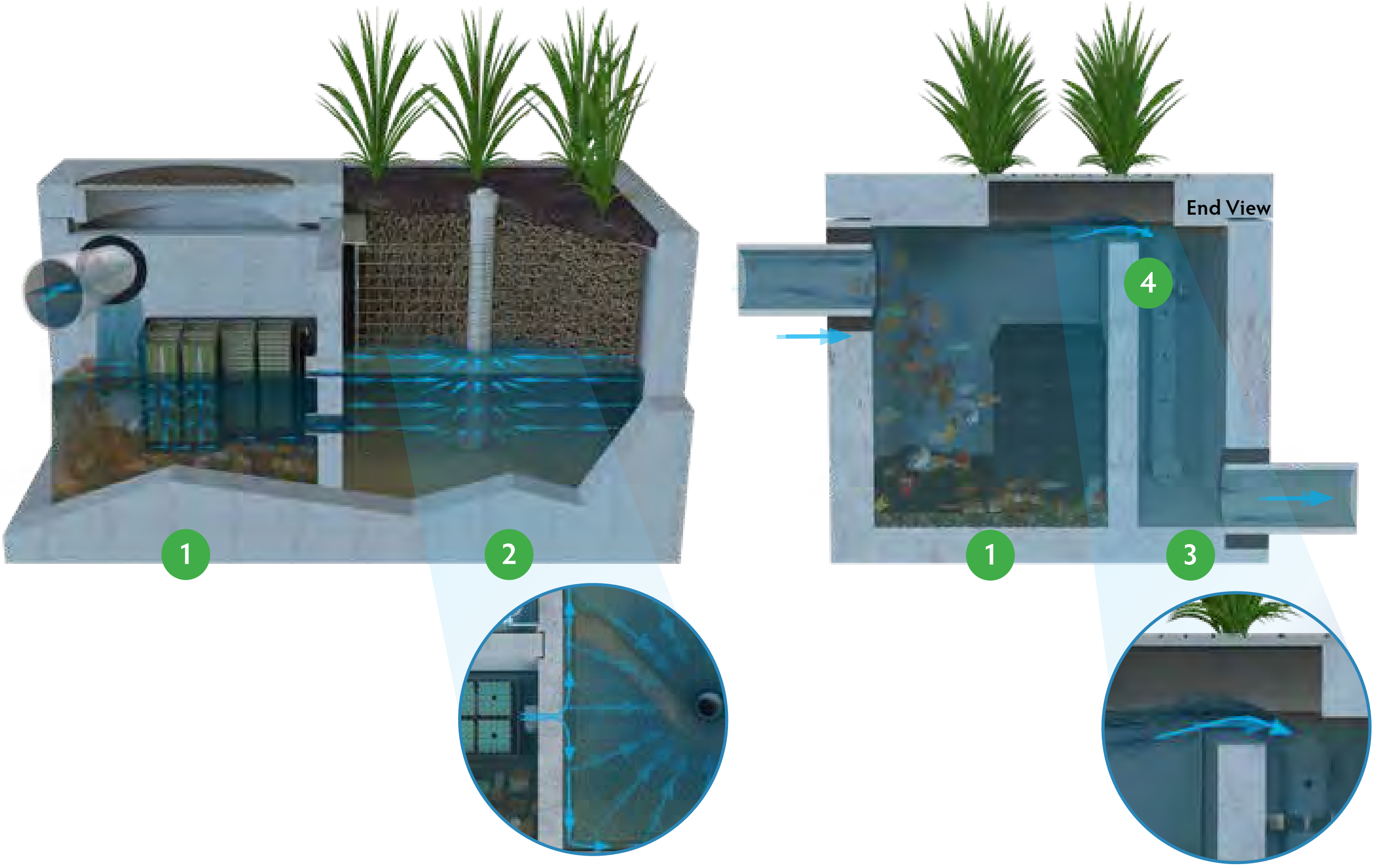
As cities grow, there is less space for natural solutions to treat stormwater. Contech understands this and is committed to providing compact, Low Impact Development (LID) solutions like the Modular Wetlands Linear to protect our nation's waterways.

The Modular Wetlands® Linear is the only biofiltration system to utilize patented horizontal flow, allowing for a small footprint, high treatment capacity, and design versatility. It is also the only biofiltration system that can be routinely installed downstream of storage for additional volume control and treatment.

With numerous regulatory approvals, the system's aesthetic appeal and superior pollutant removal make it the ideal solution for a wide range of stormwater applications, including urban development projects, commercial parking lots, residential streets, mixed-use developments, streetscapes, and more.

MODULAR WETLANDS®

How the Modular Wetlands® Linear Works



1 **PRETREATMENT** | Stormwater enters the pretreatment chamber where total suspended solids settle, and trash and debris are contained within the chamber. Stormwater then travels through the pretreatment filter boxes that provide additional treatment.

2 **BIOFILTRATION** | As water enters the biofiltration chamber, it fills the void space in the chamber's perimeter. Horizontal forces push the water inward through the biofiltration media, where nutrients and metals are captured. The water then enters the drain pipe to be discharged.

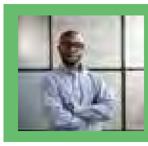
3 **DISCHARGE** | The specially designed vertical drain pipe and orifice control plate control the flow of water through the media to a level lower than the media's capacity, ensuring media effectiveness. The water then enters the horizontal drain pipe to be discharged.

4 **BYPASS** | During peak flows, an internal weir in the side-by-side configuration allows high flows to bypass treatment, eliminating flooding and the need for a separate bypass structure. Bypass is not provided in the end-to end configuration.

Using horizontal flow to improve performance

Modular Wetlands® Linear Features and Benefits

FEATURE	BENEFITS
Pretreatment chamber	Enhanced pollutant removal, faster maintenance
Horizontal flow biofiltration	Greater filter surface area
Performance verified by both the WA DOE and NJ DEP	Superior pollutant capture with confidence
Built-in high flow bypass	Eliminates flooding and the need for a separate bypass structure
Available in multiple configurations and sizes	Flexibility to meet site-specific needs

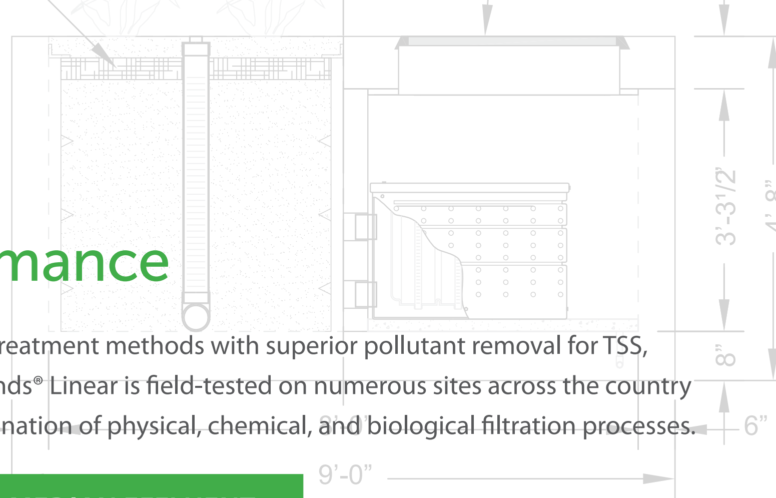


The Modular Wetlands system offers many different configurations.

Select Modular Wetlands® Linear Approvals

Modular Wetlands Linear is approved through numerous local, state and federal programs, including but not limited to:

- Washington State Department of Ecology TAPE
- California Water Resources Control Board, Full Capture Certification
- Virginia Department of Environmental Quality (VA DEQ)
- New Jersey Department of Environmental Protection (NJDEP)
- Maryland Department of the Environment - Environmental Site Design (ESD)
- Rhode Island Department of Environmental Management BMP
- Texas Commission on Environmental Quality (TCEQ)
- Atlanta Regional Commission Certification



Modular Wetlands® Performance

The Modular Wetlands® Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, and hydrocarbons. The Modular Wetlands® Linear is field-tested on numerous sites across the country and is proven to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes.

POLLUTANT OF CONCERN	MEDIAN REMOVAL EFFICIENCY	MEDIAN EFFLUENT CONCENTRATION (MG/L)
Total Suspended Solids (TSS)	89%	12
Total Phosphorus - TAPE (TP)	61%	0.041
Nitrogen (TN)	23%	1
Total Copper (TCu)	50%	0.006
Total Dissolved Copper	37%	0.006
Total Zinc (TZn)	66%	0.019
Dissolved Zinc	60%	0.0148
Motor Oil	79%	0.8

Sources:
TAPE Field Study - 2012
TAPE Field Study - 2013

Note: Some jurisdictions recognize higher removal rates. Contact your Contech Stormwater Consultant for performance expectations.

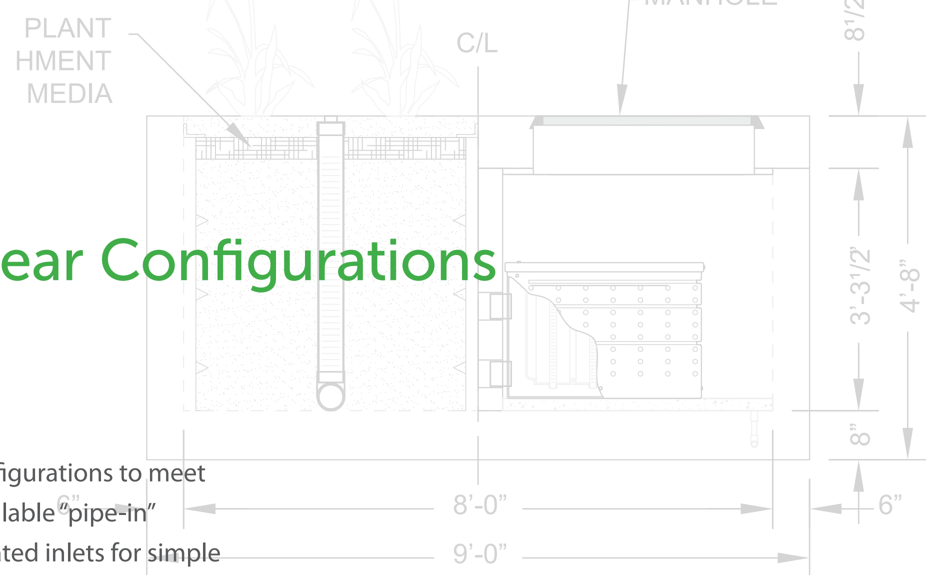
Modular Wetlands® Linear Maintenance

The Modular Wetlands® Linear is a self-contained treatment train. Maintenance requirements for the unit consist of five simple steps that can be completed using a vacuum truck. The system can also be cleaned by hand.

- Remove trash from the screening device
- Remove sediment from the separation chamber
- Periodically replace the pretreatment cartridge filter media
- Replace the drain down filter media
- Trim vegetation

Most Modular Wetland Linear systems can be cleaned in about thirty minutes.

Multiple configurations allow for easy site integration



Modular Wetlands® Linear Configurations

Multiple system configurations integrate with site hydraulic design and layout ...

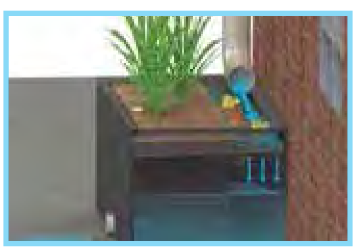
The Modular Wetlands Linear is offered in multiple configurations to meet site specific needs. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your storm drain design.

Curb Inlet

The Curb Inlet configuration accepts sheet flow through a curb opening and is commonly used along roadways and parking lots. It can be used in sump or flow-by conditions.

Vault

The Vault configuration can be used in end-of-the-line installations. Another benefit of the "pipe-in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements, or for traffic-rated designs (no plants).



Downspout

The Downspout configuration is designed to accept a vertical downspout pipe from rooftop and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter, and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

For more information: www.ContechES.com

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

CONTECH® ENGINEERED SOLUTIONS

Get social with us:

800-338-1122 | www.ContechES.com

StormTech®

ADS®

STORMTECH MC-3500 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

STORMTECH MC-3500 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
90" x 77" x 45"
2,286 mm x 1,956 mm x 1,143 mm

Chamber Storage
109.9 ft^3 (3.11 m^3)

Min. Installed Storage*
175.0 ft^3 (4.96 m^3)

Weight
134 lbs (60.8 kg)

Shipping
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 6" (150 mm) of stone between chambers/end caps and 40% stone porosity.

STORMTECH MC-3500 END CAP
(not to scale)

Nominal End Cap Specifications

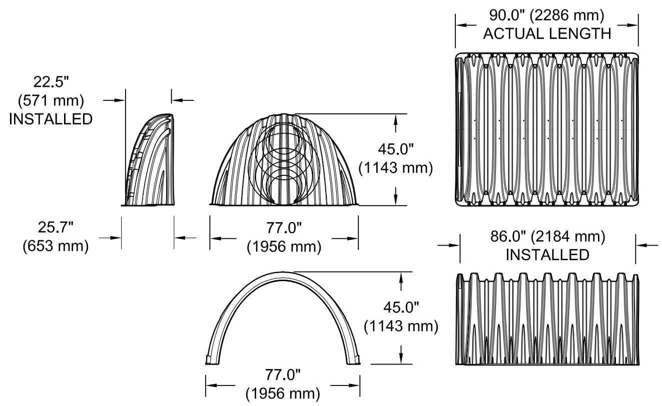
Size (L x W x H)
26.5" x 71" x 45.1"
673 mm x 1,803 mm x 1,145 mm

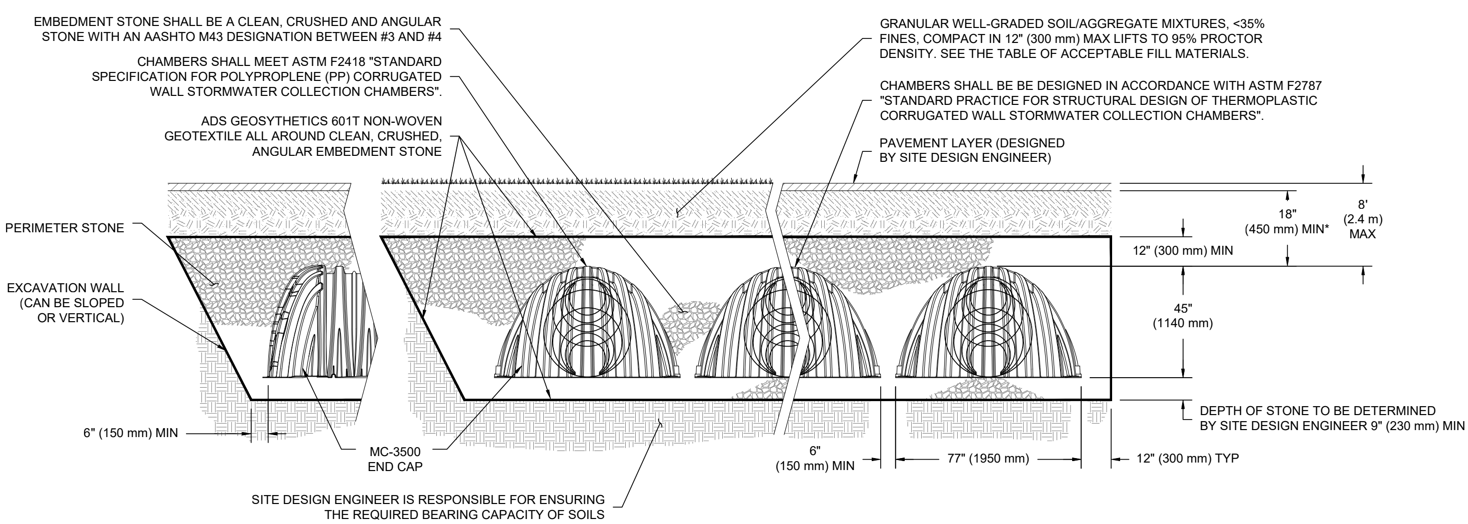
End Cap Storage
14.9 ft^3 (0.42 m^3)

Min. Installed Storage*
45.1ft^3 (1.28 m^3)

Weight
49 lbs (22.2 kg)

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 6" (150 mm) of stone perimeter, 6" (150 mm) of stone between chambers/end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

MC-3500 CHAMBER SPECIFICATION

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-3500 Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
MC-3500 End Cap	14.9 (.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

Note: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

AMOUNT OF STONE PER CHAMBER

ENGLISH TONS (yds³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-3500 Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
MC-3500 End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC KILOGRAMS (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
MC-3500 Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
MC-3500 End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

Note: Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375mm)	18" (450 mm)
MC-3500 Chamber	11.9 (9.1)	12.4 (9.5)	12.8(9.8)	13.3 (10.2)
MC-3500 End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

Note: Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Working on a project?
Visit us at www.stormtech.com
and utilize the StormTech Design Tool

For more information on the StormTech MC-3500 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

*THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS®*

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteASSIST™ FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

REDLANDS WEST PRELIM

PERRIS, CA

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 F2418-16a, "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 AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. 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.

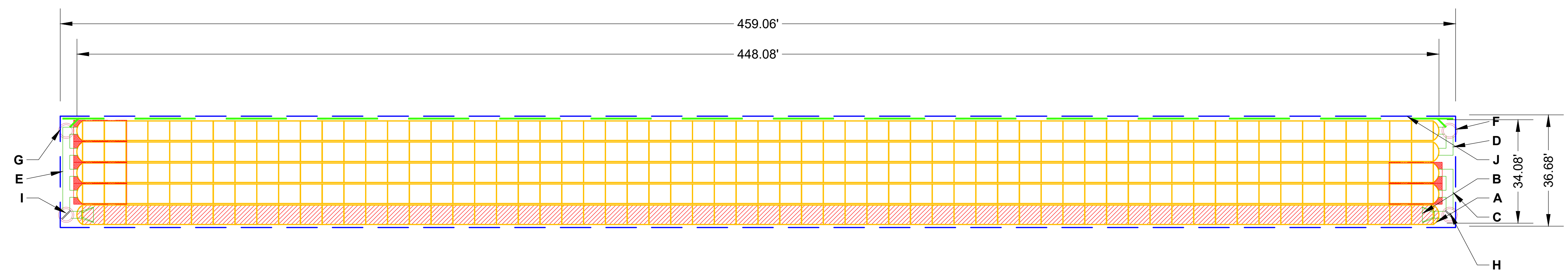
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT	
310	STORMTECH MC-3500 CHAMBERS
10	STORMTECH MC-3500 END CAPS
36	STONE ABOVE (in)
9	STONE BELOW (in)
40	STONE VOID
71059	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
16840	SYSTEM AREA (SF)
991.5	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	1444.25
TOP OF STONE:	1439.25
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1438.25
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1437.75
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1437.75
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1437.75
TOP OF MC-3500 CHAMBER:	1436.25
24" x 24" BOTTOM MANIFOLD INVERT:	1432.67
24" x 24" BOTTOM MANIFOLD INVERT:	1432.67
24" x 24" BOTTOM MANIFOLD INVERT:	1432.67
24" ISOLATOR ROW PLUS INVERT:	1432.67
24" ISOLATOR ROW PLUS INVERT:	1432.67
24" BOTTOM CONNECTION INVERT:	1432.67
24" BOTTOM CONNECTION INVERT:	1432.67
BOTTOM OF MC-3500 CHAMBER:	1432.50
UNDERDRAIN INVERT:	1431.75
BOTTOM OF STONE:	1431.75

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.06"	
FLAMP	B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC350024RAMP (TYP 2 PLACES)		
MANIFOLD	C	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.06"	
MANIFOLD	D	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.06"	
MANIFOLD	E	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.06"	
CONCRETE STRUCTURE	F	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		14.0 CFS OUT
CONCRETE STRUCTURE	G	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		7.0 CFS OUT
CONCRETE STRUCTURE W/WEIR	H	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		17.0 CFS IN
CONCRETE STRUCTURE W/WEIR	I	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		34.0 CFS IN
UNDERDRAIN	J	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 17.50' OF ADSPLUS175 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.

REDLANDS WEST PRELIM
PERRIS, CA

DRAWN: AS
CHECKED: N/A
DATE:
PROJECT #:

REV	DRW	CHK	DESCRIPTION

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

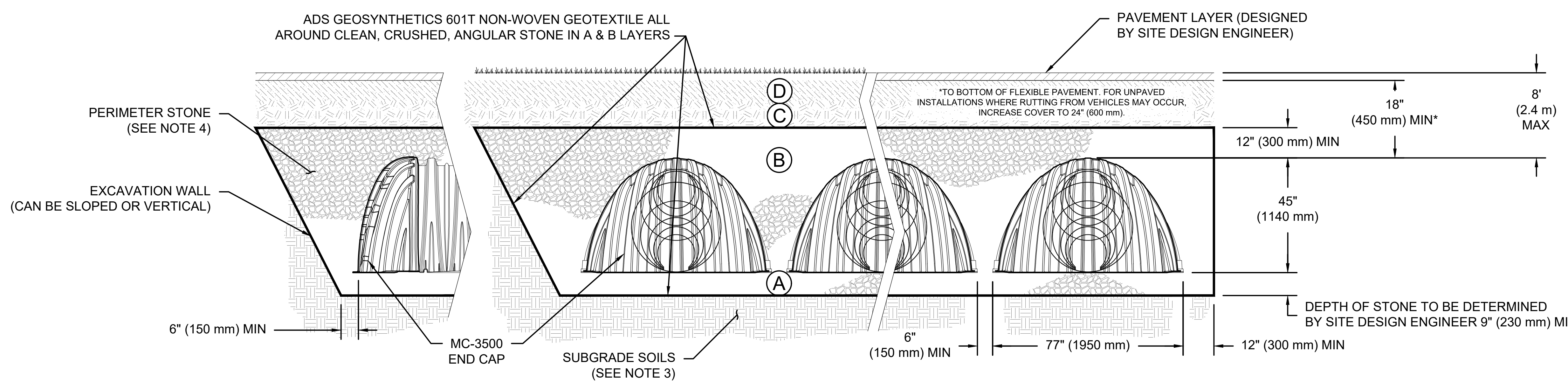
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

0 40' 80'

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** 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	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** 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.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 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	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

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.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "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 AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. 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.

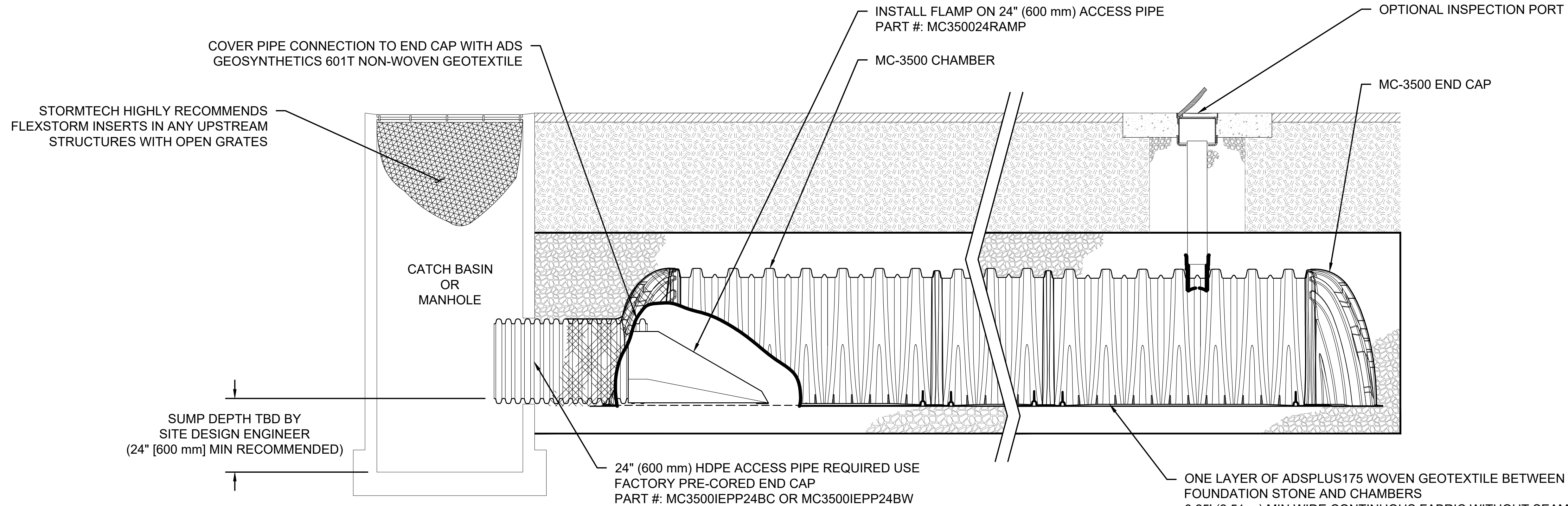
REDLANDS WEST PRELIM
PERRIS, CA

DRAWN: AS
CHECKED: N/A
DATE:
PROJECT #:

REV	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

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



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.

REDLANDS WEST PRELIM
PERRIS, CA

DATE: | DRAWN: AS
PROJECT #: | CHECKED: N/A

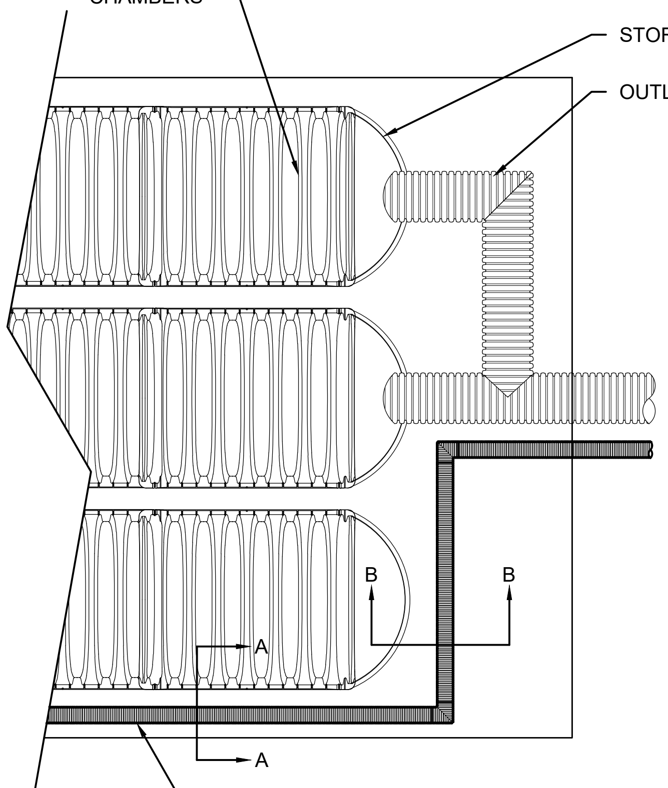
REV	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

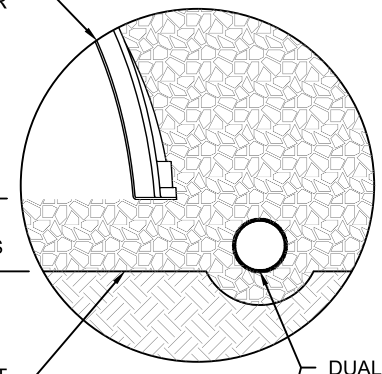
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

UNDERDRAIN DETAIL

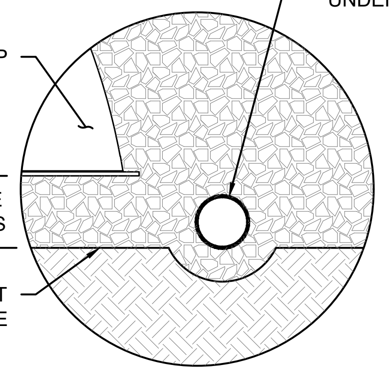
NTS



NUMBER AND SIZE OF UNDERDRAINS PER SITE DESIGN ENGINEER
4" (100 mm) TYP FOR SC-310 & SC-160LP SYSTEMS
6" (150 mm) TYP FOR SC-740, DC-780, MC-3500 & MC-4500 SYSTEMS



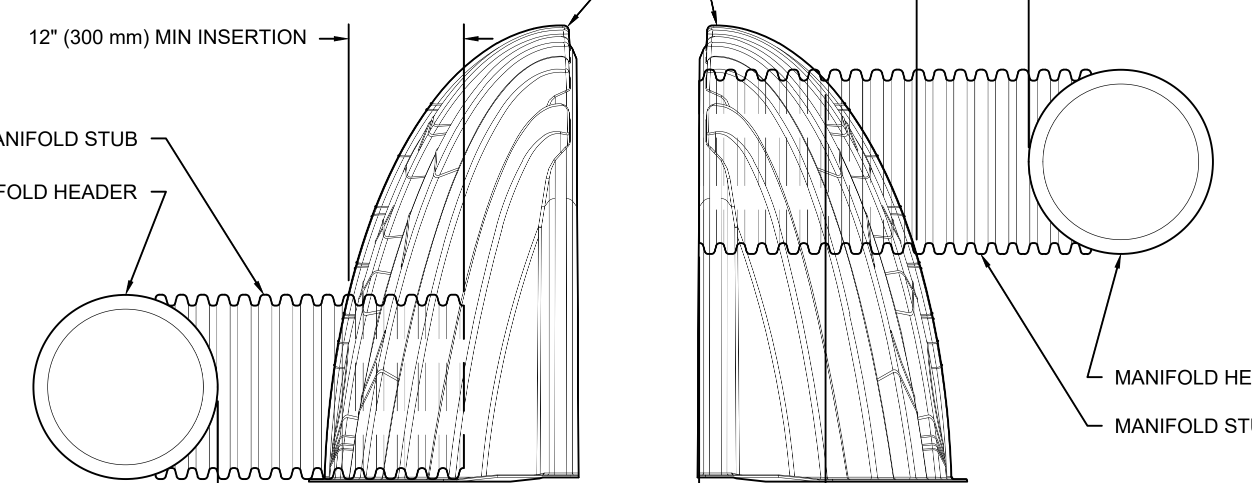
SECTION A-A



SECTION B-B

MC-SERIES END CAP INSERTION DETAIL

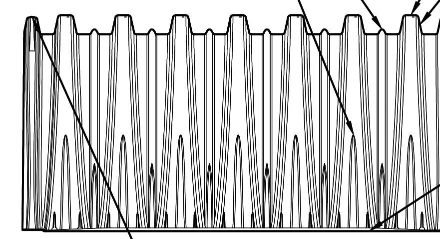
NTS

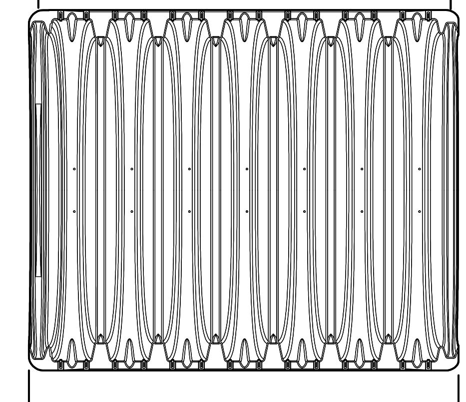


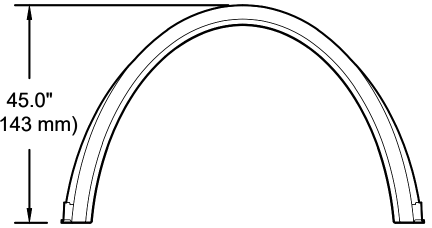
NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

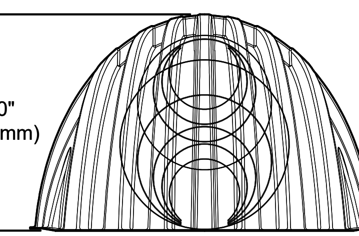
MC-3500 TECHNICAL SPECIFICATION

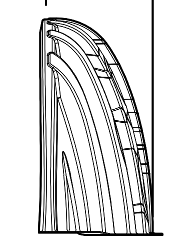
NTS











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 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

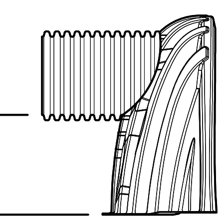
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

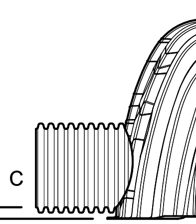
*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

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)

NOTE: ALL DIMENSIONS ARE NOMINAL





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.

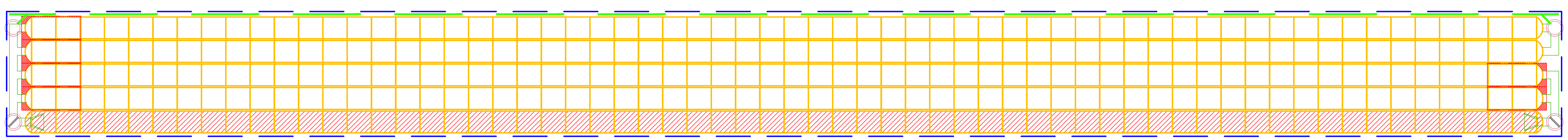
REDLANDS WEST PRELIM
PERRIS, CA

DATE:
DRAWN: AS
PROJECT #:
CHECKED: N/A

REV	DRW	CHK	DESCRIPTION

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

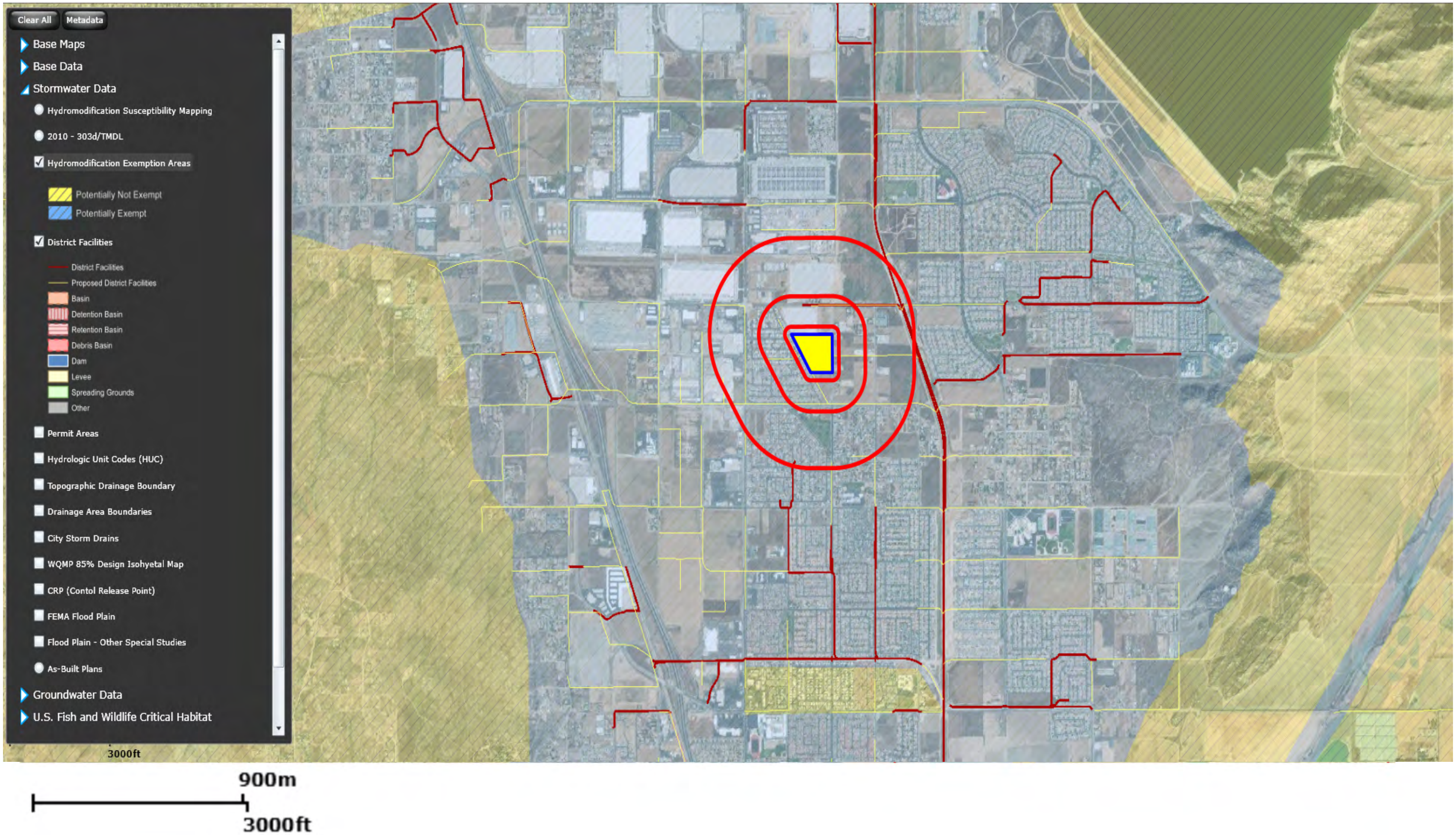
StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM



Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

The project site drains towards the MDP Line A-B via an extension of the existing lateral Lat A-B-10. The Redlands West Industrial project is allocated 20.0 cfs of flow to discharge into Lat A-B-10. Proposed underground storage chambers are required for the site in order to mitigate the 100-year peak flow rates.



Riverside County
SWCTT

Stormwater Map

Site Address: rivco.permitrack.com

DEVELOPED CONDITION									
Cover Type	Condition (Poor,Fair,Good)	Soil Type (A,B,C,D)	COVER TYPE	RI	Land Use	% Impervious	Area (SF)	Area (Acre)	Impervious Area (SF)
Urban	Good	B	RESIDENTIAL OR COMMERCIAL	56	Streets/Conc	0.9	165244	3.79	148720
Urban	Good	B	RESIDENTIAL OR COMMERCIAL	56	Roof	0.9	191447	4.40	172302
Urban	Good	B	RESIDENTIAL OR COMMERCIAL	56	Landscape	0	80318	1.84	0
Urban	Good	C	RESIDENTIAL OR COMMERCIAL	69	Streets/Conc	0.9	266630	6.12	239967
Urban	Good	C	RESIDENTIAL OR COMMERCIAL	69	Roof	0.9	105592	2.42	95033
Urban	Good	C	RESIDENTIAL OR COMMERCIAL	69	Landscape	0	68078	1.56	0
			AVERAGE WEIGHTED RI VALUE	**62.5**		**TOTAL**	877309	20.1	656022
						TOTAL % IMPERVIOUS			**75%**
						LOW LOSS RATE			**0.30**

DEVELOPED CONDITION									
	EAST			WEST			COMBINED	
RETURN PERIOD *(yr)*	EVENT *(hrs)*	VOL *(ac-ft)*	***PEAK*** *(cfs)*	EVENT *(hrs)*	VOL *(ac-ft)*	***PEAK*** *(cfs)*	VOL *(ac-ft)*	***PEAK*** *(cfs)*
100	1	1.1	*36.37*	1	1.8	*49.37*	2.9	*85.74*
	3	1.6	*20.47*	3	2.6	*30.85*	4.2	*51.32*
	6	2.1	*17.76*	6	3.2	*26.8*	5.3	*44.56*
	24	3.3	*5.81*	24	5.3	*9.27*	8.6	*15.08*

\\chqpan01.webb.lan\WO4\2020\20-0181\Drainage\PHYD\Hydrology\Unit Hydrograph\[20-0181 Eas

	Developed Condition		Basin Routing Results		
Storm Event	Volume (Ac-ft)	Peak Flow (cfs)	Peak Flow (cfs)	Max Basin Depth (feet)	Water Surface Elevation (cfs)
EAST 100-Year, 1-Hour	1.1	36.4	5.0	3.98	1434.98
WEST 100-Year, 1-Hour	1.8	49.4	5.0	5.22	1440.72
COMBINED 100-Year, 1-Hour	**2.9**	**85.8**	**10.0**	-	-
EAST 100-Year, 3-Hour	1.6	20.5	5.0	3.59	1434.59
WEST 100-Year, 3-Hour	2.6	30.9	9.0	5.97	1441.47
COMBINED 100-Year, 3-Hour	**4.2**	**51.4**	**14.0**	-	-
EAST 100-Year, 6-Hour	2.1	17.8	5.0	3.05	1434.05
WEST 100-Year, 6-Hour	3.2	26.8	7.0	5.74	1441.24
COMBINED 100-Year, 24-Hour	**5.3**	**44.6**	**12.0**	-	-
EAST 100-Year, 24-Hour	3.3	5.8	5.0	0.55	1431.55
WEST 100-Year, 24-Hour	5.3	9.3	5.0	2.09	1437.59
COMBINED 100-Year, 24-Hour	**8.6**	**15.1**	**10.0**	-	-

\\chqpan01.webb.lan\WO4\2020\20-0181\Drainage\PHYD\Hydrology\Unit Hydrograph\[20-0181 East UH Summary Tables (Formatte

Basin 1 - Stage/Storage/Outflow Table
W.O.# 20-0186 - Redlands West

UG Chamber Storage

Tributary Area: 20.1 AC
DCV= N/A

Bottom Chamber Ele 1435.50

Bottom Stone Elevat 1434.75

100-Year	WEIR
Q ALLOWABLE	20
L(ft)	4
C	3
Invert H (ft)	5.5

100 YEAR
WEIR +PUMP (Q=5.0 CFS)

$$Q_{ORIFICE} = Cd*Area*(2*G*H)^{0.5}$$
$$Q_{WEIR} = C*L*H^{3/2}$$

#	Elevation (ft)	Depth (ft)	Storage (cf)	Storage (ac-ft)	H (ft)	Q (cfs)	Total Q (cfs)	Comments
1	1435.5	0	0.00	0.000			5.00	Bottom of Chamber
2	1436	0.5	12235.72	0.281		0.00	5.00	
3	1436.5	1	19286.43	0.443		0.00	5.00	
4	1437	1.5	26119.75	0.600		0.00	5.00	
5	1437.5	2	32657.67	0.750		0.00	5.00	
6	1438	2.5	38792.55	0.891		0.00	5.00	
7	1438.5	3	44355.79	1.018		0.00	5.00	
8	1439	3.5	48890.35	1.122		0.00	5.00	
9	1439.5	4	52339.64	1.202		0.00	5.00	
10	1440	4.5	55686.98	1.278		0.00	5.00	
11	1440.5	5	59034.32	1.355		0.00	5.00	
12	1441	5.5	62381.66	1.432	0	0.00	5.00	Weir Opening
13	1441.5	6	65729.00	1.509	0.5	4.24	9.24	
14	1442	6.5	69076.34	1.586	1	12.00	17.00	Top of Storage

H:\2020\20-0186\Drainage\PHYD\Hydrology\Rational Method\[20-0186 Rational Method_2023.06.26.xlsx]Sheet1

Project: **Redlands West Industrial**

Chamber Model -	MC-3500	
Units -	**Imperial**	Click Here for Metric
Number of Chambers -	310	
Number of End Caps -	10	
Voids in the stone (porosity) -	40	%
Base of STONE Elevation -	1431.75	ft
Amount of Stone Above Chambers -	36	in
Amount of Stone Below Chambers -	9	in
Area of system -	16737	sf Min. Area - 16090 sf min. area

☑ Include Perimeter Stone in Calculations

Height of System *(inches)*	Incremental Single Chamber *(cubic feet)*	Incremental Single End Cap *(cubic feet)*	Incremental Chambers *(cubic feet)*	Incremental End Cap *(cubic feet)*	Incremental Stone *(cubic feet)*	Incremental Ch, EC and Stone *(cubic feet)*	Cumulative System (cubic feet)	Elevation (feet)
90	0.00	0.00	0.00	0.00	557.89	557.89	70750.01	1439.25
89	0.00	0.00	0.00	0.00	557.89	557.89	70192.12	1439.17
88	0.00	0.00	0.00	0.00	557.89	557.89	69634.23	1439.08
87	0.00	0.00	0.00	0.00	557.89	557.89	69076.34	1439.00
86	0.00	0.00	0.00	0.00	557.89	557.89	68518.45	1438.92
85	0.00	0.00	0.00	0.00	557.89	557.89	67960.56	1438.83
84	0.00	0.00	0.00	0.00	557.89	557.89	67402.67	1438.75
83	0.00	0.00	0.00	0.00	557.89	557.89	66844.78	1438.67
82	0.00	0.00	0.00	0.00	557.89	557.89	66286.89	1438.58
81	0.00	0.00	0.00	0.00	557.89	557.89	65729.00	1438.50
80	0.00	0.00	0.00	0.00	557.89	557.89	65171.11	1438.42
79	0.00	0.00	0.00	0.00	557.89	557.89	64613.22	1438.33
78	0.00	0.00	0.00	0.00	557.89	557.89	64055.33	1438.25
77	0.00	0.00	0.00	0.00	557.89	557.89	63497.44	1438.17
76	0.00	0.00	0.00	0.00	557.89	557.89	62939.55	1438.08
75	0.00	0.00	0.00	0.00	557.89	557.89	62381.66	1438.00
74	0.00	0.00	0.00	0.00	557.89	557.89	61823.77	1437.92
73	0.00	0.00	0.00	0.00	557.89	557.89	61265.88	1437.83
72	0.00	0.00	0.00	0.00	557.89	557.89	60707.99	1437.75
71	0.00	0.00	0.00	0.00	557.89	557.89	60150.10	1437.67
70	0.00	0.00	0.00	0.00	557.89	557.89	59592.21	1437.58
69	0.00	0.00	0.00	0.00	557.89	557.89	59034.32	1437.50
68	0.00	0.00	0.00	0.00	557.89	557.89	58476.43	1437.42
67	0.00	0.00	0.00	0.00	557.89	557.89	57918.54	1437.33
66	0.00	0.00	0.00	0.00	557.89	557.89	57360.65	1437.25
65	0.00	0.00	0.00	0.00	557.89	557.89	56802.76	1437.17
64	0.00	0.00	0.00	0.00	557.89	557.89	56244.87	1437.08
63	0.00	0.00	0.00	0.00	557.89	557.89	55686.98	1437.00
62	0.00	0.00	0.00	0.00	557.89	557.89	55129.09	1436.92
61	0.00	0.00	0.00	0.00	557.89	557.89	54571.20	1436.83
60	0.00	0.00	0.00	0.00	557.89	557.89	54013.31	1436.75
59	0.00	0.00	0.00	0.00	557.89	557.89	53455.42	1436.67
58	0.00	0.00	0.00	0.00	557.89	557.89	52897.53	1436.58
57	0.00	0.00	0.00	0.00	557.89	557.89	52339.64	1436.50
56	0.00	0.00	0.00	0.00	557.89	557.89	51781.75	1436.42
55	0.00	0.00	0.00	0.00	557.89	557.89	51223.86	1436.33
54	0.06	0.00	18.01	0.00	550.69	568.69	50665.97	1436.25
53	0.19	0.02	60.17	0.24	533.73	594.14	50097.28	1436.17
52	0.29	0.04	91.13	0.38	521.29	612.79	49503.14	1436.08
51	0.40	0.05	125.13	0.52	507.63	633.28	48890.35	1436.00
50	0.69	0.07	213.03	0.68	472.41	686.11	48257.07	1435.92
49	1.03	0.09	318.77	0.88	430.03	749.68	47570.96	1435.83
48	1.25	0.11	387.35	1.07	402.52	790.94	46821.28	1435.75
47	1.42	0.13	440.89	1.26	381.03	823.18	46030.33	1435.67
46	1.57	0.14	487.67	1.44	362.24	851.36	45207.15	1435.58
45	1.71	0.16	529.22	1.63	345.55	876.40	44355.79	1435.50
44	1.83	0.18	566.83	1.82	330.43	899.08	43479.39	1435.42
43	1.94	0.20	600.71	2.01	316.80	919.52	42580.31	1435.33
42	2.04	0.22	632.66	2.18	303.95	938.79	41660.79	1435.25
41	2.13	0.23	661.75	2.35	292.25	956.35	40722.00	1435.17
40	2.22	0.25	689.51	2.51	281.08	973.10	39765.65	1435.08
39	2.31	0.27	715.11	2.66	270.79	988.55	38792.55	1435.00
38	2.38	0.28	739.28	2.80	261.06	1003.14	37804.00	1434.92
37	2.46	0.29	762.32	2.94	251.79	1017.05	36800.87	1434.83
36	2.53	0.31	783.73	3.08	243.17	1029.98	35783.82	1434.75
35	2.59	0.32	804.06	3.21	234.98	1042.25	34753.84	1434.67
34	2.66	0.33	823.38	3.34	227.20	1053.92	33711.59	1434.58
33	2.72	0.35	841.68	3.47	219.83	1064.98	32657.67	1434.50
32	2.77	0.36	859.10	3.60	212.81	1075.51	31592.69	1434.42
31	2.82	0.37	875.64	3.72	206.14	1085.51	30517.18	1434.33
30	2.88	0.38	891.39	3.84	199.80	1095.03	29431.67	1434.25
29	2.92	0.40	906.48	3.96	193.71	1104.16	28336.64	1434.17
28	2.97	0.41	920.67	4.08	187.99	1112.73	27232.48	1434.08
27	3.01	0.42	933.86	4.19	182.67	1120.72	26119.75	1434.00
26	3.05	0.43	946.51	4.30	177.57	1128.37	24999.03	1433.92
25	3.09	0.44	959.23	4.40	172.44	1136.07	23870.65	1433.83
24	3.13	0.45	970.47	4.51	167.90	1142.88	22734.59	1433.75
23	3.17	0.46	981.36	4.61	163.50	1149.47	21591.71	1433.67
22	3.20	0.47	991.83	4.71	159.28	1155.81	20442.24	1433.58
21	3.23	0.48	1001.65	4.80	155.31	1161.76	19286.43	1433.50
20	3.26	0.49	1011.04	4.89	151.52	1167.45	18124.67	1433.42
19	3.29	0.50	1019.98	4.98	147.91	1172.87	16957.22	1433.33
18	3.32	0.51	1028.57	5.06	144.44	1178.07	15784.36	1433.25
17	3.34	0.51	1036.68	5.14	141.16	1182.98	14606.29	1433.17
16	3.37	0.52	1044.27	5.22	138.09	1187.59	13423.30	1433.08
15	3.39	0.53	1051.68	5.30	135.10	1192.07	12235.72	1433.00
14	3.41	0.54	1058.51	5.37	132.34	1196.21	11043.64	1432.92
13	3.44	0.54	1065.48	5.43	129.53	1200.43	9847.43	1432.83
12	3.46	0.55	1071.89	5.49	126.94	1204.32	8647.00	1432.75
11	3.48	0.56	1078.40	5.55	124.31	1208.26	7442.68	1432.67
10	3.51	0.59	1086.58	5.95	120.88	1213.41	6234.42	1432.58
9	0.00	0.00	0.00	0.00	557.89	557.89	5021.01	1432.50
8	0.00	0.00	0.00	0.00	557.89	557.89	4463.12	1432.42
7	0.00	0.00	0.00	0.00	557.89	557.89	3905.23	1432.33
6	0.00	0.00	0.00	0.00	557.89	557.89	3347.34	1432.25
5	0.00	0.00	0.00	0.00	557.89	557.89	2789.45	1432.17
4	0.00	0.00	0.00	0.00	557.89	557.89	2231.56	1432.08
3	0.00	0.00	0.00	0.00	557.89	557.89	1673.67	1432.00
2	0.00	0.00	0.00	0.00	557.89	557.89	1115.78	1431.92
1	0.00	0.00	0.00	0.00	557.89	557.89	557.89	1431.83

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  06/26/23 File: PROPWEST1001100.out


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4010

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format




---------------------------------------------------------------------
REDLANDS WEST - DEVELOPED CONDITION
100-YEAR STORM EVENT
20-0186 WEST INDUSTRIAL PROJECT
06/26/2023 WG
--------------------------------------------------------------------
Drainage Area =      20.10(Ac.)  =      0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      20.10(Ac.)  =      0.031 Sq. Mi.
Length along longest watercourse =    1372.00(Ft.)
Length along longest watercourse measured to centroid =     918.00(Ft.)
Length along longest watercourse =      0.260 Mi.
Length along longest watercourse measured to centroid =      0.174 Mi.
Difference in elevation =      11.85(Ft.)
Slope along watercourse =     45.6035 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.054 Hr.
Lag time =     3.22 Min.
25% of lag time =     0.81 Min.
40% of lag time =     1.29 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       20.10            0.45                    9.05

100 YEAR Area rainfall data:
```

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
20.10	1.20	24.12

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.450(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
20.100	62.50	0.760

Total Area Entered = 20.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	62.5	0.443	0.760	0.140	1.000	0.140
					Sum (F) =	0.140

Area averaged mean soil loss (F) (In/Hr) = 0.140
Minimum soil loss rate ((In/Hr)) = 0.070
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	155.186	34.407	6.970
2	0.167	310.372	46.627	9.445
3	0.250	465.558	10.888	2.206
4	0.333	620.745	4.727	0.958
5	0.417	775.931	2.324	0.471
6	0.500	931.117	1.028	0.208
			Sum = 100.000	Sum= 20.257

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.140	(0.175)	0.465
2	0.17	4.30	0.619	0.140	(0.180)	0.479

```
   3   0.25     5.00     0.720          0.140    (  0.209)       0.580
   4   0.33     5.00     0.720          0.140    (  0.209)       0.580
   5   0.42     5.80     0.835          0.140    (  0.242)       0.695
   6   0.50     6.50     0.936          0.140    (  0.271)       0.796
   7   0.58     7.40     1.065          0.140    (  0.309)       0.925
   8   0.67     8.60     1.238          0.140    (  0.359)       1.098
   9   0.75    12.30     1.771          0.140    (  0.514)       1.631
  10   0.83    29.10     4.190          0.140    (  1.215)       4.050
  11   0.92     6.80     0.979          0.140    (  0.284)       0.839
  12   1.00     5.00     0.720          0.140    (  0.209)       0.580
                 (Loss Rate Not Used)
     Sum =     100.0                               Sum =    12.7
        Flood volume = Effective rainfall      1.06(In)
         times area      20.1(Ac.)/[(In)/(Ft.)] =       1.8(Ac.Ft)
        Total soil loss =      0.14(In)
        Total soil loss =     0.234(Ac.Ft)
        Total rainfall =      1.20(In)
        Flood volume =       77325.7 Cubic Feet
        Total soil loss =       10213.9 Cubic Feet
        --------------------------------------------------------------------
         Peak flow rate of this hydrograph =     49.373(CFS)
        --------------------------------------------------------------------
        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                            1 - H O U R   S T O R M
                       R u n o f f     H y d r o g r a p h
        --------------------------------------------------------------------
                    Hydrograph in   5   Minute intervals ((CFS))

        --------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
  -----------------------------------------------------------------------
    0+ 5      0.0223      3.24  V Q       |         |         |         |
    0+10      0.0756      7.73  |V    Q   |         |         |         |
    0+15      0.1417      9.60  |  V   Q  |         |         |         |
    0+20      0.2176     11.03  |   V   Q |         |         |         |
    0+25      0.3022     12.28  |     V  Q|         |         |         |
    0+30      0.4005     14.28  |        V|Q        |         |         |
    0+35      0.5137     16.44  |         |V Q      |         |         |
    0+40      0.6461     19.22  |         |   VQ    |         |         |
    0+45      0.8183     25.00  |         |       V Q         |         |
    0+50      1.1453     47.48  |         |         |    V    |      Q  |
    0+55      1.4853     49.37  |         |         |         |  V     Q|
    1+ 0      1.6450     23.18  |         |       Q |         |      V  |
    1+ 5      1.7291     12.21  |        Q|         |         |       V |
    1+10      1.7589      4.33  |  Q      |         |         |        V|
    1+15      1.7712      1.79  |Q        |         |         |        V|
    1+20      1.7743      0.45  Q         |         |         |        V|
    1+25      1.7752      0.12  Q         |         |         |         V
-----------------------------------------------------------------------
```

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  06/26/23 File: PROPWEST1003100.out


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4010

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format




---------------------------------------------------------------------
REDLANDS WEST - DEVELOPED CONDITION
100-YEAR STORM EVENT
20-0186 WEST INDUSTRIAL PROJECT
06/26/2023 WG
--------------------------------------------------------------------
Drainage Area =      20.10(Ac.)  =      0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      20.10(Ac.)  =      0.031 Sq. Mi.
Length along longest watercourse =    1372.00(Ft.)
Length along longest watercourse measured to centroid =     918.00(Ft.)
Length along longest watercourse =      0.260 Mi.
Length along longest watercourse measured to centroid =      0.174 Mi.
Difference in elevation =      11.85(Ft.)
Slope along watercourse =     45.6035 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.054 Hr.
Lag time =     3.22 Min.
25% of lag time =     0.81 Min.
40% of lag time =     1.29 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       20.10            0.80                  16.08

100 YEAR Area rainfall data:
```

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
20.10	1.90	38.19

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
20.100	62.50	0.760

Total Area Entered = 20.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	62.5	0.443	0.760	0.140	1.000	0.140
					Sum (F) =	0.140

Area averaged mean soil loss (F) (In/Hr) = 0.140
Minimum soil loss rate ((In/Hr)) = 0.070
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	155.186	34.407	6.970
2	0.167	310.372	46.627	9.445
3	0.250	465.558	10.888	2.206
4	0.333	620.745	4.727	0.958
5	0.417	775.931	2.324	0.471
6	0.500	931.117	1.028	0.208
			Sum = 100.000	Sum= 20.257

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.296	(0.140)	0.086	0.210
2	0.17	1.30	0.296	(0.140)	0.086	0.210
3	0.25	1.10	0.251	(0.140)	0.073	0.178
4	0.33	1.50	0.342	(0.140)	0.099	0.243

```
 5   0.42     1.50      0.342       (  0.140)       0.099        0.243
 6   0.50     1.80      0.410       (  0.140)       0.119        0.291
 7   0.58     1.50      0.342       (  0.140)       0.099        0.243
 8   0.67     1.80      0.410       (  0.140)       0.119        0.291
 9   0.75     1.80      0.410       (  0.140)       0.119        0.291
10   0.83     1.50      0.342       (  0.140)       0.099        0.243
11   0.92     1.60      0.365       (  0.140)       0.106        0.259
12   1.00     1.80      0.410       (  0.140)       0.119        0.291
13   1.08     2.20      0.502          0.140    (  0.145)        0.362
14   1.17     2.20      0.502          0.140    (  0.145)        0.362
15   1.25     2.20      0.502          0.140    (  0.145)        0.362
16   1.33     2.00      0.456       (  0.140)       0.132        0.324
17   1.42     2.60      0.593          0.140    (  0.172)        0.453
18   1.50     2.70      0.616          0.140    (  0.179)        0.476
19   1.58     2.40      0.547          0.140    (  0.159)        0.407
20   1.67     2.70      0.616          0.140    (  0.179)        0.476
21   1.75     3.30      0.752          0.140    (  0.218)        0.612
22   1.83     3.10      0.707          0.140    (  0.205)        0.567
23   1.92     2.90      0.661          0.140    (  0.192)        0.521
24   2.00     3.00      0.684          0.140    (  0.198)        0.544
25   2.08     3.10      0.707          0.140    (  0.205)        0.567
26   2.17     4.20      0.958          0.140    (  0.278)        0.818
27   2.25     5.00      1.140          0.140    (  0.331)        1.000
28   2.33     3.50      0.798          0.140    (  0.231)        0.658
29   2.42     6.80      1.550          0.140    (  0.450)        1.410
30   2.50     7.30      1.664          0.140    (  0.483)        1.524
31   2.58     8.20      1.869          0.140    (  0.542)        1.729
32   2.67     5.90      1.345          0.140    (  0.390)        1.205
33   2.75     2.00      0.456       (  0.140)       0.132        0.324
34   2.83     1.80      0.410       (  0.140)       0.119        0.291
35   2.92     1.80      0.410       (  0.140)       0.119        0.291
36   3.00     0.60      0.137       (  0.140)       0.040        0.097
              (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    18.4
      Flood volume = Effective rainfall      1.53(In)
       times area      20.1(Ac.)/[(In)/(Ft.)] =      2.6(Ac.Ft)
      Total soil loss =      0.37(In)
      Total soil loss =     0.618(Ac.Ft)
      Total rainfall =      1.90(In)
      Flood volume =      111712.3 Cubic Feet
      Total soil loss =       26905.2 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =     30.848(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          3 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       10.0      20.0      30.0      40.0
-----------------------------------------------------------------------
  0+ 5       0.0101      1.47  VQ        |         |         |         |
  0+10       0.0339      3.46  V  Q      |         |         |         |
```

```
    0+15       0.0594      3.69  V  Q      |         |         |         |
    0+20       0.0872      4.04  |V  Q     |         |         |         |
    0+25       0.1194      4.68  |V  Q     |         |         |         |
    0+30       0.1551      5.18  | V  Q    |         |         |         |
    0+35       0.1919      5.34  | V  Q    |         |         |         |
    0+40       0.2287      5.35  |  V Q    |         |         |         |
    0+45       0.2684      5.76  |   VQ    |         |         |         |
    0+50       0.3064      5.51  |   VQ    |         |         |         |
    0+55       0.3422      5.20  |    Q    |         |         |         |
    1+ 0       0.3799      5.48  |    Q    |         |         |         |
    1+ 5       0.4232      6.28  |     Q   |         |         |         |
    1+10       0.4714      7.00  |      Q  |         |         |         |
    1+15       0.5209      7.19  |      QV |         |         |         |
    1+20       0.5692      7.01  |      QV |         |         |         |
    1+25       0.6215      7.59  |      Q V|         |         |         |
    1+30       0.6828      8.90  |       Q V         |         |         |
    1+35       0.7440      8.89  |       Q |V        |         |         |
    1+40       0.8051      8.87  |       Q | V       |         |         |
    1+45       0.8767     10.40  |         Q  V      |         |         |
    1+50       0.9559     11.50  |         |Q  V     |         |         |
    1+55       1.0323     11.09  |         |Q    V   |         |         |
    2+ 0       1.1071     10.86  |         Q      V  |         |         |
    2+ 5       1.1840     11.17  |         |Q      V |         |         |
    2+10       1.2746     13.15  |         |  Q     V|         |         |
    2+15       1.3905     16.83  |         |     Q   |V        |         |
    2+20       1.5059     16.75  |         |     Q   |  V      |         |
    2+25       1.6397     19.42  |         |        Q|    V    |         |
    2+30       1.8247     26.87  |         |         |     Q V |         |
    2+35       2.0372     30.85  |         |         |         QV        |
    2+40       2.2436     29.98  |         |         |        Q|   V     |
    2+45       2.3795     19.72  |         |        Q|         |      V  |
    2+50       2.4512     10.42  |         Q         |         |       V |
    2+55       2.5048      7.79  |      Q  |         |         |        V|
    3+ 0       2.5414      5.31  |    Q    |         |         |        V|
    3+ 5       2.5569      2.24  | Q       |         |         |        V|
    3+10       2.5617      0.70  Q         |         |         |        V|
    3+15       2.5637      0.29  Q         |         |         |        V|
    3+20       2.5644      0.11  Q         |         |         |        V|
    3+25       2.5646      0.02  Q         |         |         |        V|
-----------------------------------------------------------------------
```

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  06/26/23 File: PROPWEST1006100.out


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 4010

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format




---------------------------------------------------------------------
REDLANDS WEST - DEVELOPED CONDITION
100-YEAR STORM EVENT
20-0186 WEST INDUSTRIAL PROJECT
06/26/2023 WG
--------------------------------------------------------------------
Drainage Area =      20.10(Ac.)  =      0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      20.10(Ac.)  =      0.031 Sq. Mi.
Length along longest watercourse =    1372.00(Ft.)
Length along longest watercourse measured to centroid =     918.00(Ft.)
Length along longest watercourse =      0.260 Mi.
Length along longest watercourse measured to centroid =      0.174 Mi.
Difference in elevation =      11.85(Ft.)
Slope along watercourse =     45.6035 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.054 Hr.
Lag time =     3.22 Min.
25% of lag time =     0.81 Min.
40% of lag time =     1.29 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       20.10            1.00                  20.10

100 YEAR Area rainfall data:
```

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
20.10	2.50	50.25

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
20.100	62.50	0.760

Total Area Entered = 20.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	62.5	0.443	0.760	0.140	1.000	0.140
					Sum (F) =	0.140

Area averaged mean soil loss (F) (In/Hr) = 0.140
Minimum soil loss rate ((In/Hr)) = 0.070
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	155.186	34.407	6.970
2	0.167	310.372	46.627	9.445
3	0.250	465.558	10.888	2.206
4	0.333	620.745	4.727	0.958
5	0.417	775.931	2.324	0.471
6	0.500	931.117	1.028	0.208
			Sum = 100.000	Sum= 20.257

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.140)	0.043	0.106
2	0.17	0.60	0.180	(0.140)	0.052	0.128
3	0.25	0.60	0.180	(0.140)	0.052	0.128
4	0.33	0.60	0.180	(0.140)	0.052	0.128

5	0.42	0.60	0.180	(0.140)	0.052	0.128
6	0.50	0.70	0.210	(0.140)	0.061	0.149
7	0.58	0.70	0.210	(0.140)	0.061	0.149
8	0.67	0.70	0.210	(0.140)	0.061	0.149
9	0.75	0.70	0.210	(0.140)	0.061	0.149
10	0.83	0.70	0.210	(0.140)	0.061	0.149
11	0.92	0.70	0.210	(0.140)	0.061	0.149
12	1.00	0.80	0.240	(0.140)	0.070	0.170
13	1.08	0.80	0.240	(0.140)	0.070	0.170
14	1.17	0.80	0.240	(0.140)	0.070	0.170
15	1.25	0.80	0.240	(0.140)	0.070	0.170
16	1.33	0.80	0.240	(0.140)	0.070	0.170
17	1.42	0.80	0.240	(0.140)	0.070	0.170
18	1.50	0.80	0.240	(0.140)	0.070	0.170
19	1.58	0.80	0.240	(0.140)	0.070	0.170
20	1.67	0.80	0.240	(0.140)	0.070	0.170
21	1.75	0.80	0.240	(0.140)	0.070	0.170
22	1.83	0.80	0.240	(0.140)	0.070	0.170
23	1.92	0.80	0.240	(0.140)	0.070	0.170
24	2.00	0.90	0.270	(0.140)	0.078	0.192
25	2.08	0.80	0.240	(0.140)	0.070	0.170
26	2.17	0.90	0.270	(0.140)	0.078	0.192
27	2.25	0.90	0.270	(0.140)	0.078	0.192
28	2.33	0.90	0.270	(0.140)	0.078	0.192
29	2.42	0.90	0.270	(0.140)	0.078	0.192
30	2.50	0.90	0.270	(0.140)	0.078	0.192
31	2.58	0.90	0.270	(0.140)	0.078	0.192
32	2.67	0.90	0.270	(0.140)	0.078	0.192
33	2.75	1.00	0.300	(0.140)	0.087	0.213
34	2.83	1.00	0.300	(0.140)	0.087	0.213
35	2.92	1.00	0.300	(0.140)	0.087	0.213
36	3.00	1.00	0.300	(0.140)	0.087	0.213
37	3.08	1.00	0.300	(0.140)	0.087	0.213
38	3.17	1.10	0.330	(0.140)	0.096	0.234
39	3.25	1.10	0.330	(0.140)	0.096	0.234
40	3.33	1.10	0.330	(0.140)	0.096	0.234
41	3.42	1.20	0.360	(0.140)	0.104	0.256
42	3.50	1.30	0.390	(0.140)	0.113	0.277
43	3.58	1.40	0.420	(0.140)	0.122	0.298
44	3.67	1.40	0.420	(0.140)	0.122	0.298
45	3.75	1.50	0.450	(0.140)	0.130	0.319
46	3.83	1.50	0.450	(0.140)	0.130	0.319
47	3.92	1.60	0.480	(0.140)	0.139	0.341
48	4.00	1.60	0.480	(0.140)	0.139	0.341
49	4.08	1.70	0.510	0.140	(0.148)	0.370
50	4.17	1.80	0.540	0.140	(0.157)	0.400
51	4.25	1.90	0.570	0.140	(0.165)	0.430
52	4.33	2.00	0.600	0.140	(0.174)	0.460
53	4.42	2.10	0.630	0.140	(0.183)	0.490
54	4.50	2.10	0.630	0.140	(0.183)	0.490
55	4.58	2.20	0.660	0.140	(0.191)	0.520
56	4.67	2.30	0.690	0.140	(0.200)	0.550
57	4.75	2.40	0.720	0.140	(0.209)	0.580
58	4.83	2.40	0.720	0.140	(0.209)	0.580
59	4.92	2.50	0.750	0.140	(0.217)	0.610

60	5.00	2.60	0.780	0.140	(0.226)	0.640
61	5.08	3.10	0.930	0.140	(0.270)	0.790
62	5.17	3.60	1.080	0.140	(0.313)	0.940
63	5.25	3.90	1.170	0.140	(0.339)	1.030
64	5.33	4.20	1.260	0.140	(0.365)	1.120
65	5.42	4.70	1.410	0.140	(0.409)	1.270
66	5.50	5.60	1.680	0.140	(0.487)	1.540
67	5.58	1.90	0.570	0.140	(0.165)	0.430
68	5.67	0.90	0.270	(0.140)	0.078	0.192
69	5.75	0.60	0.180	(0.140)	0.052	0.128
70	5.83	0.50	0.150	(0.140)	0.043	0.106
71	5.92	0.30	0.090	(0.140)	0.026	0.064
72	6.00	0.20	0.060	(0.140)	0.017	0.043

(Loss Rate Not Used)

Sum = 100.0 Sum = 23.2

Flood volume = Effective rainfall 1.94(In)
times area 20.1(Ac.)/[(In)/(Ft.)] = 3.2(Ac.Ft)
Total soil loss = 0.56(In)
Total soil loss = 0.942(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 141362.4 Cubic Feet
Total soil loss = 41032.5 Cubic Feet

Peak flow rate of this hydrograph = 26.804(CFS)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                   6 - H O U R    S T O R M
              R u n o f f     H y d r o g r a p h
--------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

--------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
-----------------------------------------------------------------------
  0+ 5       0.0051      0.74  Q         |         |         |         |
  0+10       0.0182      1.90  V Q       |         |         |         |
  0+15       0.0343      2.33  V  Q      |         |         |         |
  0+20       0.0514      2.48  V  Q      |         |         |         |
  0+25       0.0689      2.55  V  Q      |         |         |         |
  0+30       0.0878      2.73  |V Q      |         |         |         |
  0+35       0.1080      2.94  |V Q      |         |         |         |
  0+40       0.1286      2.99  |V Q      |         |         |         |
  0+45       0.1493      3.01  |V  Q     |         |         |         |
  0+50       0.1701      3.02  | V Q     |         |         |         |
  0+55       0.1909      3.02  | V Q     |         |         |         |
  1+ 0       0.2127      3.17  | V Q     |         |         |         |
  1+ 5       0.2359      3.37  | V Q     |         |         |         |
  1+10       0.2595      3.42  |  VQ     |         |         |         |
  1+15       0.2832      3.44  |  VQ     |         |         |         |
  1+20       0.3069      3.45  |  VQ     |         |         |         |
  1+25       0.3307      3.45  |   Q     |         |         |         |
  1+30       0.3545      3.45  |   Q     |         |         |         |
  1+35       0.3783      3.45  |   Q     |         |         |         |
  1+40       0.4021      3.45  |   Q     |         |         |         |
  1+45       0.4258      3.45  |   QV    |         |         |         |
```

```
1+50       0.4496       3.45  |   QV    |         |         |         |
1+55       0.4734       3.45  |   QV    |         |         |         |
2+ 0       0.4982       3.60  |   Q V   |         |         |         |
2+ 5       0.5234       3.65  |   Q V   |         |         |         |
2+10       0.5485       3.65  |   Q V   |         |         |         |
2+15       0.5748       3.82  |    Q V  |         |         |         |
2+20       0.6014       3.86  |    Q V  |         |         |         |
2+25       0.6281       3.87  |    Q V  |         |         |         |
2+30       0.6548       3.88  |    Q  V |         |         |         |
2+35       0.6816       3.89  |    Q  V |         |         |         |
2+40       0.7084       3.89  |    Q  V |         |         |         |
2+45       0.7361       4.03  |    Q   V|         |         |         |
2+50       0.7653       4.23  |    Q   V|         |         |         |
2+55       0.7948       4.28  |    Q   V|         |         |         |
3+ 0       0.8244       4.30  |    Q    V         |         |         |
3+ 5       0.8541       4.31  |    Q    V         |         |         |
3+10       0.8849       4.47  |    Q    V         |         |         |
3+15       0.9170       4.67  |     Q   |V        |         |         |
3+20       0.9495       4.71  |     Q   |V        |         |         |
3+25       0.9831       4.88  |     Q   | V       |         |         |
3+30       1.0192       5.24  |     Q   | V       |         |         |
3+35       1.0581       5.64  |      Q  |  V      |         |         |
3+40       1.0988       5.91  |      Q  |  V      |         |         |
3+45       1.1411       6.14  |       Q |   V     |         |         |
3+50       1.1850       6.37  |       Q |   V     |         |         |
3+55       1.2303       6.58  |       Q |    V    |         |         |
4+ 0       1.2772       6.81  |        Q|    V    |         |         |
4+ 5       1.3259       7.07  |        Q|     V   |         |         |
4+10       1.3781       7.58  |         Q     V   |         |         |
4+15       1.4342       8.15  |         Q      V  |         |         |
4+20       1.4944       8.74  |         |Q      V |         |         |
4+25       1.5587       9.34  |         | Q      V|         |         |
4+30       1.6258       9.74  |         | Q       V         |         |
4+35       1.6951      10.06  |         |  Q      V         |         |
4+40       1.7682      10.61  |         |   Q     |V        |         |
4+45       1.8452      11.18  |         |   Q     | V       |         |
4+50       1.9249      11.57  |         |    Q    |  V      |         |
4+55       2.0068      11.89  |         |    Q    |   V     |         |
5+ 0       2.0924      12.43  |         |     Q   |    V    |         |
5+ 5       2.1877      13.85  |         |       Q |     V   |         |
5+10       2.3007      16.41  |         |         |Q      V |         |
5+15       2.4304      18.83  |         |         |   Q    V|         |
5+20       2.5737      20.80  |         |         |     Q   |V        |
5+25       2.7329      23.12  |         |         |         Q  V      |
5+30       2.9175      26.80  |         |         |         |    Q    |
5+35       3.0697      22.11  |         |         |        Q|      V  |
5+40       3.1438      10.76  |         |   Q     |         |       V |
5+45       3.1849       5.96  |      Q  |         |         |        V|
5+50       3.2109       3.77  |    Q    |         |         |        V|
5+55       3.2277       2.44  |  Q      |         |         |        V|
6+ 0       3.2376       1.44  |Q        |         |         |        V|
6+ 5       3.2427       0.75  Q         |         |         |        V|
6+10       3.2443       0.23  Q         |         |         |        V|
6+15       3.2449       0.09  Q         |         |         |        V|
6+20       3.2452       0.03  Q         |         |         |        V|
```

```
    6+25       3.2452      0.01  Q         |         |         |         V
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 06/26/23 File: PROPWEST10024100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4010

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

REDLANDS WEST - DEVELOPED CONDITION
100-YEAR STORM EVENT
20-0186 WEST INDUSTRIAL PROJECT
06/26/2023 WG

Drainage Area = 20.10(Ac.) = 0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 20.10(Ac.) = 0.031 Sq. Mi.
Length along longest watercourse = 1372.00(Ft.)
Length along longest watercourse measured to centroid = 918.00(Ft.)
Length along longest watercourse = 0.260 Mi.
Length along longest watercourse measured to centroid = 0.174 Mi.
Difference in elevation = 11.85(Ft.)
Slope along watercourse = 45.6035 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.22 Min.
25% of lag time = 0.81 Min.
40% of lag time = 1.29 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
20.10	1.70	34.17

100 YEAR Area rainfall data:

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       20.10            4.25                  85.43

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    1.700(In)
Area Averaged 100-Year Rainfall =    4.250(In)

Point rain (area averaged) =    4.250(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    4.250(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    20.100           62.50         0.760
 Total Area Entered =     20.10(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
62.5  62.5      0.443     0.760       0.140       1.000      0.140
                                                 Sum (F) =   0.140
Area averaged mean soil loss (F) (In/Hr) =  0.140
Minimum soil loss rate ((In/Hr)) =  0.070
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.290
--------------------------------------------------------------------

                U n i t  H y d r o g r a p h
                        VALLEY S-Curve
-------------------------------------------------------------------
                Unit Hydrograph Data
--------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                             Graph %           (CFS)
--------------------------------------------------------------------
    1   0.083       155.186         34.407              6.970
    2   0.167       310.372         46.627              9.445
    3   0.250       465.558         10.888              2.206
    4   0.333       620.745          4.727              0.958
    5   0.417       775.931          2.324              0.471
    6   0.500       931.117          1.028              0.208
                              Sum = 100.000   Sum=      20.257
-----------------------------------------------------------------------


The following loss rate calculations reflect use of the minimum calculated loss
rate subtracted from the Storm Rain to produce the maximum Effective Rain value

 Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
      (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     0.07      0.034       (  0.248)       0.010        0.024
  2   0.17     0.07      0.034       (  0.247)       0.010        0.024
  3   0.25     0.07      0.034       (  0.246)       0.010        0.024
  4   0.33     0.10      0.051       (  0.245)       0.015        0.036
```

5	0.42	0.10	0.051	(0.244)	0.015	0.036
6	0.50	0.10	0.051	(0.243)	0.015	0.036
7	0.58	0.10	0.051	(0.242)	0.015	0.036
8	0.67	0.10	0.051	(0.241)	0.015	0.036
9	0.75	0.10	0.051	(0.241)	0.015	0.036
10	0.83	0.13	0.068	(0.240)	0.020	0.048
11	0.92	0.13	0.068	(0.239)	0.020	0.048
12	1.00	0.13	0.068	(0.238)	0.020	0.048
13	1.08	0.10	0.051	(0.237)	0.015	0.036
14	1.17	0.10	0.051	(0.236)	0.015	0.036
15	1.25	0.10	0.051	(0.235)	0.015	0.036
16	1.33	0.10	0.051	(0.234)	0.015	0.036
17	1.42	0.10	0.051	(0.233)	0.015	0.036
18	1.50	0.10	0.051	(0.232)	0.015	0.036
19	1.58	0.10	0.051	(0.231)	0.015	0.036
20	1.67	0.10	0.051	(0.230)	0.015	0.036
21	1.75	0.10	0.051	(0.229)	0.015	0.036
22	1.83	0.13	0.068	(0.228)	0.020	0.048
23	1.92	0.13	0.068	(0.227)	0.020	0.048
24	2.00	0.13	0.068	(0.227)	0.020	0.048
25	2.08	0.13	0.068	(0.226)	0.020	0.048
26	2.17	0.13	0.068	(0.225)	0.020	0.048
27	2.25	0.13	0.068	(0.224)	0.020	0.048
28	2.33	0.13	0.068	(0.223)	0.020	0.048
29	2.42	0.13	0.068	(0.222)	0.020	0.048
30	2.50	0.13	0.068	(0.221)	0.020	0.048
31	2.58	0.17	0.085	(0.220)	0.025	0.060
32	2.67	0.17	0.085	(0.219)	0.025	0.060
33	2.75	0.17	0.085	(0.218)	0.025	0.060
34	2.83	0.17	0.085	(0.217)	0.025	0.060
35	2.92	0.17	0.085	(0.217)	0.025	0.060
36	3.00	0.17	0.085	(0.216)	0.025	0.060
37	3.08	0.17	0.085	(0.215)	0.025	0.060
38	3.17	0.17	0.085	(0.214)	0.025	0.060
39	3.25	0.17	0.085	(0.213)	0.025	0.060
40	3.33	0.17	0.085	(0.212)	0.025	0.060
41	3.42	0.17	0.085	(0.211)	0.025	0.060
42	3.50	0.17	0.085	(0.210)	0.025	0.060
43	3.58	0.17	0.085	(0.209)	0.025	0.060
44	3.67	0.17	0.085	(0.209)	0.025	0.060
45	3.75	0.17	0.085	(0.208)	0.025	0.060
46	3.83	0.20	0.102	(0.207)	0.030	0.072
47	3.92	0.20	0.102	(0.206)	0.030	0.072
48	4.00	0.20	0.102	(0.205)	0.030	0.072
49	4.08	0.20	0.102	(0.204)	0.030	0.072
50	4.17	0.20	0.102	(0.203)	0.030	0.072
51	4.25	0.20	0.102	(0.202)	0.030	0.072
52	4.33	0.23	0.119	(0.202)	0.035	0.084
53	4.42	0.23	0.119	(0.201)	0.035	0.084
54	4.50	0.23	0.119	(0.200)	0.035	0.084
55	4.58	0.23	0.119	(0.199)	0.035	0.084
56	4.67	0.23	0.119	(0.198)	0.035	0.084
57	4.75	0.23	0.119	(0.197)	0.035	0.084
58	4.83	0.27	0.136	(0.196)	0.039	0.097
59	4.92	0.27	0.136	(0.196)	0.039	0.097

60	5.00	0.27	0.136	(0.195)	0.039	0.097
61	5.08	0.20	0.102	(0.194)	0.030	0.072
62	5.17	0.20	0.102	(0.193)	0.030	0.072
63	5.25	0.20	0.102	(0.192)	0.030	0.072
64	5.33	0.23	0.119	(0.191)	0.035	0.084
65	5.42	0.23	0.119	(0.191)	0.035	0.084
66	5.50	0.23	0.119	(0.190)	0.035	0.084
67	5.58	0.27	0.136	(0.189)	0.039	0.097
68	5.67	0.27	0.136	(0.188)	0.039	0.097
69	5.75	0.27	0.136	(0.187)	0.039	0.097
70	5.83	0.27	0.136	(0.186)	0.039	0.097
71	5.92	0.27	0.136	(0.186)	0.039	0.097
72	6.00	0.27	0.136	(0.185)	0.039	0.097
73	6.08	0.30	0.153	(0.184)	0.044	0.109
74	6.17	0.30	0.153	(0.183)	0.044	0.109
75	6.25	0.30	0.153	(0.182)	0.044	0.109
76	6.33	0.30	0.153	(0.182)	0.044	0.109
77	6.42	0.30	0.153	(0.181)	0.044	0.109
78	6.50	0.30	0.153	(0.180)	0.044	0.109
79	6.58	0.33	0.170	(0.179)	0.049	0.121
80	6.67	0.33	0.170	(0.178)	0.049	0.121
81	6.75	0.33	0.170	(0.177)	0.049	0.121
82	6.83	0.33	0.170	(0.177)	0.049	0.121
83	6.92	0.33	0.170	(0.176)	0.049	0.121
84	7.00	0.33	0.170	(0.175)	0.049	0.121
85	7.08	0.33	0.170	(0.174)	0.049	0.121
86	7.17	0.33	0.170	(0.173)	0.049	0.121
87	7.25	0.33	0.170	(0.173)	0.049	0.121
88	7.33	0.37	0.187	(0.172)	0.054	0.133
89	7.42	0.37	0.187	(0.171)	0.054	0.133
90	7.50	0.37	0.187	(0.170)	0.054	0.133
91	7.58	0.40	0.204	(0.170)	0.059	0.145
92	7.67	0.40	0.204	(0.169)	0.059	0.145
93	7.75	0.40	0.204	(0.168)	0.059	0.145
94	7.83	0.43	0.221	(0.167)	0.064	0.157
95	7.92	0.43	0.221	(0.166)	0.064	0.157
96	8.00	0.43	0.221	(0.166)	0.064	0.157
97	8.08	0.50	0.255	(0.165)	0.074	0.181
98	8.17	0.50	0.255	(0.164)	0.074	0.181
99	8.25	0.50	0.255	(0.163)	0.074	0.181
100	8.33	0.50	0.255	(0.163)	0.074	0.181
101	8.42	0.50	0.255	(0.162)	0.074	0.181
102	8.50	0.50	0.255	(0.161)	0.074	0.181
103	8.58	0.53	0.272	(0.160)	0.079	0.193
104	8.67	0.53	0.272	(0.160)	0.079	0.193
105	8.75	0.53	0.272	(0.159)	0.079	0.193
106	8.83	0.57	0.289	(0.158)	0.084	0.205
107	8.92	0.57	0.289	(0.157)	0.084	0.205
108	9.00	0.57	0.289	(0.157)	0.084	0.205
109	9.08	0.63	0.323	(0.156)	0.094	0.229
110	9.17	0.63	0.323	(0.155)	0.094	0.229
111	9.25	0.63	0.323	(0.154)	0.094	0.229
112	9.33	0.67	0.340	(0.154)	0.099	0.241
113	9.42	0.67	0.340	(0.153)	0.099	0.241
114	9.50	0.67	0.340	(0.152)	0.099	0.241

115	9.58	0.70	0.357	(0.151)	0.104	0.253
116	9.67	0.70	0.357	(0.151)	0.104	0.253
117	9.75	0.70	0.357	(0.150)	0.104	0.253
118	9.83	0.73	0.374	(0.149)	0.108	0.266
119	9.92	0.73	0.374	(0.149)	0.108	0.266
120	10.00	0.73	0.374	(0.148)	0.108	0.266
121	10.08	0.50	0.255	(0.147)	0.074	0.181
122	10.17	0.50	0.255	(0.146)	0.074	0.181
123	10.25	0.50	0.255	(0.146)	0.074	0.181
124	10.33	0.50	0.255	(0.145)	0.074	0.181
125	10.42	0.50	0.255	(0.144)	0.074	0.181
126	10.50	0.50	0.255	(0.144)	0.074	0.181
127	10.58	0.67	0.340	(0.143)	0.099	0.241
128	10.67	0.67	0.340	(0.142)	0.099	0.241
129	10.75	0.67	0.340	(0.141)	0.099	0.241
130	10.83	0.67	0.340	(0.141)	0.099	0.241
131	10.92	0.67	0.340	(0.140)	0.099	0.241
132	11.00	0.67	0.340	(0.139)	0.099	0.241
133	11.08	0.63	0.323	(0.139)	0.094	0.229
134	11.17	0.63	0.323	(0.138)	0.094	0.229
135	11.25	0.63	0.323	(0.137)	0.094	0.229
136	11.33	0.63	0.323	(0.137)	0.094	0.229
137	11.42	0.63	0.323	(0.136)	0.094	0.229
138	11.50	0.63	0.323	(0.135)	0.094	0.229
139	11.58	0.57	0.289	(0.135)	0.084	0.205
140	11.67	0.57	0.289	(0.134)	0.084	0.205
141	11.75	0.57	0.289	(0.133)	0.084	0.205
142	11.83	0.60	0.306	(0.133)	0.089	0.217
143	11.92	0.60	0.306	(0.132)	0.089	0.217
144	12.00	0.60	0.306	(0.131)	0.089	0.217
145	12.08	0.83	0.425	(0.131)	0.123	0.302
146	12.17	0.83	0.425	(0.130)	0.123	0.302
147	12.25	0.83	0.425	(0.129)	0.123	0.302
148	12.33	0.87	0.442	(0.129)	0.128	0.314
149	12.42	0.87	0.442	0.128	(0.128)	0.314
150	12.50	0.87	0.442	0.127	(0.128)	0.315
151	12.58	0.93	0.476	0.127	(0.138)	0.349
152	12.67	0.93	0.476	0.126	(0.138)	0.350
153	12.75	0.93	0.476	0.126	(0.138)	0.350
154	12.83	0.97	0.493	0.125	(0.143)	0.368
155	12.92	0.97	0.493	0.124	(0.143)	0.369
156	13.00	0.97	0.493	0.124	(0.143)	0.369
157	13.08	1.13	0.578	0.123	(0.168)	0.455
158	13.17	1.13	0.578	0.122	(0.168)	0.456
159	13.25	1.13	0.578	0.122	(0.168)	0.456
160	13.33	1.13	0.578	0.121	(0.168)	0.457
161	13.42	1.13	0.578	0.121	(0.168)	0.457
162	13.50	1.13	0.578	0.120	(0.168)	0.458
163	13.58	0.77	0.391	(0.119)	0.113	0.278
164	13.67	0.77	0.391	(0.119)	0.113	0.278
165	13.75	0.77	0.391	(0.118)	0.113	0.278
166	13.83	0.77	0.391	(0.117)	0.113	0.278
167	13.92	0.77	0.391	(0.117)	0.113	0.278
168	14.00	0.77	0.391	(0.116)	0.113	0.278
169	14.08	0.90	0.459	0.116	(0.133)	0.343

170	14.17	0.90	0.459	0.115	(0.133)	0.344
171	14.25	0.90	0.459	0.115	(0.133)	0.344
172	14.33	0.87	0.442	0.114	(0.128)	0.328
173	14.42	0.87	0.442	0.113	(0.128)	0.329
174	14.50	0.87	0.442	0.113	(0.128)	0.329
175	14.58	0.87	0.442	0.112	(0.128)	0.330
176	14.67	0.87	0.442	0.112	(0.128)	0.330
177	14.75	0.87	0.442	0.111	(0.128)	0.331
178	14.83	0.83	0.425	0.110	(0.123)	0.315
179	14.92	0.83	0.425	0.110	(0.123)	0.315
180	15.00	0.83	0.425	0.109	(0.123)	0.316
181	15.08	0.80	0.408	0.109	(0.118)	0.299
182	15.17	0.80	0.408	0.108	(0.118)	0.300
183	15.25	0.80	0.408	0.108	(0.118)	0.300
184	15.33	0.77	0.391	0.107	(0.113)	0.284
185	15.42	0.77	0.391	0.107	(0.113)	0.284
186	15.50	0.77	0.391	0.106	(0.113)	0.285
187	15.58	0.63	0.323	(0.105)	0.094	0.229
188	15.67	0.63	0.323	(0.105)	0.094	0.229
189	15.75	0.63	0.323	(0.104)	0.094	0.229
190	15.83	0.63	0.323	(0.104)	0.094	0.229
191	15.92	0.63	0.323	(0.103)	0.094	0.229
192	16.00	0.63	0.323	(0.103)	0.094	0.229
193	16.08	0.13	0.068	(0.102)	0.020	0.048
194	16.17	0.13	0.068	(0.102)	0.020	0.048
195	16.25	0.13	0.068	(0.101)	0.020	0.048
196	16.33	0.13	0.068	(0.101)	0.020	0.048
197	16.42	0.13	0.068	(0.100)	0.020	0.048
198	16.50	0.13	0.068	(0.100)	0.020	0.048
199	16.58	0.10	0.051	(0.099)	0.015	0.036
200	16.67	0.10	0.051	(0.099)	0.015	0.036
201	16.75	0.10	0.051	(0.098)	0.015	0.036
202	16.83	0.10	0.051	(0.098)	0.015	0.036
203	16.92	0.10	0.051	(0.097)	0.015	0.036
204	17.00	0.10	0.051	(0.097)	0.015	0.036
205	17.08	0.17	0.085	(0.096)	0.025	0.060
206	17.17	0.17	0.085	(0.096)	0.025	0.060
207	17.25	0.17	0.085	(0.095)	0.025	0.060
208	17.33	0.17	0.085	(0.095)	0.025	0.060
209	17.42	0.17	0.085	(0.094)	0.025	0.060
210	17.50	0.17	0.085	(0.094)	0.025	0.060
211	17.58	0.17	0.085	(0.093)	0.025	0.060
212	17.67	0.17	0.085	(0.093)	0.025	0.060
213	17.75	0.17	0.085	(0.092)	0.025	0.060
214	17.83	0.13	0.068	(0.092)	0.020	0.048
215	17.92	0.13	0.068	(0.092)	0.020	0.048
216	18.00	0.13	0.068	(0.091)	0.020	0.048
217	18.08	0.13	0.068	(0.091)	0.020	0.048
218	18.17	0.13	0.068	(0.090)	0.020	0.048
219	18.25	0.13	0.068	(0.090)	0.020	0.048
220	18.33	0.13	0.068	(0.089)	0.020	0.048
221	18.42	0.13	0.068	(0.089)	0.020	0.048
222	18.50	0.13	0.068	(0.088)	0.020	0.048
223	18.58	0.10	0.051	(0.088)	0.015	0.036
224	18.67	0.10	0.051	(0.088)	0.015	0.036

225	18.75	0.10	0.051	(0.087)	0.015	0.036
226	18.83	0.07	0.034	(0.087)	0.010	0.024
227	18.92	0.07	0.034	(0.086)	0.010	0.024
228	19.00	0.07	0.034	(0.086)	0.010	0.024
229	19.08	0.10	0.051	(0.085)	0.015	0.036
230	19.17	0.10	0.051	(0.085)	0.015	0.036
231	19.25	0.10	0.051	(0.085)	0.015	0.036
232	19.33	0.13	0.068	(0.084)	0.020	0.048
233	19.42	0.13	0.068	(0.084)	0.020	0.048
234	19.50	0.13	0.068	(0.084)	0.020	0.048
235	19.58	0.10	0.051	(0.083)	0.015	0.036
236	19.67	0.10	0.051	(0.083)	0.015	0.036
237	19.75	0.10	0.051	(0.082)	0.015	0.036
238	19.83	0.07	0.034	(0.082)	0.010	0.024
239	19.92	0.07	0.034	(0.082)	0.010	0.024
240	20.00	0.07	0.034	(0.081)	0.010	0.024
241	20.08	0.10	0.051	(0.081)	0.015	0.036
242	20.17	0.10	0.051	(0.081)	0.015	0.036
243	20.25	0.10	0.051	(0.080)	0.015	0.036
244	20.33	0.10	0.051	(0.080)	0.015	0.036
245	20.42	0.10	0.051	(0.080)	0.015	0.036
246	20.50	0.10	0.051	(0.079)	0.015	0.036
247	20.58	0.10	0.051	(0.079)	0.015	0.036
248	20.67	0.10	0.051	(0.079)	0.015	0.036
249	20.75	0.10	0.051	(0.078)	0.015	0.036
250	20.83	0.07	0.034	(0.078)	0.010	0.024
251	20.92	0.07	0.034	(0.078)	0.010	0.024
252	21.00	0.07	0.034	(0.077)	0.010	0.024
253	21.08	0.10	0.051	(0.077)	0.015	0.036
254	21.17	0.10	0.051	(0.077)	0.015	0.036
255	21.25	0.10	0.051	(0.076)	0.015	0.036
256	21.33	0.07	0.034	(0.076)	0.010	0.024
257	21.42	0.07	0.034	(0.076)	0.010	0.024
258	21.50	0.07	0.034	(0.075)	0.010	0.024
259	21.58	0.10	0.051	(0.075)	0.015	0.036
260	21.67	0.10	0.051	(0.075)	0.015	0.036
261	21.75	0.10	0.051	(0.075)	0.015	0.036
262	21.83	0.07	0.034	(0.074)	0.010	0.024
263	21.92	0.07	0.034	(0.074)	0.010	0.024
264	22.00	0.07	0.034	(0.074)	0.010	0.024
265	22.08	0.10	0.051	(0.074)	0.015	0.036
266	22.17	0.10	0.051	(0.073)	0.015	0.036
267	22.25	0.10	0.051	(0.073)	0.015	0.036
268	22.33	0.07	0.034	(0.073)	0.010	0.024
269	22.42	0.07	0.034	(0.073)	0.010	0.024
270	22.50	0.07	0.034	(0.073)	0.010	0.024
271	22.58	0.07	0.034	(0.072)	0.010	0.024
272	22.67	0.07	0.034	(0.072)	0.010	0.024
273	22.75	0.07	0.034	(0.072)	0.010	0.024
274	22.83	0.07	0.034	(0.072)	0.010	0.024
275	22.92	0.07	0.034	(0.072)	0.010	0.024
276	23.00	0.07	0.034	(0.071)	0.010	0.024
277	23.08	0.07	0.034	(0.071)	0.010	0.024
278	23.17	0.07	0.034	(0.071)	0.010	0.024
279	23.25	0.07	0.034	(0.071)	0.010	0.024

```
280  23.33     0.07      0.034       (  0.071)      0.010        0.024
281  23.42     0.07      0.034       (  0.071)      0.010        0.024
282  23.50     0.07      0.034       (  0.070)      0.010        0.024
283  23.58     0.07      0.034       (  0.070)      0.010        0.024
284  23.67     0.07      0.034       (  0.070)      0.010        0.024
285  23.75     0.07      0.034       (  0.070)      0.010        0.024
286  23.83     0.07      0.034       (  0.070)      0.010        0.024
287  23.92     0.07      0.034       (  0.070)      0.010        0.024
288  24.00     0.07      0.034       (  0.070)      0.010        0.024
                (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    36.8
       Flood volume = Effective rainfall      3.07(In)
        times area      20.1(Ac.)/[(In)/(Ft.)] =       5.1(Ac.Ft)
       Total soil loss =      1.18(In)
       Total soil loss =     1.979(Ac.Ft)
       Total rainfall =      4.25(In)
       Flood volume =      223858.2 Cubic Feet
       Total soil loss =       86222.4 Cubic Feet
       --------------------------------------------------------------------
        Peak flow rate of this hydrograph =      9.272(CFS)
       --------------------------------------------------------------------
       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
       --------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

       --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5       0.0012      0.17  Q        |         |         |         |
   0+10       0.0039      0.40  VQ       |         |         |         |
   0+15       0.0070      0.45  VQ       |         |         |         |
   0+20       0.0108      0.56  V Q      |         |         |         |
   0+25       0.0155      0.68  V Q      |         |         |         |
   0+30       0.0204      0.71  V Q      |         |         |         |
   0+35       0.0254      0.73  V Q      |         |         |         |
   0+40       0.0305      0.73  V Q      |         |         |         |
   0+45       0.0355      0.73  V Q      |         |         |         |
   0+50       0.0412      0.82  V  Q     |         |         |         |
   0+55       0.0476      0.93  V  Q     |         |         |         |
   1+ 0       0.0542      0.96  V  Q     |         |         |         |
   1+ 5       0.0603      0.89  V  Q     |         |         |         |
   1+10       0.0656      0.78  V  Q     |         |         |         |
   1+15       0.0708      0.75  V  Q     |         |         |         |
   1+20       0.0759      0.74  V Q      |         |         |         |
   1+25       0.0810      0.74  V Q      |         |         |         |
   1+30       0.0861      0.73  V Q      |         |         |         |
   1+35       0.0911      0.73  V Q      |         |         |         |
   1+40       0.0962      0.73  V Q      |         |         |         |
   1+45       0.1012      0.73  V Q      |         |         |         |
   1+50       0.1069      0.82  V  Q     |         |         |         |
   1+55       0.1133      0.93  V  Q     |         |         |         |
   2+ 0       0.1199      0.96  V  Q     |         |         |         |
   2+ 5       0.1266      0.97  V  Q     |         |         |         |
```

```
2+10       0.1333      0.98  |V Q      |         |         |         |
2+15       0.1400      0.98  |V Q      |         |         |         |
2+20       0.1468      0.98  |V Q      |         |         |         |
2+25       0.1535      0.98  |V Q      |         |         |         |
2+30       0.1602      0.98  |V Q      |         |         |         |
2+35       0.1676      1.06  |V  Q     |         |         |         |
2+40       0.1757      1.18  |V  Q     |         |         |         |
2+45       0.1840      1.20  |V  Q     |         |         |         |
2+50       0.1923      1.21  |V  Q     |         |         |         |
2+55       0.2007      1.22  |V  Q     |         |         |         |
3+ 0       0.2092      1.22  |V  Q     |         |         |         |
3+ 5       0.2176      1.22  |V  Q     |         |         |         |
3+10       0.2260      1.22  |V  Q     |         |         |         |
3+15       0.2344      1.22  |V  Q     |         |         |         |
3+20       0.2428      1.22  |V  Q     |         |         |         |
3+25       0.2513      1.22  |V  Q     |         |         |         |
3+30       0.2597      1.22  | V Q     |         |         |         |
3+35       0.2681      1.22  | V Q     |         |         |         |
3+40       0.2765      1.22  | V Q     |         |         |         |
3+45       0.2850      1.22  | V Q     |         |         |         |
3+50       0.2940      1.31  | V  Q    |         |         |         |
3+55       0.3038      1.42  | V  Q    |         |         |         |
4+ 0       0.3137      1.45  | V  Q    |         |         |         |
4+ 5       0.3238      1.46  | V  Q    |         |         |         |
4+10       0.3339      1.47  | V  Q    |         |         |         |
4+15       0.3440      1.47  | V  Q    |         |         |         |
4+20       0.3547      1.55  | V   Q   |         |         |         |
4+25       0.3661      1.67  | V   Q   |         |         |         |
4+30       0.3778      1.69  | V   Q   |         |         |         |
4+35       0.3895      1.70  |  V  Q   |         |         |         |
4+40       0.4013      1.71  |  V  Q   |         |         |         |
4+45       0.4131      1.71  |  V  Q   |         |         |         |
4+50       0.4255      1.80  |  V   Q  |         |         |         |
4+55       0.4386      1.91  |  V   Q  |         |         |         |
5+ 0       0.4520      1.94  |  V   Q  |         |         |         |
5+ 5       0.4642      1.78  |  V   Q  |         |         |         |
5+10       0.4750      1.56  |  V  Q   |         |         |         |
5+15       0.4853      1.51  |  V  Q   |         |         |         |
5+20       0.4961      1.57  |  V  Q   |         |         |         |
5+25       0.5077      1.67  |  V  Q   |         |         |         |
5+30       0.5193      1.69  |   V Q   |         |         |         |
5+35       0.5316      1.79  |   V  Q  |         |         |         |
5+40       0.5448      1.91  |   V  Q  |         |         |         |
5+45       0.5581      1.94  |   V  Q  |         |         |         |
5+50       0.5715      1.95  |   V  Q  |         |         |         |
5+55       0.5850      1.95  |   V  Q  |         |         |         |
6+ 0       0.5985      1.96  |   V  Q  |         |         |         |
6+ 5       0.6125      2.04  |   V   Q |         |         |         |
6+10       0.6274      2.16  |   V   Q |         |         |         |
6+15       0.6424      2.18  |    V  Q |         |         |         |
6+20       0.6575      2.19  |    V  Q |         |         |         |
6+25       0.6726      2.20  |    V  Q |         |         |         |
6+30       0.6878      2.20  |    V  Q |         |         |         |
6+35       0.7036      2.29  |    V   Q|         |         |         |
6+40       0.7201      2.40  |    V   Q|         |         |         |
```

```
 6+45       0.7368      2.43  |    V   Q|         |         |         |
 6+50       0.7536      2.44  |    V   Q|         |         |         |
 6+55       0.7704      2.44  |    V   Q|         |         |         |
 7+ 0       0.7873      2.45  |     V  Q|         |         |         |
 7+ 5       0.8041      2.45  |     V  Q|         |         |         |
 7+10       0.8210      2.45  |     V  Q|         |         |         |
 7+15       0.8378      2.45  |     V  Q|         |         |         |
 7+20       0.8552      2.53  |     V   Q         |         |         |
 7+25       0.8734      2.64  |     V   Q         |         |         |
 7+30       0.8918      2.67  |     V   Q         |         |         |
 7+35       0.9109      2.77  |      V  |Q        |         |         |
 7+40       0.9308      2.89  |      V  |Q        |         |         |
 7+45       0.9509      2.92  |      V  |Q        |         |         |
 7+50       0.9716      3.01  |      V  | Q       |         |         |
 7+55       0.9932      3.13  |      V  | Q       |         |         |
 8+ 0       1.0149      3.16  |      V  | Q       |         |         |
 8+ 5       1.0379      3.34  |       V |  Q      |         |         |
 8+10       1.0625      3.57  |       V |   Q     |         |         |
 8+15       1.0875      3.63  |       V |   Q     |         |         |
 8+20       1.1127      3.65  |       V |   Q     |         |         |
 8+25       1.1379      3.66  |       V |   Q     |         |         |
 8+30       1.1632      3.67  |        V|   Q     |         |         |
 8+35       1.1891      3.75  |        V|    Q    |         |         |
 8+40       1.2157      3.87  |        V|    Q    |         |         |
 8+45       1.2425      3.89  |        V|    Q    |         |         |
 8+50       1.2700      3.99  |        V|    Q    |         |         |
 8+55       1.2983      4.11  |         V     Q   |         |         |
 9+ 0       1.3268      4.14  |         V     Q   |         |         |
 9+ 5       1.3565      4.32  |         V      Q  |         |         |
 9+10       1.3879      4.55  |         V       Q |         |         |
 9+15       1.4196      4.61  |         |V      Q |         |         |
 9+20       1.4521      4.72  |         |V      Q |         |         |
 9+25       1.4854      4.84  |         |V       Q|         |         |
 9+30       1.5190      4.87  |         |V       Q|         |         |
 9+35       1.5532      4.97  |         | V      Q|         |         |
 9+40       1.5883      5.09  |         | V       Q         |         |
 9+45       1.6235      5.12  |         | V       Q         |         |
 9+50       1.6594      5.21  |         | V       Q         |         |
 9+55       1.6961      5.33  |         |  V      |Q        |         |
10+ 0       1.7331      5.36  |         |  V      |Q        |         |
10+ 5       1.7660      4.78  |         |  V     Q|         |         |
10+10       1.7935      3.99  |         |  V Q    |         |         |
10+15       1.8197      3.81  |         |   VQ    |         |         |
10+20       1.8454      3.73  |         |   Q     |         |         |
10+25       1.8708      3.69  |         |   Q     |         |         |
10+30       1.8960      3.67  |         |   Q     |         |         |
10+35       1.9242      4.09  |         |   V Q   |         |         |
10+40       1.9563      4.66  |         |    V  Q |         |         |
10+45       1.9893      4.79  |         |    V   Q|         |         |
10+50       2.0227      4.85  |         |    V   Q|         |         |
10+55       2.0563      4.88  |         |     V  Q|         |         |
11+ 0       2.0900      4.89  |         |     V  Q|         |         |
11+ 5       2.1232      4.81  |         |     V  Q|         |         |
11+10       2.1555      4.69  |         |     V Q |         |         |
11+15       2.1876      4.67  |         |      VQ |         |         |
```

```
11+20       2.2197      4.66  |         |      VQ |         |         |
11+25       2.2517      4.65  |         |      VQ |         |         |
11+30       2.2837      4.65  |         |      VQ |         |         |
11+35       2.3146      4.48  |         |      QV |         |         |
11+40       2.3439      4.25  |         |      QV |         |         |
11+45       2.3728      4.20  |         |     Q V |         |         |
11+50       2.4021      4.26  |         |      QV |         |         |
11+55       2.4321      4.36  |         |      QV |         |         |
12+ 0       2.4623      4.38  |         |      Q V|         |         |
12+ 5       2.4967      4.98  |         |        Q|         |         |
12+10       2.5365      5.79  |         |        V|  Q      |         |
12+15       2.5777      5.98  |         |         V  Q      |         |
12+20       2.6200      6.14  |         |         V   Q     |         |
12+25       2.6634      6.30  |         |         V    Q    |         |
12+30       2.7071      6.35  |         |         |V   Q    |         |
12+35       2.7526      6.61  |         |         |V    Q   |         |
12+40       2.8004      6.94  |         |         |V     Q  |         |
12+45       2.8488      7.04  |         |         | V     Q |         |
12+50       2.8984      7.20  |         |         | V     Q |         |
12+55       2.9493      7.39  |         |         | V      Q|         |
13+ 0       3.0006      7.45  |         |         |  V     Q|         |
13+ 5       3.0561      8.07  |         |         |  V      | Q       |
13+10       3.1174      8.89  |         |         |   V     |    Q    |
13+15       3.1800      9.10  |         |         |   V     |     Q   |
13+20       3.2433      9.19  |         |         |    V    |     Q   |
13+25       3.3070      9.24  |         |         |    V    |     Q   |
13+30       3.3708      9.27  |         |         |     V   |      Q  |
13+35       3.4261      8.02  |         |         |     V   | Q       |
13+40       3.4696      6.32  |         |         |    Q V  |         |
13+45       3.5104      5.92  |         |         |  Q   V  |         |
13+50       3.5499      5.75  |         |         | Q    V  |         |
13+55       3.5890      5.66  |         |         | Q    V  |         |
14+ 0       3.6277      5.63  |         |         | Q     V |         |
14+ 5       3.6696      6.08  |         |         |   Q   V |         |
14+10       3.7158      6.71  |         |         |     Q V |         |
14+15       3.7631      6.86  |         |         |      Q V|         |
14+20       3.8100      6.82  |         |         |      Q V|         |
14+25       3.8562      6.70  |         |         |     Q   V         |
14+30       3.9023      6.69  |         |         |     Q   V         |
14+35       3.9483      6.68  |         |         |     Q   V         |
14+40       3.9944      6.69  |         |         |     Q   |V        |
14+45       4.0405      6.70  |         |         |     Q   |V        |
14+50       4.0859      6.59  |         |         |     Q   |V        |
14+55       4.1302      6.44  |         |         |    Q    | V       |
15+ 0       4.1744      6.41  |         |         |    Q    | V       |
15+ 5       4.2177      6.29  |         |         |    Q    | V       |
15+10       4.2600      6.13  |         |         |   Q     |  V      |
15+15       4.3020      6.10  |         |         |   Q     |  V      |
15+20       4.3432      5.98  |         |         |  Q      |  V      |
15+25       4.3833      5.82  |         |         |  Q      |   V     |
15+30       4.4232      5.79  |         |         |  Q      |   V     |
15+35       4.4603      5.40  |         |         |Q        |   V     |
15+40       4.4938      4.86  |         |        Q|         |   V     |
15+45       4.5265      4.74  |         |       Q |         |    V    |
15+50       4.5587      4.69  |         |       Q |         |    V    |
```

```
15+55       4.5908      4.66  |         |       Q |         |    V    |
16+ 0       4.6228      4.65  |         |       Q |         |    V    |
16+ 5       4.6461      3.39  |         |  Q      |         |     V   |
16+10       4.6577      1.67  |     Q   |         |         |     V   |
16+15       4.6665      1.27  |    Q    |         |         |     V   |
16+20       4.6740      1.10  |   Q     |         |         |     V   |
16+25       4.6810      1.02  |   Q     |         |         |     V   |
16+30       4.6878      0.98  |  Q      |         |         |     V   |
16+35       4.6939      0.89  |  Q      |         |         |     V   |
16+40       4.6993      0.78  |  Q      |         |         |     V   |
16+45       4.7045      0.75  |  Q      |         |         |     V   |
16+50       4.7096      0.74  | Q       |         |         |     V   |
16+55       4.7147      0.74  | Q       |         |         |     V   |
17+ 0       4.7197      0.73  | Q       |         |         |     V   |
17+ 5       4.7259      0.90  |  Q      |         |         |     V   |
17+10       4.7337      1.13  |   Q     |         |         |     V   |
17+15       4.7419      1.18  |   Q     |         |         |     V   |
17+20       4.7502      1.21  |   Q     |         |         |     V   |
17+25       4.7586      1.22  |   Q     |         |         |      V  |
17+30       4.7670      1.22  |   Q     |         |         |      V  |
17+35       4.7754      1.22  |   Q     |         |         |      V  |
17+40       4.7839      1.22  |   Q     |         |         |      V  |
17+45       4.7923      1.22  |   Q     |         |         |      V  |
17+50       4.8001      1.14  |   Q     |         |         |      V  |
17+55       4.8072      1.02  |   Q     |         |         |      V  |
18+ 0       4.8141      1.00  |  Q      |         |         |      V  |
18+ 5       4.8209      0.99  |  Q      |         |         |      V  |
18+10       4.8276      0.98  |  Q      |         |         |      V  |
18+15       4.8343      0.98  |  Q      |         |         |      V  |
18+20       4.8411      0.98  |  Q      |         |         |      V  |
18+25       4.8478      0.98  |  Q      |         |         |      V  |
18+30       4.8546      0.98  |  Q      |         |         |      V  |
18+35       4.8607      0.89  |  Q      |         |         |      V  |
18+40       4.8661      0.78  |  Q      |         |         |      V  |
18+45       4.8713      0.75  |  Q      |         |         |      V  |
18+50       4.8758      0.66  | Q       |         |         |      V  |
18+55       4.8795      0.54  | Q       |         |         |      V  |
19+ 0       4.8830      0.51  | Q       |         |         |       V |
19+ 5       4.8870      0.58  | Q       |         |         |       V |
19+10       4.8918      0.69  | Q       |         |         |       V |
19+15       4.8967      0.71  | Q       |         |         |       V |
19+20       4.9023      0.81  |  Q      |         |         |       V |
19+25       4.9087      0.93  |  Q      |         |         |       V |
19+30       4.9153      0.96  |  Q      |         |         |       V |
19+35       4.9214      0.89  |  Q      |         |         |       V |
19+40       4.9267      0.78  |  Q      |         |         |       V |
19+45       4.9319      0.75  |  Q      |         |         |       V |
19+50       4.9365      0.66  | Q       |         |         |       V |
19+55       4.9402      0.54  | Q       |         |         |       V |
20+ 0       4.9437      0.51  | Q       |         |         |       V |
20+ 5       4.9477      0.58  | Q       |         |         |       V |
20+10       4.9524      0.69  | Q       |         |         |       V |
20+15       4.9574      0.71  | Q       |         |         |       V |
20+20       4.9624      0.73  | Q       |         |         |       V |
20+25       4.9674      0.73  | Q       |         |         |       V |
```

```
   20+30       4.9724      0.73  | Q       |         |         |      V |
   20+35       4.9775      0.73  | Q       |         |         |      V |
   20+40       4.9826      0.73  | Q       |         |         |      V |
   20+45       4.9876      0.73  | Q       |         |         |      V |
   20+50       4.9921      0.65  | Q       |         |         |      V |
   20+55       4.9958      0.54  | Q       |         |         |      V |
   21+ 0       4.9993      0.51  | Q       |         |         |      V |
   21+ 5       5.0033      0.58  | Q       |         |         |      V |
   21+10       5.0080      0.69  | Q       |         |         |      V |
   21+15       5.0129      0.71  | Q       |         |         |       V|
   21+20       5.0174      0.64  | Q       |         |         |       V|
   21+25       5.0210      0.53  | Q       |         |         |       V|
   21+30       5.0245      0.51  | Q       |         |         |       V|
   21+35       5.0285      0.58  | Q       |         |         |       V|
   21+40       5.0333      0.69  | Q       |         |         |       V|
   21+45       5.0382      0.71  | Q       |         |         |       V|
   21+50       5.0426      0.64  | Q       |         |         |       V|
   21+55       5.0463      0.53  | Q       |         |         |       V|
   22+ 0       5.0498      0.51  | Q       |         |         |       V|
   22+ 5       5.0538      0.58  | Q       |         |         |       V|
   22+10       5.0586      0.69  | Q       |         |         |       V|
   22+15       5.0635      0.71  | Q       |         |         |       V|
   22+20       5.0679      0.64  | Q       |         |         |       V|
   22+25       5.0716      0.53  | Q       |         |         |       V|
   22+30       5.0751      0.51  | Q       |         |         |       V|
   22+35       5.0785      0.50  |Q        |         |         |       V|
   22+40       5.0819      0.49  |Q        |         |         |       V|
   22+45       5.0853      0.49  |Q        |         |         |       V|
   22+50       5.0886      0.49  |Q        |         |         |       V|
   22+55       5.0920      0.49  |Q        |         |         |       V|
   23+ 0       5.0954      0.49  |Q        |         |         |       V|
   23+ 5       5.0987      0.49  |Q        |         |         |       V|
   23+10       5.1021      0.49  |Q        |         |         |       V|
   23+15       5.1055      0.49  |Q        |         |         |       V|
   23+20       5.1089      0.49  |Q        |         |         |       V|
   23+25       5.1122      0.49  |Q        |         |         |       V|
   23+30       5.1156      0.49  |Q        |         |         |       V|
   23+35       5.1190      0.49  |Q        |         |         |       V|
   23+40       5.1223      0.49  |Q        |         |         |       V|
   23+45       5.1257      0.49  |Q        |         |         |       V|
   23+50       5.1291      0.49  |Q        |         |         |       V|
   23+55       5.1324      0.49  |Q        |         |         |       V|
   24+ 0       5.1358      0.49  |Q        |         |         |       V|
   24+ 5       5.1380      0.32  |Q        |         |         |       V|
   24+10       5.1387      0.09  Q         |         |         |       V|
   24+15       5.1389      0.04  Q         |         |         |       V|
   24+20       5.1390      0.02  Q         |         |         |       V|
   24+25       5.1391      0.01  Q         |         |         |        V
-----------------------------------------------------------------------
```

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

**To be provided during final engineering.*

Appendix 9: O&M

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

**To be provided during final engineering.*

Appendix 10: Educational Materials

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

**To be provided during final engineering.*