Appendix K-3

Project Specific Water Quality Management Plan,
Meridian Park South Building B

Project Specific Water Quality Management Plan

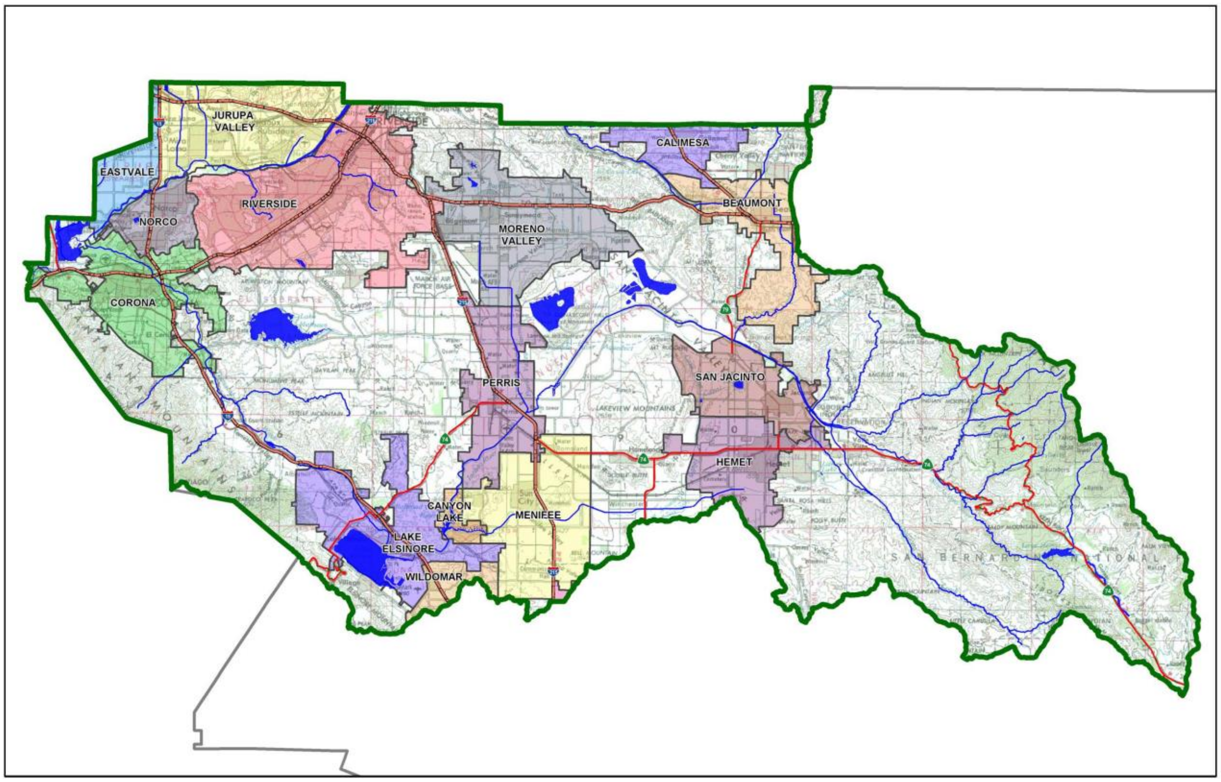
*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Addendum to Master Meridian West Campus Upper Plateau WQMP

Project Title: Meridian Park South Building B

Development No:

Design Review/Case No: TBD



☒ **Preliminary**
☐ **Final**

Original Date Prepared: March 30, 2022

Revision Date(s):

Prepared for Compliance with

Regional Board Order No. ***R8-2010-0033***

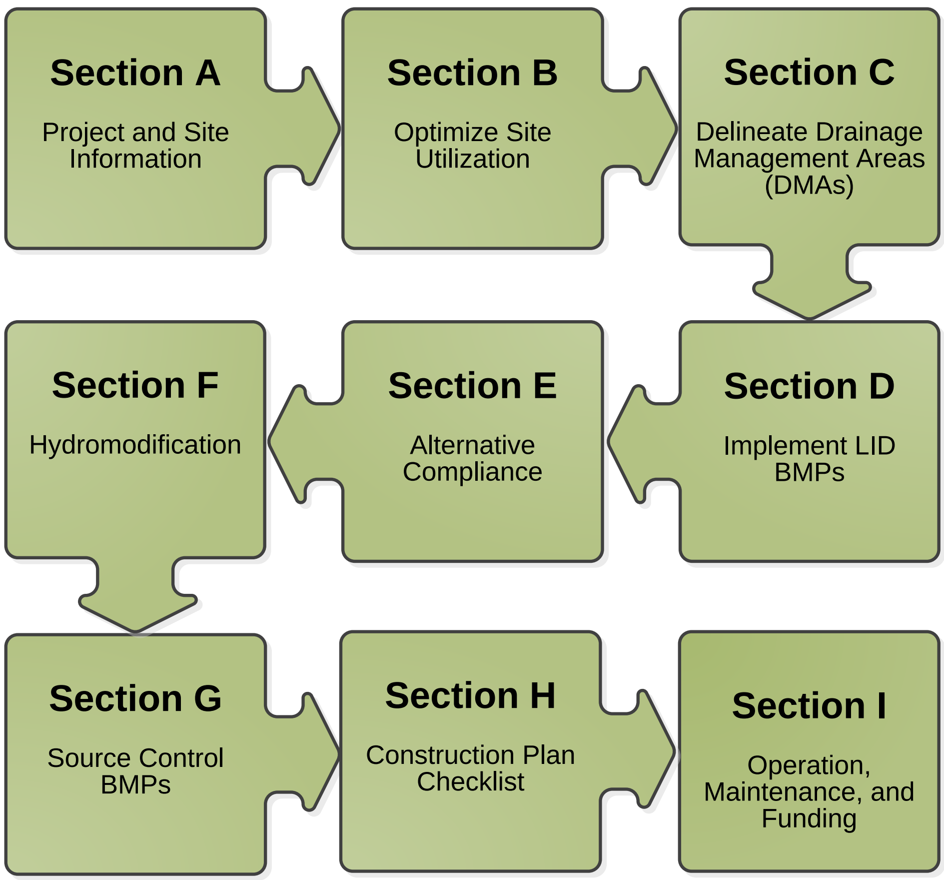
Contact Information:

Prepared for:
Meridian Park, LLC
1156 N. Mountain Avenue
Upland, CA 91786
(909) 579-1294
Contact: Jeff Gordon

Prepared by:
DRC Engineering, Inc.
160 South Old Springs Road, Suite 210
Anaheim Hills, CA 92808
(714) 685-6860

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 Meridian Park, LLC by DRC Engineering, Inc. for the Building B project (XXX-XXX-XXX).

This WQMP is intended to comply with the requirements of March JPA Section 1.8 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 March JPA Section 1.8.

"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	Date
Jeff Gordon	Sr. Vice President, Development
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

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

______________________	______________________
Preparer's Signature	Date
Christopher McKee	Project Engineer
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

The Meridian South Campus Building C WQMP has been prepared as an addendum to the Master Meridian West Campus Upper Plateau WQMP approved on XX/XX/XXXX. This addendum is consistent with the design shown in the approved Master WQMP. The proposed Building C project covers the 27.5 acres making up Lot 5 of the approved Phase III Master WQMP (see Drainage Area Map located in Appendix 1 of the approved report). All water quality treatment and hydromodification for the public streets are addressed by the Master WQMP.

The Building B project consists of the construction of one industrial building (approximately ±1,250,000 SF), paved parking areas, drive aisles, utilities, and associated landscaping areas. The site is located to the south of Cactus Avenue, east of Airman Drive, west of Linebacker Drive, and north of Bunker Hills Drive in an unincorporated portion of the County of Riverside. The project site is not allowed to have standing water within airport influence.

The western 13.0 acres of the project site will drain to underground detention system DET A. The northeastern 22.8 acres of the project site will drain to underground detention system DET B. The southeastern 23.7 acres of the project site will drain to underground detention system DET C. Proposed detention system DET A consists of 3,960 LF of 60" diameter storm drain pipe, which provides a total volume of 77,770 CF. Proposed detention system DET B consists of 5,700 LF of 60" diameter storm drain pipe, which provides a total volume of 111,942 CF. Proposed detention system DET C consists of 6,000 LF of 60" diameter storm drain pipe, which provides a total volume of 117,833 CF. A proprietary biotreatment unit (BIO A, BIO B & BIO C - Modular Wetlands System L-8-20-V) will be located downstream of each detention system and provide a maximum treatment flow rate of 0.577 cfs. Watersheds A & B will outlet via pipe to the existing storm drain lateral located at the northwest corner of the project site. Watershed C will connect to the existing 24" public storm drain under Airman Drive. The public storm drain outlets near Moray Court and flows into an existing 72" storm drain. Stormwater flows through an existing residential development and flows northwest through a creek towards Mary Street Dam. Overflow continues on to the Santa Ana River.

A Vicinity Map and Downstream Receiving Waters Map as well as the WQMP Post-Construction BMP Plans are included in Appendix 1. The pertinent conceptual grading and utility plans are included in Appendix 2. There are no jurisdictional areas within the project limits.

PROJECT INFORMATION	
Type of Project:	Industrial
Planning Area:	MJPA
Community Name:	Riverside County
Development Name:	Meridian Business Center, Upper Plateau, Building C
PROJECT LOCATION	
Latitude & Longitude (DMS): 33°54'19.45"N, -117°18'32.19"W	
Project Watershed and Sub-Watershed: Santa Ana River Watershed	
APN(s): TBD	
Map Book and Page No.: Parcels 1 & 2 of RS Book 110 Pages 30-40	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Office/Warehouse
Proposed or Potential SIC Code(s)	4225
Area of Impervious Project Footprint (SF)	2,334,538 SF (53.6AC)

Total Area of <u>proposed</u> Impervious Surfaces within the Project Limits (SF)/or Replacement	2,334,538 SF (53.6AC)
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 <u>existing</u> 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)	BC
What is the Water Quality Design Storm Depth for the project?	0.60 inches

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
Mary Street Dam Stream	N/A	None	N/A
Mary Street Dam	N/A	None	N/A
Santa Ana River Reach 3	Copper, Indicator Bacteria, Lead	Agricultural Supply, Navagation, Water Contact Recreation, Non-Water Contact Recreation, Warm Freshwater Habitat, Wildlife Habitat, Rarte, Threatened or Endangered species, Spawning, Repoduction and Development	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)*	☐ 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 consists of a rough graded dirt pad that generally slopes towards the northwest. The existing outlet point is a desilting basin with a CMP riser connected to the 36" storm drain pipe under Airman Drive to the west of the site. The proposed project will drain to underground detention systems and connect to the same existing 36" storm drain serving the existing desilting basin as well as an additional lateral connection to the same storm drain pipe under Airman Drive upstream of the existing connection.

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

The undeveloped site is a series of rough graded dirt pads and does not contain existing vegetation to protect.

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

Percolation testing has not been completed at the site as of yet. Based on the preliminary geotechnical report, the site is underlain by granitic bedrock and fill soils. The granitic bedrock at nearby sites has been shown to possess very low infiltration rates (<0.6 in/hr). Therefore, infiltration is considered infeasible on this project site.

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

Proposed pervious area is shown to the maximum extent practiable while still allowing for other impervious site design requirements (ie. amount of parking stalls)

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

Any overflow runoff will be conveyed to the adjacent street and to the public storm drain system. There is not an adjacent pervious area athat would be able to take on runon.

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
A1	Roof	212,510	Area Draining to BMP
A2	Concrete	222,319	Area Draining to BMP
A3	Landscape (Landscape Swale)	1,916	Self-Retaining Area
A4	Landscape	29,180	Area Draining to BMP
A5	Landscape	26,802	Area Draining to BMP
A6	Landscape (Landscape Swale)	5,217	Self-Retaining Area
A7	Landscape	8,429	Area Draining to BMP
A8	Landscape	5,363	Area Draining to BMP
A9	Landscape (Landscape Swale)	2,627	Self-Retaining Area
A10	Landscape	1,966	Area Draining to BMP
A11	Concrete	6,151	Area Draining to BMP
A12	Landscape	21,434	Area Draining to BMP
A13	Landscape (Landscape Swale)	5,394	Self-Retaining Area
A14	Landscape	1,813	Area Draining to BMP
A15	Landscape (Landscape Swale)	1,837	Self-Retaining Area
A16	Landscape	14,092	Area Draining to BMP
B1	Roof	517,974	Area Draining to BMP
B2	Concrete	426,824	Area Draining to BMP
B3	Landscape	23,721	Area Draining to BMP
B4	Landscape (Landscape Swale)	7,313	Self-Retaining Area
B5	Landscape (Landscape Swale)	14,546	Self-Retaining Area
B6	Landscape	3,799	Area Draining to BMP
C1	Roof	518,761	Area Draining to BMP
C2	Concrete	444,334	Area Draining to BMP
C3	Landscape	50,214	Area Draining to BMP
C4	Landscape (Landscape Swale)	19,394	Self-Retaining Area

[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)
N/A			

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]
A3	Landscape	1,916	0.60	-		
A6	Landscape	5,217	0.60	-		
A9	Landscape	2,627	0.60	-		
A13	Landscape	5,394	0.60	-		
A15	Landscape	1,837	0.60			
B4	Landscape	7,313	0.60			
B5	Landscape	14,546	0.60			
C4	Landscape	19,394	0.60			

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

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

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

Table C.5 Type ‘D’, Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
A1	DET A/MWS A
A2	DET A/MWS A
A4	DET A/MWS A
A5	DET A/MWS A
A7	DET A/MWS A
A8	DET A/MWS A
A10	DET A/MWS A
A11	DET A/MWS A
A12	DET A/MWS A
A14	DET A/MWS A
A16	DET A/MWS A
B1	DET B/MWS B
B2	DET B/MWS B
B3	DET B/MWS B
B6	DET B/MWS B
C1	DET C/MWS C
C2	DET C/MWS C
C3	DET C/MWS C
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:		
…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.

Percolation testing has not been completed at the site as of yet. Based on the preliminary geotechnical report, the site is underlain by granitic bedrock and fill soils. The granitic bedrock at nearby sites has been shown to possess very low infiltration rates (<0.6 in/hr). Therefore, infiltration is considered infeasible on this project site.

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: Insert Area (Acres)

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

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

Total Area of Impervious Surfaces: Insert Area (Acres)

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

Enter your EIATIA factor: EIATIA Factor

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

Minimum required irrigated area: Insert Area (Acres)

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

Minimum required irrigated area (Step 4)	**Available Irrigated Landscape (Step 1)**
Insert Area (Acres)	Insert Area (Acres)

Toilet Use Feasibility

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

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

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

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

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

Total Area of Impervious Surfaces: Insert Area (Acres)

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

Enter your TUTIA factor: TUTIA Factor

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

Minimum number of toilet users: Required number of toilet users

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

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
Insert Area (Acres)	Insert Area (Acres)

Other Non-Potable Use Feasibility

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

Insert text here describing how each included Site Design BMP will be implemented.

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

Average Daily Demand: Projected Average Daily Use (gpd)

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

Total Area of Impervious Surfaces: Insert Area (Acres)

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

Enter the factor from Table 2-3: Enter Value

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: Minimum use required (gpd)

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)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

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

☐ None of the above.

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	
A1	☐	☐	☐	☒	☐
A2	☐	☐	☐	☒	☐
A4	☐	☐	☐	☒	☐
A5	☐	☐	☐	☒	☐
A7	☐	☐	☐	☒	☐
A8	☐	☐	☐	☒	☐
A10	☐	☐	☐	☒	☐
A11	☐	☐	☐	☒	☐
A12	☐	☐	☐	☒	☐
A14	☐	☐	☐	☒	☐
A16	☐	☐	☐	☒	☐
B1	☐	☐	☐	☒	☐
B2	☐	☐	☐	☒	☐
B3	☐	☐	☐	☒	☐
B6	☐	☐	☐	☒	☐
C1	☐	☐	☐	☒	☐
C2	☐	☐	☐	☒	☐
C3	☐	☐	☐	☒	☐
	☐	☐	☐	☐	☐
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	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

The Building B WQMP has been prepared as an addendum to the Master Meridian West Campus Upper Plateau WQMP. This addendum is consistent with the design shown in the approved Master WQMP. Based on poor percolation test results encountered near the project site, infiltration is deemed infeasible. Additionally, since reclaimed water will be used for non-potable water demands on the project, harvest and use BMPs were not assessed for the site. The proposed LID Biotreatment BMPs for the South Campus Building D are consistent with the design presented in the Master WQMP.

The proposed treatment volume for Watershed A is 22,664 cf is treated by MWS A (MWS-L-8-20-V) which has a treatment capacity V_{BMP} of 45,000 cf for a drawdown time of approximately 75 hours. The proposed treatment volume for Watershed B is 42,290 cf is treated by MWS B (MWS-L-8-20-V) which has a treatment capacity V_{BMP} of 45,000 cf for a drawdown time of approximately 75 hours. The proposed treatment volume for Watershed C is 43,232 cf is treated by MWS C (MWS-L-8-20-V) which has a treatment capacity V_{BMP} of 45,000 cf for a drawdown time of approximately 75 hours.

D.5 LID BMP Sizing

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

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here* *Detention System A (DET A)*		
	[A]		[B]	[C]	[A] x [C]			
A1	212,510	Roofs	1	0.89	189558.9			
A2	222,319	Concrete	1	0.89	198308.5			
A4	29,180	Ornamental Landscaping	0.1	0.11	3223.2			
A5	26,802	Ornamental Landscaping	0.1	0.11	2960.5			
A7	8,429	Ornamental Landscaping	0.1	0.11	931.1			
A8	5,363	Ornamental Landscaping	0.1	0.11	592.4			
A10	1,966	Concrete	1	0.89	1753.7			
A11	6,151	Ornamental Landscaping	0.1	0.11	679.4			
A12	21,434	Ornamental Landscaping	0.1	0.11	2367.6			
A14	1,813	Concrete	1	0.89	1617.2			
A16	14,092	Ornamental Landscaping	0.1	0.11	1556.6			
						Design Storm Depth (in)	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Treated Volume on Plans (cubic feet)*
	$A_T = \Sigma[A]$ =550,059				$\Sigma = [D]$ =403,549.1	[E] = 0.60	$[F] = \frac{[D]x[E]}{12}$ = 20177.5	[G] = 45,000

[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	*Enter BMP Name / Identifier Here* *Detention System B (DET B)*		
	[A]		[B]	[C]	[A] x [C]			
B1	*517,974*	*Roofs*	*1*	*0.89*	*462032.8*	*Design Storm Depth (in)*	*Design Capture Volume,* **V_{BMP}** *(cubic feet)*	*Proposed Treated Volume on Plans (cubic feet)*
B2	*426,824*	*Concrete*	*1*	*0.89*	*380727*			
B4	*23,721*	*Ornamental Landscaping*	*0.1*	*0.11*	*2620.2*			
B5	*3,799*	*Ornamental Landscaping*	*0.1*	*0.11*	*419.6*			
	$A_T = \Sigma[A]$ =972,318				$\Sigma = [D]$ =845799.6	[E] = 0.60	$[F] = \frac{[D]x[E]}{12}$ = 42,290	[G] = 45,000

[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	*Enter BMP Name / Identifier Here* *Detention System C (DET C)*		
	[A]		[B]	[C]	[A] x [C]			
C1	*518,761*	*Roofs*	*1*	*0.89*	*462734.8*	*Design Storm Depth (in)*	*Design Capture Volume,* **V_{BMP}** *(cubic feet)*	*Proposed Treated Volume on Plans (cubic feet)*
C2	*444,334*	*Concrete*	*1*	*0.89*	*396345.9*			
C3	*50,214*	*Ornamental Landscaping*	*0.1*	*0.11*	*5546.5*			
	$A_T = \Sigma[A]$ =1,013,309				$\Sigma = [D]$ =864627.2	[E] = 0.60	$[F] = \frac{[D]x[E]}{12}$ = 42231.4	[G] = 45,000

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

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

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

Section E: Alternative Compliance (LID Waiver Program)

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

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

- *Or* -

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

E.1 Identify Pollutants of Concern

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

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ 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]	*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

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]
Proprietary Biotreatment System (Modular Wetlands Unit MWS A)	Oil & Grease, Metals, Trash & Debris	Oil & Grease - 95% (High) Metals - 38%-69% (Med.) TSS - 85% (High)
Proprietary Biotreatment System (Modular Wetlands Unit MWS B)	Oil & Grease, Metals, Trash & Debris	Oil & Grease - 95% (High) Metals - 38%-69% (Med.) TSS - 85% (High)
Proprietary Biotreatment System (Modular Wetlands Unit MWS C)	Oil & Grease, Metals, Trash & Debris	Oil & Grease - 95% (High) Metals - 38%-69% (Med.) TSS - 85% (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			
Volume (Cubic Feet)			

[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:

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.

Per the Meridian West Campus Upper Plateau Master WQMP approved on XX/XX/XXXX, as parcels are developed, each parcel will need to design its LID BMPs for the portion of the overall hydromod volume. The proposed site runoff is connected to the existing storm drain lateral at the northeast of the site that outflows to the existing terrain. The site is located within an area that is not exempt from Hydrologic Conditions of Concerns and will therefore need to follow the HCOCO criteria discussed above.

The western 13.0 acres of the project site will drain to underground detention system DET A. The northeastern 22.8 acres of the project site will drain to underground detention system DET B. The southeastern 23.7 acres of the project site will drain to underground detention system DET C. Proposed detention system DET A consists of 3,960 LF of 60" diameter storm drain pipe, which provides a total volume of 77,770 CF. Proposed detention system DET B consists of 5,700 LF of 60" diameter storm drain pipe, which provides a total volume of 111,942 CF. Proposed detention system DET C consists of 6,000 LF of 60" diameter storm drain pipe, which provides a total volume of 117,833 CF. A proprietary biotreatment unit (BIO A, BIO B & BIO C - Modular Wetlands System L-8-20-V) will be located downstream of each detention system and provide a maximum treatment flow rate of 0.577 cfs. See Appendix 7 for a map showing the limits of the non-exempt area as well as the detention calculations.

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

Permanent Source Control BMPs

- Mark all inlets with the words "No Dumping! Flows to River". Each drain inlet identified on the Source Control Exhibit shall be painted in either blue or white lettering on the drain inlet or immediately adjacent to the inlet.
- Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer. All drains located interior to the building will be directed into the sanitary sewer system within the building and discharge to the public sewer system.
- Minimize the number of entry ways and openings to the building at ground surface elevation. The building is designed to minimize the number of location where pests can enter the building. Doors are designed to close with minimal gaps to the frame and points of penetration into the walls by utilities are to be sealed.
- Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. The existing project site contains grasses and low-lying vegetation that has grown in since the site was rough graded as part of a previous project. There is no native vegetation remaining. Due to the grading requirements of the site, the new growth will be removed during the grading process and new vegetation planted per the landscape plans.
- 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. Landscape materials have been chosen with water wise practices in mind and drought tolerant plantings. Landscape areas are designed as sumps with overflow drains located higher than the bottom of sump to infiltrate low flows and reduce runoff. The use of fertilizers and pesticides will be in conformance with the CASQA recommendations of SC-41.
- Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Plants located in landscape retention areas are tolerant to over-saturated soils for short periods of time.
- 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. The landscape plant list for this project has been specifically designed to work with the project site and to be in conformance with the area of Fallbrook design requirements.
- Design of designated cleaning areas in food uses to be determined in final design.
- Items to be cleaned in food uses and sizing of cleaning areas to be determined in final design.
- Site refuse will be contained in designated trash areas and equipped with roofs or be self-containing equipment (trash compactors) that will prevent run-on.
- Signs to be posted in designated trash areas reading "Do not dump hazardous materials here" or similar.
- Provide a means to drain fire sprinkler test water to the sanitary sewer. Drains located internal to the building will drain into the building's sanitary sewer system and discharge into the public sewer system.
- Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system Condensate drain lines will not directly connect to the storm drain system. Drain lines will either discharge into landscape areas for infiltration or connect directly to the sewer system.
- Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. Rooftop equipment will discharge through the roof drain system into landscape areas for infiltration.
- Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. Unprotected metals will not be used for the roofing, gutter or building trim.

Operational Source Control BMPs

- Maintain and periodically repaint or replace inlet markings. Inlet markings to be inspected on an annual basis for fading. Markings to be repainted as required.
- Provide stormwater pollution prevention information to new site owner, lessees or operators. A copy of the SUSMP is to be kept on-site at all times by management. At time of hire, operation and maintenance staff are to be educated on the source control BMPs and treatment BMPs for the project.
- See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. Educational material, included Fact Sheet SC-44, found within this SUSMP report is to be made available to maintenance staff by owner.
- Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains." While the current project is not intended to be leased, the owner shall include this language in the event that the property does become leased.
- Inspect and maintain drains to prevent blockages and overflow. Drains internal to the building will be routinely inspected and maintained by the maintenance staff.
- Provide Integrated Pest Management (IPM) information to owners, lessees, and operators. Owner shall develop an IPM prior to occupancy and provide this information to the maintenance staff at time of employment and provide to future property owner or lessees.
- Maintain landscaping using minimum or no pesticides. Plantings chosen for the site are to be pest-resistant plants around the building and pesticides used are to be environmentally sensitive varieties.
- See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks.
- Provide IPM information to new owners, lessees and operators. Owner to develop the IPM for the project and distribute to maintenance staff at time of employment and provide to future lessees and new owners.
- Owner/maintenance staff to maintain a proper number of trash receptacles on hand to ensure available storage space. Routine inspection of trash receptacles for leaking or trash accumulation. Inspection of "No hazardous materials" signage, replace as necessary. See Fact Sheet SC-34 "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbook.
- Owner/maintenance staff to move unloaded items indoors as soon as possible.
- See Fact Sheet SC-30 "Outdoor Loading and Unloading" in the CASQA Stormwater Quality Handbook.
- See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks. Owner to provide BMP fact sheet to maintenance staff at time of employment and to future lessees.
- Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain. Owner to hire parking lot sweeping service or provide maintenance staff proper vacuuming equipment to collect litter and debris from the site. In the event water is used to clean the site, wastewater shall be collected and disposed of properly, not dumped down the storm drain system.

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)

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

Section I: Operation, Maintenance and Funding

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

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

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

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

Maintenance Mechanism:	The property owner will record an agreement with the County of Riverside to maintain the BMPs outlined in this report.

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

☐ Y ☐ N

The maintenance of the proposed structure BMPs will be done by the property owner through site maintenance workers. The property owner will be responsible for funding of all onsite BMPs through its operating budget. The following party is responsible for the operation and maintenance of all Structural Source Control and Treatment Control BMPs until such time that the permanent sale of the parcel and transfer of ownership occurs:

Meridian Park, LLC
1156 N. Mountain Avenue
Upland, CA 91786
Contact: Jeff Gordon (303) 579-1294

Operation and Maintenance Plan and Maintenance Mechanism included in Appendix 9. Educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP included in Appendix 10.

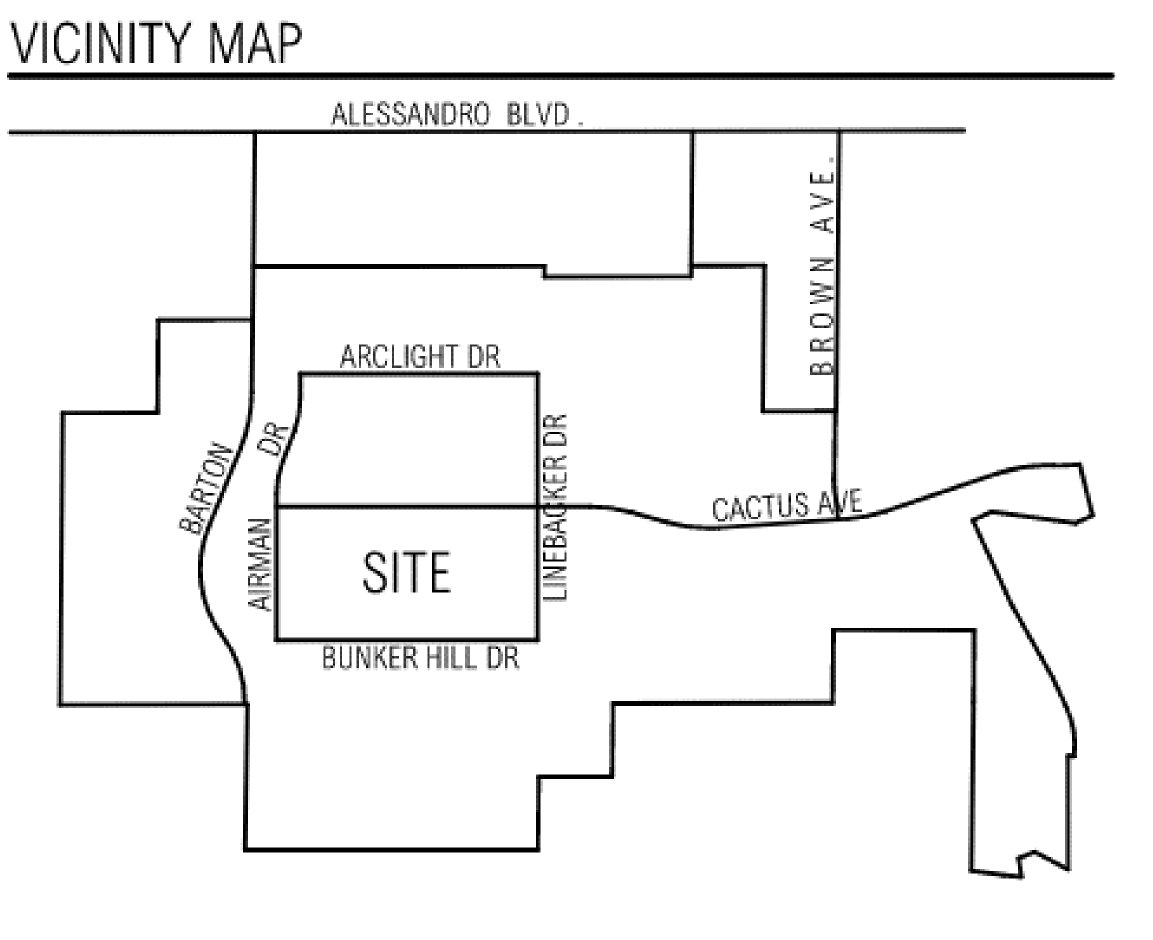
			Maintenance Responsibility				Funding Mechanism for Maintenance			Maintenance Costs	
BMP	Used	Not Used	Owner **	City	County	Flood District	Owner	Developer	Public *	1-year ($)	2-year ($)
Hydro seeding & Mulching	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Landscape Private	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Landscape Public	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Lawns	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Impervious permanent cover (concrete/ asphalt) Private	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Impervious permanent cover (concrete/ asphalt) Public	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Pervious permanent cover (gravel)	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Down drains	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Ribbon Gutter Public	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Ribbon Gutter Private	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Curb & gutter Public	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Curb & gutter Private	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Storm Drain	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Detention Basin	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Biotreatment (Modular Wetlands System)	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Education Materials	☐	☐	☐	☐	☐	☐	☐	☐	☐		

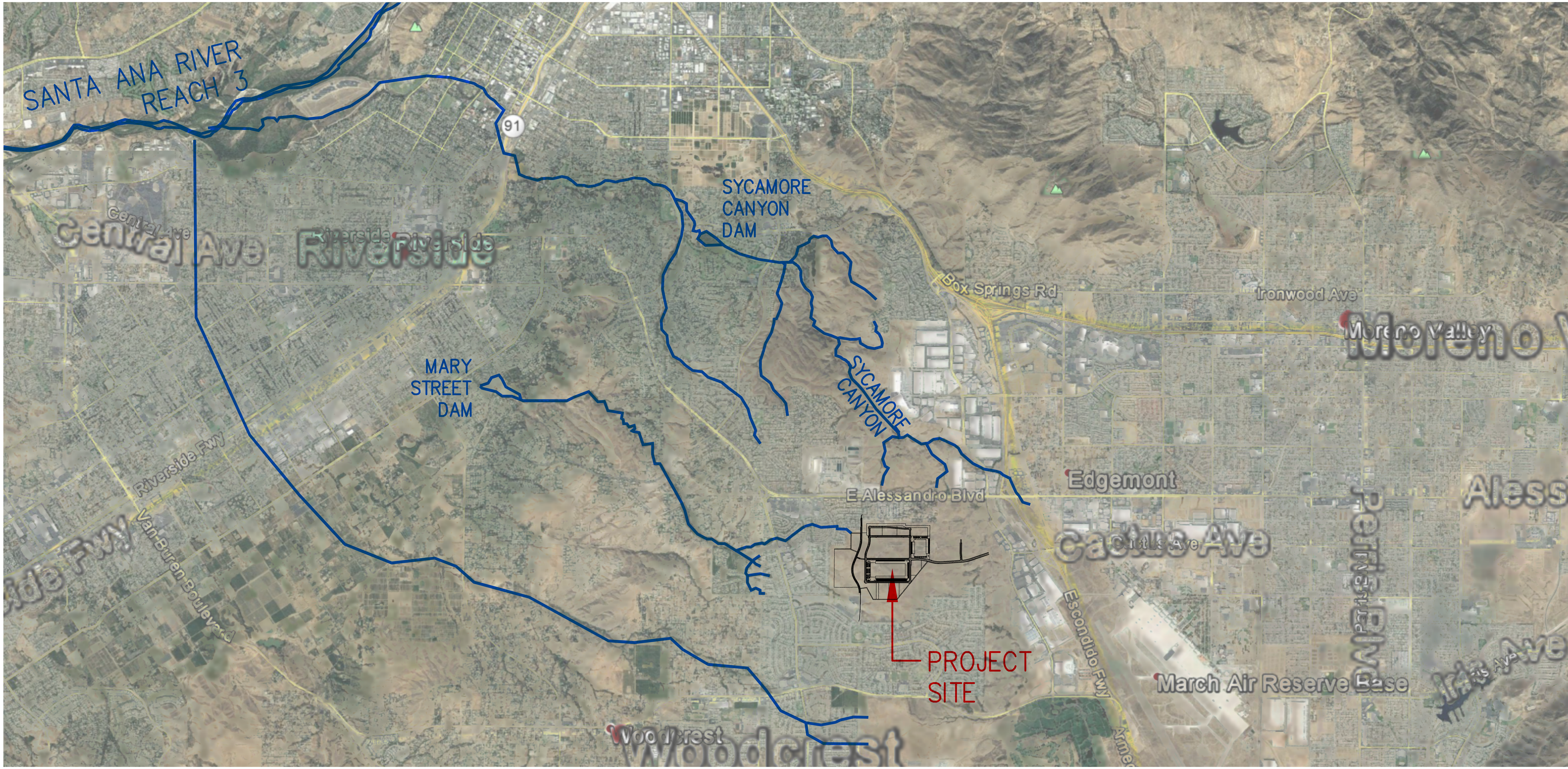
* Provide annual costs (1-year and 2-year) for all publicly maintained BMPs. Specifically include the costs for all public landscaping and treatment control that are responsibility of the City of Landscape Maintenance District.

** Maintenance funding contact information for each privately maintained (by owner, POA or HOA) BMP must be included.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map





N

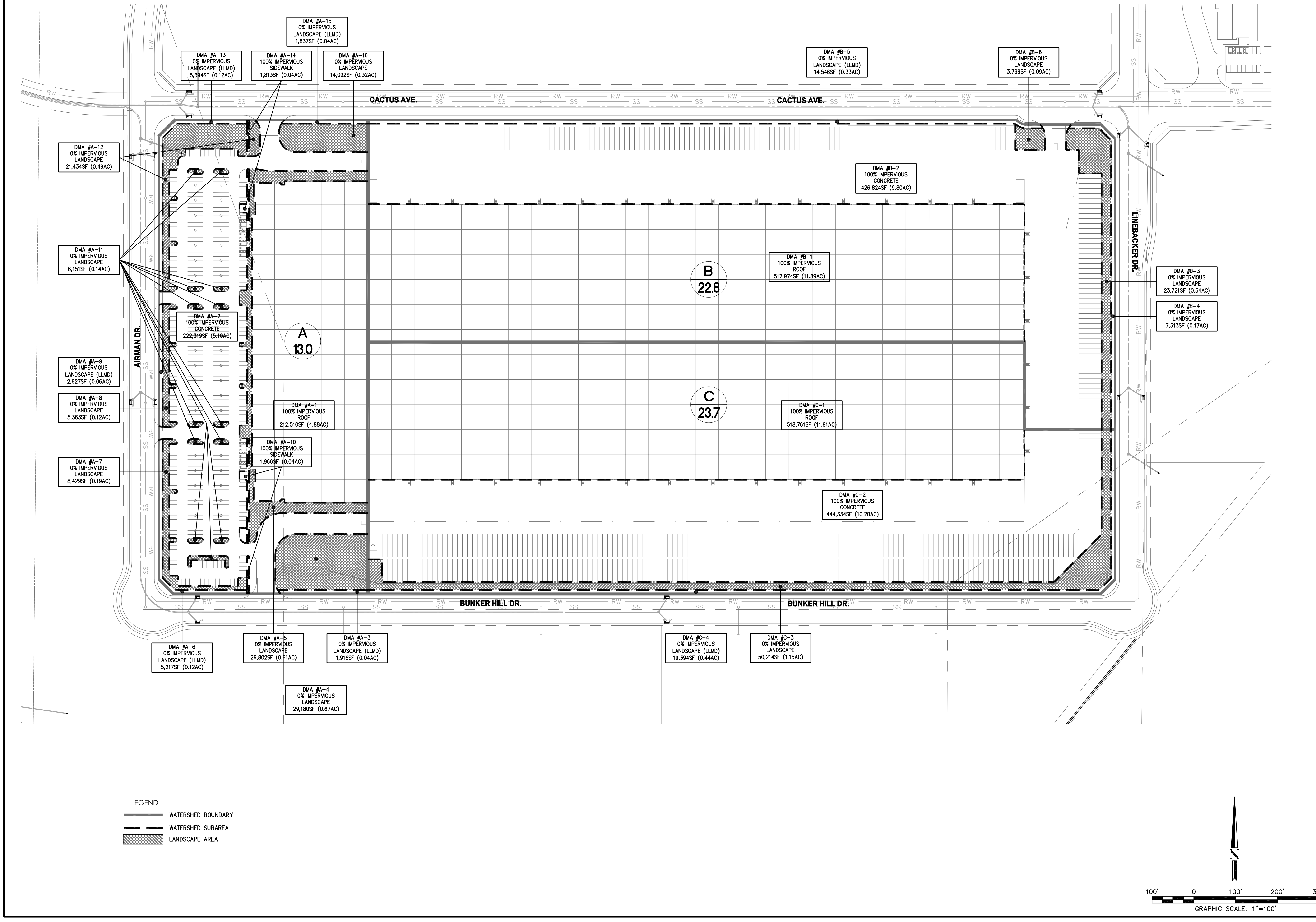
SCALE: 1" = 1 MILE

MERIDIAN WEST CAMPUS UPPER PLATEAU, BUILDING B

RECEIVING WATERS MAP

RIVERSIDE COUNTY, CALIFORNIA

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



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Suite 210
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714-685-6860

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NO.:	REVISION:	DATE:

PROJECT: **MERIDIAN - UPPER PLATEAU**
LOT 17 - BUILDING B
COUNTY OF RIVERSIDE, CALIFORNIA

DRAWING NAME: **DMA EXHIBIT**

ISSUE:	CONCEPTUAL
DATE:	2022-03-28
CHECKED: KH	DRAWN: KH
DRAWING FILE:	
PROJECT NO.:	20-750
SHEET NUMBER:	1
OF 1 SHEETS	
SCALE:	AS SHOWN

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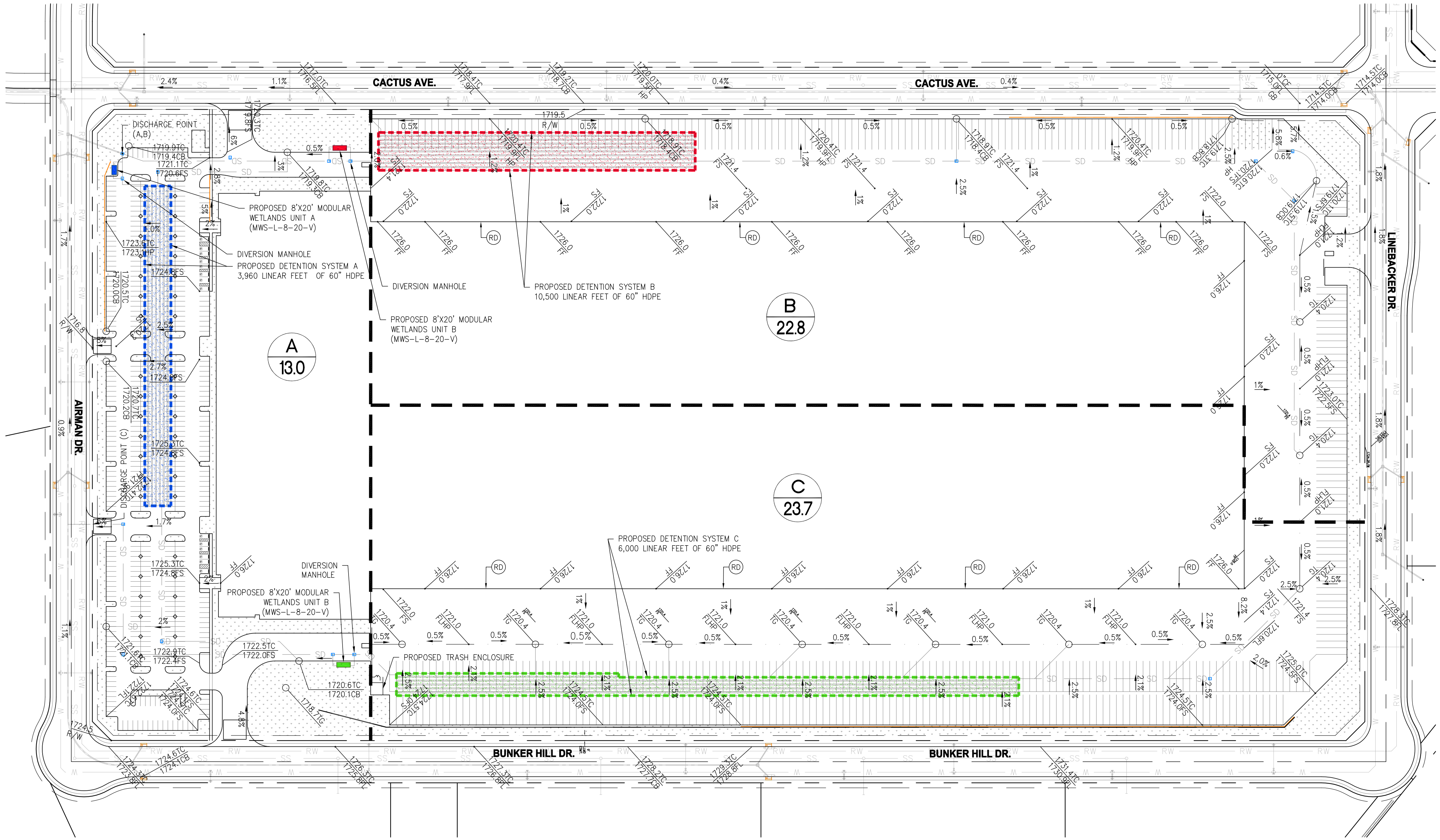

LEGEND

LANDSCAPE AREA

(RD) ROOF DRAIN

NOTE: NO POINTS OF RUN-ON LOCATED ON SITE.

DETENTION SYSTEM A (DET A) Q_2=19.20 CFS V_{BMP}=74,711

DETENTION SYSTEM B (DET B) Q_2=16.92 CFS V_{BMP}=60,873

DETENTION SYSTEM C (DET C) Q_2=16.92 CFS V_{BMP}=60,873

MODULAR WETLANDS UNIT (BIO A) PER DETAIL HEREON. V_{BMP}=37,774

MODULAR WETLANDS UNIT (BIO B) PER DETAIL HEREON. V_{BMP}=37,774

MODULAR WETLANDS UNIT (BIO B) PER DETAIL HEREON. V_{BMP}=37,774

X — WATERSHED NAME

XX.X — WATERSHED ACREAGE

N

100' 0 100' 200' 300'

GRAPHIC SCALE: 1"=100'

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NO.:	REVISION:	DATE:

PROJECT: **MERIDIAN - UPPER PLATEAU LOT 17 - BUILDING B COUNTY OF RIVERSIDE, CALIFORNIA**

DRAWING NAME: **POST CONSTRUCTION BMP SITE MAP**

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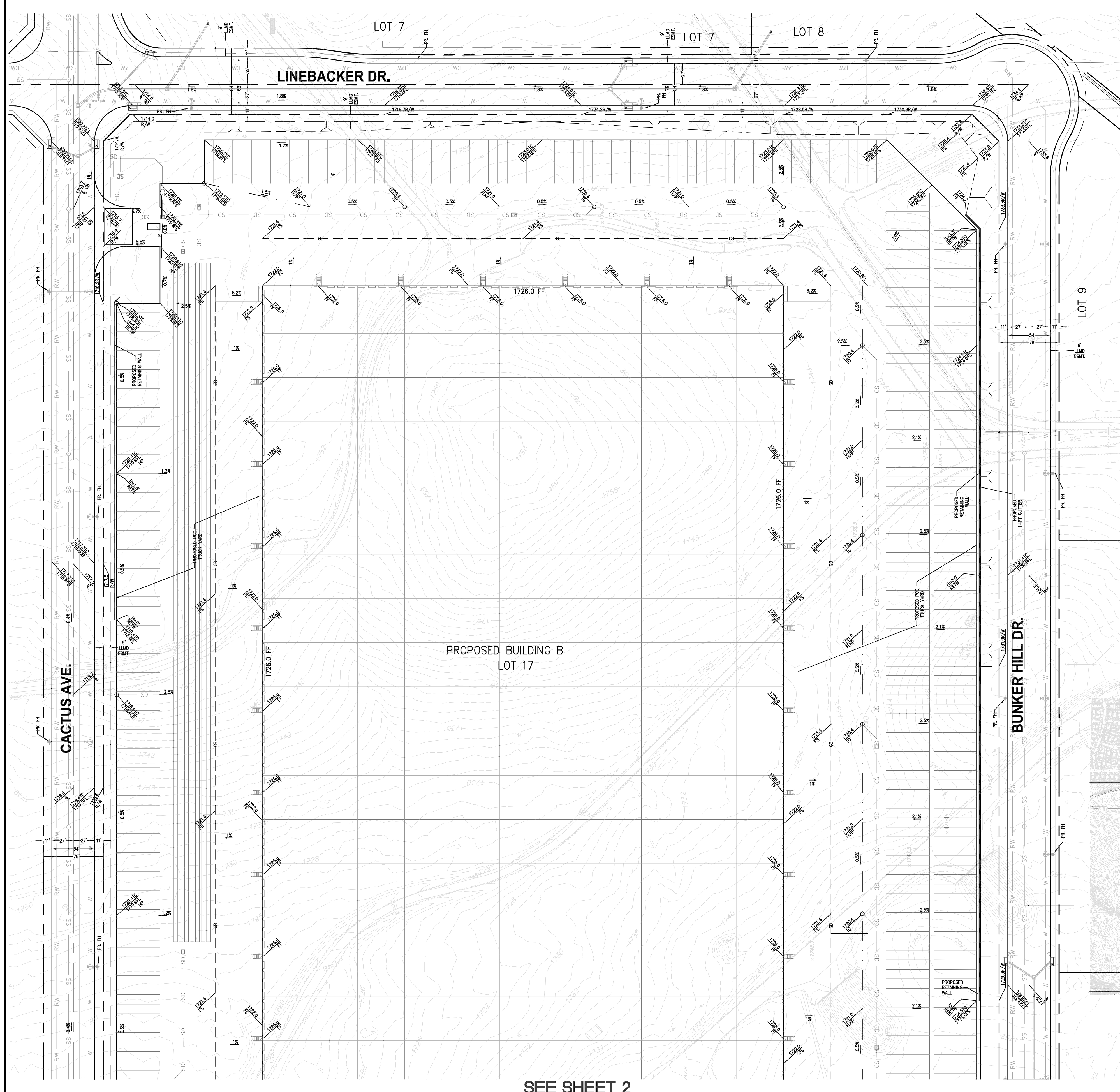
DATE:	XX
CHECKED: XX	DRAWN: XX
DRAWING FILE:	
PROJECT NO.:	**20-750**
SHEET NUMBER:	**1**
OF 1 SHEETS	
SCALE:	**AS SHOWN**

Appendix 2: Construction Plans

Grading and Drainage Plans



LLMD REQUIREMENTS:

- PRIOR TO SITE GRADING THE GRADING CONTRACTOR SHALL CONTACT THE MARCH JPA LANDSCAPE AND LIGHTING MAINTENANCE DISTRICT (LLMD) MANAGER AT (951) 656-7000 TO COORDINATE ALL ACTIVITY AND IMPACTS UPON LLMD FACILITIES WITHIN THE PUBLIC RIGHT OF WAY AND LANDSCAPE EASEMENTS. THE COORDINATION SHALL ASSURE UNINTERRUPTED OPERATION OF THE LLMD IRRIGATION SYSTEM AND SHALL IDENTIFY ANY IMPACTS ON LLMD MAINLINES, WIRES, LATERALS AND IRRIGATION COMPONENTS, INCLUSIVE OF THE NEED TO MOVE OR SLEEVE LLMD FACILITIES AS DETERMINED BY THE LLMD MANAGER.
- ALL LLMD PRESSURE MAIN LINE AND LATERAL CROSSINGS BENEATH PAVED AREAS SHALL BE ENCASED IN SCHEDULE 40 PVC SLEEVES TWICE THE DIAMETER OF THE PIPE. SLEEVES SHALL BE PLACED AT A DEPTH OF 24" BENEATH FINISHED SURFACE, MEASURED FROM THE TOP OF THE SLEEVE. CONTROL WIRES SHALL BE SEPARATE SLEEVES WITH A MINIMUM DIAMETER OF 2". WIRE SLEEVES SHALL BE SIZED SO THAT WIRE BUNDLES MAY BE PULLED WITHOUT BINDING. ON EACH SIDE OF PAVED AREAS A 10" ROUND VALVE BOX WITH WIRE CONNECTIONS SHALL BE INSTALLED. PIN TIE CONNECTORS SHALL BE USED IN WIRE CONNECTION BOX AND MUST BE BRANDED ON THE VALVE BOX LID WITH "SW" FOR FUTURE IDENTIFICATION.
- ALL CHANGES TO THE LLMD EASEMENT AREA SHALL BE COMPLETED IN ACCORDANCE WITH THE APPROVED LLMD LANDSCAPE PLANS AND AN "AS BUILT" DRAWING SHALL BE SUBMITTED AND APPROVED UPON COMPLETION AND INSPECTION OF THE WORK. ALL REPAIRS AND/OR INSTALLATIONS IN THE LLMD RIGHT OF WAY AND EASEMENT AREAS MUST BE INSPECTED BY THE LLMD MANAGER.
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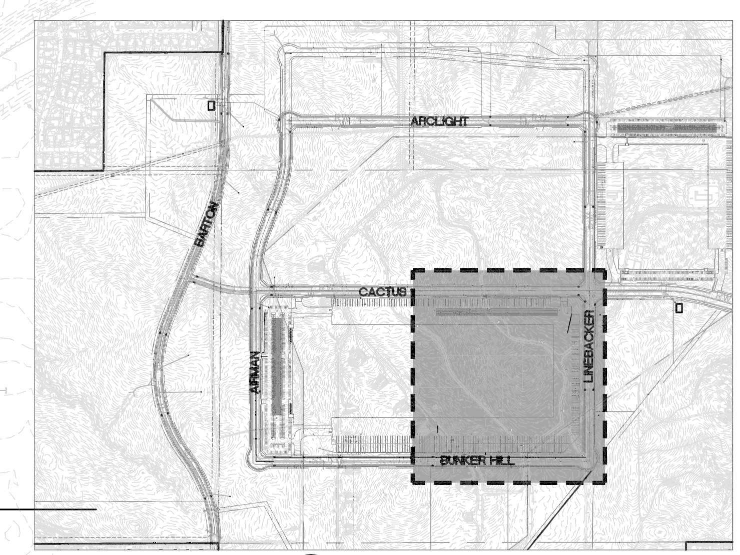
- ALL LLMD PLANT MATERIAL DAMAGED SHALL BE REPLACED WITH LIKE SIZED MATERIAL WITHIN THREE (3) BUSINESS DAYS UNLESS AN EXTENSION IS APPROVED IN WRITING BY THE LLMD MANAGER.
- AT NO TIME SHALL ANY CONTRACTOR STORE OR PLACE EQUIPMENT, SIGNS, TEMPORARY UTILITIES OR ANY OTHER ITEMS WITHIN THE PUBLIC RIGHT OF WAY OR LLMD LANDSCAPE EASEMENT AREAS.
- NO CONTRACTOR PARKING WILL BE ALLOWED ON THE MJPA STREETS AT ANY TIME DURING CONSTRUCTION.
- NO CONSTRUCTION PERSONNEL OR SUBCONTRACTORS MAY CONDUCT THEIR BREAK TIME IN THE LLMD AREA. COST FOR DAMAGES WILL APPLY AS PER COA 69.
- NO CERTIFICATE OF OCCUPANCY WILL BE ISSUED UNTIL ALL LLMD IRRIGATION AND/OR PLANTINGS ARE RESTORED IN-KIND AND TO THE SATISFACTION OF THE MJPA OPERATIONS DIRECTOR AND ANY OUTSTANDING FINES ARE PAID IN FULL.
- PRIOR TO ANY WALL AND FENCE CONSTRUCTION OR ENCROACHMENT INTO THE LLMD THE MJPA MUST BE NOTIFIED FOR LLMD PRE-INSPECTION AND SCHEDULE OF WORK.



SHEET INDEX
SCALE: 1" = 500'

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DRC Engineering, Inc.
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Anaheim Hills, CA 92808
714-685-6860

NO.	REVISION:	DATE:

PROJECT: MERIDIAN - UPPER PLATEAU
LOT 17 - BUILDING B
COUNTY OF RIVERSIDE, CALIFORNIA

DRAWING NAME: CONCEPTUAL GRADING

ISSUE: CONCEPTUAL
DATE: 2022-02-07
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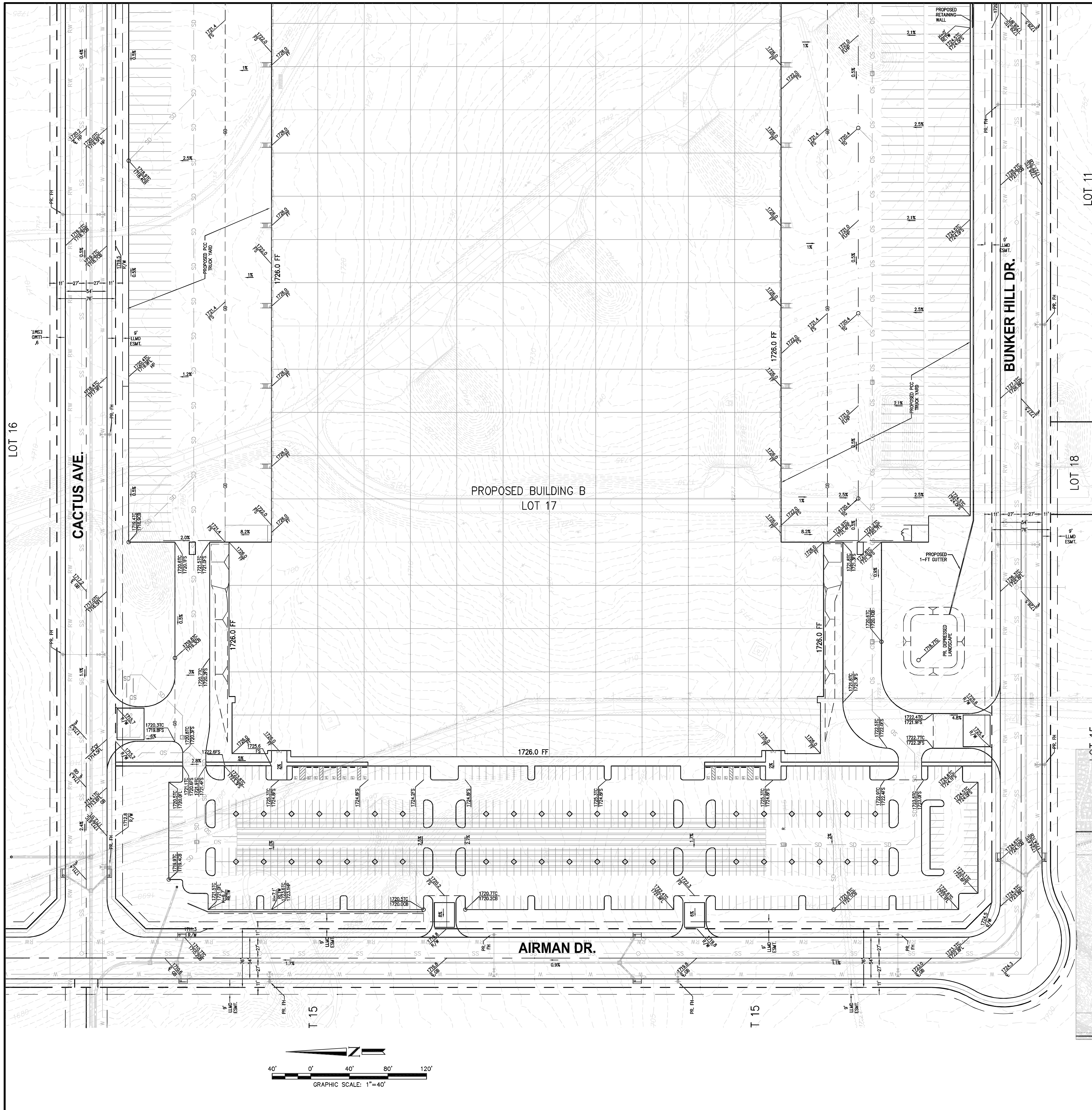

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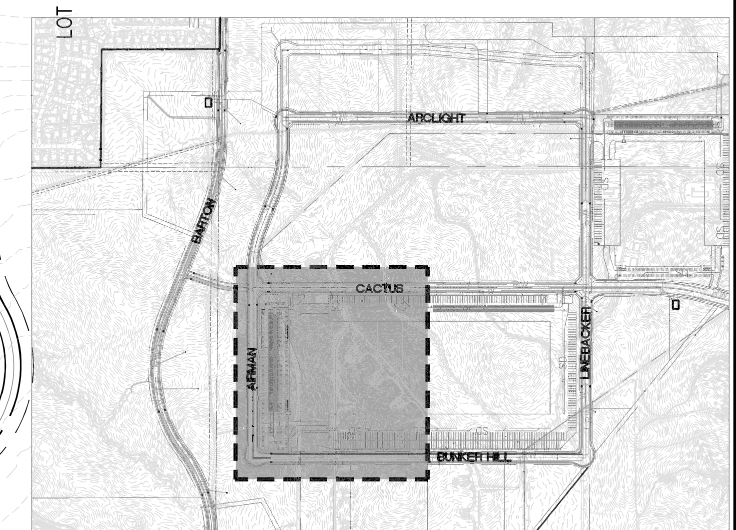

SHEET INDEX
SCALE: 1" = 500'

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Anaheim Hills, CA 92808
714-685-6860

NO.	REVISION:	DATE:

PROJECT: **MERIDIAN - UPPER PLATEAU**
LOT 17 - BUILDING B
COUNTY OF RIVERSIDE, CALIFORNIA

DRAWING NAME: **CONCEPTUAL GRADING**

ISSUE:	CONCEPTUAL
DATE:	2022-02-07
CHECKED: CM	DRAWN: HM
DRAWING FILE:	
PROJECT NO.:	20-750
SHEET NUMBER:	2 OF 2 SHEETS
SCALE:	AS SHOWN

FILENAME: M:\2020\20-750 Meridian Upper Plateau\CG\Bldg B\2075...

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

GEOTECHNICAL EXPLORATION
PROPOSED MERIDIAN WEST CAMPUS UPPER PLATEAU
WEST OF LA CROSSE STREET AND SOUTH OF CAMINO DEL SOL
MORENO VALLEY, CALIFORNIA

Prepared For

LEWIS LAND DEVELOPERS, LLC
1156 NORTH MOUNTAIN AVENUE
UPLAND, CALIFORNIA 91786

Prepared By

LEIGHTON CONSULTING, INC.
41715 ENTERPRISE CIRCLE N, SUITE 103
TEMECULA, CA 92590

Project Number 13226.001

September 24, 2021

Leighton Consulting, Inc.
A Leighton Group Company

September 24, 2021

Project No. 13226.001

Lewis Land Developers, LLC
1156 North Mountain Avenue
Upland, California 91786

Attention: Mr. Adam Collier

Subject: Geotechnical Exploration
Proposed Meridian West Campus - Upper Plateau
West of La Crosse Street and South of Camino Del Sol
March JPA, Riverside County, California

In accordance with your request, we are pleased to provide this report for the subject project summarizing our geotechnical findings, conclusions and recommendations regarding the design and construction of the proposed development. Based on the results of our findings and conclusions, it is our opinion that the site is suitable for the intended use provided the recommendations included in herein are implemented during design and construction phases of development. However, it should be noted that additional geotechnical evaluations and/or reviews will be required based on final site development and/or grading plans.

If you have any questions regarding this report, please do not hesitate to contact the undersigned. We appreciate this opportunity to be of service on this project.

Respectfully submitted,
LEIGHTON CONSULTING, INC.

DRAFT

Simon I. Saiid, GE 2641
Principal Engineer

Robert F. Riha, CEG 1921
Senior Principal Geologist

DRAFT

Brent A. Adam, PG 9653
Project Geologist/PM

Distribution: (1) Addressee (PDF via email)

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Accompanying Tables, Figures, Plates and Appendices

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Figures

Plates

Appendices

1.0 INTRODUCTION

1.1 Purpose and Scope

This geotechnical exploration is for the proposed Meridian Upper Plateau commercial development, located generally south of Camino Del Sol and west of La Crosse Way, County of Riverside, California (see Figure 1). Our scope of services for this exploration included the following:

- A site reconnaissance, excavation of 44 exploratory excavator test pits and 6 small-diameter hollow stem auger borings. Approximate locations of these test pits and borings are depicted on the *Geotechnical Map*. The logs are presented in Appendix A-1.
- Geotechnical laboratory testing of selected soil samples collected during this exploration. Test results are presented in Appendix B.
- A geophysical study to further evaluate rippability and depth of onsite bedrock with 18 seismic refraction lines. Approximate locations of the seismic lines are depicted on the *Geotechnical Map*. The geophysical report is included as Appendix A-2.
- Geotechnical engineering analyses performed or as directed by a California registered Geotechnical Engineer (GE) and reviewed by a California Certified Engineering Geologist (CEG).
- Preparation of this report which presents our geotechnical conclusions and recommendations regarding the proposed structures.

This report is not intended to be used as an environmental assessment (Phase I or other), or foundation plan review.

1.2 Project and Site Description

The project site is approximately 312 acres of mostly vacant land located generally south of East Alessandro Boulevard and west of Meridian Parkway in the March JPA General Plan area of Riverside Country, California (*see* Figure 1, *Site Location Map*). Topographically, the property contains rolling hills with the highest elevation of approximately 1,765 feet MSL in the central portion of the site and the lowest elevation of approximately 1,645 feet MSL is located in the northeastern portion of the site. Drainage is generally from the elevated central portion of the site to the perimeters through natural drainage features incised in to the rolling hills.

The majority of the site is currently occupied by the former March Air Force Base ordnance area. This ordnance area is surrounded by approximately 10-foot high barbed-wire-topped chain link fencing, and makes up approximately 70% of the overall

Site. The remainder of the Site is vacant and undeveloped land. The ordnance area contains 14 single-story, concrete ordnance storage bunkers (circa 1940's and 1950's), and seven other associated single-story buildings (circa late 1950's to mid 1960's) in various states of abandonment. Numerous asphalt paved roads, as well as some dirt roads, exist within the ordnance area, and connect these various structures/bunkers. The facilities on-site are no longer in use by the military. A tenant is currently using the bunkers as storage for pyrotechnics. Existing nearby improvements include Industrial buildings to the east of the site, residential to the north, west and south, and a church to the southwest. It is our understanding that a buffer of undisturbed land will remain between the surrounding existing developments and the proposed new development.

Based on provided site plan (RGA, 2020) the proposed site development includes large industrial buildings ranging in size from approximately 200,000 to 1,000,000 square-feet (SF) and various future lots ranging in size from approximately 7 to 67 acres to host these industrial buildings and associated park sites and access roads. Access to the development will be through the extension of Cactus from the east, Brown Road from the north and Barton Road traversing the western portion of the site.

Based on the review of the provided preliminary grading plans, site grading is expected to have cuts of up to approximately 50 feet deep and fills of up to approximately 55 feet thick, plus remedial grading, where applicable. Although no structural loads or foundations plans are developed yet, we anticipate the structural loads to range up to 200 kips for isolated columns/pads and 10 kips/lineal-foot for continuous wall footings. If site development significantly differs from the assumptions made herein, the recommendations included in this report should be subject to further evaluation.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

Our field exploration for this report consisted of the excavation of forty-four (44) excavator test pits located generally within areas of planned building footprints to provide basis for foundation and pavement design. Test pits were excavated utilizing a Cat 349F, with an operating weight of 105,000 pounds to further evaluate rock hardness in the field. In addition, six (6) small-diameter borings were advanced within the areas of planned building footprints. During exploration, relatively undisturbed and disturbed/bulk samples were collected for further laboratory testing and evaluation. Approximate locations of these explorations are depicted on the *Geotechnical Map* (see Plate 1). Sampling was conducted by a staff geologist from our firm. After logging and sampling, the excavations were loosely backfilled with spoils generated during excavation. The exploration logs are included in Appendix A.

A seismic refraction survey was performed by Atlas Geophysics to further evaluate rock rippability at depth. The full report is attached as Appendix A-2.

2.2 Laboratory Testing

Laboratory tests were performed on representative bulk samples to provide a basis for development of remedial earthwork and geotechnical design parameters. The laboratory testing program included expansion index, maximum density/optimum moisture content relationships, R-value, sieve analysis, and corrosion suites. The results of our laboratory testing from this exploration and previous investigations are presented in Appendix B.

3.0 GEOTECHNICAL AND GEOLOGIC FINDINGS

3.1 Regional Geology

The site is located within a prominent geomorphic province in southwestern California known as the Peninsular Ranges. This province is characterized by steep, elongated ranges and valleys that trend northwestward. More specifically, the proposed site is located within the relatively stable Perris Block of the Peninsular Ranges.

The Perris Block, approximately 20 miles by 50 miles in extent, is bounded by the San Jacinto Fault Zone to the northeast, and the Elsinore Fault Zone to the southwest. The Perris Block has had a complex tectonic history, undergoing relative vertical land-movements of several thousand feet in response to movement on the Elsinore and San Jacinto Fault Zones. Within the general site vicinity, thin residual sedimentary and volcanic materials mantle crystalline bedrock, consisting of the Val Verde Tonalite (Kvt) and lesser amounts of Cretaceous granitic dikes (Kg).

3.2 Site Specific Geology

3.2.1 Earth Materials

Our field exploration, observations, and review of the pertinent literature indicate that materials on the site include the following units; top soil/residual soil, and granitic Val Verde Tonalite (Kvt). For the engineering purposes of this report, we have grouped the upper near surface soil materials into one unit, Topsoil/Residual Soil. These units are discussed in the following sections in order of increasing age. A more detailed description of each unit is provided on the logs of borings in Appendix A.

- **Undocumented Artificial Fill (not a mapped unit):** Although not encountered in our subsurface exploration, undocumented fill should be expected as roadway embankments, previous utility trench backfill and fill associated with the various onsite structures. Fill soils are expected to have been generated from site excavations.
- **Residual soil/Topsoil (not a mapped unit):** Residual soil materials are expected to mantle the majority of the site. The residual soil generally consists of a thin surface layer up to 5 feet in depth in some areas. Encountered materials appear to be generally porous and relatively loose and have a low expansion potential. These materials are generally comprised of light to grayish brown silty sand (SM) and clayey sand (SC).
- **Colluvium (Qcol):** Colluvium was encountered in the gently sloping central portion of the site and generally extends to approximate depths of 3 to 9 feet BGS. Encountered materials generally consist of silty to clayey sand (SM/SC) and

appear to be relatively porous and expected to have very low to low expansion potential (EI<51)

- **Alluvium (Qal):** Recent alluvial deposits are expected to exist within drainages or low-laying areas of the site. Where encountered, the alluvium generally extends to a depth of 6 feet BGS. Encountered materials generally consist of clayey sand to sandy clay(SC/CL) and appear to be relatively porous and expected to have very low to low expansion potential (EI<51)
- **Val Verde Tonalite (Kvt):** The Val Verde Tonalite (Cretaceous granite) was encountered near the surface across the majority of the site with the exception of TP-44. In TP-44, the Tonalite was encountered at an approximate depth of 9 feet BGS. As observed during the field exploration, the condition of the near-surface bedrock varies from that of completely disintegrated rock that has become a dense soil-like deposit to that of moderately to highly weathered rock. Where encountered, the bedrock is generally massive and can be expected to range from readily rippable to non-rippable depending on the degree of weathering. The less weathered granitic rock is anticipated to generate sand, gravel, cobbles, and possibly oversize boulders. The more weathered bedrock produced fine to coarse sand with silt and gravel size rock fragments. The weathered bedrock is expected to be generally suitable for re-use as compacted fill. It should be anticipated that deep cuts will generate boulders or core stones (greater than 12 inches) that will require special placement described later in Section 5.2 of this report.

3.3 Groundwater and Surface Water

Groundwater was only encountered in one boring (B-6) during this exploration at an approximate depth of 48 feet below the existing ground surface. Groundwater was also encountered during previous grading of the western terminus of Cactus Avenues for Meridian Park West. The groundwater encountered within the Tonalite bedrock is associated with a joint/fracture system If encountered during grading and/or utility installation; this condition would likely be associated with localized seepages along existing joints and fractures. Groundwater may be encountered during grading and canyon subdrains are recommended in the canyon fill areas to mitigate water accumulation at the transition between native bedrock and engineered fill. In addition, groundwater seepage may appear in cut slopes exposing joints and fractures or earth materials of contrasting permeabilities. Mitigation of possible seepage within building pads or cut-slope areas can be provided on an individual basis after evaluation by the geotechnical consultant during grading operations. Surface water was not observed onsite during our field reconnaissance.

3.4 Landslides/Debris Flow and Rockfalls

No evidence of on-site landslides/debris flow or rock fall was observed during our field investigation. Thick deposits of surficial soils typically associated with landsliding or debris flows are not present and, therefore, landslide hazard at the sight is considered low. Based on the current proposed buildings, no prominent rock outcrop will remain onsite, therefore the rock fall hazard is considered very low. The potential for rock fall due to either erosion or seismic ground shaking is considered nil. Other soils susceptible to slumping (i.e. such as thick residual soil/colluvium) will be removed and compacted during the course of grading.

3.5 Rippability

Based on our geotechnical exploration and the seismic refraction survey conducted by Atlas Geophysics (See, Appendix C), we anticipate the bedrock in most of the site to be rippable to the proposed design grades with conventional heavy earth moving equipment in good operating conditions (Caterpillar D9L or D10 with single shank ripper and rock teeth). Localized marginally rippable to unrippable rock will be encountered, particularity in the areas of excavations deeper than 25 feet. However, unrippable rock or buried core stones (P-wave velocities typically >7,000 feet/second) may exist at depth of 15 to 25 feet BGS in some areas of the site (see SL-9 and SL-14). In addition, due to differential weathering of the bedrock materials, very heavy ripping and/or other specialized excavation techniques may be required to maintain desired excavation rates. For proposed building pads and utility trenches in marginally rippable to non-rippable rock areas, it may be desirable to over-excavate at least 2 feet below the bottom of proposed utilities, storm water storage basins or 3 to 4 feet below pad grade (or lower truck loading ramp areas) to facilitate future trenching operations. Pad over-excavation should be sloped a minimum of 1 percent towards the deeper fills or streets.

3.6 Regional Faulting and Fault Activity

The subject site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. Based on published geologic hazard maps, this site is not located within a currently designated Alquist-Priolo (AP) Earthquake Fault Zone; nor is located within a County Fault Zone. The nearest zoned active faults are the San Bernardino segment of the San Jacinto Fault Zone, located approximately 8.8 miles (14.2 km) northeast of the site and the San Jacinto Valley Segment of the San Jacinto Fault Zone, located approximately 8.9 miles (14.4 km) east of the site (Blake, 2000c).

3.7 Seismic Coefficients per 2019 CBC

As is common for virtually all of Southern California, strong ground shaking can be expected at the site during moderate to severe earthquakes in this general region. Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (soil type) characteristics. Based on our explorations and review, the site is underlain by weathered granitic bedrock. As such, the site is classified as a Class C site. In accordance with ASCE 7-16 as the Design Code Reference Document, the 2019 CBC seismic coefficients for the site is listed in table below. The project structural engineer should confirm such assumption or else a site–specific ground motion analysis will be required.

Table 1. 2019 CBC Seismic Coefficients

Site Seismic Coefficients / Coordinates		Design Value (g)
Latitude: 33.9050		Site Class C
Longitude: -117.3067		
Mapped Spectra (OSHPD)	Spectral Response (short), S_S	1.50 g
	Spectral Response (1 sec), S_1	0.60 g
	Site Modified Peak Ground Acceleration, PGA_M	0.60 g
	Max. Considered Earthquake Spectral Response Acceleration (short), S_{MS}	1.80 g
	Max. Considered Earthquake Spectral Response Acceleration – (1 sec), S_{M1}	0.84 g
	5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.20 g
	5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.56 g
	Site-Specific Peak Ground Acceleration, PGA	0.50 g

* g- Gravity acceleration

The results of the analysis also indicate that the adjusted Peak Ground Acceleration (PGA_M) for this site is 0.6g.

3.8 Secondary Seismic Hazards

Ground shaking can induce "secondary" seismic hazards such as liquefaction, dynamic densification, lateral spreading, flooding, seiche/tsunami, collapsible soils, and ground rupture, as discussed in the following subsections:

3.8.1 Dynamic Settlement (Liquefaction and/or Dry Settlement)

Due to the lack of shallow groundwater and relatively dense nature of underlying materials, dynamic settlement (Liquefaction and/or Dry Settlement) is not considered a geologic hazard on this site.

3.8.2 Lateral Spreading

Due to the lack of shallow groundwater and relatively dense nature of underlying materials lateral spreading is not considered a geologic hazard on this site.

3.8.3 Flooding

The site is not within a flood plain and potential for flooding is considered very low for this site.

3.8.4 Seiche and Tsunami

Due to the site location and lack of nearby open bodies of water, the possibility of the affects due to seiches or tsunami is considered non-existent.

3.8.5 Collapsible Soils

Laboratory testing indicates that the onsite soils (residual soils) are expected to possess a slight collapse potential. Based on the remedial grading recommendations to remove and compact the near surface soils (Section 4.2.1) as well as the anticipated deep cuts and fills, this geologic hazard on this site is considered very low.

3.8.6 Expansive Soils

Limited laboratory testing indicated that onsite soils generally possess a very low expansion potential (EI<21). However, localized deposits of residual soils may possess low expansion potential (EI<51). The mitigation for this geologic hazard is presented in Section 4.2.4 of this report.

3.8.7 Ground Rupture

Since this site is not located within a mapped Fault Zone, the possibility of ground surface-fault-rupture is very low at this site.

3.9 Slope Stability

Proposed 2:1 (horizontal to vertical) cut slopes in the weathered bedrock will be grossly stable under static and seismic conditions. Slope faces in highly weathered bedrock are inherently subject to erosion, particularly if exposed to rainfall and irrigation. Landscaping and slope maintenance should be conducted as soon as possible in order to increase long-term surficial stability. If unstable conditions are encountered during grading as identified by the geotechnical consultant, a stabilization fill may be considered as depicted in Appendix D. Proposed 2:1 fill slopes up to heights of 30 feet constructed with onsite soils are considered to be grossly stable. Slopes with greater heights should be reviewed prior to construction.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 General

Based on the results of this exploration, it is our opinion that the site is suitable for the proposed development from a geotechnical viewpoint. Grading of the site should be in accordance with our recommendations included in this report and future recommendations and evaluations made during construction by the geotechnical consultant.

4.2 Earthwork

Earthwork should be performed in accordance with the General Earthwork and Grading Specifications in Appendix D as well as the following recommendations. The recommendations contained in Appendix D, are general grading specifications provided for typical grading projects and some of the recommendations may not be strictly applicable to this project. The specific recommendations contained in the text of this report supersede the general recommendations in Appendix D.

The contract between the developer and earthwork contractor should be worded such that it is the responsibility of the contractor to place fill properly in accordance with the recommendations of this report, the specifications in Appendix D, applicable County Grading Ordinances, notwithstanding the testing and observation of the geotechnical consultant during construction.

4.2.1 Site Preparation and Remedial Grading

Prior to grading, the proposed structural improvement areas (i.e. all-structural fill areas, pavement areas, buildings, etc.) should be cleared of surface and subsurface pipelines and obstructions. Heavy vegetation, roots and debris should be disposed of offsite. Any onsite wells or septic waste system should be removed or abandoned in accordance with the Riverside County Department of Environmental Health. Voids created by removal of buried/unsuitable materials should be backfilled with properly compacted soil in general accordance with the recommendations of this report.

The near surface soils (including residual soils/colluvium and alluvium) are potentially compressible in their present state and may settle under the surcharge of fills or foundation loading. As such, these materials should be removed in all settlement-sensitive areas including building pads, pavement, and slopes. The depth of removal should extend into underlying dense bedrock, but not generally expected to exceed a depth of 3 to 9 feet. Acceptability of all removal bottoms should be reviewed by an engineering geologist or geotechnical engineer and documented in the as-graded geotechnical report. The removal limit should be established by a

1:1 (horizontal:vertical) projection from the edge of fill soils supporting structural fill or settlement-sensitive structures downward and outward to competent material identified by the geotechnical consultant. This may require remedial grading that extends beyond the limits of design grading. Removal will also include benching into competent material as the fills rise. Areas adjacent to existing property limits or protected habitat areas may require special considerations and monitoring. Steeper temporary slopes in these areas may be considered.

After completion of the recommended removal of unsuitable soils and prior to fill placement, the exposed surface should be scarified to a minimum depth of 8-inches, moisture conditioned as necessary to optimum moisture content and compacted using heavy compaction equipment to an unyielding condition. All structural fill should be compacted throughout to 90 percent of the ASTM D 1557 laboratory maximum density, at or slightly above optimum moisture.

The California Building Code and County of Riverside require that no oversize rock (>12-inches) be placed within 10 feet of the surface of a structural fill and/or building pad. The grading plan should be carefully reviewed during grading to verify that oversized rocks are buried below a 10-foot fill cap. Generally, oversize rock will require windrowing, individual burial, or other special placement methods as further described in Appendix D. In addition, an adequate supply of granular fill material will be needed for placement around the rocks. A grading contractor with experience in the handling and placement of oversize rock should be selected for this project.

4.2.2 Cut/Fill Transition and Streets

In order to mitigate the impact of underlying cut/fill transition conditions, we recommend overexcavation of the cut portion underlying building pads during grading to a minimum depth of 3 feet below finish pad elevation or 2 feet below bottom of footings, whichever is deeper. This overexcavation does not include scarification or preprocessing prior to placement of fill. Overexcavation should encompass the entire building limits a horizontal distance equal to the depth of overexcavation or to a minimum distance of 5 feet, whichever is greater. Overexcavation bottoms should be sloped as needed to reduce the accumulation of subsurface water.

We further recommend that streets located in the dense bedrock be overexcavated to a depth of 2 feet below the deepest utility and then brought back up to design grades with compacted fill.

4.2.3 Structural Fills

The onsite soils are generally suitable for re-use as compacted fill, provided they are free of debris and organic matter. Fills placed within 10 feet of finish pad grades or slope faces should contain no rocks over 12 inches in maximum dimension. In addition, encountered clayey soils layers (EI>21), if any, should be placed at a depth greater than 5 feet below finished grades.

Areas to receive structural fill and/or other surface improvements should be scarified to a minimum depth of 8 inches, conditioned to at least optimum moisture content, and recompacted. Fill soils should be placed at a minimum of 90 percent relative compaction (based on ASTM D1557) at or above optimum moisture content. Placement and compaction of fill should be performed in accordance with local grading ordinances under the observation and testing of the geotechnical consultant. The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in thickness.

Fill slope keyways will be necessary at the toe of all fill slopes and at fill-over-cut contacts. Keyway schematics, including dimensions and subdrain recommendations, are provided in Appendix C. All keyways should be excavated into dense bedrock as determined by the geotechnical engineer. The cut portions of all slope and keyway excavations should be geologically mapped and approved by a geologist prior to fill placement.

Fills placed on slopes steeper than 5:1 (horizontal:vertical) should be benched into dense soils (see Appendix C for benching detail). Benching should be of sufficient depth to remove all loose material. A minimum bench height of 2 feet into approved material should be maintained at all times.

4.2.4 Suitability of Site Soils for Fills

Topsoil and vegetation layers, root zones, and similar surface materials should be striped and stockpiled or removed from the site. Existing on-site soils should be considered suitable for re-use as compacted fills provided the recommendations contained herein are followed. Fill materials with expansion index greater than 21 should not be used in upper 3 feet of subgrade soils below building pad. If cobbles and boulders larger than 6-inches in largest diameter are encountered or produced during grading, these oversized cobbles and boulders should be reduced to less than 6 inches or placed in structural fill as outlined in Appendix D.

4.2.5 Import Soils

Import soils and/or borrow sites, if needed, should be evaluated by us prior to import. Import soils should be uncontaminated, granular in nature, free of organic material (loss on ignition less-than 2 percent), have very low expansion potential (E<21) and have a low corrosion impact to the proposed improvements.

4.2.6 Utility Trenches

Utility trenches should be backfilled with compacted fill in accordance with the *Standard* Specifications *for Public Works Construction,* ("Greenbook"), 2021 Edition. Fill material above the pipe zone should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted to at least 90 percent relative compaction (ASTM D 1557) by mechanical means only. Site soils may generally be suitable as trench backfill provided these soils are screened of rocks over 1½ inches in diameter and organic matter. If imported sand is used as backfill, the upper 3 feet in building and pavement areas should be compacted to 95 percent. The upper 6 inches of backfill in all pavement areas should be compacted to at least 95 percent relative compaction.

Where granular backfill is used in utility trenches adjacent to moisture sensitive subgrades and foundation soils, we recommend that a cut-off "plug" of impermeable material be placed in these trenches at the perimeter of buildings, and at pavement edges adjacent to irrigated landscaped areas. A "plug" can consist of a 5-foot long section of clayey soils with more than 35-percent passing the No. 200 sieve, or a Controlled Low Strength Material (CLSM) consisting of one sack of Portland-cement plus one sack of bentonite per cubic-yard of sand. CLSM should generally conform to requirements of the "Greenbook". This is intended to reduce the likelihood of water permeating trenches from landscaped areas, then seeping along permeable trench backfill into the building and pavement subgrades, resulting in wetting of moisture sensitive subgrade earth materials under buildings and pavements.

Excavation of utility trenches should be performed in accordance with the project plans, specifications and the *California Construction Safety Orders* (latest Edition). The contractor should be responsible for providing a "competent person" as defined in Article 6 of the *California Construction Safety Orders*. Contractors should be advised that sandy soils (such as fills generated from the onsite bedrock materials) could make excavations particularly unsafe if all safety precautions are not properly implemented. In addition, excavations at or near the toe of slopes and/or parallel to slopes may be highly unstable due to the increased driving force and load on the trench wall. Spoil piles from the excavation(s) and construction equipment should be kept away from the sides of the trenches. Leighton Consulting, Inc. does not consult in the area of safety engineering.

4.2.7 Shrinkage

The volume change of excavated onsite soils upon recompaction is expected to vary with materials, density, insitu moisture content, and location and compaction effort. The in-place and compacted densities of soil materials vary and accurate overall determination of shrinkage and bulking cannot be made. Therefore, we recommend site grading include, if possible, a balance area or ability to adjust grades slightly to accommodate some variation. Based on our geotechnical laboratory results, we expect recompaction shrinkage of subsurface soils and bulking of bedrock materials (when recompacted to an average 92 percent of ASTM D1557) and estimate the following earth volume changes will occur during grading:

Geologic Unit	Estimated Shrinkage/Bulking
Residual Soil/Colluvium/Alluvium	10% shrinkage, +/- 5%
Bedrock (Upper 30 ft)	5 to 10% bulking, +/- 3%

4.2.8 Drainage

All drainage should be directed away from structures and pavements by means of approved permanent/temporary drainage devices. Adequate storm drainage of any proposed pad should be provided to avoid wetting of foundation soils. Irrigation adjacent to buildings should be avoided when possible. As an option, sealed-bottom planter boxes and/or drought resistant vegetation should be used within 5-feet of buildings.

4.3 Foundation Design

Shallow spread or continuous footings bearing on a newly placed properly compacted fill are anticipated for the proposed structures.

4.3.1 Design Parameters – Spread/Continuous Shallow Footings

Footings should be embedded at least 12-inches below lowest adjacent grade for the proposed structure. Footing embedment should be measured from lowest adjacent finished grade, considered as the top of interior slabs-on-grade or the finished exterior grade, excluding landscape topsoil, whichever is lower. Footings located adjacent to utility trenches or vaults should be embedded below an imaginary 1:1 (horizontal:vertical) plane projected upward and outward from the bottom edge of the trench or vault, up towards the footing.

- **Bearing Capacity**: For footings on newly placed, properly compacted fill soil, an allowable vertical bearing capacity of 2,500 pounds-per-square-foot (psf) should be used. These footings should have a minimum base width of 18 inches for continuous wall footings and a minimum bearing area of 3 square feet (1.75-ft by 1.75-ft) for pad foundations. The bearing pressure value may be increased by 250 psf for each additional foot of embedment or each additional foot of width to a maximum vertical bearing value of 4,500 psf. Additionally, these bearing values may be increased by one-third when considering short-term seismic or wind loads. A modulus of subgrade reaction, K of 200 PCI may be used to relative dense bedrock or onsite soil compacted to minimum 90% relative compaction.
- **Lateral loads**: Lateral loads may be resisted by friction between the footings and the supporting subgrade. A maximum allowable frictional resistance of 0.35 may be used for design. In addition, lateral resistance may be provided by passive pressures acting against foundations poured neat against properly compacted granular fill. We recommend that an allowable passive pressure based on an equivalent fluid pressure of 350 pounds-per-cubic-foot (pcf) be used in design. These friction and passive values have already been reduced by a factor-of-safety of 1.5.

4.3.2 Settlement Estimates

For settlement estimates, we assumed that column loads will be no larger than 200 kips, with bearing wall loads not exceeding 10 kips per foot of wall. If greater column or wall loads are required, we should re-evaluate our foundation recommendation, and re-calculate settlement estimates.

Buildings located on compacted fill soils as required per Section 4.2.1 above should be designed in anticipation of 1 inch of total static settlement and 0.5-inch of static differential settlement within a 40 foot horizontal run.

4.4 Vapor Retarder

It has been a standard of care to install a moisture-vapor retarder underneath all slabs where moisture condensation is undesirable. Moisture vapor retarders may retard but not totally eliminate moisture vapor movement from the underlying soils up through the slabs. Moisture vapor transmission may be additionally reduced by use of concrete additives. Leighton Consulting, Inc. does not practice in the field of moisture vapor transmission evaluation/mitigation. Therefore, we recommend that a qualified person/firm be engaged/consulted with to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. This person/firm should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structure as deemed appropriate.

However, based on our experience, the standard of practice in Southern California has evolved over the last 15 to 20 years into a construction of a vapor retarder system that generally consisted of a membrane (such as 15-mil thick), underlain by a capillary break consisting of 4 inches of clean ½-inch-minimum gravel or 2-inch sand layer (SE>30). The structural engineer/architect or concrete contractor often require a sand layer be placed over the membrane (typically 2-inch thick layer) to help in curing and reduction of curling of concrete. If such sand layer is placed on top of the membrane, the contractor should not allow the sand to become wet prior to concrete placement (e.g., sand should not be placed if rain is expected).

In conclusion, the construction of the vapor barrier/retarder system is dependent on several variables which cannot be all geotechnically evaluated and/or tested. As such, the design of this system should be a design team/owner decision taking into consideration finish flooring materials and manufacture's installation requirements of proposed membrane. Moreover, we recommend that the design team also follow ACI Committee 302 publication for "Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials" (ACI 302.2R-06) which includes a flow chart that assists in determining if a vapor barrier/retarder is required and where it is to be placed.

4.5 Retaining Walls

Retaining wall earth pressures are a function of the amount of wall yielding horizontally under load. If the wall can yield enough to mobilize full shear strength of backfill soils, then the wall can be designed for "active" pressure. If the wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance. Retaining walls backfilled with non-expansive soils can be designed using the following equivalent fluid pressures:

Table 2. Retaining Wall Design Earth Pressures (Static, Drained)

Loading Conditions	Equivalent Fluid Density (pcf)	
	Level Backfill	2:1 Backfill
Active	36	55
At-Rest	55	90
Passive*	350	150 (2:1, sloping down)

* This assumes level condition in front of the wall will remain for the duration of the project, not to exceed 3,500 psf at depth.

Unrestrained (yielding) cantilever walls should be designed for the active equivalent-fluid weight value provided above for very low to low expansive soils that are free draining. In the design of walls restrained from movement at the top (non-yielding) such as basement or elevator pit/utility vaults, the at-rest equivalent fluid weight value should be used. Total depth of retained earth for design of cantilever walls should be measured as the vertical distance below the ground surface measured at the wall face for stem design, or measured at the heel of the footing for overturning and sliding calculations. Should a sloping backfill other than a 2:1 (horizontal:vertical) be constructed above the wall (or a backfill is loaded by an adjacent surcharge load), the equivalent fluid weight values provided above should be re-evaluated on an individual case basis by us. Non-standard wall designs should also be reviewed by us prior to construction to check that the proper soil parameters have been incorporated into the wall design.

All retaining walls should be provided with appropriate drainage. The outlet pipe should be sloped to drain to a suitable outlet. Wall backfill should be non-expansive (EI $\leq$ 21) sands compacted by mechanical methods to a minimum of 90 percent relative compaction (ASTM D 1557). Clayey site soils should not be used as wall backfill. Walls should not be backfilled until wall concrete attains the 28-day compressive strength and/or as determined by the Structural Engineer that the wall is structurally capable of supporting backfill. Lightweight compaction equipment should be used, unless otherwise approved by the Structural Engineer.

4.6 Sulfate Attack

Based on past experience in this area, the onsite soils are expected to possess negligible sulfate content. Type II soils or equivalent may be used. Further testing should be performed at the completion of site grading to confirm such conditions.

4.7 Preliminary Pavement Design

Our preliminary HMA pavement design is based on an R-value of 57 and the Caltrans Highway Design Manual. For planning and estimating purposes, the pavement sections are calculated based on Traffic Indexes (TI) as indicated in Table below:

Table 3. Asphalt Pavement Sections

General Traffic Condition	Traffic Index (TI)	Asphalt Concrete (inches)	Aggregate Base* (inches)
Automobile Parking Lanes	4.5	3.0	4.0
	5.0	3.0	4.0
Truck Access & Driveways	6.0	3.0	4.0
	6.5	3.5	4.0
Roadways (Barton, Brown)	7.0	4.0	4.0
Roadways (Cactus)	9.0	5.0	5.0

Appropriate Traffic Index (TI) should be selected or verified by the project civil engineer and actual R-value of the subgrade soils will need to be verified after completion of site grading to finalize the pavement design. Pavement design and construction should also conform to applicable local, county and industry standards. The Caltrans pavement section design calculations were based on a pavement life of approximately 20 years with periodic flexible pavement maintenance.

Where PCC pavement is planned, the following table provides sections based on the design standards presented in the ACI "Guide for the Design and construction of Concrete Parking Lots" (ACI 330R-14), R-value test results, and the provided Average Daily Truck Traffic Indices (ADTT). The ADTT index is provided by Client/civil engineer.

Table 4. Pavement Sections

Street	ADTT	R-Value	PCC (Inches)
Heavy Truck Traffic	>700	>40	8.0
Moderate Truck Traffic/Parking	≤ 300		7.0
Parking/Light Traffic	≤ 50		6.5

- **Traffic Categories ACI 330, Table 3.3*

The above recommended concrete sections are based on properly compacted fill soils with a very low expansion potential (EI<21) and R-Value greater than 40. All utility trenches should be compacted to 90 percent relative compaction and pavement subgrade (upper 12-inches) uniformly compacted (non-yielding) to 95 percent of the laboratory maximum dry density (ASTM D1557) and at/or slightly above optimum moisture content. Compaction should extend a minimum of 12-inches beyond formlines. Slab edges and construction joint details provided by ACI should be followed. Slab edges that will be subject to through going traffic should be tapered from the heaviest traffic load into the lessor traffic load area a minimum of 3 feet. The PCC pavement should have a minimum of 28-day compressive strength of 3250 psi (or MOR of 550 psi). Construction and crack control joints should be designed per structural engineer's requirements and/or ACI or ACPA guidelines.

The upper 6 inches of the subgrade soils should be moisture-conditioned to near optimum moisture content, compacted to at least 95 percent relative compaction (ASTM D1557) and kept in this condition until the pavement section is constructed. Minimum relative compaction requirements for aggregate base should be 95 percent of the maximum laboratory density as determined by ASTM D1557. If applicable, aggregate base should conform to the "Standard Specifications for Public Works Construction" (green book) current edition or Caltrans Class 2 aggregate base.

If pavement areas are adjacent to heavily watered landscape areas, some deterioration of the subgrade load bearing capacity and pavement failure may result. Moisture control measures such as deepened curbs or other moisture barrier materials may be used to prevent the subgrade soils from becoming saturated. The use of concrete cutoff or edge barriers should be considered when pavement is planned adjacent to either open (unfinished) or irrigated landscaped areas.

5.0 GEOTECHNICAL CONSTRUCTION SERVICES

Geotechnical review is of paramount importance in engineering practice. Poor performances of many foundation and earthwork projects have been attributed to inadequate construction review. We recommend that Leighton Consulting, Inc. be provided the opportunity to review the grading plan and foundation plan(s) prior to bid.

Reasonably-continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction. Geotechnical conclusions and preliminary recommendations should be reviewed and verified by Leighton Consulting, Inc. during construction, and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Geotechnical observation and testing should be provided:

- After completion of site demolition and clearing,
- During over-excavation of compressible soil,
- During compaction of all fill materials,
- After excavation of all footings and prior to placement of concrete,
- During utility trench backfilling and compaction, and
- When any unusual conditions are encountered.

Additional geotechnical exploration and analysis may be required based on final development plans, for reasons such as significant changes in proposed structure locations/footprints. We should review grading (civil) and foundation (structural) plans, and comment further on geotechnical aspects of this project.

6.0 LIMITATIONS

This report was based in part on data obtained from a limited number of observations, site visits, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions and recommendations presented in this report are based on the assumption that we (Leighton Consulting, Inc.) will provide geotechnical observation and testing during construction as the Geotechnical Engineer of Record for this project. Please refer to Appendix D, GBA's *Important Information About This Geotechnical-Engineering Report*, prepared by the Geoprofessional Business Association (GBA) presenting additional information and limitations regarding geotechnical engineering studies and reports.

This report was prepared for the sole use of Client and their design team, for application to design of the proposed maintenance building, in accordance with generally accepted geotechnical engineering practices at this time in California. Any unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton Consulting, Inc. from and against any liability, which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton Consulting, Inc.

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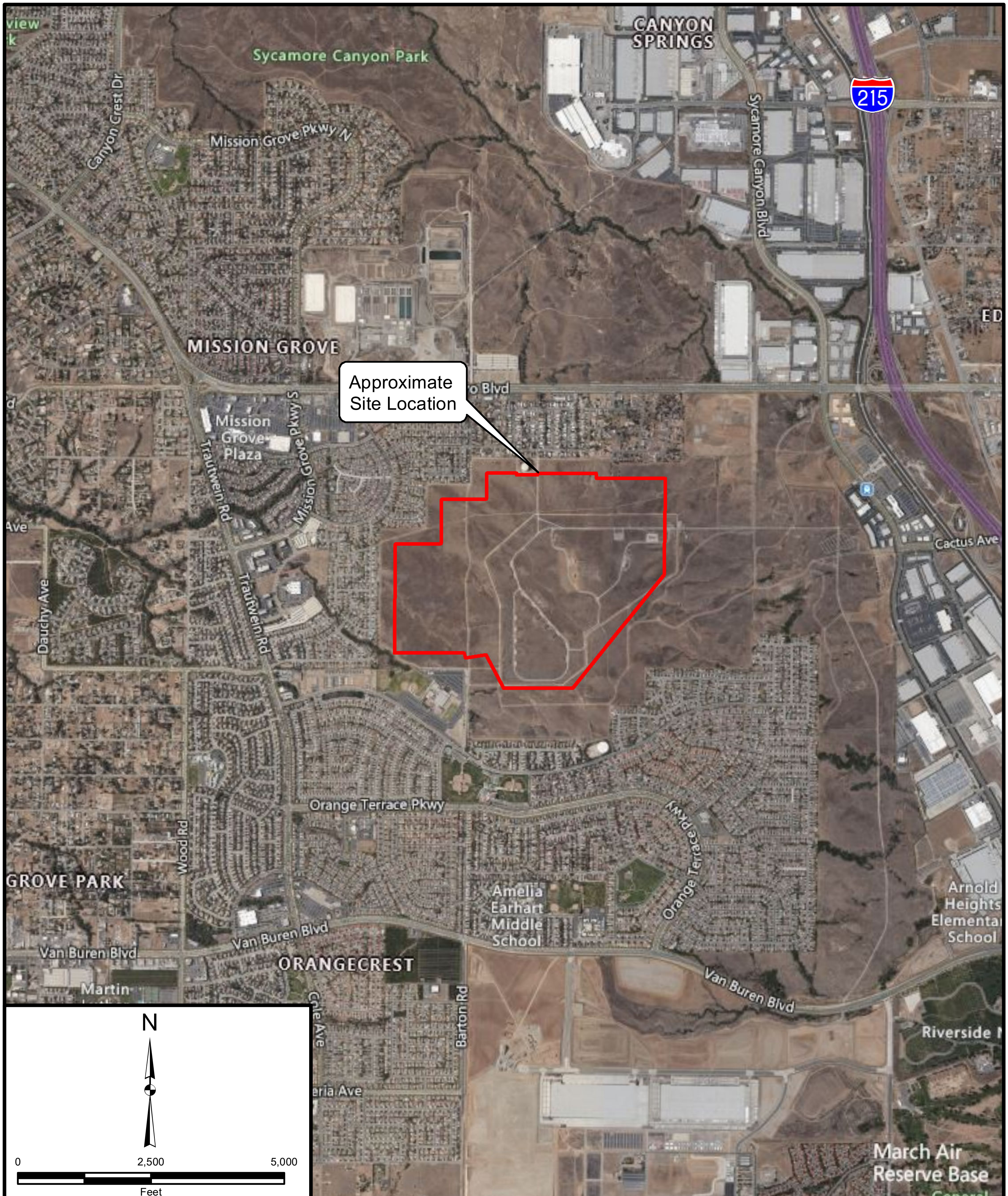


Project: 13226.001	Eng/Geol: SIS/BAA
Scale: 1 " = 2,500 '	Date: September 2021

Base Map: ESRI ArcGIS Online 2021

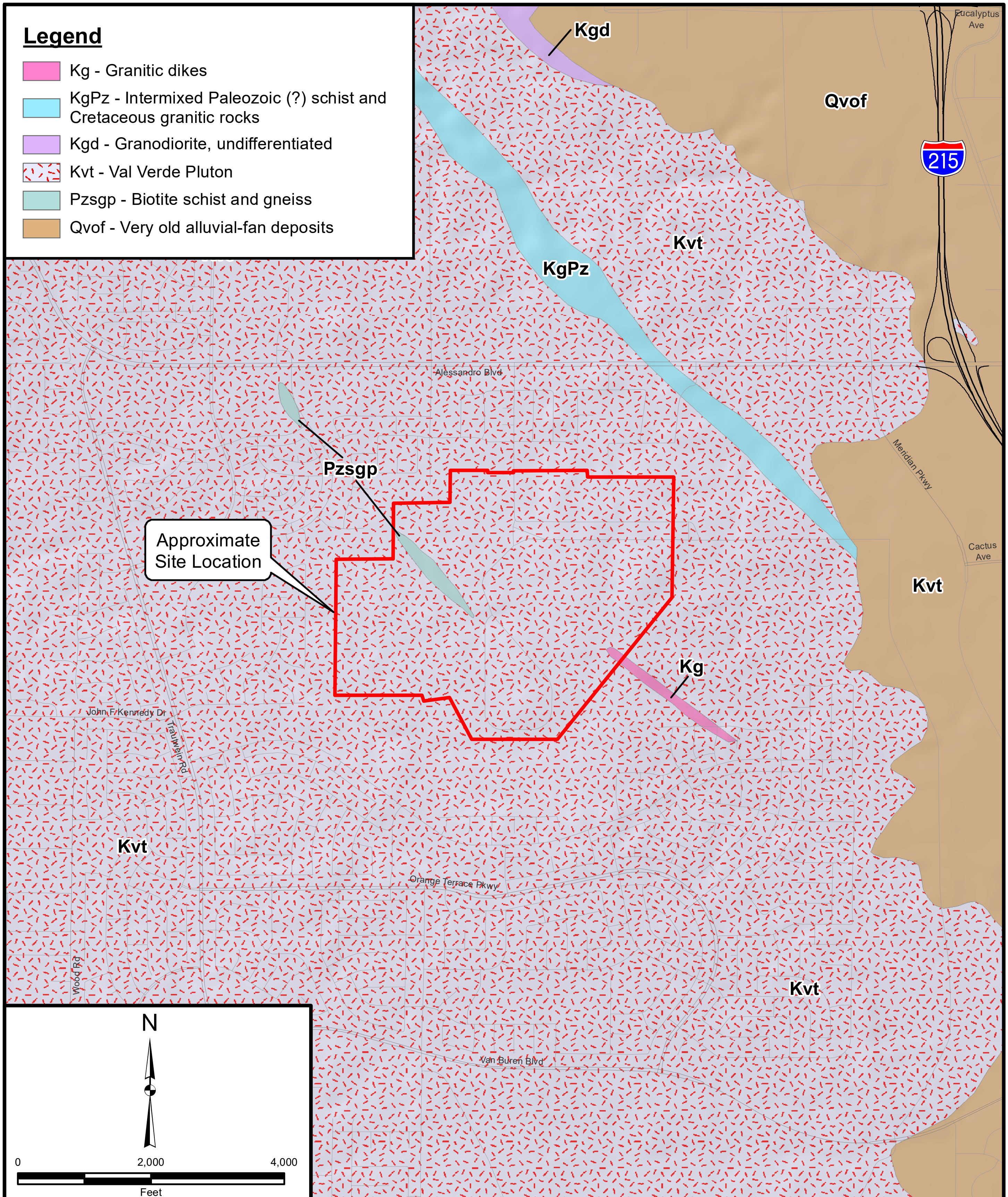
SITE LOCATION MAP

Proposed Meridian Upper Plateau
Vista Grande Drive, Riverside, California

FIGURE 1

Leighton

Map Saved as V:\Drafting\13226\001\Maps\13226.001_F01_SLM_2021-08-17.mxd on 9/23/2021 4:27:26 PM Author: Leighton Geomatics (mmurphy)



Project: 13226.001	Eng/Geol: SIS/BAA
Scale: 1 " = 2,000 '	Date: September 2021

Reference: USGS, 2006 Geologic map of the San Bermardino and Santa Ana 30'x60 quadrangle, California Version 1,0 Open File Report 2006-1217.

Author: Leighton Geomatics (mmurphy)

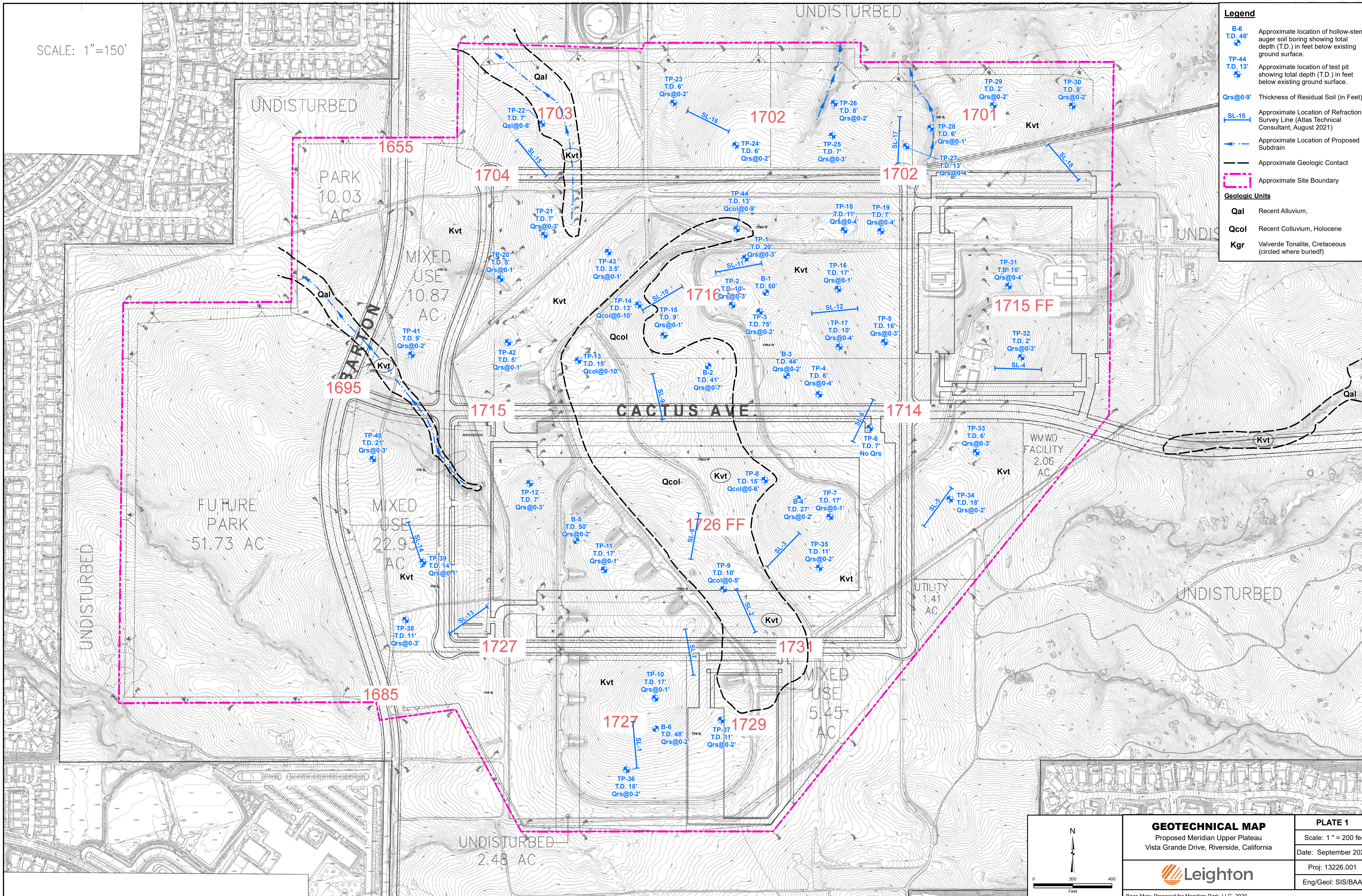
REGIONAL GEOLOGY MAP

Proposed Meridian Upper Plateau
Vista Grande Drive, Riverside, California

FIGURE 2

Leighton

Map Saved as V:\Drafting\13226\001\Maps\13226-001_F02_RGM_2021-09-23.mxd on 9/23/2021 4:50:00 PM


SCALE: 1"=150'
UNDISTURBED
PARK 10.03 AC
MIXED USE 10.87 AC
FUTURE PARK 51.73 AC
MIXED USE 22.93 AC
MIXED USE 5.45 AC
UTILITY 1.41 AC
WMWD FACILITY 2.06 AC
UNDISTURBED 2.48 AC
BARTON
CACTUS AVE.
1655
1703
1702
1701
1704
1695
1715
1714
1716
1715 FF
1726 FF
1727
1731
1685
1729
Qal
Qcol
Kvt
Legend
B-6 T.D. 48' Approximate location of hollow-stem auger soil boring showing total depth (T.D.) in feet below existing ground surface.
TP-44 T.D. 13' Approximate location of test pit showing total depth (T.D.) in feet below existing ground surface.
Qrs@0-9' Thickness of Residual Soil (in Feet)
SL-15 Approximate Location of Refraction Survey Line (Atlas Technical Consultant, August 2021)
Approximate Location of Proposed Subdrain
Approximate Geologic Contact
Approximate Site Boundary
Geologic Units
Qal Recent Alluvium,
Qcol Recent Colluvium, Holocene
Kgr Valverde Tonalite, Cretaceous (circled where buried)
GEOTECHNICAL MAP
Proposed Meridian Upper Plateau
Vista Grande Drive, Riverside, California
PLATE 1
Scale: 1" = 200 feet
Date: September 2021
Proj: 13226.001
Eng/Geol: SIS/BAA
Leighton
Base Map: Prepared for Meridian Park, LLC, 2020
N
0 200 400
Feet

APPENDIX A

GEOTECHNICAL FIELD EXPLORATIONS

APPENDIX A-1

LOGS OF EXPLORATORY BORINGS/TEST PITS

GEOTECHNICAL BORING LOG B-1

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1742'
Location	See Geotechnical Map	**Sampled By**	BAA

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B1				SM	**Residual Soil** SILTY SAND, dense, reddish brown, slightly moist, medium sand	
1740				R1	50/6"	122	7			
									Granitic Bedrock recovered as Poorly graded SAND with silt, very dense, pale brown to grayish brown, slightly moist	
	5			R2	50/5"	116	5			
1735				R3	50/4"		3.2			
	10			S1	50/6"					
1730										
	15			S2	50/5"					
1725										
	20			S3	50/5"					
1720										
	25			S4	50/3"					
1715										
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG B-1

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1742'
Location	See Geotechnical Map	**Sampled By**	BAA

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30									
1710										
	35									
1705										
	40								@ 40'; becomes harder to drill	
1700										
	45									
1695										
	50			S5	50/2.5"					
									Total Depth 50' No Groundwater Encountered Backfilled 8/2/2021	
1690										
	55									
1685										
	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-2

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1730'
Location	See Geotechnical Map	**Sampled By**	BAA

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N – S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1730	0							SM/SC	**Colluvium** SILTY CLAYEY SAND, strong brown to reddish brown, slightly moist, fine to medium sand, trace fine gravel	
				R1	4 2 6	102	6			
1725	5			R2	7 11 4	116	7			
				R3	7 15 23				**Granitic Bedrock** Poorly graded SAND with silt, dense, slightly moist, medium to coarse sand	
1720	10			S1	9 15 18					
1715	15			S2	10 30 50/5"		8.1			
1710	20			S3	35 50/2"					
1705	25			S4	26 50/4"					
1700	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-2

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1730'
Location	See Geotechnical Map	**Sampled By**	BAA

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
1700	30								@ 30'; becomes harder to drill	
1695	35									
1690	40									
									Refusal @ 41' No Groundwater Encountered Backfilled 8/2/2021	
1685	45									
1680	50									
1675	55									
1670	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-3

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1756'
Location	See Geotechnical Map	**Sampled By**	BAA

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1755	0							SM	**Residual Soil** SILTY SAND, medium dense, pale brown, slightly moist, medium sand	
	2			R1	50/3"	107	2		**Granitic Bedrock** recovered as SAND with silt, dense, grayish brown, slightly moist, medium to coarse sand	
1750	5			S1	50/5"					
	7								@ 7'; becomes harder to drill	
1745	10			S2	50/3.5"					
1740	15									
1735	20									
1730	25									
	30									

SOIL DESCRIPTION: This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-3

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1756'
Location	See Geotechnical Map	**Sampled By**	BAA

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	30									
1725										
	35									
1720										
	40									
1715										
	45								Refusal @ 44' No Groundwater Encountered Backfill 8/2/2021	
1710										
	50									
1705										
	55									
1700										
	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-4

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1755'
Location	See Geotechnical Map	**Sampled By**	BAA

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1755	0			B1				SC-SM	**Residual Soil** SILTY, CLAYEY SAND, medium dense, reddish brown, slightly moist, fine to medium sand	
				R1	16 50/4.5"	111	8		**Granitic Bedrock** recovered as Poorly graded SAND with silt, dense to very dense, slightly moist, medium to coarse sand	
1750	5			R2	50/6"					
1745	10			S1	50/5.5"					
1740	15								@ 15'; becomes harder to drill	
1735	20									
1730	25									
									Refusal @ 27' No Groundwater Encountered Backfilled 8/2/2021	
1725	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-5

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1739'
Location	See Geotechnical Map	**Sampled By**	BAA

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	Soil Description	Type of Tests
	0			B1				SM	**Topsoil** SILTY SAND, medium dense, pale brown, slightly moist, fine to medium sand	
				R1	50/6"	126	3		**Granitic Bedrock** recovered as Poorly graded SAND with silt, very dense, grayish brown, slightly moist, coarse sand	
1735	5			S1	34 50/5"					
1730	10			S2	34 50/5.5"					
1725	15			S3	50/5.5"					
1720	20									
1715	25									
1710	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-5

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1739'
Location	See Geotechnical Map	**Sampled By**	BAA

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	**SOIL DESCRIPTION** *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	30									
1705										
	35								@ 35'; becomes harder to drill	
1700										
	40									
1695										
	45									
1690										
	50			S4	50/2"					
									Total Depth 50' No Groundwater Encountered Backfill 8/2/2021	
1685										
	55									
1680										
	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG B-6

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1750'
Location	See Geotechnical Map	**Sampled By**	BAA

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1750	0							SM	**Residual Soil** SILTY SAND, medium dense, pale brown, slightly moist, fine to coarse sand	
				R1	37 50/4"	122	4		**Granitic Bedrock** recovered as Poorly graded SAND with silt, very dense, grayish brown, slightly moist, coarse sand	
1745	5			S1	50/6"					
1740	10			S2	27 50/3"					
1735	15								@ 15' becomes harder to drill	
1730	20									
1725	25									
1720	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

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GEOTECHNICAL BORING LOG B-6

Project No.	13226.001	**Date Drilled**	8-2-21
Project	Meridian Upper Plateau	**Logged By**	BAA
Drilling Co.	MARTINI DRILLING	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1750'
Location	See Geotechnical Map	**Sampled By**	BAA

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
1720	30									
1715	35									
1710	40									
1705	45									
1700	50			S3	50/4"				Total Depth 50' Groundwater Encountered @ 47.75' Backfilled 8/2/2021	
1695	55									
1690	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

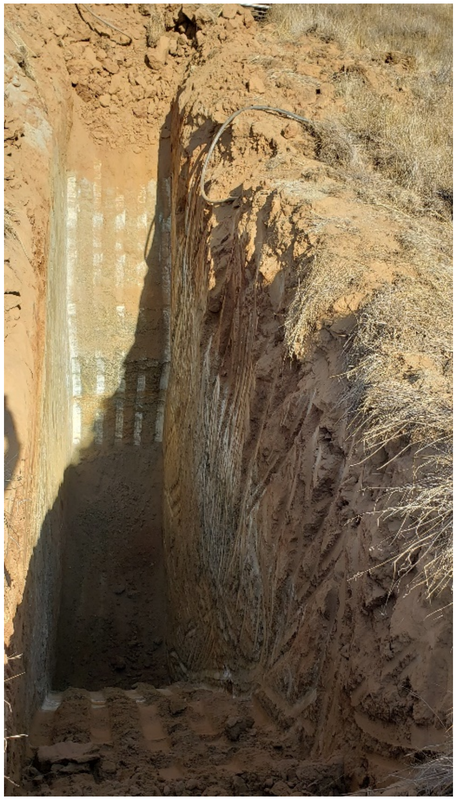
Leighton

LOG OF TEST PITS

PROJECT NO.: 13226.001
PROJECT NAME: Meridian Upper Plateau

LOGGED BY: BAA
DATE: 7/27-30/2021

TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-1	B-1 B-2		SM	**Residual Soil (Qrs)**; 0' 3.0' – SILTY SAND, reddish brown, moist medium dense, trace gravel. **Bedrock (Kvt)**; 3.0'-19.0' – Granitic BEDROCK, gray to yellowish brown, completely weathered, moist, heavily fractured, soft. Total Depth 19.0', no groundwater, backfilled with spoils.



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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-2			SM/ SC-SM	**Residual Soil (Qrs)**; 0'-3.0' – SILTY SAND to SILTY CLAYEY SAND, reddish brown, moist medium dense, medium to coarse sand **Granitic Bedrock (Kvt)**; 3.0-12.0' – Granitic Bedrock, grayish brown, soft, completely weathered to moderately weathered, heavily fractured. Total Depth 12.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-3			SM/ SC-SM	**Residual Soil (Qrs)**; 0'-2.0' – SILTY SAND to SILT CLAYEY SAND, reddish brown, moist, loose to medium dense, medium to coarse sand. **Granitic Bedrock (Kvt)**; 2.0'-25' – grayish brown, soft to moderately hard, completely to moderately weathered, heavily fractured. Total Depth 25.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-4			SM/ SC-SM	**Residual Soil (Qrs)**; 0-4.0' – SILTY SAND to SILTY CLAYEY SAND reddish brown, moist, medium dense, fine to medium sand. **Granitic Bedrock (Kvt)**; 4.0'-6.0' – grayish brown, moderately weathered, soft to moderately hard, moderately fractured. Total Depth 6.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-5			SM	**Residual Soil (Qrs)**; 0-3.0' – SILTY SAND, reddish brown, medium dense, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 3.0-16.0' – grayish brown, soft to moderately hard, completely to moderately weathered, heavily fractured. Total Depth 16.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-6				**Granitic Bedrock (Kvt)**; 0-7.0' – grayish brown, soft to moderately hard, moderately weathered, heavily fractured. Total Depth 7.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-7			SM/ SC-SM	**Residual Soil (Qrs)**; 0-1.0' – SILTY SAND to SILTY CLAYEY SAND, medium dense, slightly moist, medium to coarse sand. **Granitic Bedrock (Kvt)**; 1.0-17.0' – grayish brown, moderately hard, completely to moderately weathered, heavily fractured. Total Depth 17.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-8	B-1		SM SC	**Colluvium (Qcol)**; 0-3.0' – SILTY SAND, reddish brown, medium dense, moist, fine to medium sand. **Colluvium (Qcol)**; 3.0-6.0' – CLAYEY SAND, olive brown, medium dense, moist , medium to coarse sand, trace angular crystalline cobbles. **Granitic Bedrock (Kvt)**; 6.0-15.0' – dark gray to grayish brown, moderately hard, moderately weathered, heavily fractured. Total Depth 15.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-9			SC	**Colluvium (Qcol)**; 0-5.0' – CLAYEY SAND, pale brown to reddish brown, medium dense, moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 5.0-10.0' – grayish brown, soft to moderately hard, moderately weathered, heavily fractured. Total Depth 10.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-10			SM	**Residual Soil (Qrs)**; 0-1.0' – SILTY SAND, reddish brown, medium dense, slightly moist, medium to coarse sand (weathered in place). **Granitic Bedrock (Kvt)**; 1.0-17.0' –grayish brown, soft to moderately hard, slightly moist, completely to moderately weathered, heavily fractured. Total Depth 17.0', no groundwater, backfilled with spoils.

TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-11			SM	**Residual Soil (Qrs)**; 0-1.0' – SILTY SAND, reddish brown, medium dense, slightly moist, medium to coarse sand (weathered in place). **Granitic Bedrock (Kvt)**; 1.0-10.0' – grayish brown, soft to moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 10.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-12			SC	**Residual Soil (Qrs)**; 0-3.0' – CLAYEY SAND, reddish brown, loose to medium dense, dry to slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 3.0-7.0' – gray to grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 7.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-13	B-1		SM	**Colluvium (Qcol)**; 0-10.0' – SILTY SAND, strong brown, medium dense to stiff, moist, fine to medium sand, wire fragments and concrete block encountered. **Granitic Bedrock (Kvt)**; 10.0-15.0' – pale brown to grayish brown, soft to moderately hard, slightly moist, completely to moderately weathered, heavily fractured. Total Depth 15.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-14			SC	**Colluvium (Qcol)**; 0-4.0' – CLAYEY SAND, reddish brown, medium dense, slightly moist. **Colluvium (Qcol)**; 4.0-10.0' – SANDY CLAY (Hard Pan), olive brown, moderately indurated, moist, trace angular gravel. **Granitic Bedrock (Kvt)**; 10.0-13.0' – gray brown, moderately hard, moderately weathered, heavily fractured. Total Depth 13.0', no groundwater, backfilled with spoils.

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test PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-15			SC-SM	**Residual Soil (Qrs)**; 0-1.0' – SILTY CLAYEY SAND, reddish brown, moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 1.0-9.0' – reddish brown (1-4'), grayish brown (4-9'), moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 9.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-16			SC	**Residual Soil (Qrs)**; 0-1.0' – CLAYEY SAND, reddish brown, medium dense, slightly moist, medium to coarse sand. **Granitic Bedrock (Kvt)**; 1.0-12.0' – grayish brown, soft to moderately hard, moderately weathered, heavily fractured. Igneous Intrusion; 2.0-4.0' – olive brown to reddish brown, hard, fresh, moderately fractured, crystalline Total Depth 12.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-17			SM	**Residual Soil (Qrs)**; 0-4.0' – SILTY CLAYEY SAND, reddish brown, medium dense, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 4.0-10.0' – grayish brown, soft to moderately hard, slightly moist, completely to moderately weathered, heavily fractured. Total Depth 10.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-18			SC-SM	**Residual Soil (Qrs)**; 0-4.0' – SILTY CLAYEY SAND, reddish brown, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 4.0-11.0' – grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 11.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-19			SC	**Residual Soil (Qrs)**; 0-2.0' – SANDY CLAY to CLAYEY SAND, reddish brown, loose to medium dense, slightly moist. **Residual Soil (Qrs)**; 2.0-4.0' – SANDY CLAY to CLAYEY SAND (Hard Pan), reddish brown, slightly moist, moderately to strongly cemented **Granitic Bedrock (Kvt)**; 4.0-7.0' – grayish brown, soft to moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 7.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-20			SC	**Residual Soil (Qrs)**; 0-1.0' – CLAYEY SAND, reddish brown, medium dense, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 1.0-5.0' – grayish brown, soft to moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 5.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-21			SC-SM	**Residual Soil (Qrs)**; 0-3.0' – CLAYEY SAND, reddish brown, medium dense, moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 3.0-7.0' – grayish brown, soft to moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 7.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-22			SC SC/CL	**Alluvium (Qal)**; 0-3.0' – CLAYEY SAND, reddish brown, medium dense, slightly moist, fine to medium sand. **Alluvium (Qal)**; 3.0-6.0' – CLAYEY SAND to SANDY CLAY (Hard Pan), reddish brown to strong brown, slightly moist, medium sand, moderately to strongly cemented **Granitic Bedrock (Kvt)**; 6.0-7.0' – grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 7.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-23			SC	**Residual Soil (Qrs)**; 0-2.0' – CLAYEY SAND, reddish brown, medium dense, moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 2.0-6.0' – grayish brown, moderately hard, moderately weathered, heavily fractured, becomes darker when it becomes fresher/harder. Total Depth 6.0', no groundwater, backfilled with spoils.

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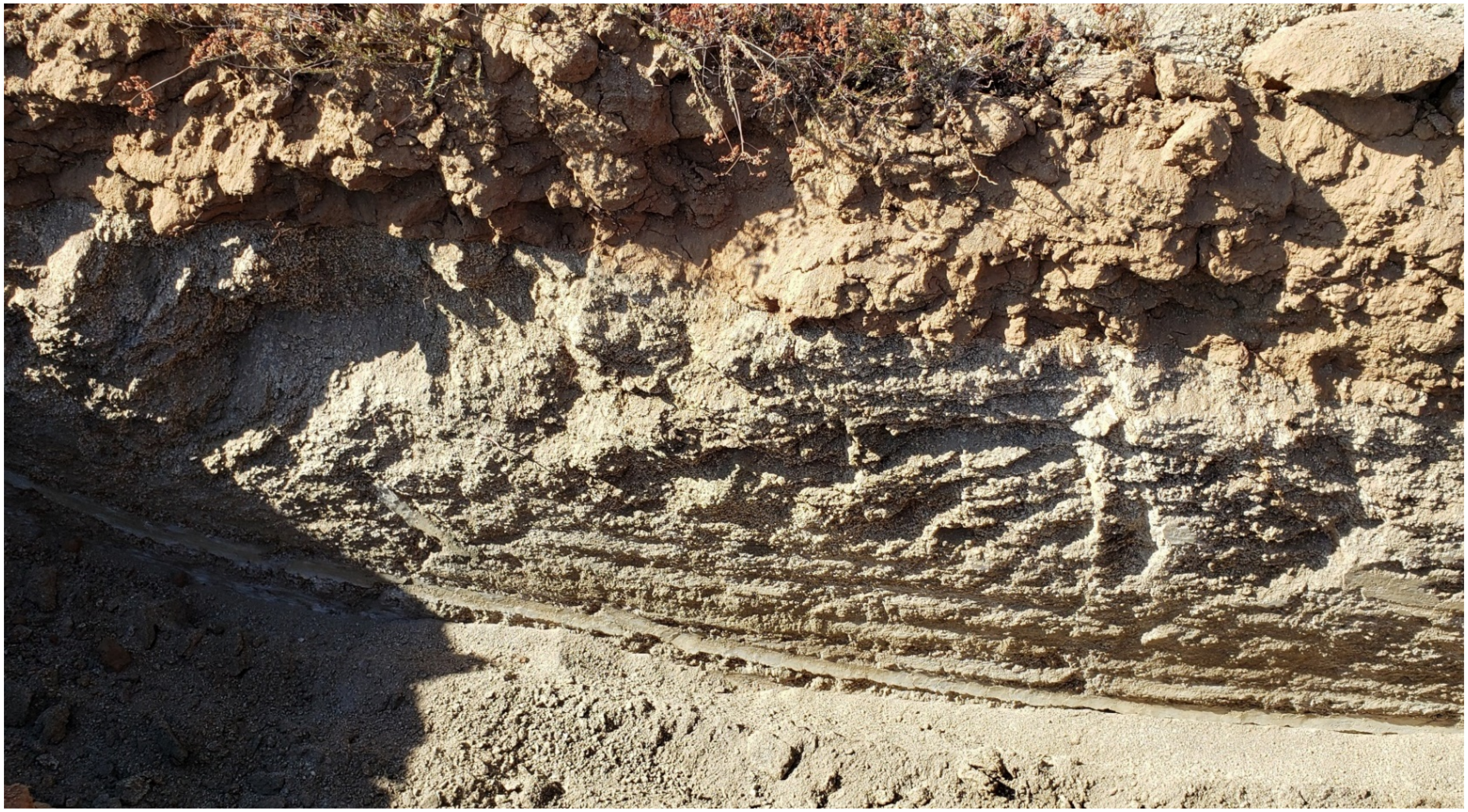
TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-24			SC	**Residual Soil (Qrs)**; 0-2.0' –CLAYEY SAND, reddish brown, medium dense, moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 2.0-6.0' – grayish brown, moderately hard, moderately weathered, heavily fractured, becomes dark gray when it becomes fresher/harder. Total Depth 6.0', no groundwater, backfilled with spoils.



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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-25			SC-SM	**Residual Soil (Qrs)**; 0-3.0' – SILTY CLAYEY SAND, reddish brown, medium dense, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 3.0-7.0' – grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured, becomes dark gray as it becomes fresher/harder. Total Depth 7.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-26			SM	**Residual Soil (Qrs)**; 0-2.0' – SILTY SAND, reddish brown, medium dense, slightly moist, medium sand, trace clay. **Granitic Bedrock (Kvt)**; 2.0-8.0' – grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 8.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-27			SC-SM	**Residual Soil (Qrs)**; 0-4.0' – SILTY CLAYEY SAND, reddish brown, medium dense, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 4.0-13.0' – grayish brown, moderately hard, slightly moist, completely to moderately weathered, heavily fractured, becomes dark gray as it becomes fresher/harder. Total Depth 13.0', no groundwater, backfilled with spoils.

TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-28			SC-SM	**Residual Soil (Qrs)**; 0-1.0' – SILTY CLAYEY SAND, light brown to reddish brown, medium dense, moist, fine sand. **Granitic Bedrock (Kvt)**; 1.0-6.0' – grayish brown to yellowish brown, moderately hard to hard, slightly moist, moderately weathered, heavily fractured. Total Depth 6.0', no groundwater, backfilled with spoils.

TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-29a			SC	**Residual Soil (Qrs)**; 0-2.0' – CLAYEY SAND, reddish brown, medium dense, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 2.0-3.0' – grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured. **Igneous Intrusion (T_{IG})**; gray to white with iron staining, very hard, slightly weathered to fresh, slightly fractured. Total Depth 3.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-29b			SC	**Residual Soil (Qrs)**; 0-2.0' – CLAYEY SAND, reddish brown, medium dense, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 2.0-3.0' – grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured. **Igneous Intrusion (T_{IG})**; gray to white with iron staining, very hard, slightly weathered to fresh, slightly fractured. Total Depth 3.0', no groundwater, backfilled with spoils.

TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-30			SM	**Residual Soil (Qrs)**; 0-2.0' – SILTY SAND, reddish brown, medium dense, moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 2.0-8.0' – grayish brown, moderately hard, moderately weathered, heavily fractured, grades to dark gray with fresher rock. Total Depth 8.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-31	B-1		SM	**Residual Soil (Qrs)**; 0-4.0' – SILTY SAND, reddish brown, medium dense, slightly moist, medium to coarse sand, trace clay. **Granitic Bedrock (Kvt)**; 4.0-10.0' – grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured, becomes dark gray as it become fresher Total Depth 10.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-32			SM	**Residual Soil (Qrs)**; 0-3.0' – SILTY SAND, reddish brown, medium dense, slightly moist, medium sand. **Granitic Bedrock (Kvt)**; 3.0-12.0' – grayish brown, soft to moderately hard, slightly moist, completely to moderately weathered, heavily fractured. Total Depth 12.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-33			SC-SM	**Residual Soil (Qrs)**; 0-3.0' – SILTY CLAYEY SAND, reddish brown, medium dense, slightly moist, medium sand. **Granitic Bedrock (Kvt)**; 3.0-6.0' – grayish brown, soft to moderately hard, slightly moist, completely to moderately weathered, heavily fractured. Total Depth 6.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-34			SC-SM	**Residual Soil (Qrs)**; 0-2.0' – SILTY CLAYEY SAND, reddish brown, medium dense, slightly moist, medium to coarse sand. **Granitic Bedrock (Kvt)**; 2.0-18.0' – grayish brown, soft to moderately hard, slightly moist, completely to moderately weathered, heavily fractured. Total Depth 18.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-35	B-1		SM	**Residual Soil (Qrs)**; 0-2.0' – SILTY SAND, reddish brown, medium dense, slightly moist, medium to coarse sand. **Granitic Bedrock (Kvt)**; 2.0-11.0' – grayish brown, soft to moderately hard, slightly moist, completely to moderately weathered, heavily fractured. Total Depth 11.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-36			SM	**Residual Soil (Qrs)**; 0-2.0' – SILTY SAND, reddish brown, medium dense, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 2.0-18.0' – grayish brown, soft to moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 18.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-37			SM	**Residual Soil (Qrs)**; 0-2.0' – SILTY SAND, pale brown to reddish brown, medium dense, slightly moist, medium sand, trace clay. **Granitic Bedrock (Kvt)**; 2.0-11.0' – gray brown, moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 11.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-38			SM	**Residual Soil (Qrs)**; 0-3.0' – SILTY SAND, reddish brown, medium dense, slightly moist, medium to coarse sand, trace clay. **Granitic Bedrock (Kvt)**; 3.0-11.0' – pale brown to grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured, becomes dark gray as it becomes fresher, some white intrusions. Total Depth 11.0', no groundwater, backfilled with spoils.

TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-39			SM	**Residual Soil (Qrs)**; 0-1.0' – SILTY SAND, pale brown to reddish brown, medium dense, slightly moist, fine to medium sand. **Granitic Bedrock (Kvt)**; 1.0-14.0' – grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured, massive. Total Depth 14.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-40	B-1		SM	**Residual Soil (Qrs)**; 0-3.0' – SILTY SAND, reddish brown, medium dense, slightly moist, medium to coarse sand. **Granitic Bedrock (Kvt)**; 3.0-21.0' – grayish brown, moderately hard, slightly moist, moderately weathered, heavily fractured. Total Depth 21.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-41			SM	**Residual Soil (Qrs)**; 0-2.0' – SILTY SAND, pale brown, loose, dry, fine to medium sand. **Granitic Bedrock (Kvt)**; 2.0-9.0' – grayish brown, moderately hard, slightly moist, moderately weathered. Total Depth 9.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-42			SM	**Residual Soil (Qrs)**; 0-1.0' – SILTY SAND, pale brown to reddish brown, loose, dry, fine to medium sand. **Granitic Bedrock (Kvt)**; 1.0-5.0' – grayish brown to dark gray, hard to very hard, moderately to slightly weathered, moderately fractured. Total Depth 5.0', no groundwater, backfilled with spoils.

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TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-43			SM	**Residual Soil (Qrs)**; 0-1.0' – SILTY SAND, pale brown, loose, dry, fine to medium sand. **Granitic Bedrock (Kvt)**; 1.0-3.5' – grayish brown, hard to very hard, slightly moist, moderately to slightly weathered, moderately to heavily fractured. Total Depth 3.5', no groundwater, backfilled with spoils.

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DATE: 7/27-30/2021

TEST PIT#	SAMPLE TYPE & DEPTH	LAB TEST	USCS	DESCRIPTION
TP-44	B-1		SM	**Colluvium (Qcol)**; 0-9.0' – SILTY SAND, strong brown, loose, moist, fine to coarse sand, trace silt. **Granitic Bedrock (Kvt)**; 9.0-14.0' – grayish brown, moderately hard to hard, slightly moist, moderately weathered, heavily fractured. Total Depth 14.0', no groundwater, backfilled with spoils.

APPENDIX A-2

SEISMIC REFRACTION SURVEY

Leighton

SEISMIC REFRACTION STUDY

MERIDIAN UPPER PLATEAU

Riverside, California

PREPARED FOR:

Brent Adam, PG
Leighton Consulting, Inc.
41715 Enterprise Circle North, Suite 103
Temecula, CA 92590

PREPARED BY:

Atlas Technical Consultants LLC
6280 Riverdale Street
San Diego, CA 92120

September 16, 2021

6280 Riverdale Street
San Diego, CA 92120
(877) 215-4321 | oneatlas.com

September 16, 2021

Atlas No. 121300SWG
Report No. 1

MR. BRENT ADAM, P.G.
LEIGHTON CONSULTING, INC.
41715 ENTERPRISE CIRCLE NORTH, SUITE 103
TEMECULA, CA 92590

**Subject: Seismic Refraction Study
Meridian Upper Plateau
Riverside, California**

Dear Mr. Adam:

In accordance with your authorization, Atlas Technical Consultants has performed a seismic refraction study pertaining to the Meridian Upper Plateau project located in Riverside, California. Specifically, our evaluation consisted of performing 18 seismic P-wave refraction traverses at the site. The purpose of our study was to develop subsurface velocity profiles of the areas studied and to assess the depth to bedrock and apparent rippability of the subsurface materials. Our field services were conducted on August 2nd through 4th, 2021. This data report presents our methodology, equipment used, analysis, and results.

If you have any questions, please call us at (619) 280-4321.

Respectfully submitted,
Atlas Technical Consultants LLC

REGISTERED PROFESSIONAL GEOPHYSICIST
PATRICK F. LEHRMANN
No. 1043
Exp. 1/31/2022
STATE OF CALIFORNIA

Afrildo Iko Syahrial
Project Geophysicist

Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist

AIS:EC:PFL:ds

Distribution: badam@leightongroup.com

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TABLE

FIGURES

1. INTRODUCTION

In accordance with your authorization, Atlas Technical Consultants has performed a seismic refraction study pertaining to the Meridian Upper Plateau project located in Riverside, California (Figure 1). Specifically, our evaluation consisted of performing 18 seismic P-wave refraction traverses at the site. The purpose of our study was to develop subsurface velocity profiles of the areas studied and to assess the depth to bedrock and apparent rippability of the subsurface materials. Our field services were conducted on August 2nd through 4th, 2021. This data report presents our methodology, equipment used, analysis, and results.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of 18 seismic P-wave refraction traverses at the project site.
- Compilation and analysis of the data collected.
- Preparation of this data report presenting our results and conclusions.

3. SITE AND PROJECT DESCRIPTION

The project site is a vacant lot on a rolling hill. The entrance to the project site is generally located at the south end of Vista Grande Drive in Riverside, California. The site was formerly owned by March Air Force Base and utilized as a munition storage. Several bunkers exist at the site and access to the bunkers is by dirt roads. Currently, some of these bunkers are abandoned and/or utilize as public storage. The seismic traverses were performed at various locations throughout the site over slightly sloping ground. Vegetation consisted of seasonal grass and a few granite outcrops with varying degrees of weathering were observed at the site. Figures 2 and 3a through 3c depict the general site conditions in the areas of the seismic traverses.

Based on our discussions with you, it is our understanding that your office requested this study in advance of proposed construction activities at the site. We also understand that the results of our study may be used in the formulation of design and construction parameters for the project.

4. STUDY METHODOLOGY

A seismic P-wave (compression wave) refraction study was conducted at the project site to develop subsurface velocity profiles, and to assess the depth to bedrock and apparent rippability of the subsurface materials. The seismic refraction method uses first-arrival times of refracted seismic waves to estimate the thicknesses and seismic velocities of subsurface layers. Seismic P-waves generated at the surface, using a hammer and plate, are refracted at boundaries separating materials of contrasting velocities. These refracted seismic waves are then detected by a series of surface vertical component 14-Hz geophones and recorded with a 24-channel Geometrics Geode seismograph. The travel times of the seismic P-waves are used in conjunction with the shot-to-geophone distances to obtain thickness and velocity information on the subsurface materials.

Eighteen (18) seismic traverses labeled as SL-1 through SL-18, respectively, were conducted at the site. The general location and length of the line were determined by surface conditions, site access, and depth of investigation, as determined by you. Shot points (signal generation locations) were conducted along the lines at the ends, midpoint, and intermediate points between the ends and the midpoint.

The seismic refraction theory requires that subsurface velocities increase with depth. A layer having a velocity lower than that of the layer above will not generally be detectable by the seismic refraction method and, therefore, could lead to errors in the depth calculations of subsequent layers. In addition, lateral variations in velocity, such as those caused by core stones, intrusions, or boulders can also result in the misinterpretation of the subsurface conditions. In general, the effective depth of evaluation for a seismic refraction traverse is approximately one-third to one-fifth of the length of the spread.

In general, the seismic P-wave velocity of a material can be correlated to rippability (see Table 1 below), or to some degree “hardness.” Table 1 is based on published information from the Caterpillar Performance Handbook (Caterpillar, 2018), as well as our experience with similar materials, and assumes that a Caterpillar D-9 dozer ripping with a single shank is used. We emphasize that the cutoffs in this classification scheme are approximate and that rock characteristic, such as fracture spacing and orientation, play a significant role in determining rock quality or rippability. The rippability of a mass is also dependent on the excavation equipment used and the skill and experience of the equipment operator.

For trenching operations, the rippability values should be scaled downward. For example, velocities as low as 3,500 feet/second may indicate difficult ripping during trenching operations. In addition, the presence of boulders, which can be troublesome in narrow trenching operations, should be anticipated.

Table 1 – Rippability Classification

Seismic P-wave Velocity	Rippability
0 to 2,000 feet/second	Easy
2,000 to 4,000 feet/second	Moderate
4,000 to 5,500 feet/second	Difficult, Possible Blasting
5,500 to 7,000 feet/second	Very Difficult, Probable Blasting
Greater than 7,000 feet/second	Blasting Generally Required

It should be noted that the rippability cutoffs presented in Table 1 are slightly more conservative than those published in the Caterpillar Performance Handbook. Accordingly, the above classification scheme should be used with discretion, and contractors should not be relieved of making their own independent evaluation of the rippability of the on-site materials prior to submitting their bids.

5. DATA ANALYSIS

The collected data were processed using SIPwin (Rimrock Geophysics, 2003), a seismic interpretation program, and analyzed using SeisOpt Pro (Optim, 2008). SeisOpt Pro uses first arrival picks and elevation data to produce subsurface velocity models through a nonlinear optimization technique called adaptive simulated annealing. The resulting velocity model provides a tomography image of the estimated geologic conditions. Both vertical and lateral velocity information is contained in the tomography model. Changes in layer velocity are revealed as gradients rather than discrete contacts, which typically are more representative of actual conditions.

6. RESULTS AND CONCLUSIONS

As previously indicated, seismic traverses were performed at 18 preselected areas as part of our study. Figures 4a through 4r present the velocity models generated from our analysis with shot point locations at each seismic line represented by red triangles. The results from our seismic study revealed distinct layers/zones in the near-surface that likely represent soil overlying bedrock with varying degrees of weathering. Distinct vertical and lateral velocity variations are evident in the models. These inhomogeneities are likely related to the possible presence of intrusions, and/or differential weathering of the bedrock materials. It is also evident in the tomography models that the depth to bedrock, while varied in degrees of weathering, was fairly shallow in some of the study areas.

Based on the refraction results, variability in the excavatability (including depth of rippability) of the subsurface materials may be expected across the project area. Furthermore, blasting may be required depending on the excavation, depth, location, equipment used, and desired rate of production. In addition, oversized materials should be expected. A contractor with excavation experience in similarly difficult conditions should be consulted for expert advice on excavation methodology, equipment, and production rate.

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluations will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Atlas should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

8. SELECTED REFERENCES

Caterpillar, Inc., 2018, Caterpillar Performance Handbook, Edition 48, Caterpillar, Inc., Peoria, Illinois.

Mooney, H.M., 1976, Handbook of Engineering Geophysics, dated February.

Optim, Inc., 2008, SeisOpt Pro, V-5.0.

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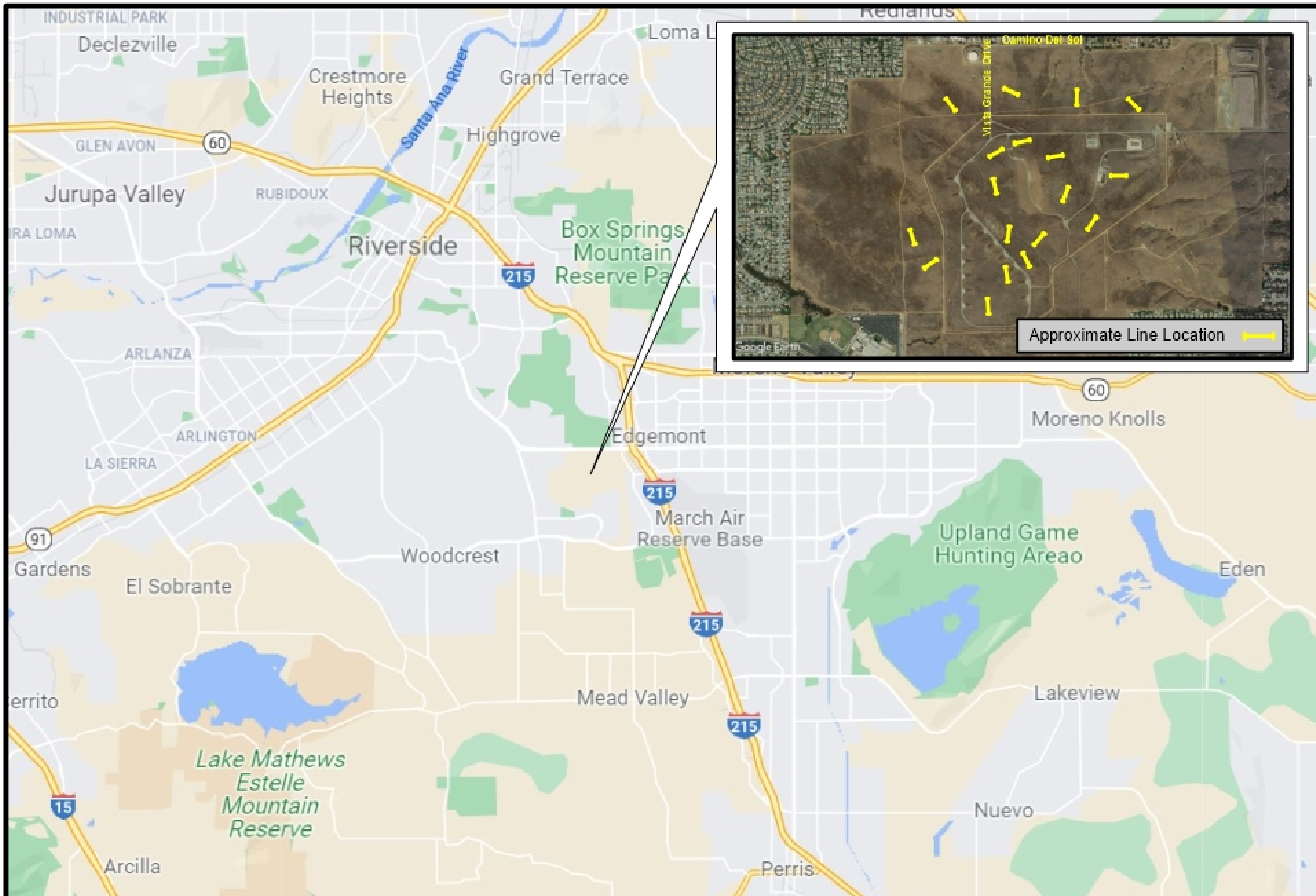
Telford, W.M., Geldart, L.P., Sheriff, R.E., and Keys, D.A., 1976, Applied Geophysics, Cambridge University Press.

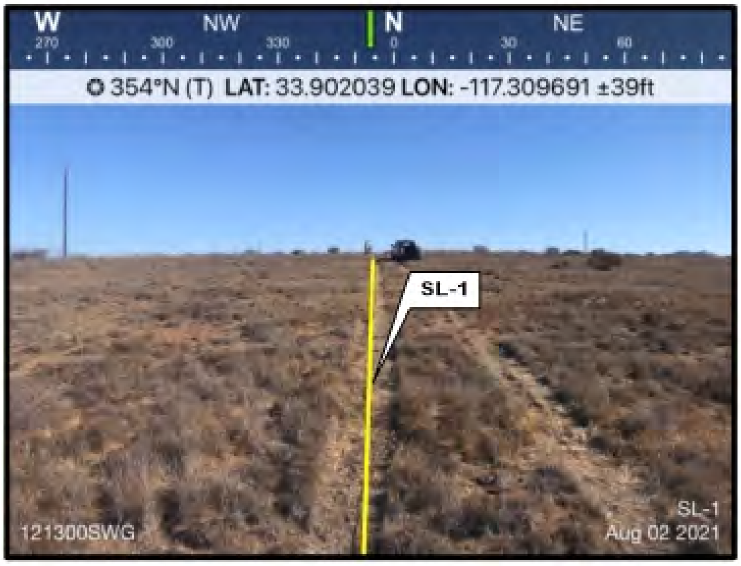


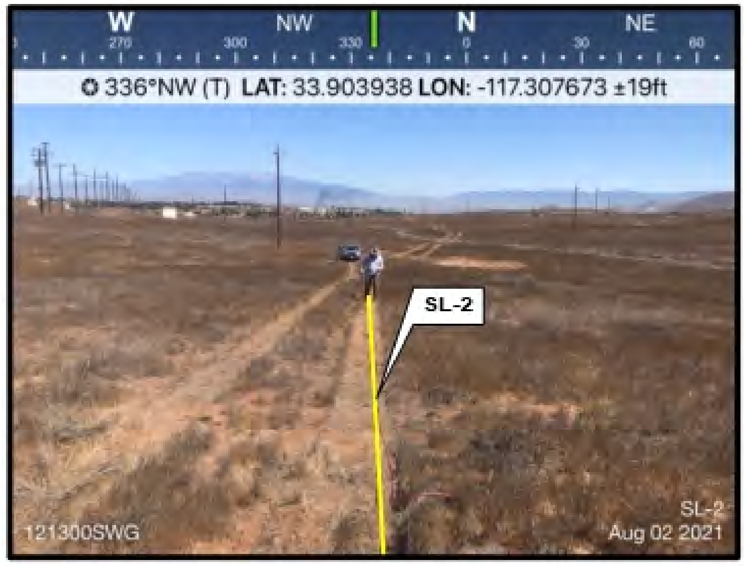
SITE LOCATION MAP	N	Meridian Upper Plateau Riverside, California	ATLAS Figure 1
		Project No.: 121300SWG Date: 09/21	

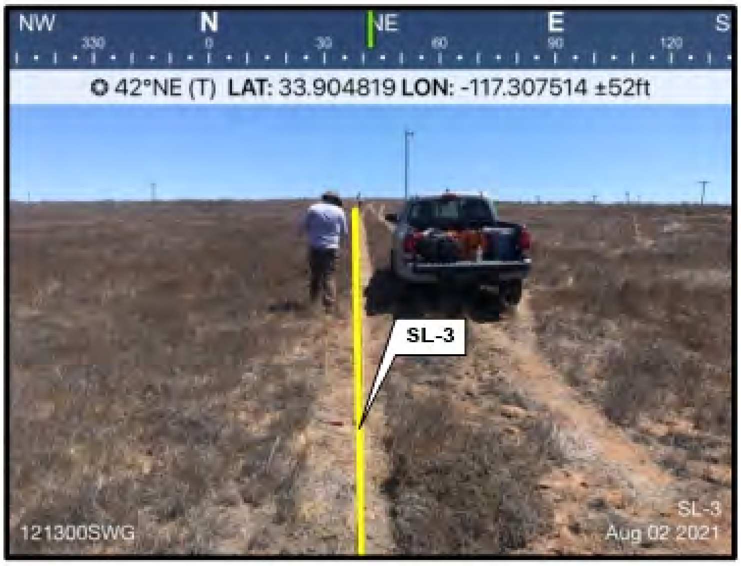
LINE LOCATION MAP	N	Meridian Upper Plateau Riverside, California Project No.: 121300SWG Date: 09/21	ATLAS Figure 2

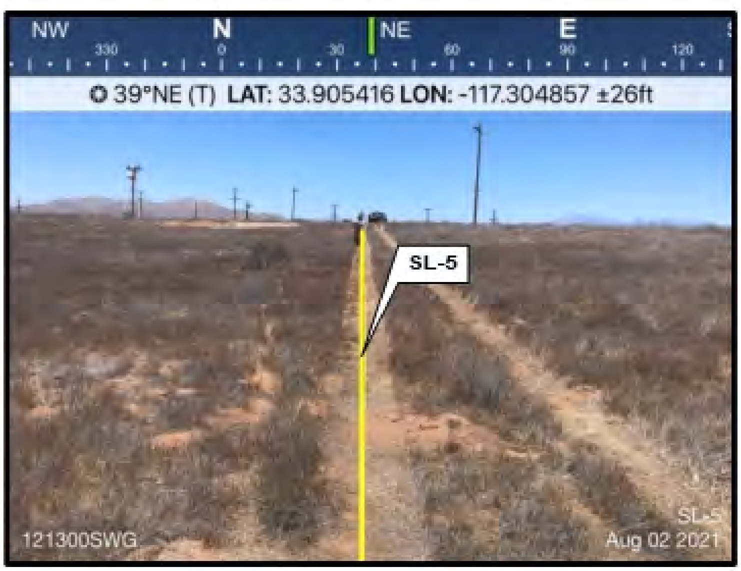
0 500 1000 1500 2000

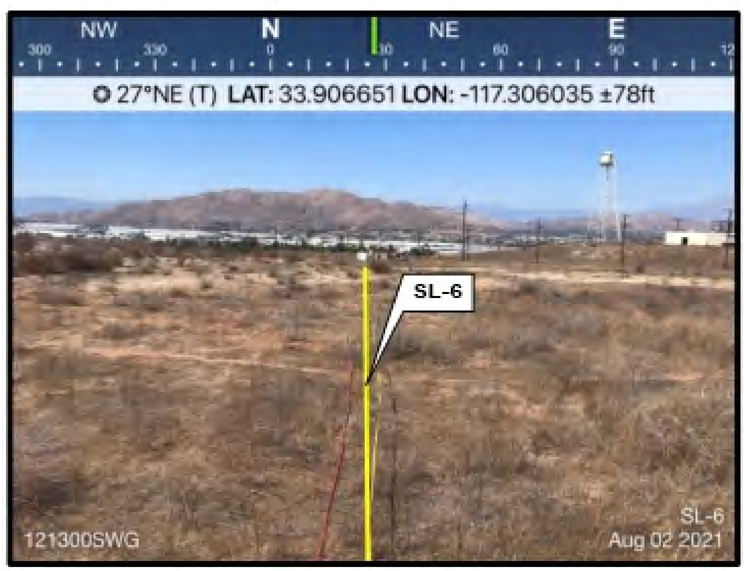
approximate scale in feet



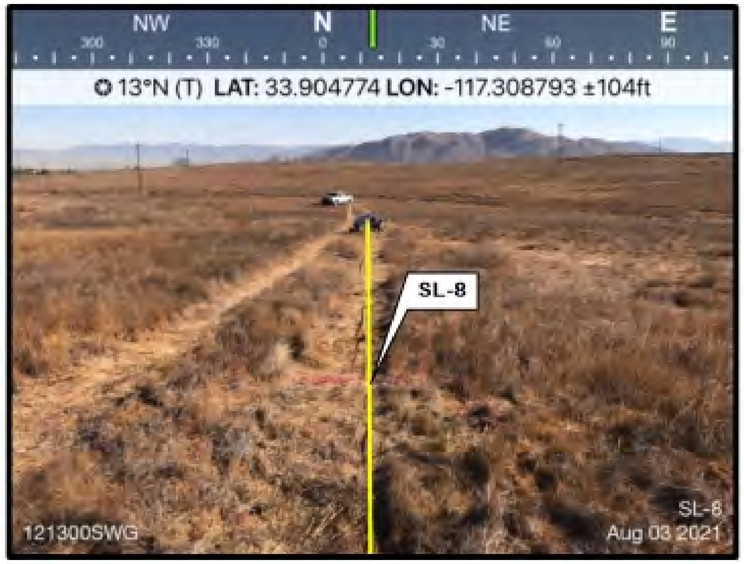


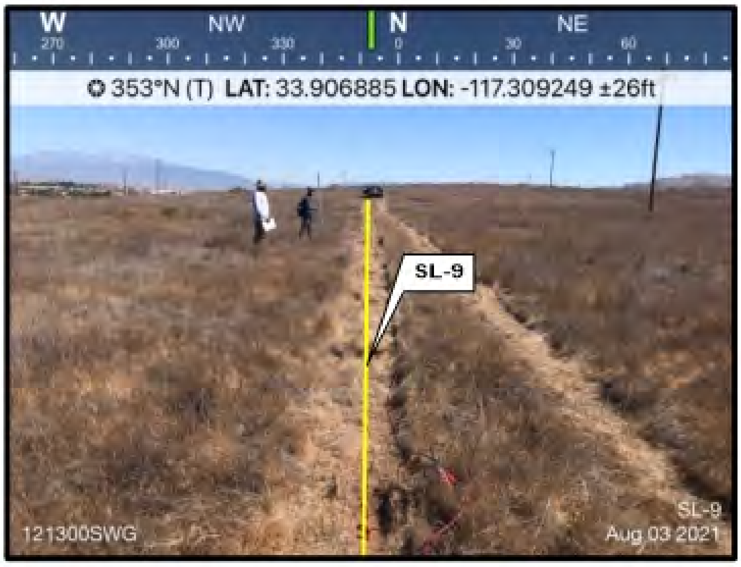


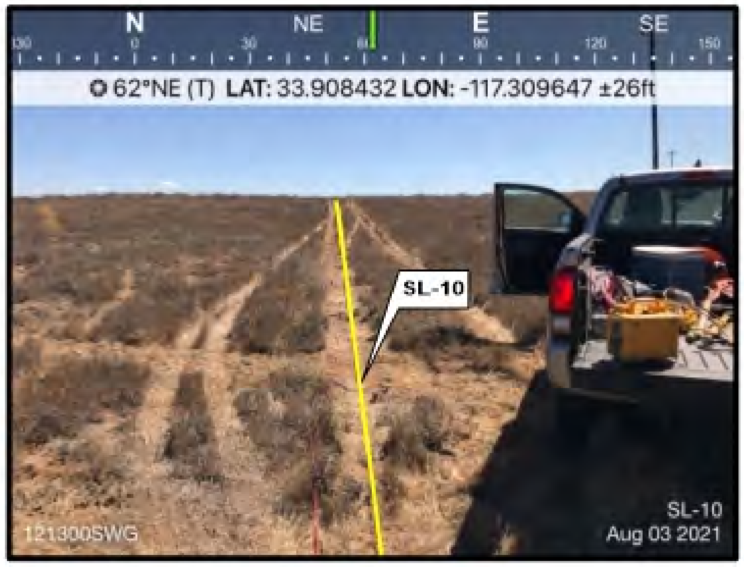




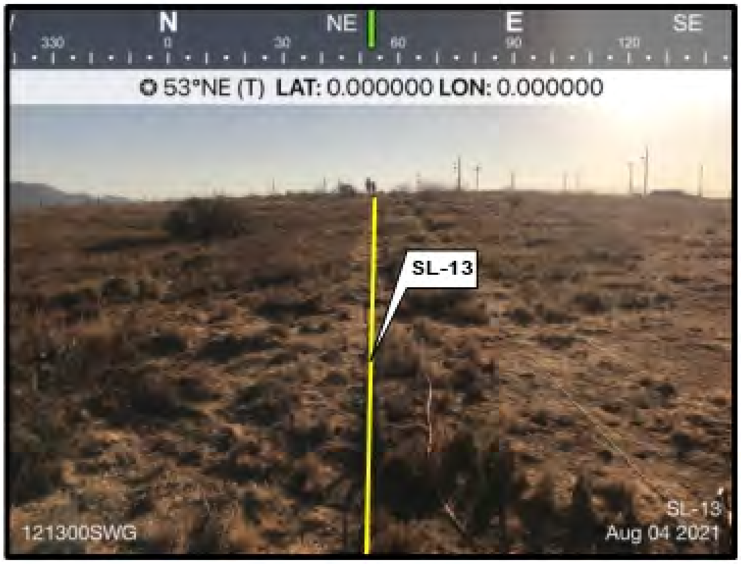
SITE PHOTOGRAPHS (SL-1 through SL-6)	Meridian Upper Plateau Riverside, California		ATLAS Figure 3a
	Project No.: 121300SWG	Date: 09/21	

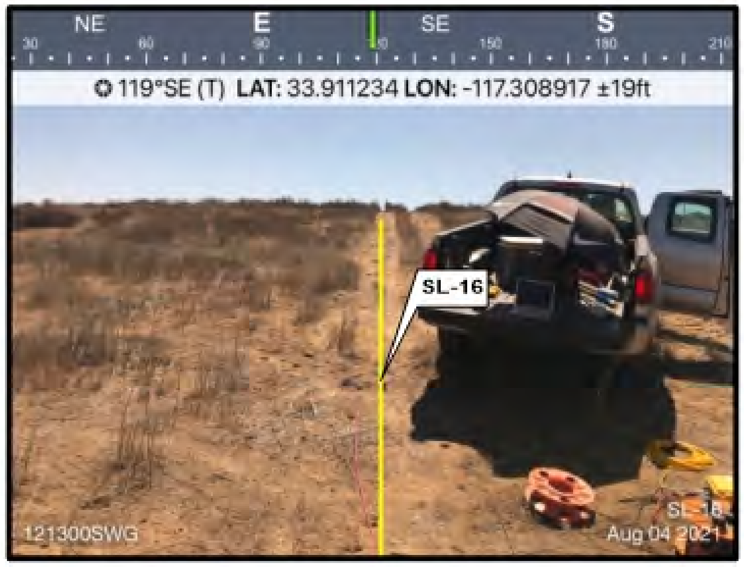


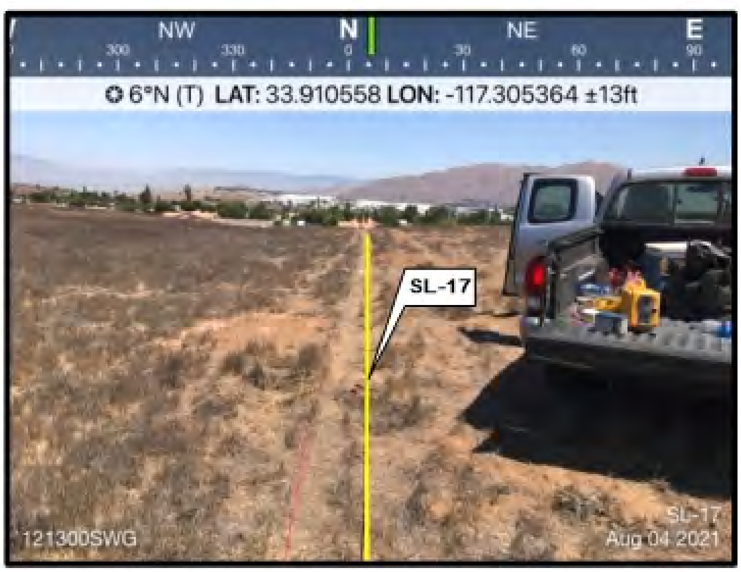


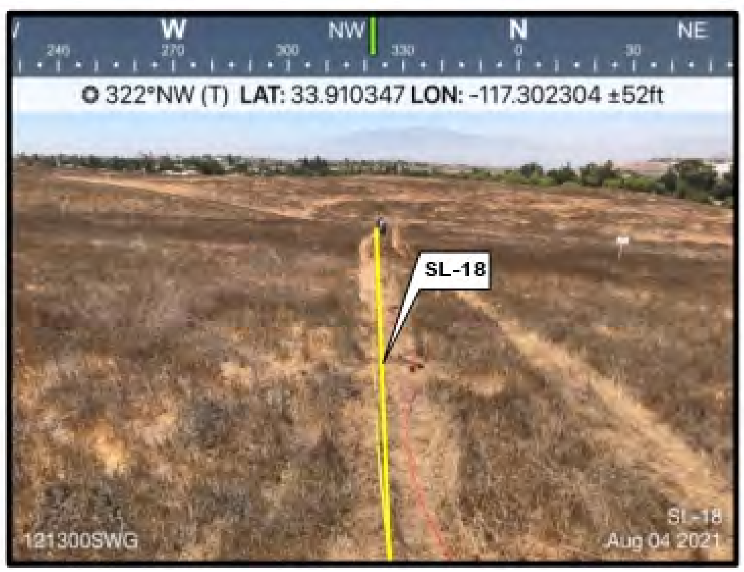


SITE PHOTOGRAPHS (SL-7 through SL-12)	Meridian Upper Plateau Riverside, California	Figure 3b
	Project No.: 121300SWG — Date: 09/21	





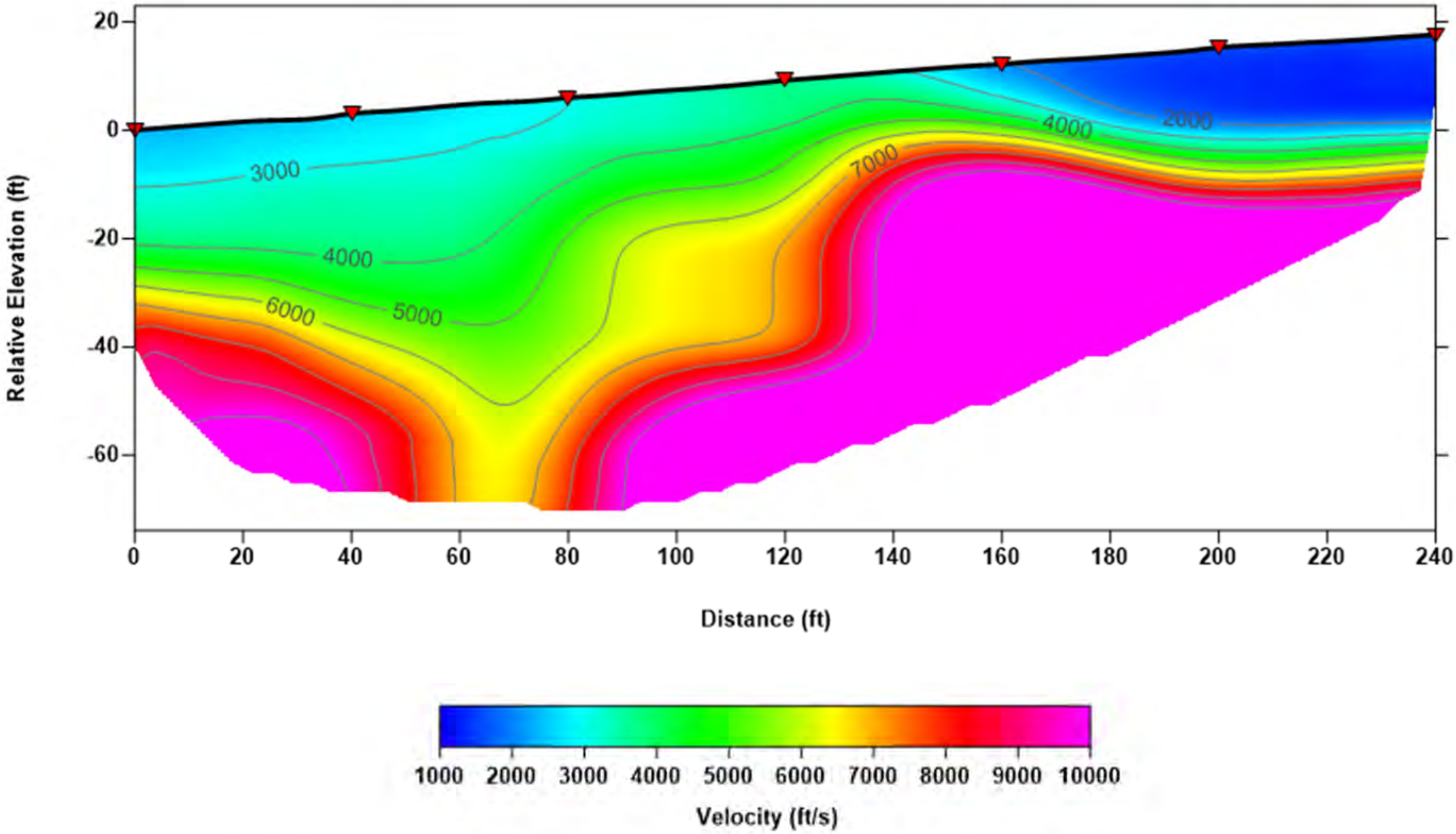




SITE PHOTOGRAPHS (SL-13 through SL-18)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 3c

TOMOGRAPHY MODEL

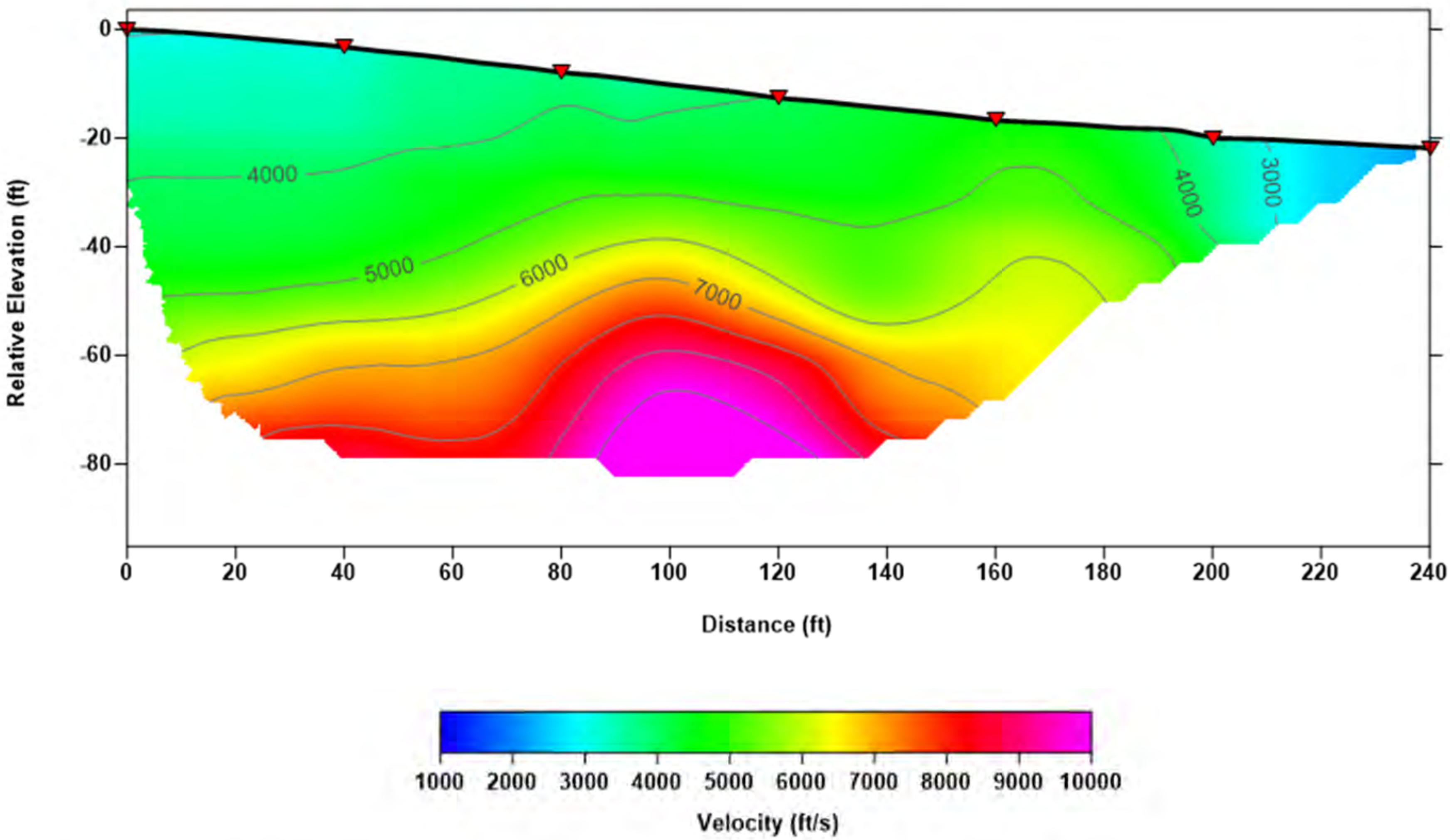
SL-1



P-WAVE PROFILE (SL-1)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4a	Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

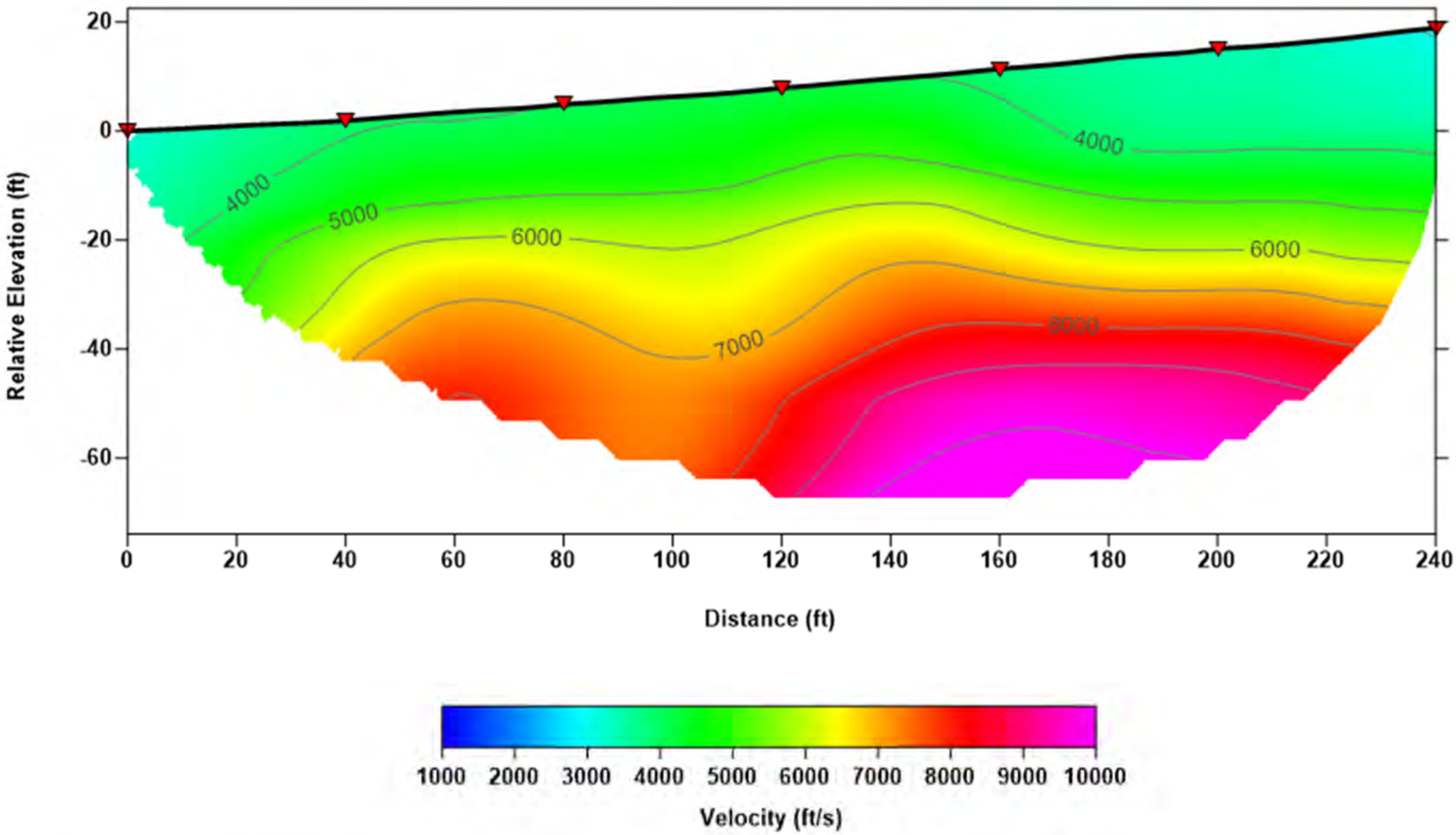
SL-2



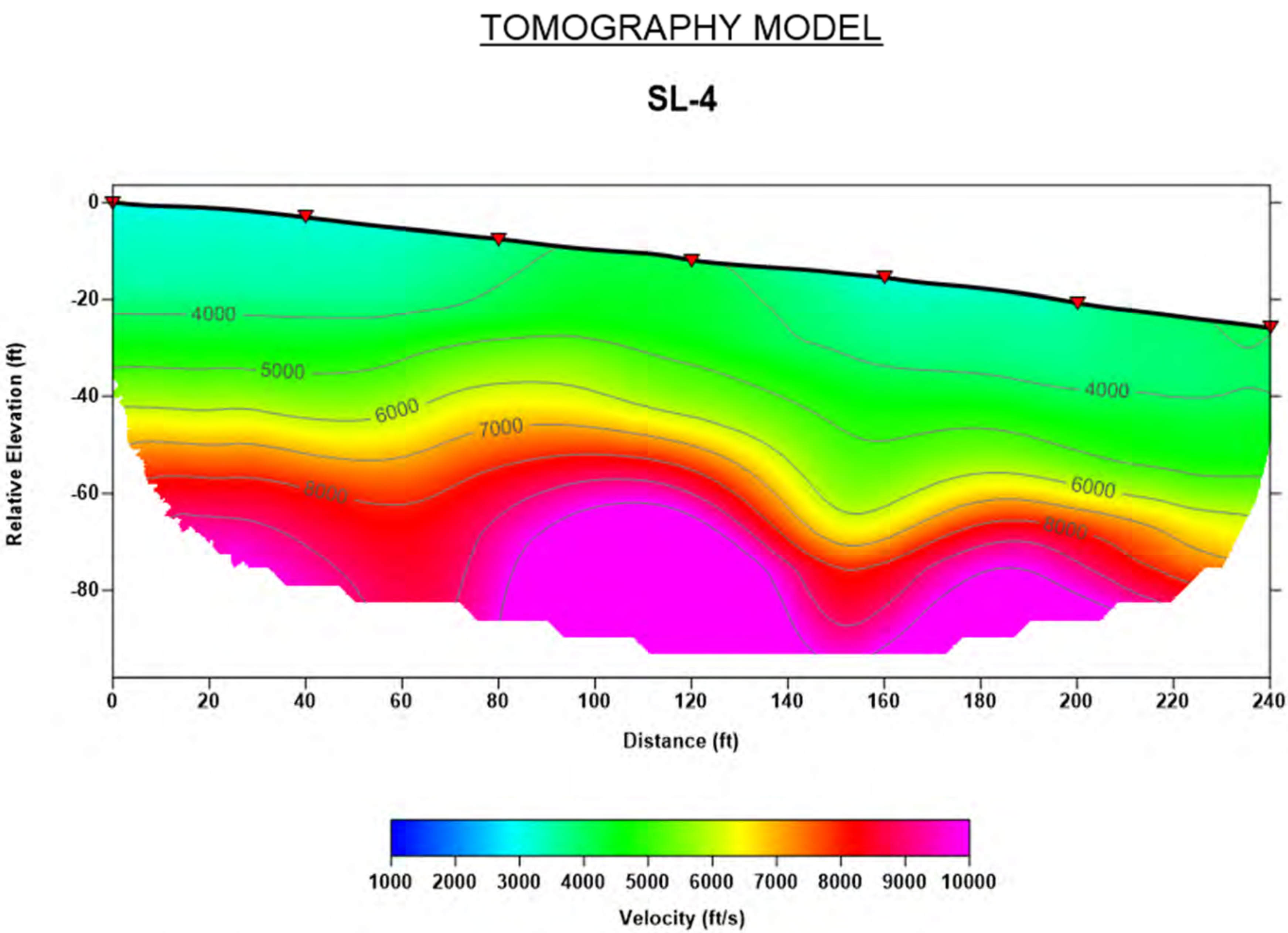
P-WAVE PROFILE (SL-2)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG Date: 08/21	ATLAS Figure 4b	**Note: Contour Interval = 1,000 feet per second**

TOMOGRAPHY MODEL

SL-3



P-WAVE PROFILE (SL-3)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4c	**Note: Contour Interval = 1,000 feet per second**

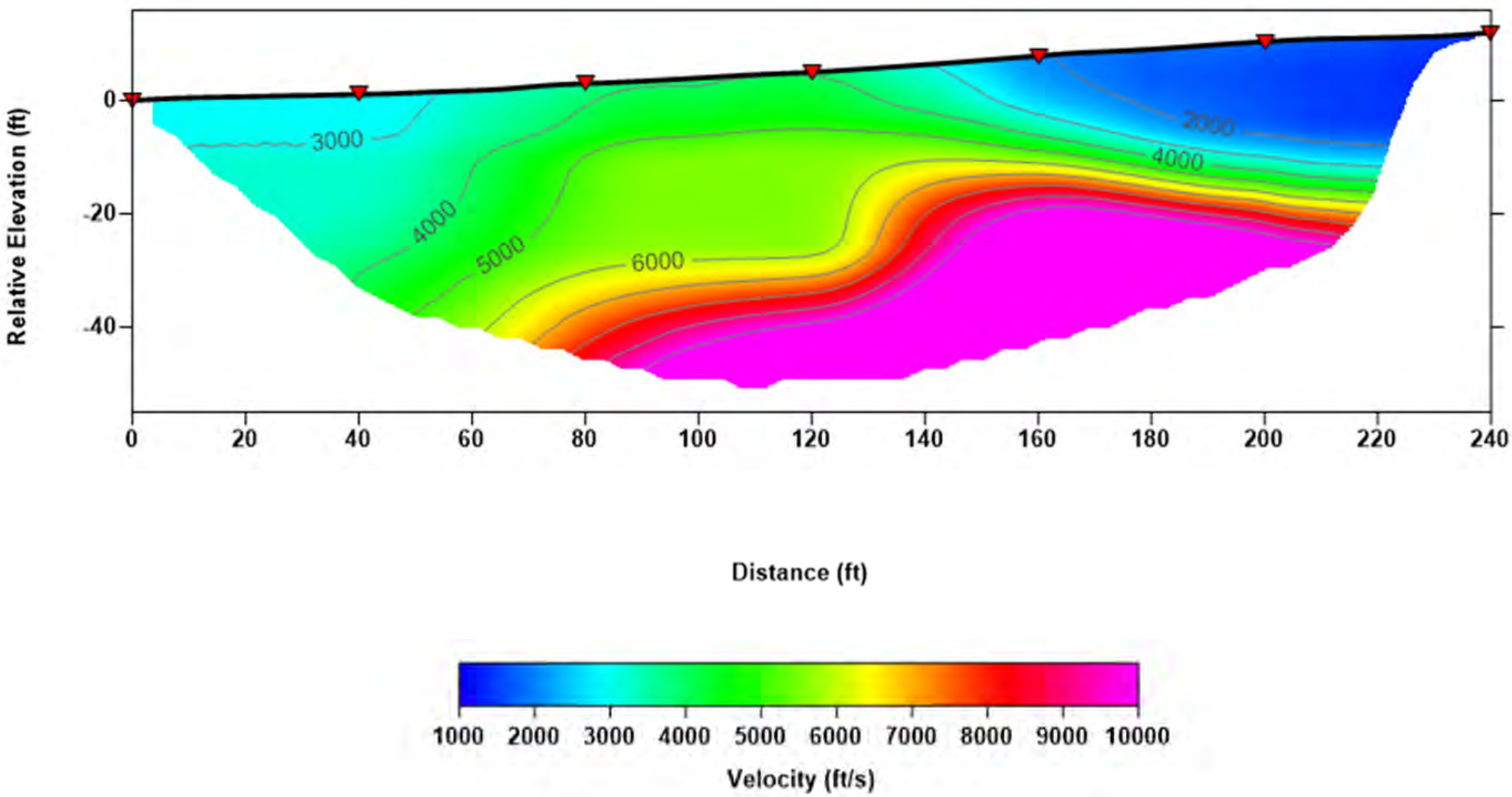


P-WAVE PROFILE (SL-4)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4d

Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

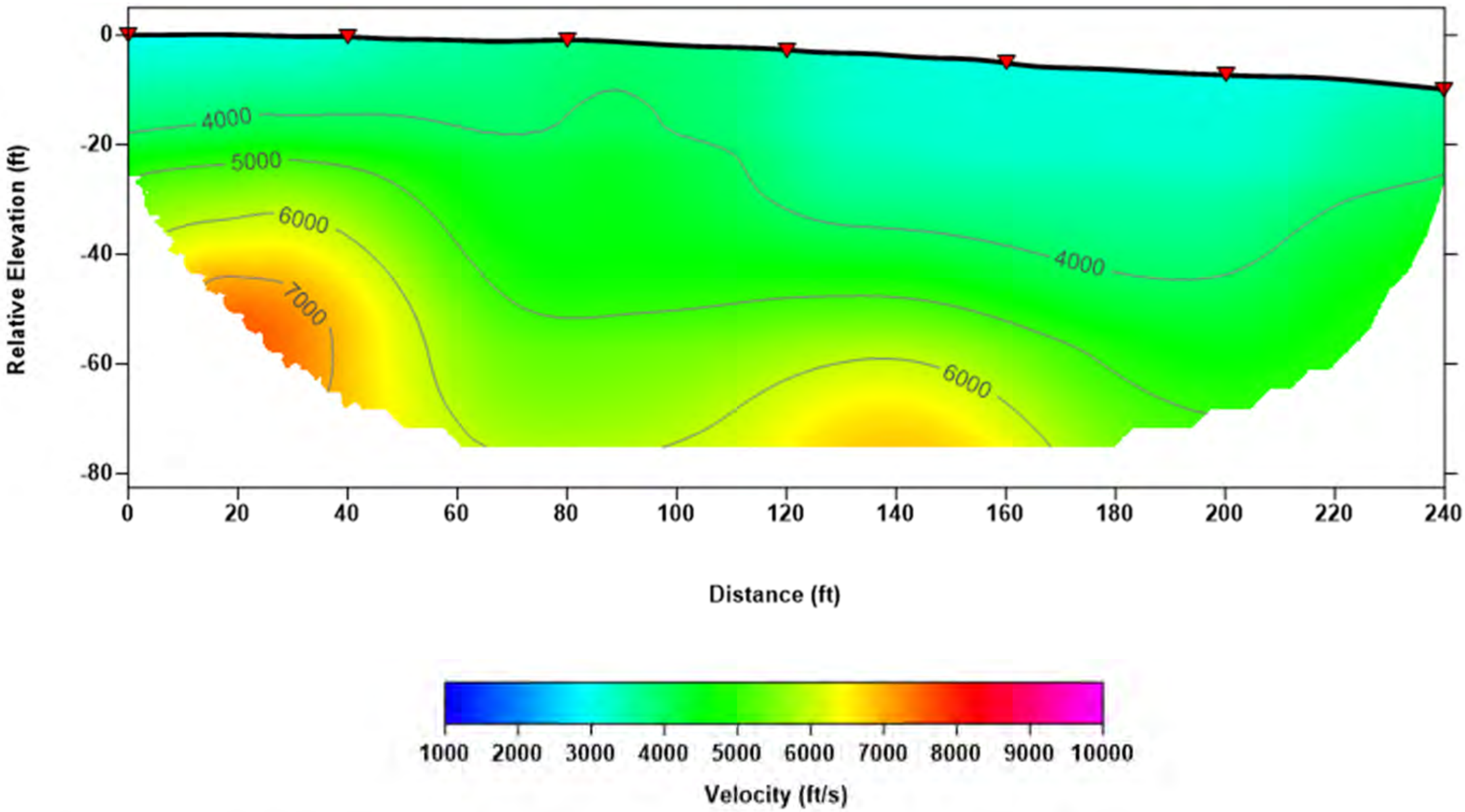
SL-5



P-WAVE PROFILE (SL-5)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG / Date: 09/21	ATLAS Figure 4e	**Note: Contour Interval = 1,000 feet per second**

TOMOGRAPHY MODEL

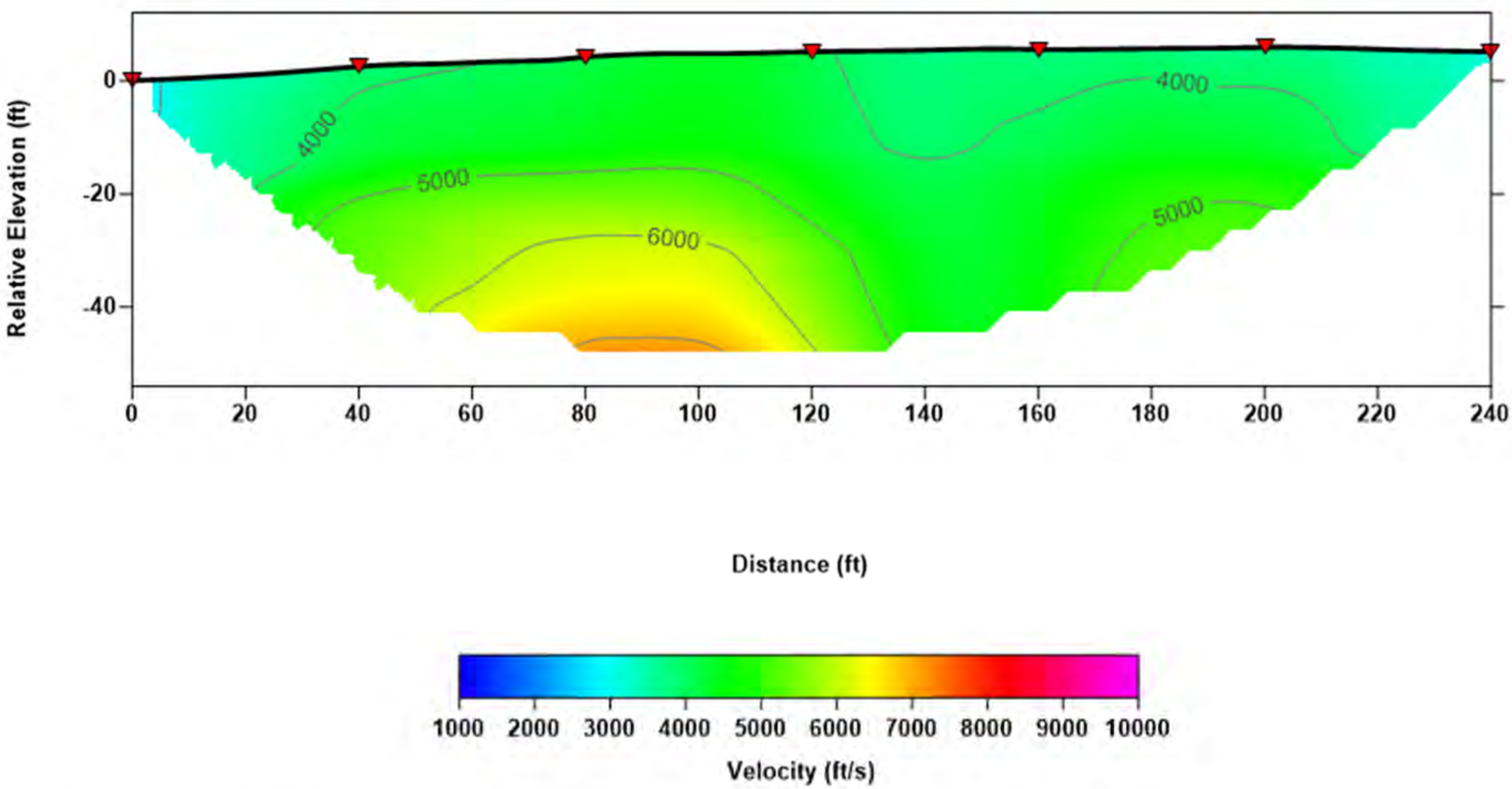
SL-6



P-WAVE PROFILE (SL-6)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG · Date: 09/21	ATLAS Figure 4f	**Note: Contour Interval = 1,000 feet per second**

TOMOGRAPHY MODEL

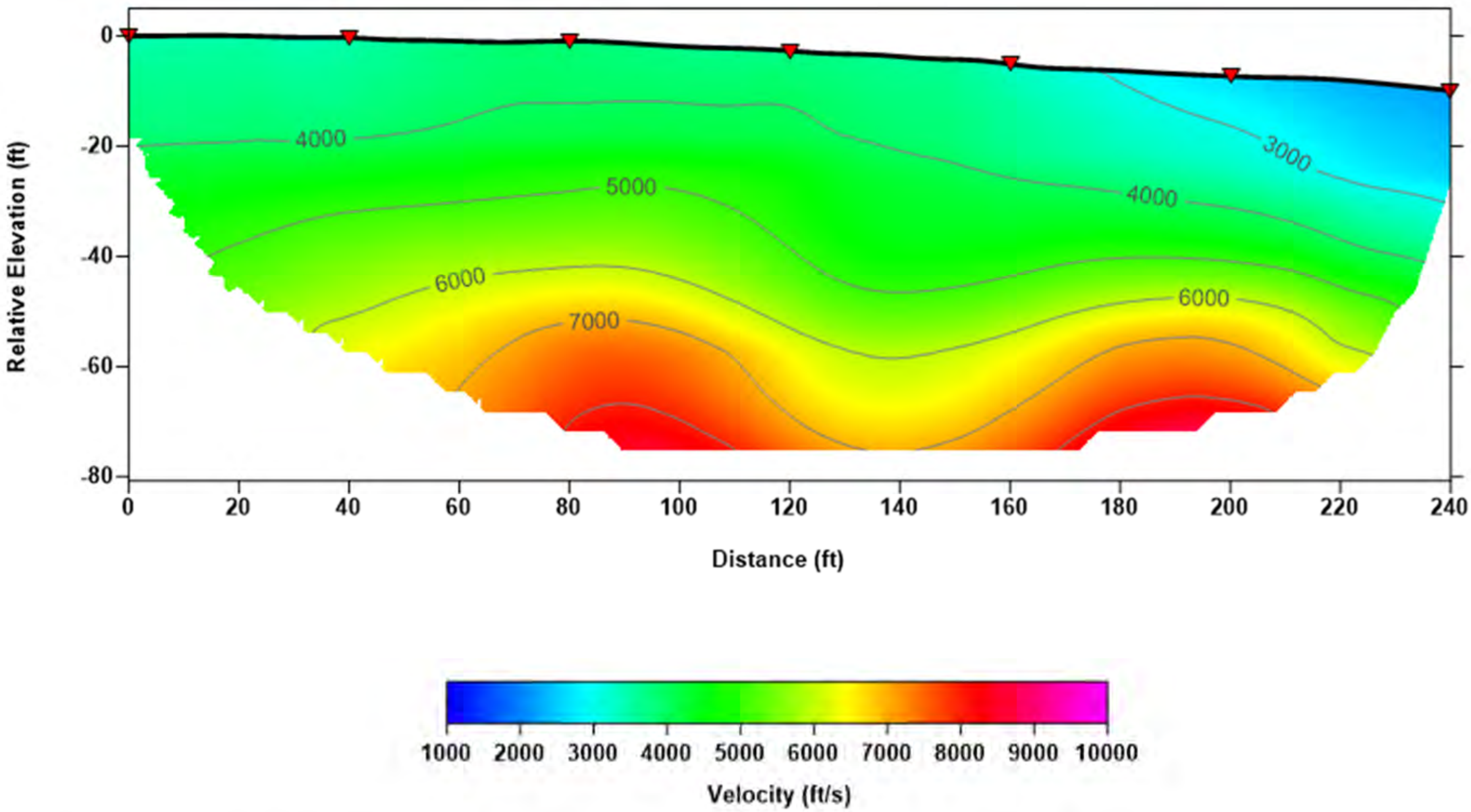
SL-7



P-WAVE PROFILE (SL-7)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG Date: 09/21	ATLAS Figure 4g	**Note: Contour Interval = 1,000 feet per second**

TOMOGRAPHY MODEL

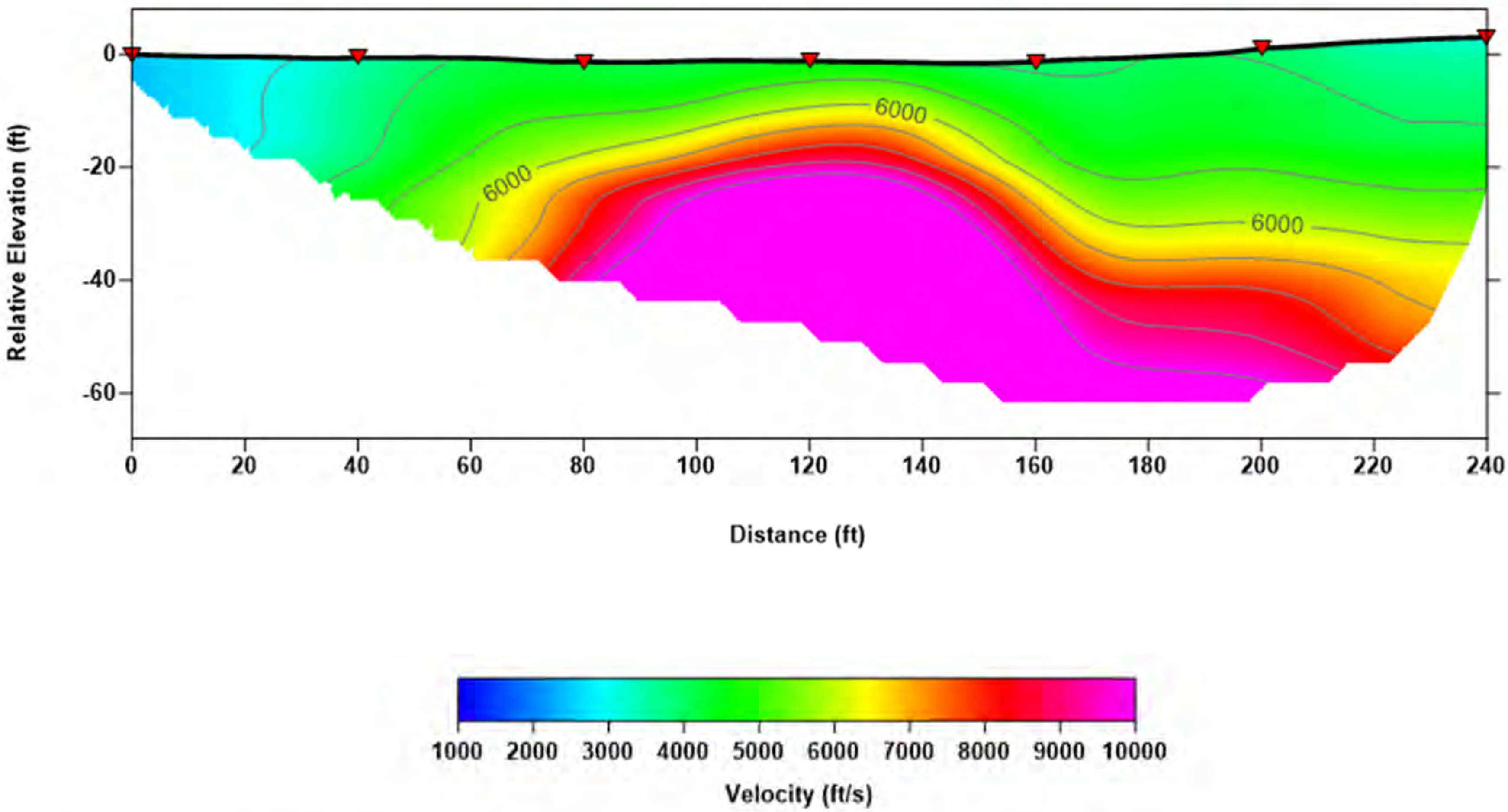
SL-8



P-WAVE PROFILE (SL-8)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG Date: 09/21	ATLAS Figure 4h	Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

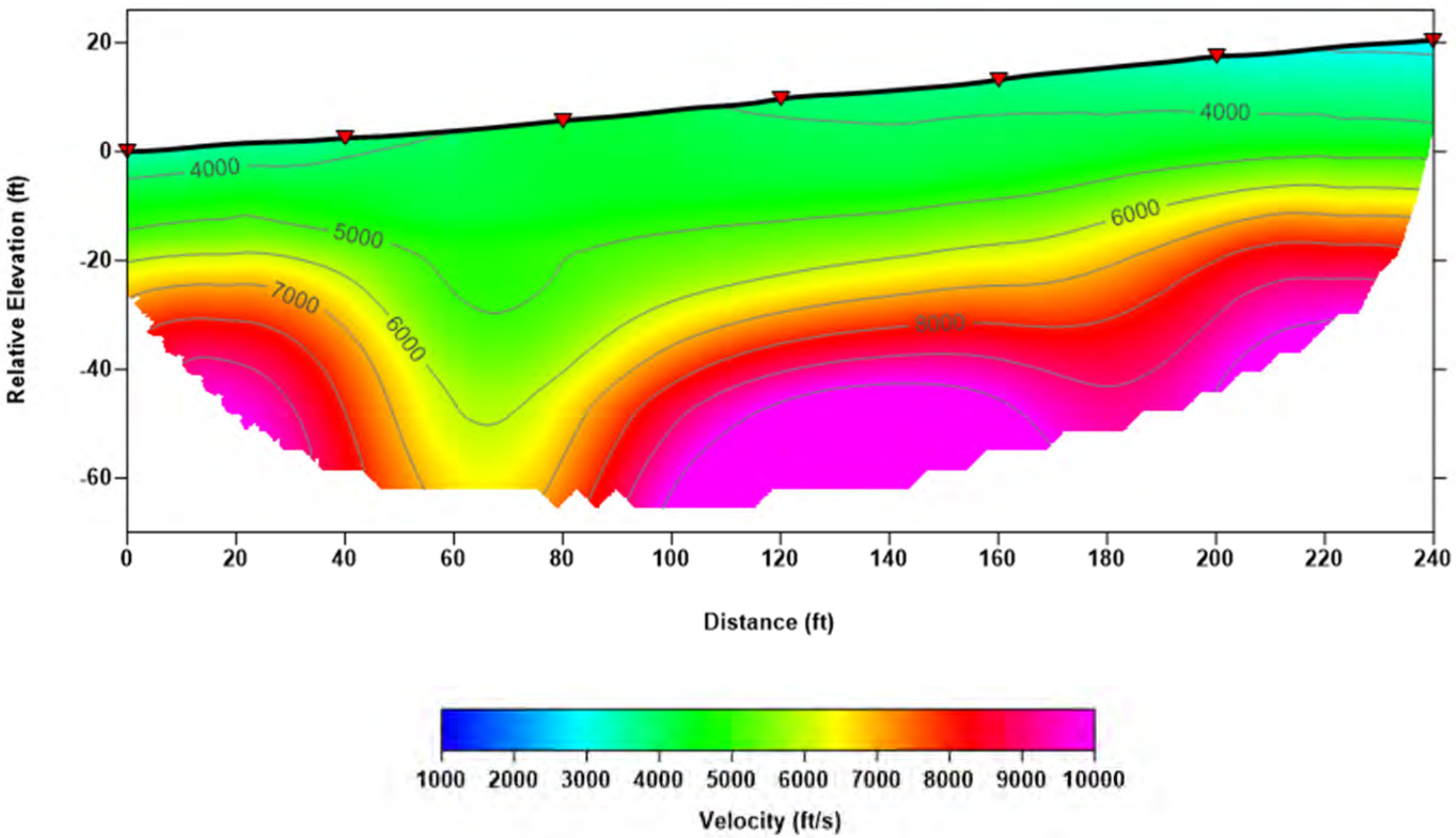
SL-9



P-WAVE PROFILE (SL-9)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4i	**Note: Contour Interval = 1,000 feet per second**

TOMOGRAPHY MODEL

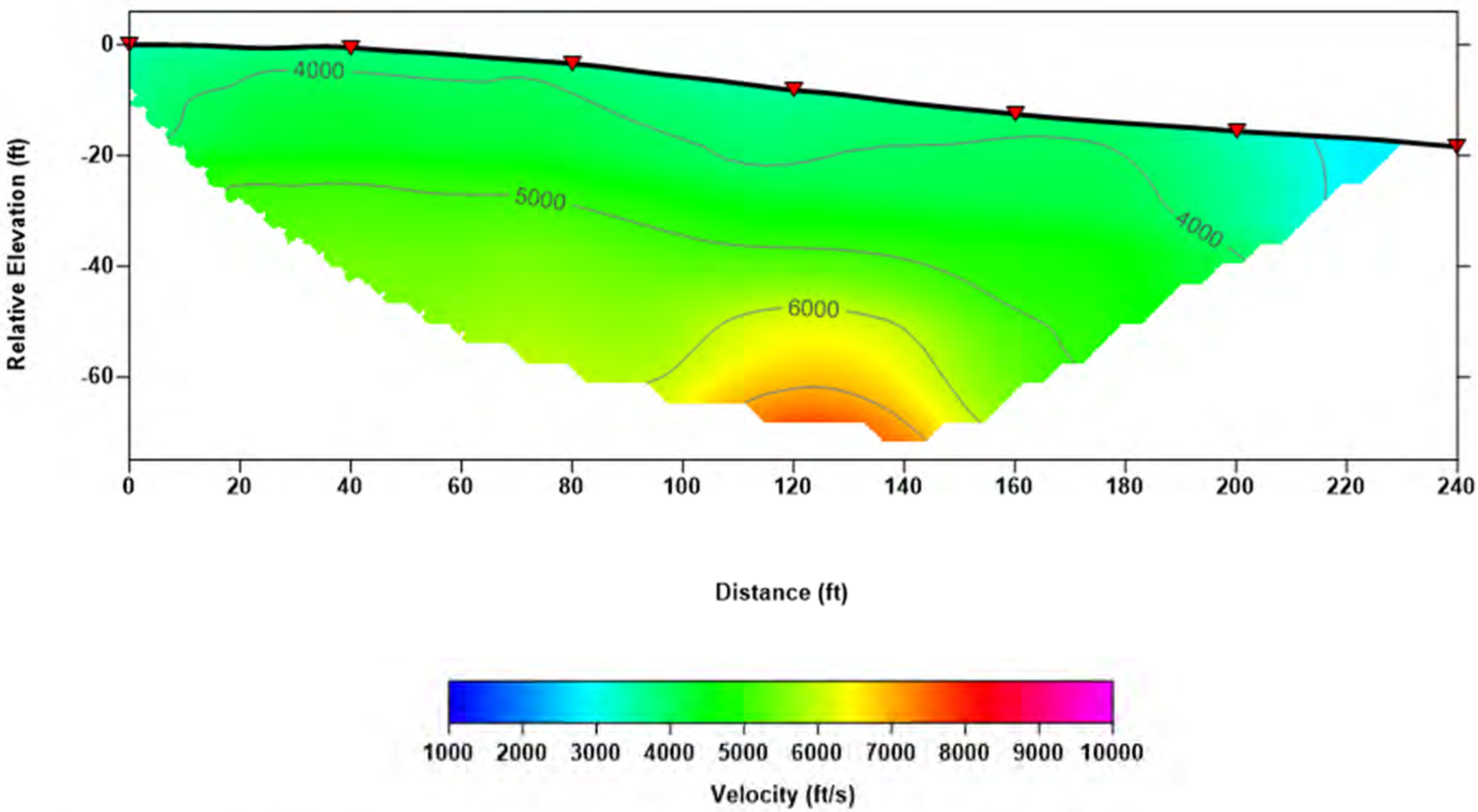
SL-10



P-WAVE PROFILE (SL-10)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4j	Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

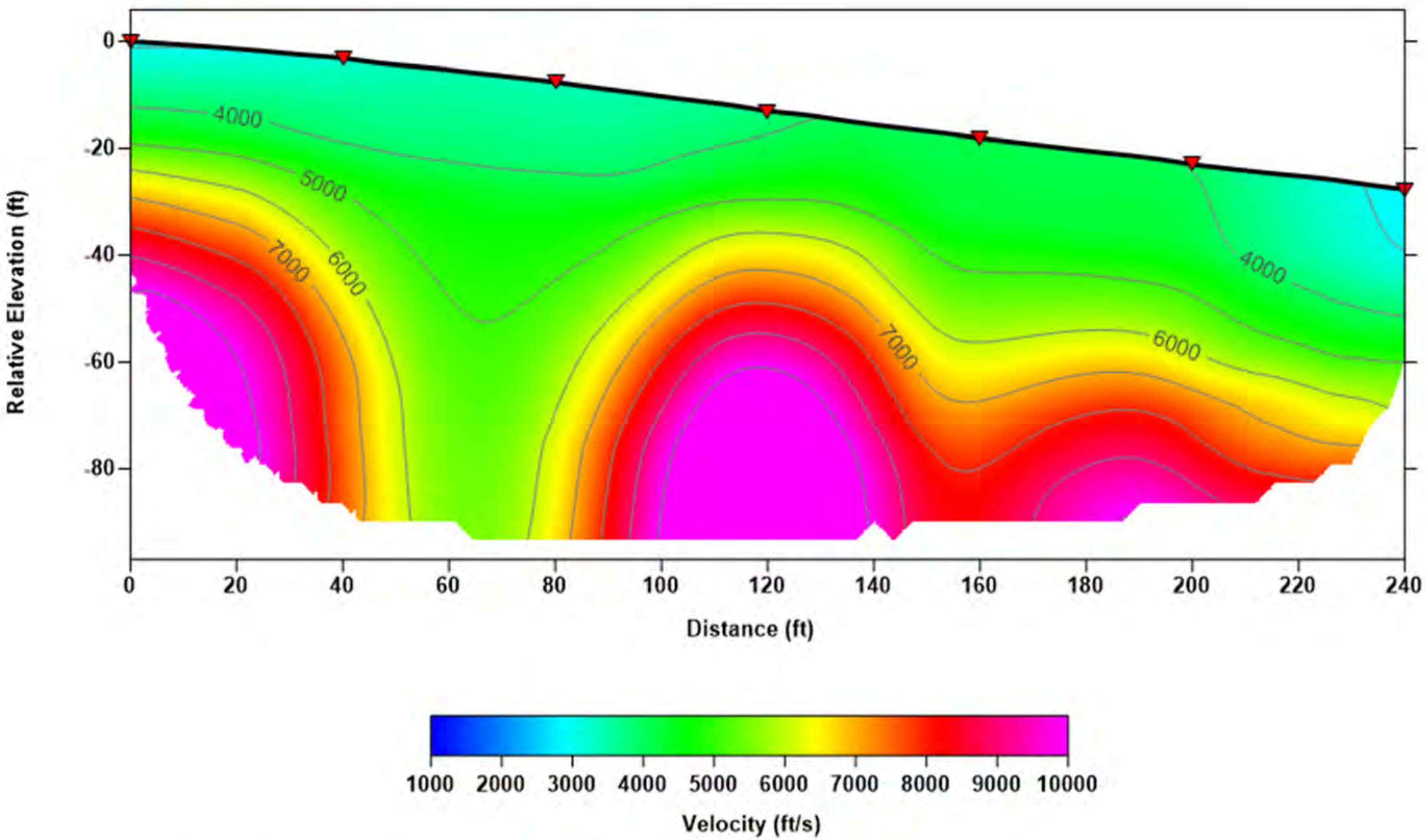
SL-11



P-WAVE PROFILE (SL-11)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4k	Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

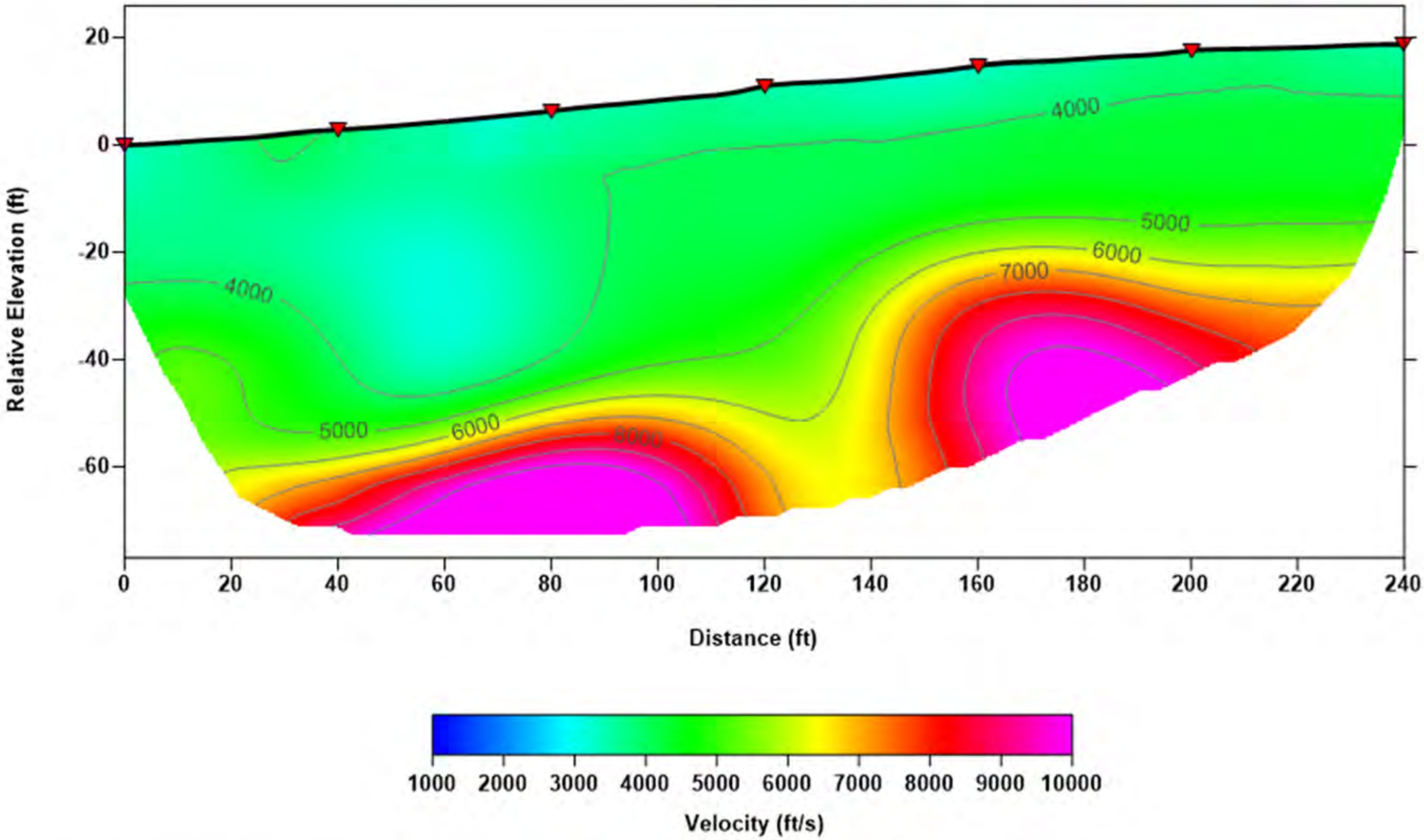
SL-12



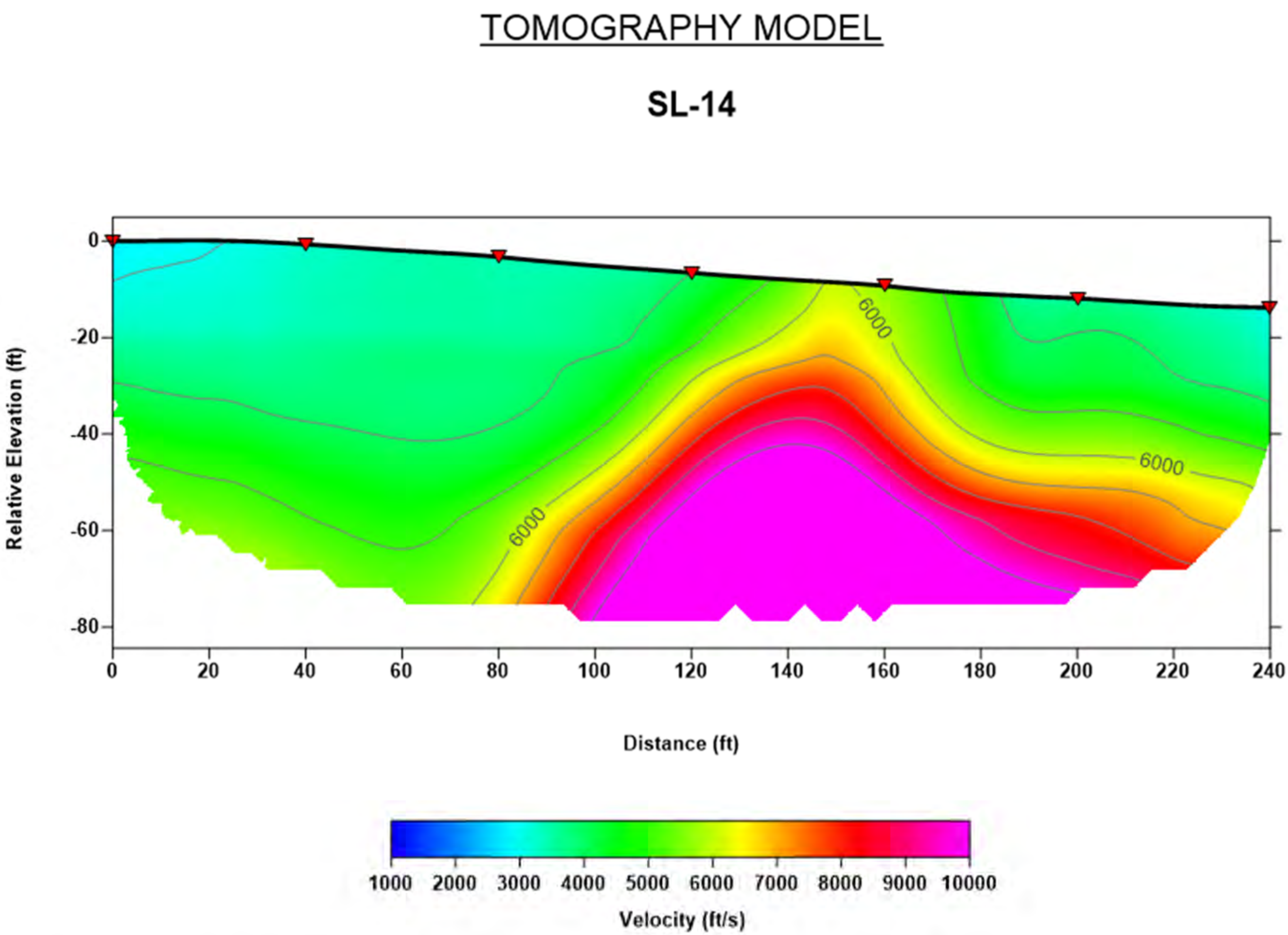
P-WAVE PROFILE (SL-12)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4l	**Note: Contour Interval = 1,000 feet per second**

TOMOGRAPHY MODEL

SL-13



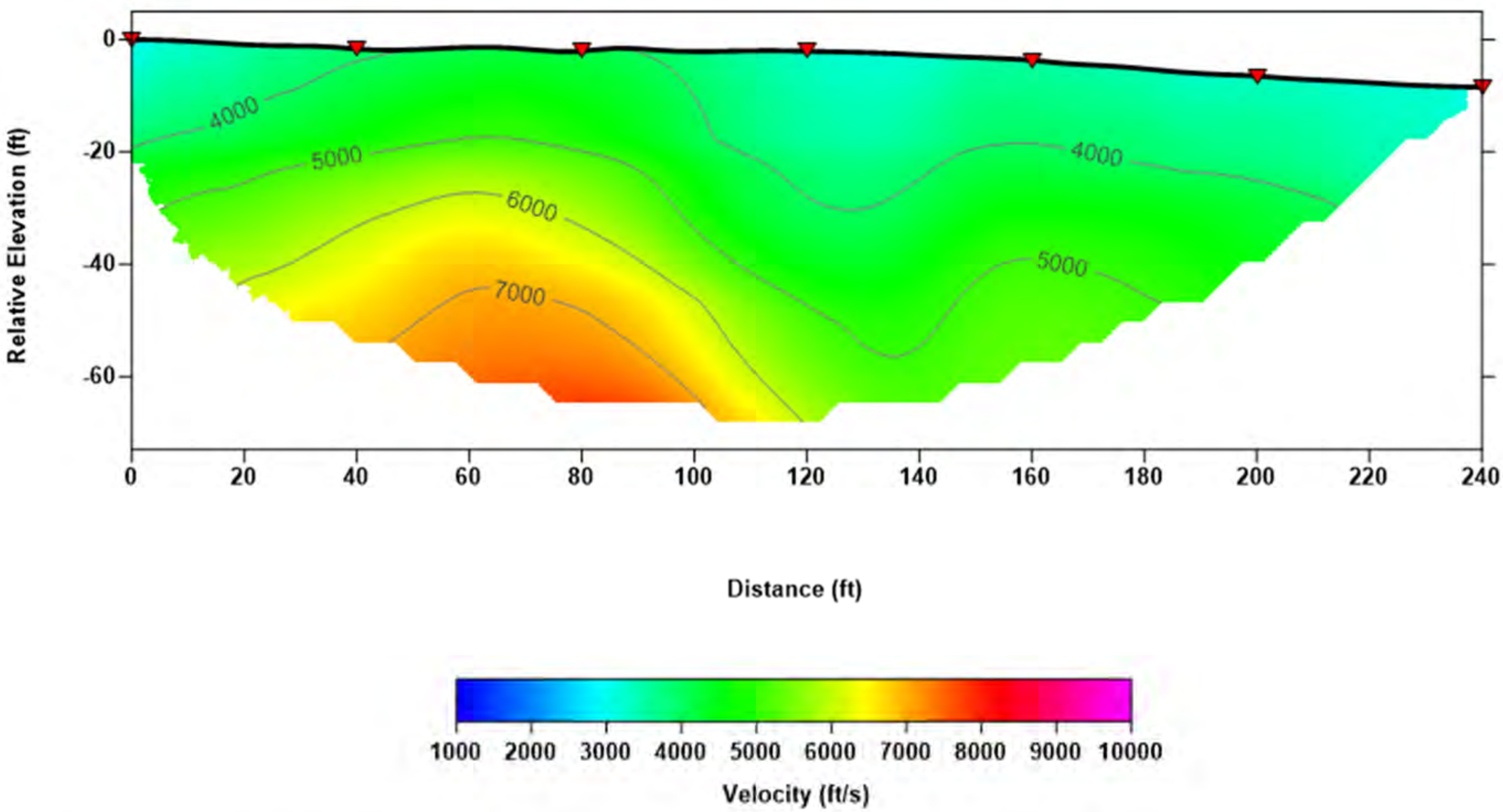
P-WAVE PROFILE (SL-13)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4m	**Note: Contour Interval = 1,000 feet per second**



P-WAVE PROFILE (SL-14)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4n	**Note: Contour Interval = 1,000 feet per second**

TOMOGRAPHY MODEL

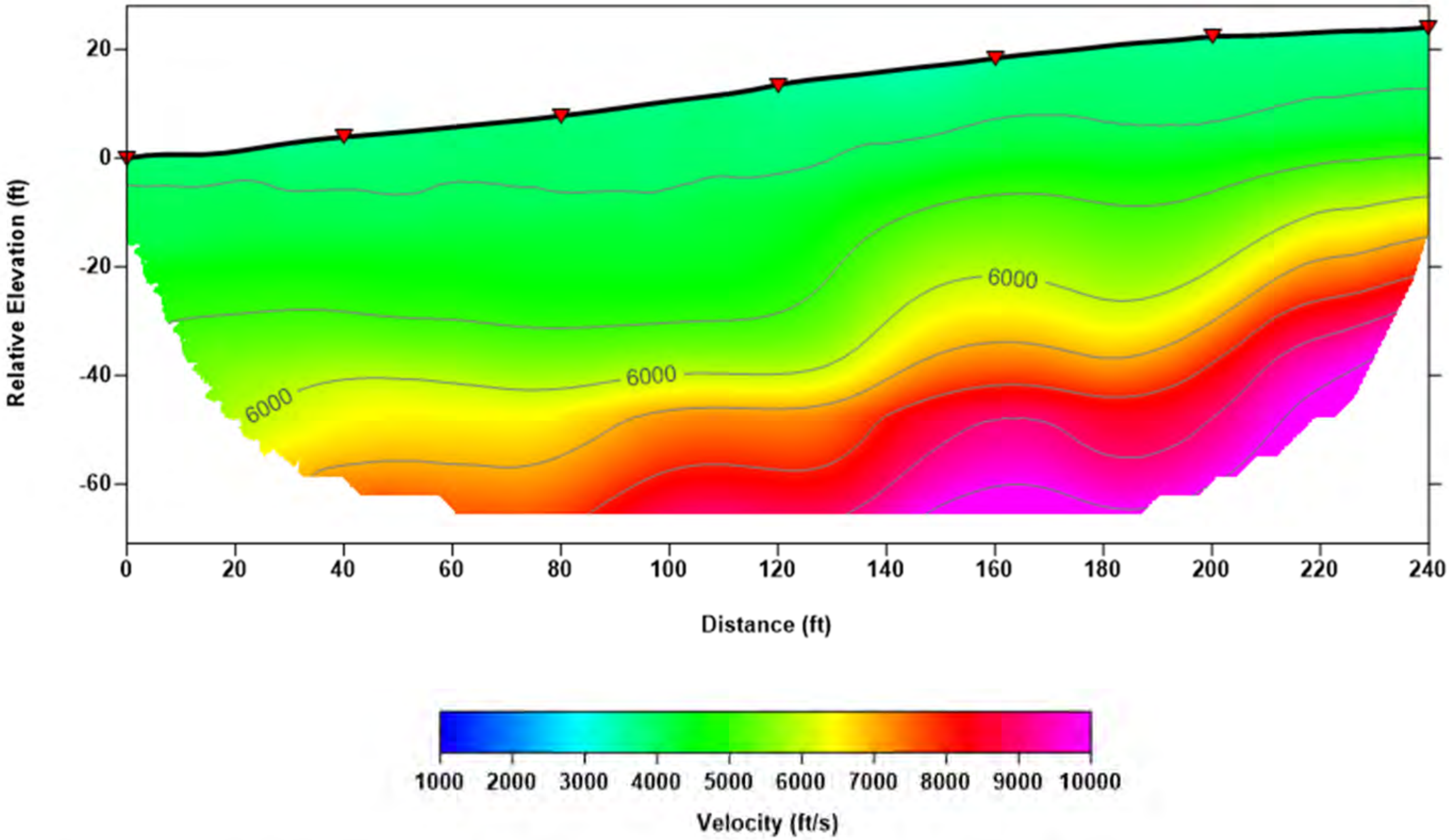
SL-15



P-WAVE PROFILE (SL-15)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4o	**Note: Contour Interval = 1,000 feet per second**

TOMOGRAPHY MODEL

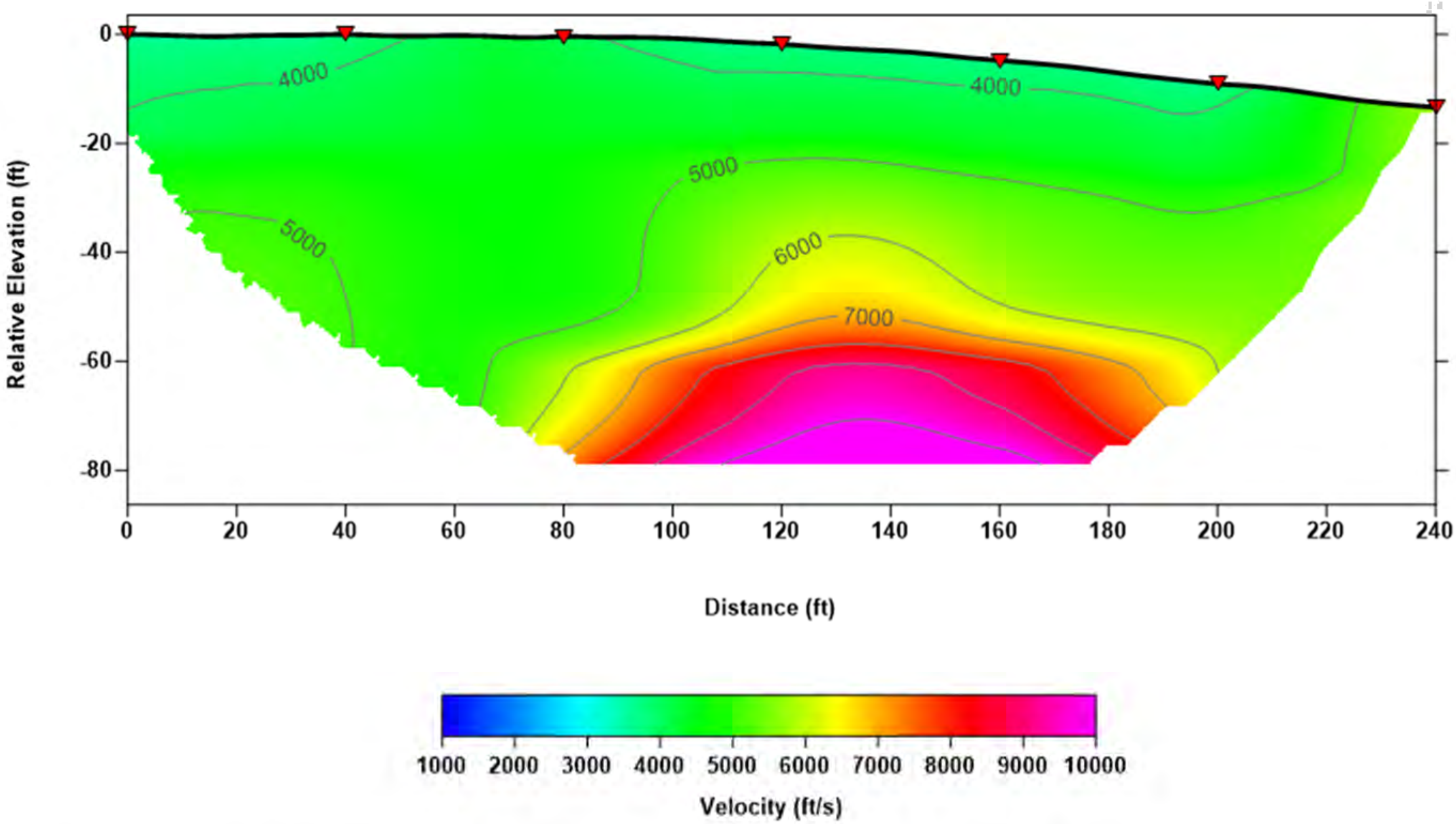
SL-16



P-WAVE PROFILE (SL-16)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4p	**Note: Contour Interval = 1,000 feet per second**

TOMOGRAPHY MODEL

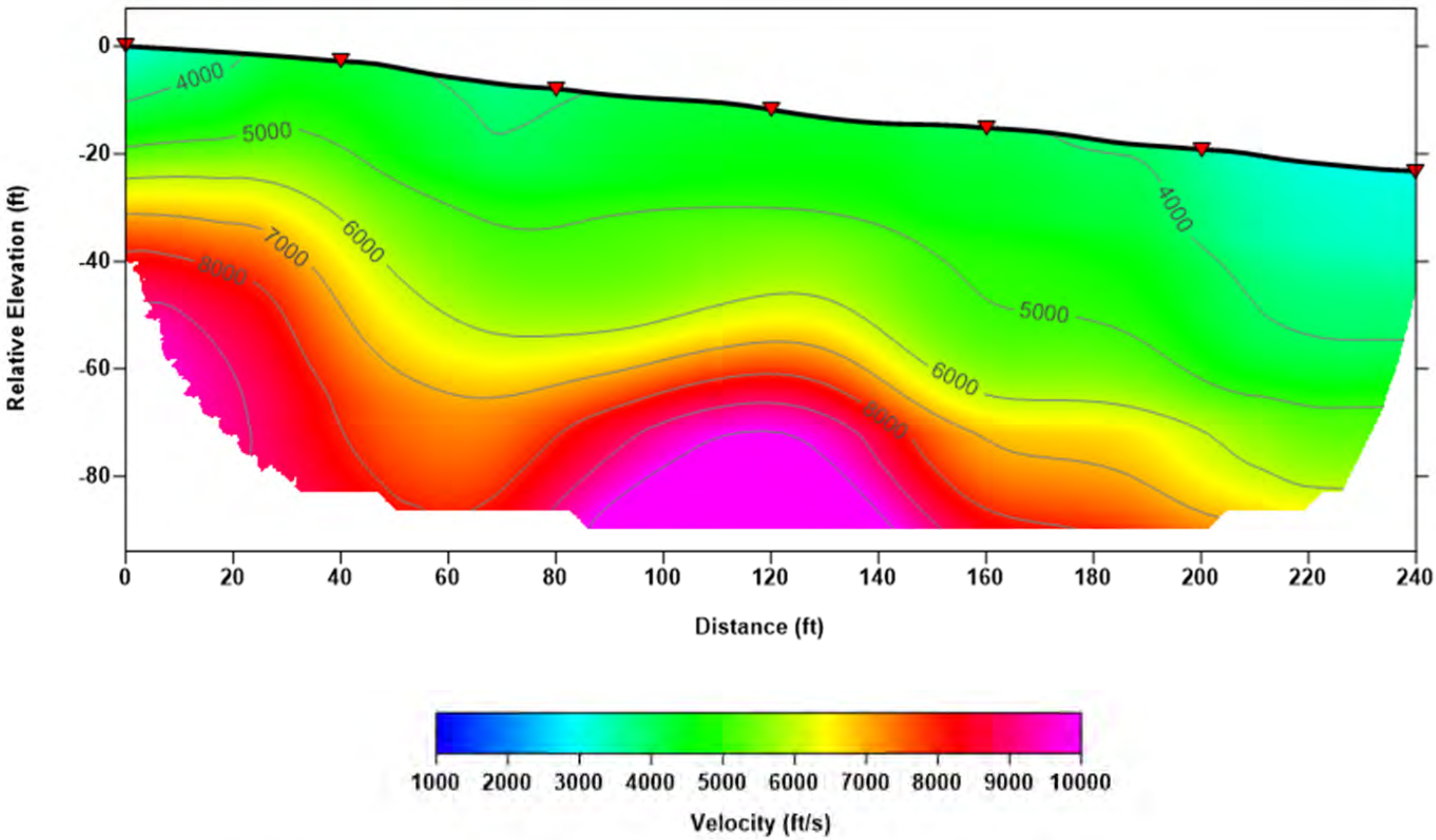
SL-17



P-WAVE PROFILE (SL-17)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG · Date: 09/21	ATLAS Figure 4q	Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

SL-18



P-WAVE PROFILE (SL-18)	Meridian Upper Plateau Riverside, California Project No.: 121300SWG — Date: 09/21	ATLAS Figure 4r	**Note: Contour Interval = 1,000 feet per second**

APPENDIX B

RESULTS OF GEOTECHNICAL LABORATORY TESTS

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Meridian West Upper Plateau GE	Tested By:	F. Mina	Date:	08/30/21
Project No.:	13226.001	Input By:	M. Vinet	Date:	09/01/21
Boring No.:	LB-4	Depth (ft.):	0 - 2.0		
Sample No.:	B-1				
Soil Identification:	Silty, Clayey Sand (SC-SM), Reddish Brown.				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03340

Ram Weight = 10 lb.; Drop = 18 in.

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5575	5649	5668	5589		
Weight of Mold (g)	3546	3546	3546	3546		
Net Weight of Soil (g)	2029	2103	2122	2043		
Wet Weight of Soil + Cont. (g)	1633.2	1522.3	1489.2	1612.2		
Dry Weight of Soil + Cont. (g)	1544.1	1418.7	1368.4	1458.0		
Weight of Container (g)	276.4	278.4	277.1	278.4		
Moisture Content (%)	7.0	9.1	11.1	13.1		
Wet Density (pcf)	133.9	138.8	140.1	134.8		
Dry Density (pcf)	125.1	127.2	126.1	119.3		

Maximum Dry Density (pcf) **127.3** **Optimum Moisture Content (%)** **9.5**

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

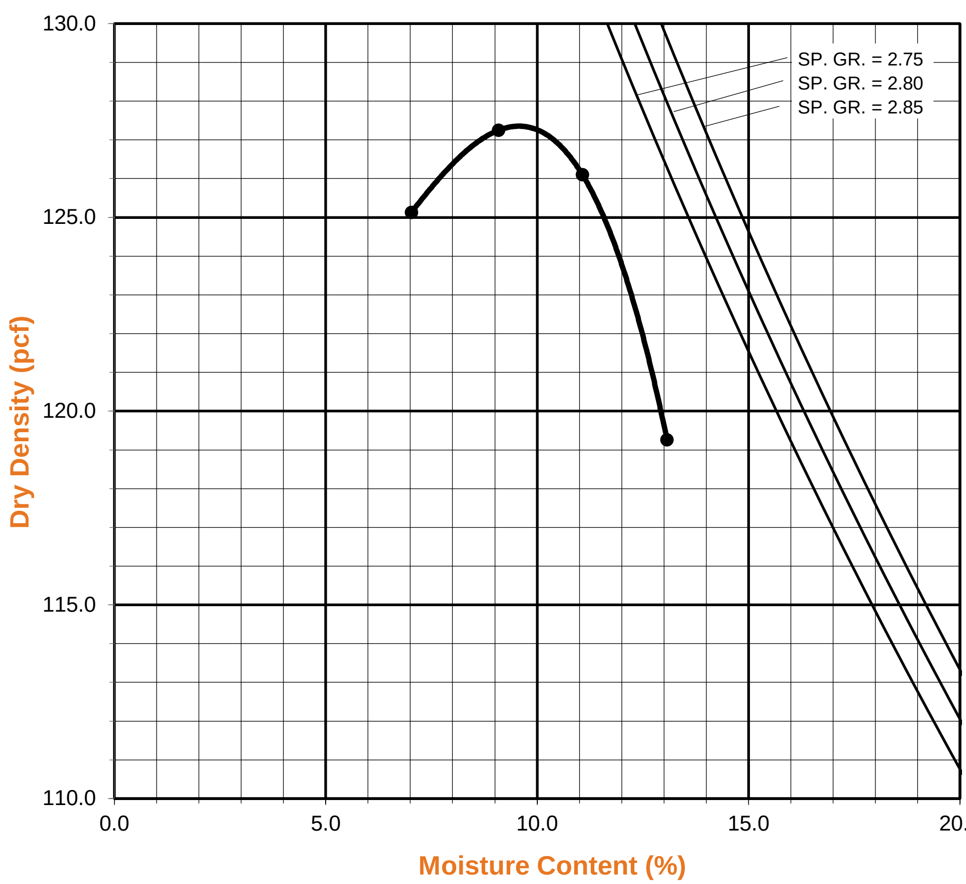
[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
0:55:45
GR:SA:FI

Atterberg Limits:

LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Meridian West Upper Plateau GE	Tested By:	F. Mina	Date:	08/30/21
Project No.:	13226.001	Input By:	M. Vinet	Date:	09/01/21
Boring No.:	TP-8	Depth (ft.):	0 - 3.0		
Sample No.:	B-1				
Soil Identification:	Silty, Clayey Sand (SC-SM), Strong Brown.				

Preparation Method: [X] Moist [ ] Dry — [X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03340 — *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5601	5686	5665			
Weight of Mold (g)	3546	3546	3546			
Net Weight of Soil (g)	2055	2140	2119			
Wet Weight of Soil + Cont. (g)	811.2	720.7	966.2			
Dry Weight of Soil + Cont. (g)	776.0	687.6	897.0			
Weight of Container (g)	277.8	326.3	276.1			
Moisture Content (%)	7.1	9.2	11.1			
Wet Density (pcf)	135.6	141.3	139.9			
Dry Density (pcf)	126.7	129.4	125.8			

Maximum Dry Density (pcf) 129.5 **Optimum Moisture Content (%)** 9.0

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

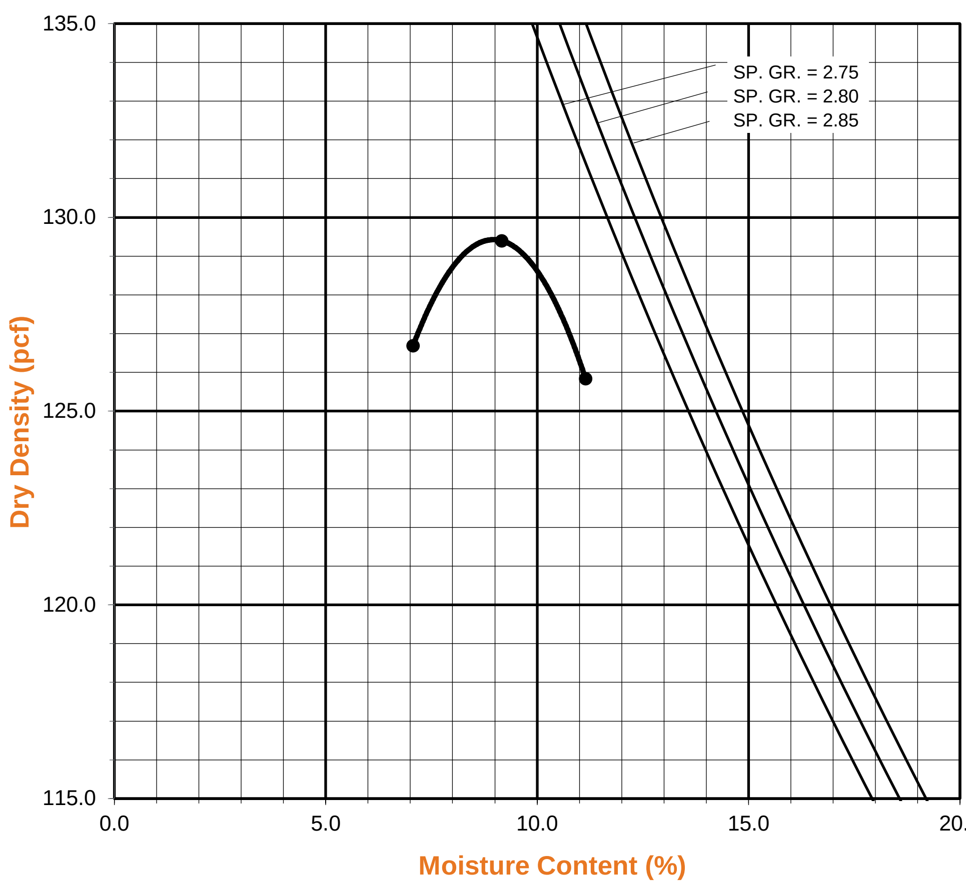
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Meridian West Upper Plateau GE	Tested By:	F. Mina	Date:	08/30/21
Project No.:	13226.001	Input By:	M. Vinet	Date:	09/01/21
Boring No.:	TP-40	Depth (ft.):	0 - 3.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand (SM), Dark Brown.				

Preparation Method: [X] Moist [ ] Dry — [X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03340 — *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5616	5677	5645			
Weight of Mold (g)	3546	3546	3546			
Net Weight of Soil (g)	2070	2131	2099			
Wet Weight of Soil + Cont. (g)	1411.6	1533.2	1612.3			
Dry Weight of Soil + Cont. (g)	1333.4	1425.0	1475.0			
Weight of Container (g)	278.2	277.8	276.8			
Moisture Content (%)	7.4	9.4	11.5			
Wet Density (pcf)	136.6	140.7	138.5			
Dry Density (pcf)	127.2	128.5	124.3			

Maximum Dry Density (pcf) 128.7 **Optimum Moisture Content (%)** 9.0

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

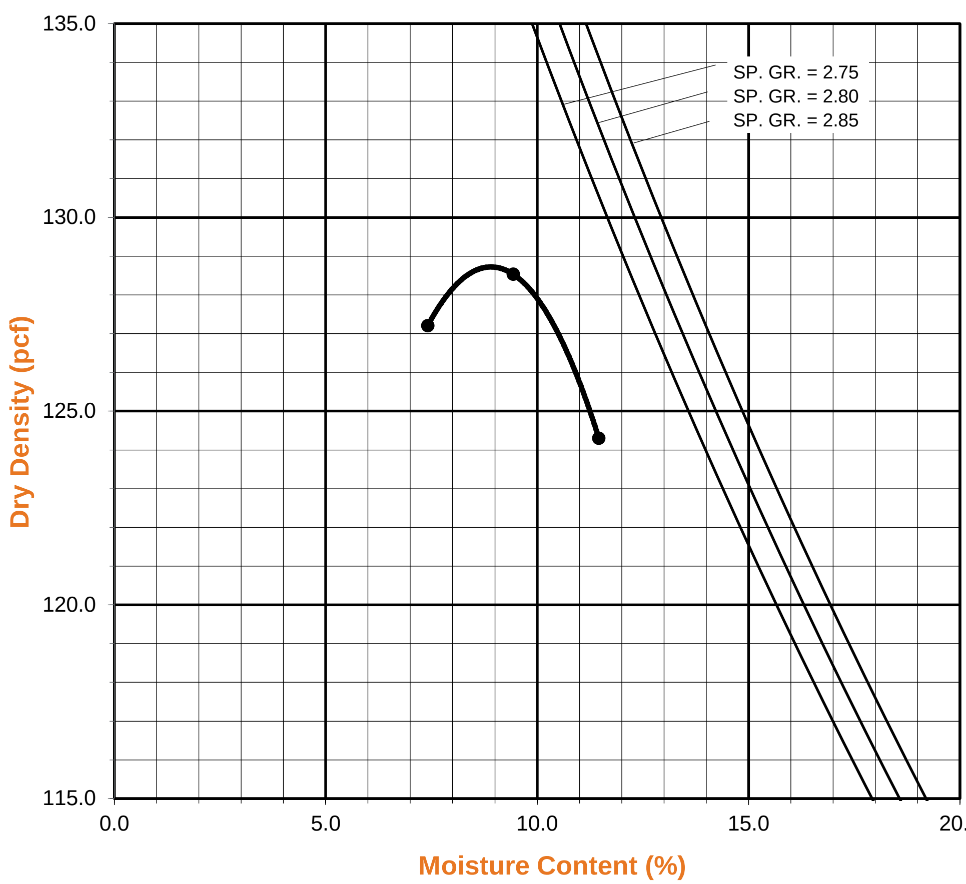
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



Compaction; TP-40, B-1 (07-27-21)

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Meridian West Upper Plateau GE   Tested By : F. Mina   Date: 08/31/21

Project No. : 13226.001   Data Input By: M. Vinet   Date: 09/01/21

Boring No.	TP-1	TP-44		
Sample No.	B-2	B-1		
Sample Depth (ft)	3.0 - 19.0	0 - 9.0		
Soil Identification:	Well-Graded Sand (SW)	Silty Sand (SM)		
Wet Weight of Soil + Container (g)	100.00	100.00		
Dry Weight of Soil + Container (g)	100.00	100.00		
Weight of Container (g)	0.00	0.00		
Moisture Content (%)	0.00	0.00		
Weight of Soaked Soil (g)	100.00	100.00		

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	1	2		
Crucible No.	1	2		
Furnace Temperature (°C)	850	850		
Time In / Time Out	Timer	Timer		
Duration of Combustion (min)	45	45		
Wt. of Crucible + Residue (g)	25.0136	24.8531		
Wt. of Crucible (g)	25.0112	24.8502		
Wt. of Residue (g) (A)	0.0024	0.0029		
PPM of Sulfate (A) x 41150	98.76	119.34		
PPM of Sulfate, Dry Weight Basis	**99**	**119**		

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30	30		
ml of AgNO3 Soln. Used in Titration (C)	0.5	1.0		
PPM of Chloride (C -0.2) * 100 * 30 / B	30	80		
PPM of Chloride, Dry Wt. Basis	**30**	**80**		

pH TEST, DOT California Test 643

pH Value	**7.70**	**6.90**		
Temperature °C	21.0	21.0		

SOIL RESISTIVITY TEST
DOT CA TEST 643

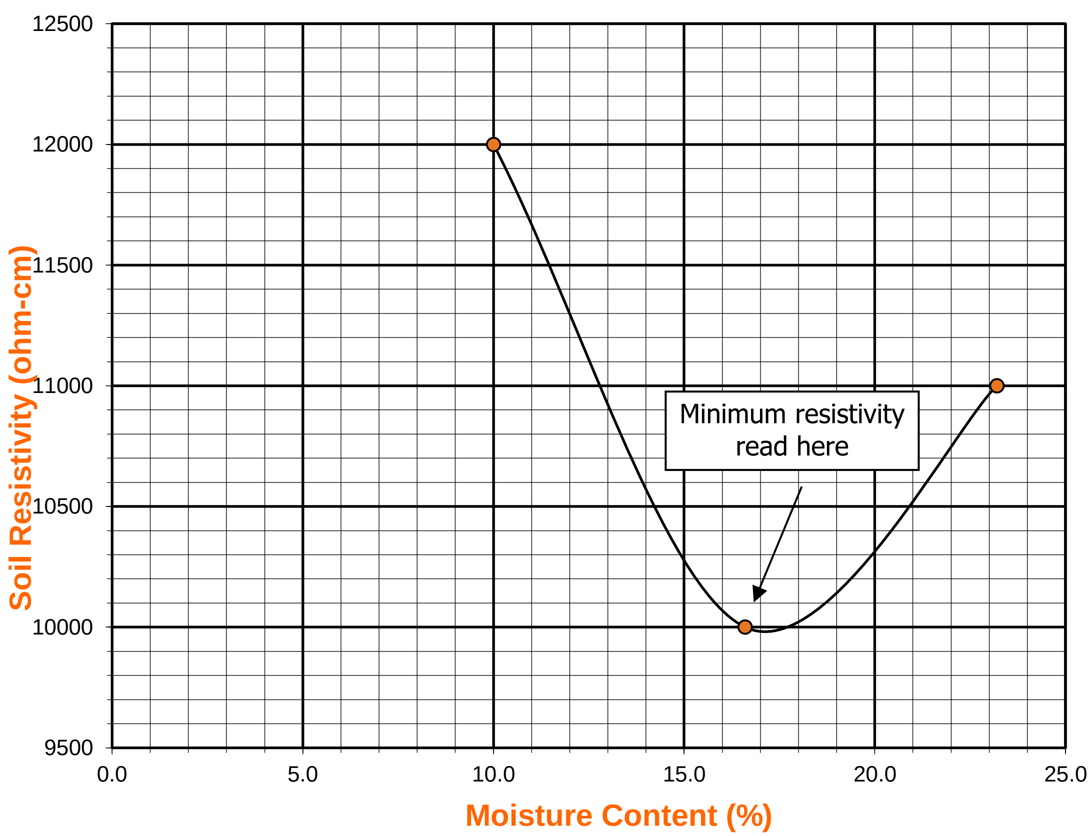
Project Name:	Meridian West Upper Plateau GE	Tested By :	F. Mina Date: 08/31/21
Project No. :	13226.001	Data Input By:	M. Vinet Date: 09/01/21
Boring No.:	TP-1	Depth (ft.) :	3.0 - 19.0
Sample No. :	B-2		
Soil Identification:*	Well-Graded Sand (SW)		

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	50	10.00	12000	12000
2	83	16.60	10000	10000
3	116	23.20	11000	11000
4				
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	100.00
Wt. of Container (g)	0.00
Container No.	A
Initial Soil Wt. (g) (Wt)	500.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
10000	**16.6**	**99**	**30**	**7.70**	**21.0**



SOIL RESISTIVITY TEST
DOT CA TEST 643

Project Name:	Meridian West Upper Plateau GE	Tested By :	F. Mina	Date:	08/31/21
Project No. :	13226.001	Data Input By:	M. Vinet	Date:	09/01/21
Boring No.:	TP-44	Depth (ft.) :	0 - 9.0		
Sample No. :	B-1				

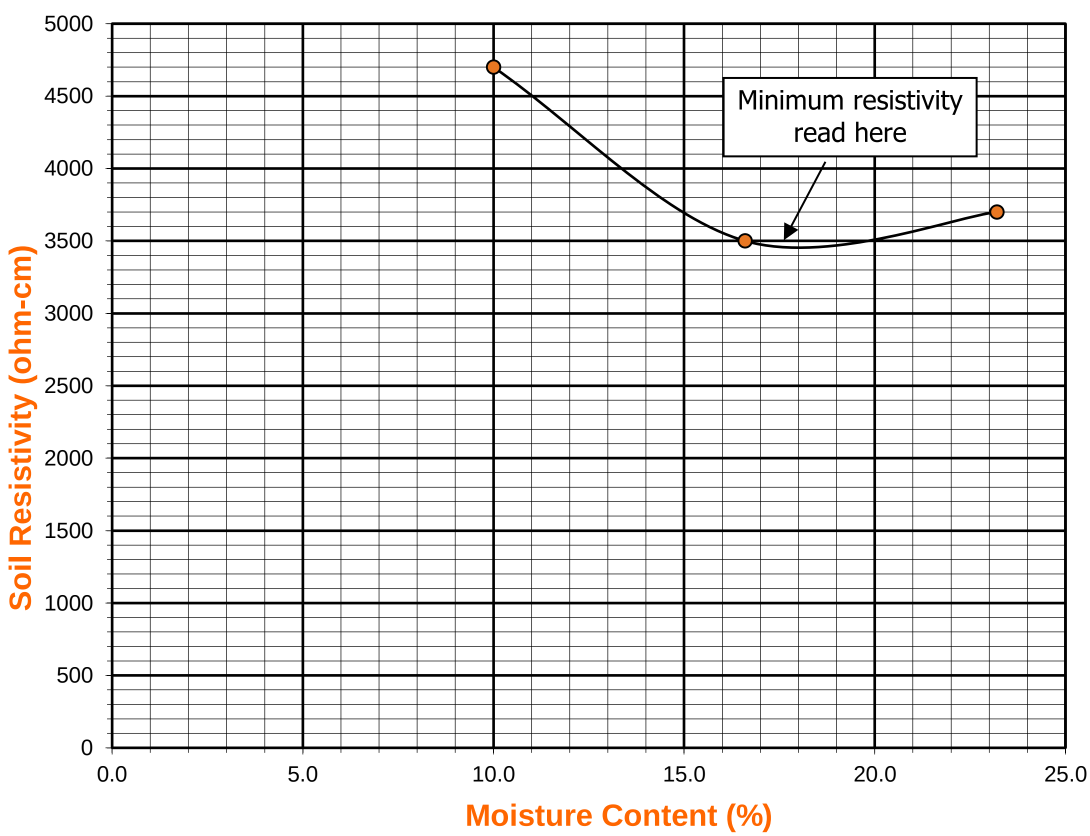
Soil Identification:* Silty Sand (SM)

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	50	10.00	4700	4700
2	83	16.60	3500	3500
3	116	23.20	3700	3700
4				
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	100.00
Wt. of Container (g)	0.00
Container No.	A
Initial Soil Wt. (g) (Wt)	500.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
3500	**16.6**	**119**	**80**	**6.90**	**21.0**



EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian West Upper Plateau GE	Tested By: F. Mina	Date: 8/30/21
Project No. :	13226.001	Checked By: M. Vinet	Date: 9/1/21
Boring No.:	TP-1	Depth: 0 - 3.0	
Sample No. :	B-1	Location: N/A	
Sample Description:	Silty Sand (SM), Reddish Brown.		

Dry Wt. of Soil + Cont. (gm.)	2733.2
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	2733.2
Weight Soil Retained on #4 Sieve	42.8
Percent Passing # 4	98.4

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0039
Wt. Comp. Soil + Mold (gm.)	618.5	635.6
Wt. of Mold (gm.)	200.3	200.3
Specific Gravity (Assumed)	2.70	2.70
Container No.	7	7
Wet Wt. of Soil + Cont. (gm.)	300.0	635.6
Dry Wt. of Soil + Cont. (gm.)	276.5	385.4
Wt. of Container (gm.)	0.0	200.3
Moisture Content (%)	8.5	12.9
Wet Density (pcf)	126.1	130.8
Dry Density (pcf)	116.3	115.8
Void Ratio	0.450	0.456
Total Porosity	0.310	0.313
Pore Volume (cc)	64.2	65.0
Degree of Saturation (%) [S meas]	**51.0**	**76.7**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
8/30/21	14:30	1.0	0	0.5000
8/30/21	14:40	1.0	10	0.5000
	Add Distilled Water to the Specimen			
8/31/21	7:00	1.0	980	0.5039
8/31/21	8:00	1.0	1040	0.5039

Expansion Index (EI meas) =	((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	3.9
Expansion Index (Report) =	Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**4**

Rev. 03-08

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian West Upper Plateau GE	Tested By: F. Mina	Date: 8/31/21
Project No. :	13226.001	Checked By: M. Vinet	Date: 9/1/21
Boring No.:	TP-8	Depth: 0 - 3.0	
Sample No. :	B-1	Location: N/A	
Sample Description:	Silty Sand (SM), Strong Brown.		

Dry Wt. of Soil + Cont. (gm.)	1770.7
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	1770.7
Weight Soil Retained on #4 Sieve	32.7
Percent Passing # 4	98.2

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0096
Wt. Comp. Soil + Mold (gm.)	613.0	635.4
Wt. of Mold (gm.)	199.3	199.3
Specific Gravity (Assumed)	2.70	2.70
Container No.	7	7
Wet Wt. of Soil + Cont. (gm.)	300.0	635.4
Dry Wt. of Soil + Cont. (gm.)	276.5	381.3
Wt. of Container (gm.)	0.0	199.3
Moisture Content (%)	8.5	14.4
Wet Density (pcf)	124.8	130.3
Dry Density (pcf)	115.0	113.9
Void Ratio	0.466	0.480
Total Porosity	0.318	0.324
Pore Volume (cc)	65.8	67.8
Degree of Saturation (%) [S meas]	**49.3**	**80.9**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
8/31/21	13:00	1.0	0	0.5000
8/31/21	13:10	1.0	10	0.5000
	Add Distilled Water to the Specimen			
9/1/21	7:00	1.0	1070	0.5096
9/1/21	8:00	1.0	1130	0.5096

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	9.6
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**10**

Rev. 03-08

EXPANSION INDEX of SOILS
ASTM D 4829

Project Name:	Meridian West Upper Plateau GE	Tested By:	F. Mina	Date:	8/31/21
Project No. :	13226.001	Checked By:	M. Vinet	Date:	9/1/21
Boring No.:	TP-13	Depth:	0 - 10.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Silty Sand (SM), Dark Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	2589.4
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	2589.4
Weight Soil Retained on #4 Sieve	50.3
Percent Passing # 4	98.1

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0107
Wt. Comp. Soil + Mold (gm.)	600.9	626.3
Wt. of Mold (gm.)	182.7	182.7
Specific Gravity (Assumed)	2.70	2.70
Container No.	8	8
Wet Wt. of Soil + Cont. (gm.)	300.0	626.3
Dry Wt. of Soil + Cont. (gm.)	276.5	385.4
Wt. of Container (gm.)	0.0	182.7
Moisture Content (%)	8.5	15.1
Wet Density (pcf)	126.1	132.4
Dry Density (pcf)	116.3	115.0
Void Ratio	0.450	0.466
Total Porosity	0.310	0.318
Pore Volume (cc)	64.2	66.5
Degree of Saturation (%) [S meas]	**51.0**	**87.5**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
8/31/21	13:30	1.0	0	0.5000
8/31/21	13:40	1.0	10	0.5000
	Add Distilled Water to the Specimen			
9/1/21	7:00	1.0	1040	0.5107
9/1/21	8:00	1.0	1100	0.5107

Expansion Index (EI meas) =	((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	10.7
Expansion Index (Report) =	Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**11**

Rev. 03-08

EXPANSION INDEX of SOILS
ASTM D 4829

Project Name:	Meridian West Upper Plateau GE	Tested By:	F. Mina	Date:	8/30/21
Project No. :	13226.001	Checked By:	M. Vinet	Date:	9/1/21
Boring No.:	TP-44	Depth:	0 - 9.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Silty Sand (SM), Dark Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	3398.0
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	3398.0
Weight Soil Retained on #4 Sieve	19.0
Percent Passing # 4	99.4

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	0.9995
Wt. Comp. Soil + Mold (gm.)	605.2	631.0
Wt. of Mold (gm.)	190.4	190.4
Specific Gravity (Assumed)	2.70	2.70
Container No.	8	8
Wet Wt. of Soil + Cont. (gm.)	300.0	631.0
Dry Wt. of Soil + Cont. (gm.)	276.5	382.3
Wt. of Container (gm.)	0.0	190.4
Moisture Content (%)	8.5	15.2
Wet Density (pcf)	125.1	133.0
Dry Density (pcf)	115.3	115.4
Void Ratio	0.462	0.461
Total Porosity	0.316	0.316
Pore Volume (cc)	65.4	65.3
Degree of Saturation (%) [S meas]	**49.7**	**89.3**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
8/30/21	14:45	1.0	0	0.5000
8/30/21	14:55	1.0	10	0.5000
	Add Distilled Water to the Specimen			
8/31/21	7:00	1.0	965	0.4995
8/31/21	8:00	1.0	1025	0.4995

Expansion Index (EI meas) =	((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	-0.5
Expansion Index (Report) =	Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**0**

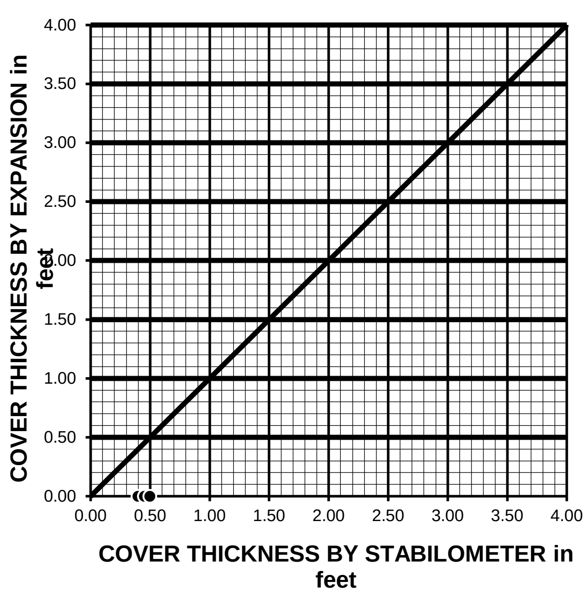
R-VALUE TEST RESULTS
ASTM D 2844

Project Name:	Meridian West Upper Plateau GE	Date:	8/30/21
Project Number:	13226.001	Technician:	F. Mina
Boring Number:	TP-1	Depth (ft.):	3.0 - 19.0
Sample Number:	B-2	Sample Location:	N/A
Sample Description:	Well-Graded Sand (SW), Reddish Brown.		

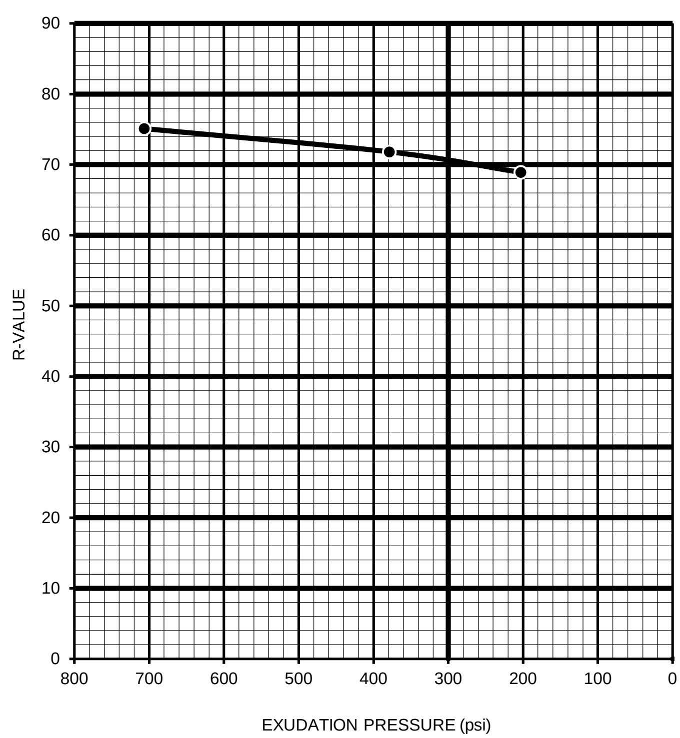
TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	8.8	10.2	10.9
HEIGHT OF SAMPLE, Inches	2.50	2.51	2.52
DRY DENSITY, pcf	106.4	118.2	116.5
COMPACTOR AIR PRESSURE, psi	175	165	150
EXUDATION PRESSURE, psi	706	379	203
EXPANSION, Inches x 10exp-4	0	0	0
STABILITY Ph 2,000 lbs (160 psi)	22	25	28
TURNS DISPLACEMENT	5.20	5.30	5.32
R-VALUE UNCORRECTED	75	72	69
R-VALUE CORRECTED	75	72	69

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.40	0.45	0.50
EXPANSION PRESSURE THICKNESS, ft.	0.00	0.00	0.00

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	N/A
R-VALUE BY EXUDATION:	70
EQUILIBRIUM R-VALUE:	70

R-VALUE TEST RESULTS

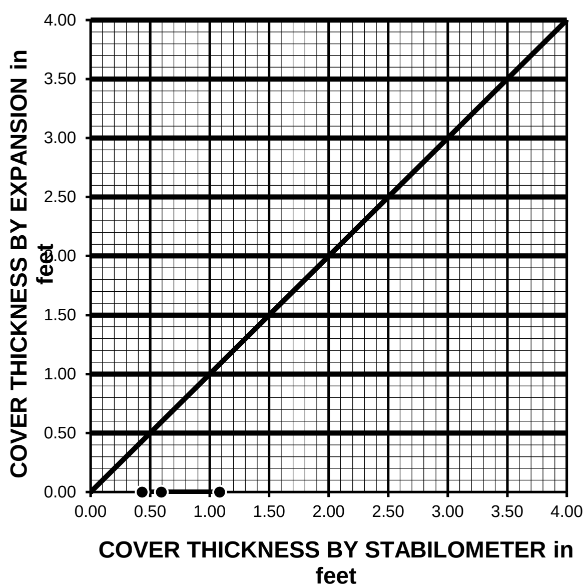
ASTM D 2844

Project Name:	Meridian West Upper Plateau GE	Date:	8/30/21
Project Number:	13226.001	Technician:	F. Mina
Boring Number:	TP-31	Depth (ft.):	0 - 4.0
Sample Number:	B-1	Sample Location:	N/A
Sample Description:	Silty Sand (SM), Reddish Brown.		

TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	9.0	10.0	11.1
HEIGHT OF SAMPLE, Inches	2.49	2.50	2.55
DRY DENSITY, pcf	117.6	117.3	116.4
COMPACTOR AIR PRESSURE, psi	175	150	125
EXUDATION PRESSURE, psi	653	347	206
EXPANSION, Inches x 10exp-4	0	0	0
STABILITY Ph 2,000 lbs (160 psi)	27	38	81
TURNS DISPLACEMENT	4.57	4.75	5.10
R-VALUE UNCORRECTED	73	63	32
R-VALUE CORRECTED	73	63	32

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.43	0.59	1.08
EXPANSION PRESSURE THICKNESS, ft.	0.00	0.00	0.00

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART

R-VALUE BY EXPANSION:	N/A
R-VALUE BY EXUDATION:	57
EQUILIBRIUM R-VALUE:	57

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS
ASTM D 6913

Project Name:	Meridian West Upper Plateau GE	Tested By:	FLM	Date:	08/31/21
Project No.:	13226.001	Checked By:	MRV	Date:	09/01/21
Boring No.:	LB-1	Depth (feet):	10.0		
Sample No.:	S-1				
Soil Identification:	Well-Graded Sand with Silt (SW-SM), Reddish Brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	F	Wt. of Air-Dry Soil + Cont. (g)	544.4
Wt. of Air-Dried Soil + Cont.(g)	544.4	Wt. of Dry Soil + Cont. (g)	540.4
Wt. of Container (g)	328.1	Wt. of Container No.______ (g)	328.1
Dry Wt. of Soil (g)	212.3	Moisture Content (%)	1.9

After Wet Sieve	Container No.	F
	Wt. of Dry Soil + Container (g)	521.7
	Wt. of Container (g)	328.1
	Dry Wt. of Soil Retained on # 200 Sieve (g)	193.6

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000		100.0
1/2"	12.500		100.0
3/8"	9.500		100.0
#4	4.750	0.0	100.0
#8	2.360	4.7	97.8
#16	1.180	44.3	79.1
#30	0.600	98.6	53.6
#50	0.300	147.6	30.5
#100	0.150	176.6	16.8
#200	0.075	191.4	9.8
PAN			

GRAVEL: **0 %**

SAND: **90 %**

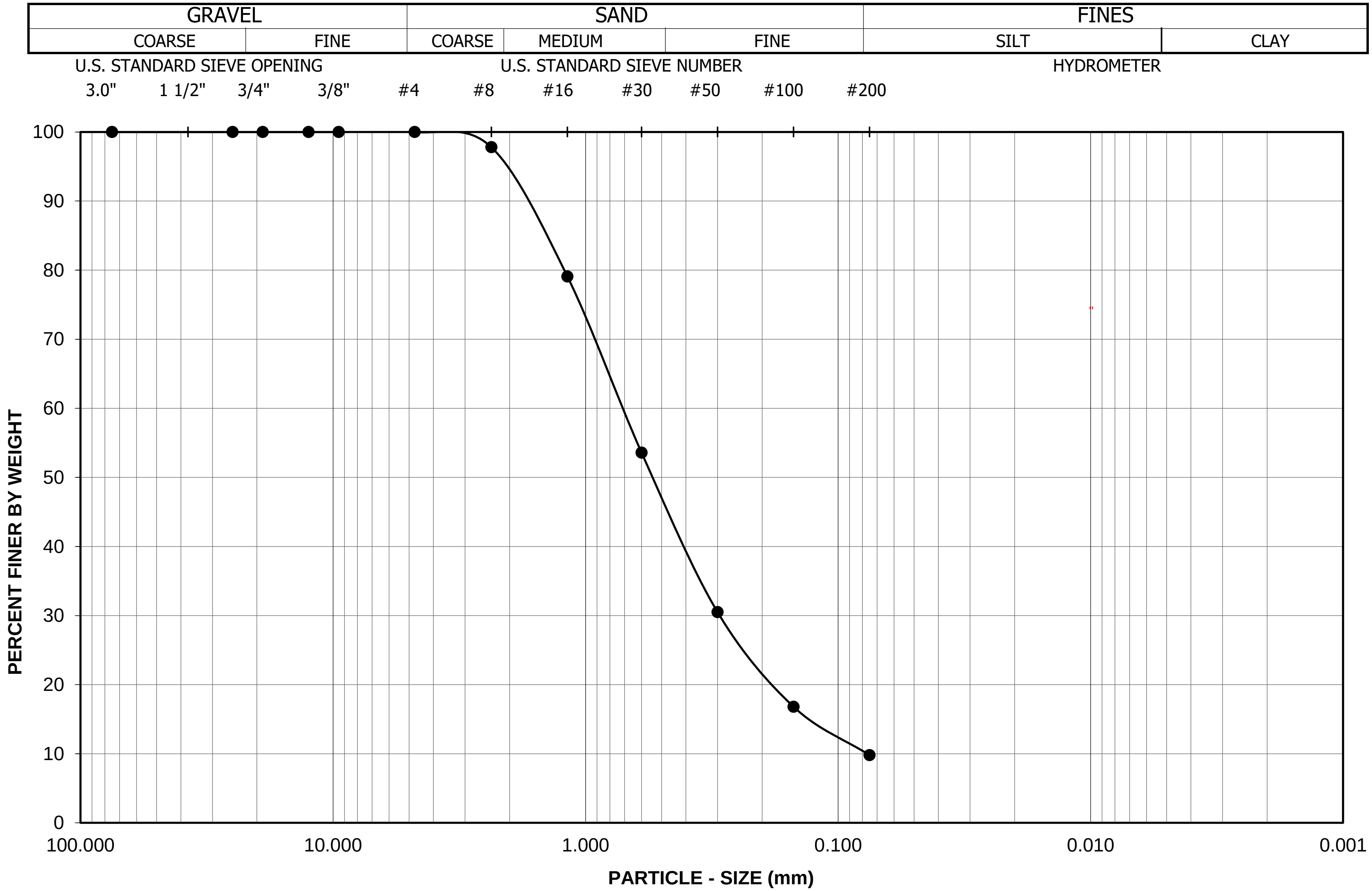
FINES: **10 %**

GROUP SYMBOL: **SW-SM**

Cu = D60/D10 = 9.33

Cc = $(D30)^2/(D60*D10)$ = 1.71

Remarks:



Project Name: Meridian West Upper Plateau GE

Project No.: 13226.001

Boring No.: LB-1 Sample No.: S-1

Depth (feet): 10.0 Soil Type : SW-SM

Soil Identification: Well-Graded Sand with Silt (SW-SM), Reddish Brown.

GR:SA:FI : (%) 0 : 90 : 10

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Sep-21

Sieve; LB-1, S-1 (07-27-21)

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS
ASTM D 6913

Project Name:	Meridian West Upper Plateau GE	Tested By:	FLM	Date:	08/31/21
Project No.:	13226.001	Checked By:	MRV	Date:	09/01/21
Boring No.:	LB-2	Depth (feet):	15.0		
Sample No.:	S-2				
Soil Identification:	Silty Sand (SM), Olive Brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	Q	Wt. of Air-Dry Soil + Cont. (g)	713.3
Wt. of Air-Dried Soil + Cont.(g)	713.3	Wt. of Dry Soil + Cont. (g)	684.4
Wt. of Container (g)	328.7	Wt. of Container No.______ (g)	328.7
Dry Wt. of Soil (g)	355.7	Moisture Content (%)	8.1

After Wet Sieve	Container No.	Q
	Wt. of Dry Soil + Container (g)	594.4
	Wt. of Container (g)	328.7
	Dry Wt. of Soil Retained on # 200 Sieve (g)	265.7

U. S. Sieve Size		Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
(in.)	(mm.)		
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000		100.0
1/2"	12.500		100.0
3/8"	9.500		100.0
#4	4.750	0.0	100.0
#8	2.360	10.8	97.0
#16	1.180	41.9	88.2
#30	0.600	83.7	76.5
#50	0.300	140.3	60.6
#100	0.150	205.0	42.4
#200	0.075	264.3	25.7
PAN			

GRAVEL: **0 %**

SAND: **74 %**

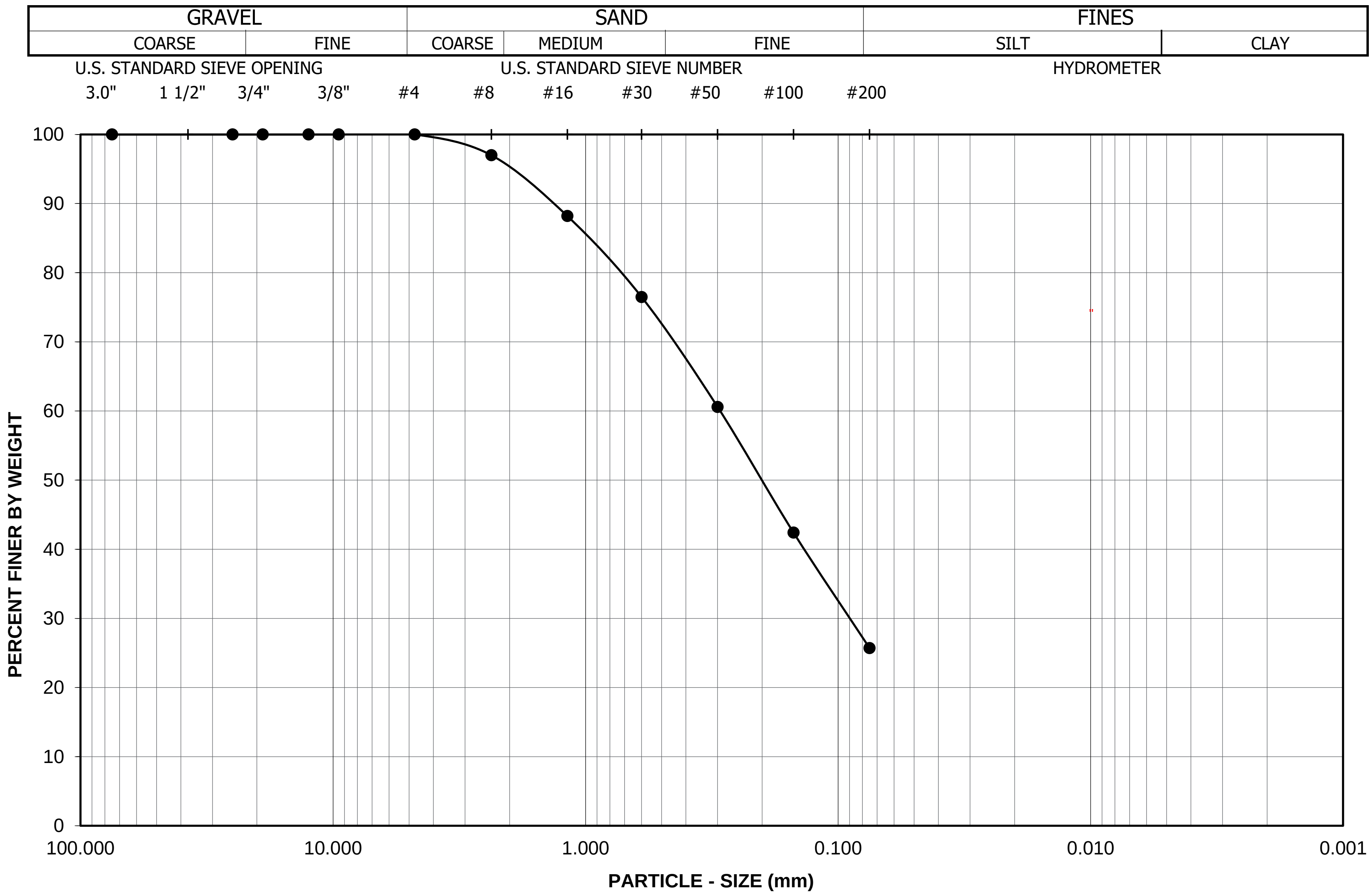
FINES: **26 %**

GROUP SYMBOL: **SM**

Cu = D60/D10 = N/A

Cc = (D30)²/(D60*D10) = N/A

Remarks:



Project Name: Meridian West Upper Plateau GE

Project No.: 13226.001

Boring No.: LB-2 Sample No.: S-2

Depth (feet): 15.0 Soil Type : SM

Soil Identification: Silty Sand (SM), Olive Brown.

GR:SA:FI : (%) 0 : 74 : 26

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Sep-21

Sieve; LB-2, S-2 (07-27-21)

Leighton

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Project Name:	Meridian West Upper Plateau GE	Tested By:	FLM	Date:	08/31/21
Project No.:	13226.001	Checked By:	MRV	Date:	09/01/21
Boring No.:	LB-4	Depth (feet):	0 - 20		
Sample No.:	B-1				
Soil Identification:	Silty, Clayey Sand (SC-SM), Reddish Brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	B	Wt. of Air-Dry Soil + Cont. (g)	1045.1
Wt. of Air-Dried Soil + Cont.(g)	1045.1	Wt. of Dry Soil + Cont. (g)	1027.9
Wt. of Container (g)	673.2	Wt. of Container No.______ (g)	673.2
Dry Wt. of Soil (g)	354.7	Moisture Content (%)	4.8

After Wet Sieve	Container No.	B
	Wt. of Dry Soil + Container (g)	868.5
	Wt. of Container (g)	673.2
	Dry Wt. of Soil Retained on # 200 Sieve (g)	195.3

U. S. Sieve Size		Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
(in.)	(mm.)		
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000		100.0
1/2"	12.500		100.0
3/8"	9.500		100.0
#4	4.750	0.0	100.0
#8	2.360	5.4	98.5
#16	1.180	23.2	93.5
#30	0.600	55.7	84.3
#50	0.300	102.3	71.2
#100	0.150	149.1	58.0
#200	0.075	194.6	45.1
PAN			

GRAVEL: **0 %**

SAND: **55 %**

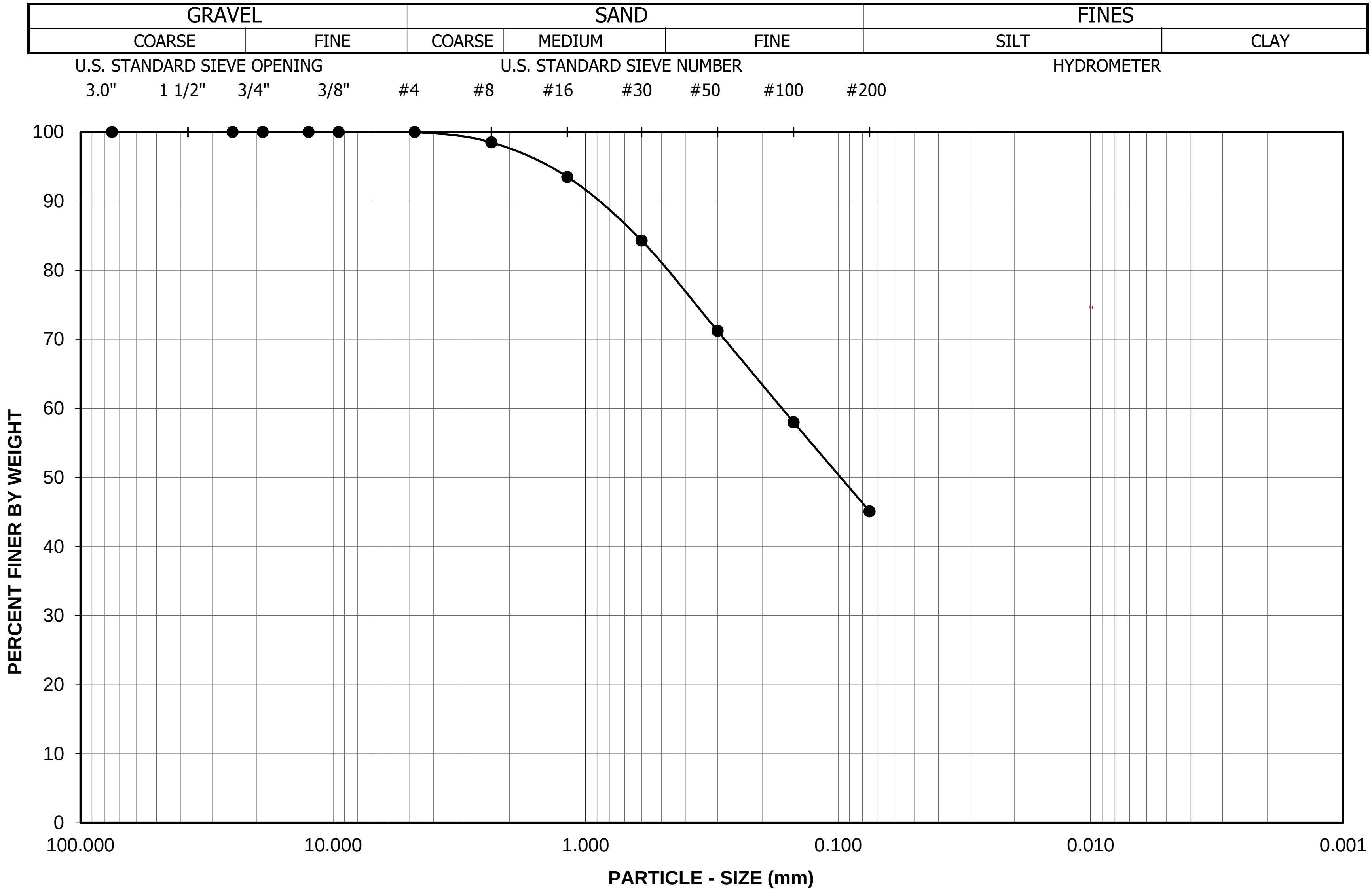
FINES: **45 %**

GROUP SYMBOL: **SC-SM**

$Cu = D60/D10 =$ N/A

$Cc = (D30)^2/(D60*D10) =$ N/A

Remarks:



Project Name: Meridian West Upper Plateau GE

Project No.: 13226.001

Boring No.: LB-4 Sample No.: B-1

Depth (feet): 0 - 20 Soil Type : SC-SM

Soil Identification: Silty, Clayey Sand (SC-SM), Reddish Brown.

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

GR:SA:FI : (%) 0 : 55 : 45

Sep-21

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS
ASTM D 6913

Leighton

Project Name:	Meridian West Upper Plateau GE	Tested By:	FLM	Date:	08/31/21
Project No.:	13226.001	Checked By:	MRV	Date:	09/01/21
Boring No.:	TP-1	Depth (feet):	3.0 - 19.0		
Sample No.:	B-2				
Soil Identification:	Well-Graded Sand (SW), Reddish Brown.				

Calculation of Dry Weights	Whole Sample	Sample Passing #4	Moisture Contents	Whole Sample	Sample passing #4
Container No.:	K	K	Wt. of Air-Dry Soil + Cont.(g)	1783.4	652.2
Wt. Air-Dried Soil + Cont.(g)	1783.4	652.2	Wt. of Dry Soil + Cont. (g)	1738.9	652.2
Wt. of Container (g)	328.2	328.2	Wt. of Container No._____(g)	328.2	328.2
Dry Wt. of Soil (g)	1410.1	324.0	Moisture Content (%)	3.2	0.0

Passing #4 Material After Wet Sieve		
	Container No.	K
	Wt. of Dry Soil + Container (g)	633.3
	Wt. of Container (g)	328.2
	Dry Wt. of Soil Retained on # 200 Sieve (g)	305.1

U. S. Sieve Size		Cumulative Weight of Dry Soil Retained (g)		Percent Passing (%)
	(mm.)	Whole Sample	Sample Passing #4	
1 1/2"	37.500			100.0
1"	25.000			100.0
3/4"	19.000	0.0		100.0
1/2"	12.500	21.2		98.5
3/8"	9.500	56.2		96.0
#4	4.750	369.7		73.8
#8	2.360		94.9	52.2
#16	1.180		172.5	34.5
#30	0.600		223.8	22.8
#50	0.300		262.8	13.9
#100	0.150		287.6	8.3
#200	0.075		303.7	4.6
PAN				

GRAVEL: **26 %**

SAND: **69 %**

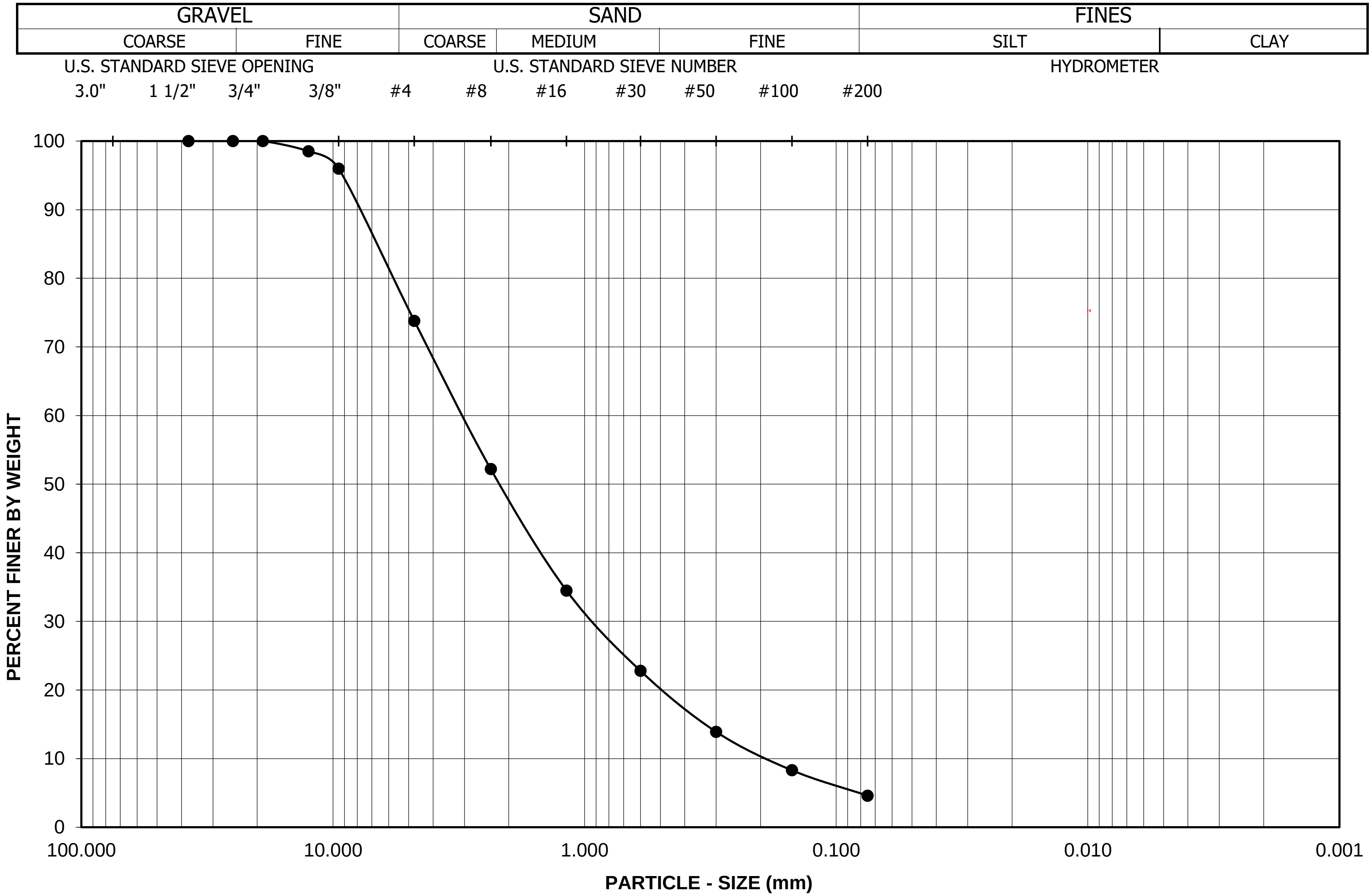
FINES: **5 %**

GROUP SYMBOL: **SW**

Cu = D60/D10 = 15.79

Cc = (D30)²/(D60*D10) = 1.58

Remarks:



Project Name: Meridian West Upper Plateau GE

Project No.: 13226.001

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Boring No.: TP-1

Sample No.: B-2

Depth (feet): 3.0 - 19.0

Soil Type : SW

Soil Identification: Well-Graded Sand (SW), Reddish Brown.

GR:SA:FI : (%) 26 : 69 : 5

Sep-21

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS
ASTM D 6913

Project Name: Meridian West Upper Plateau GE
Tested By: FLM Date: 08/31/21
Project No.: 13226.001
Checked By: MRV Date: 09/01/21
Boring No.: TP-31
Depth (feet): 0 - 4.0
Sample No.: B-1
Soil Identification: Silty Sand (SM), Reddish Brown.

		Moisture Content of Total Air - Dry Soil	
Container No.:	BA	Wt. of Air-Dry Soil + Cont. (g)	646.3
Wt. of Air-Dried Soil + Cont.(g)	646.3	Wt. of Dry Soil + Cont. (g)	646.3
Wt. of Container (g)	278.3	Wt. of Container No.______ (g)	278.3
Dry Wt. of Soil (g)	368.0	Moisture Content (%)	0.0

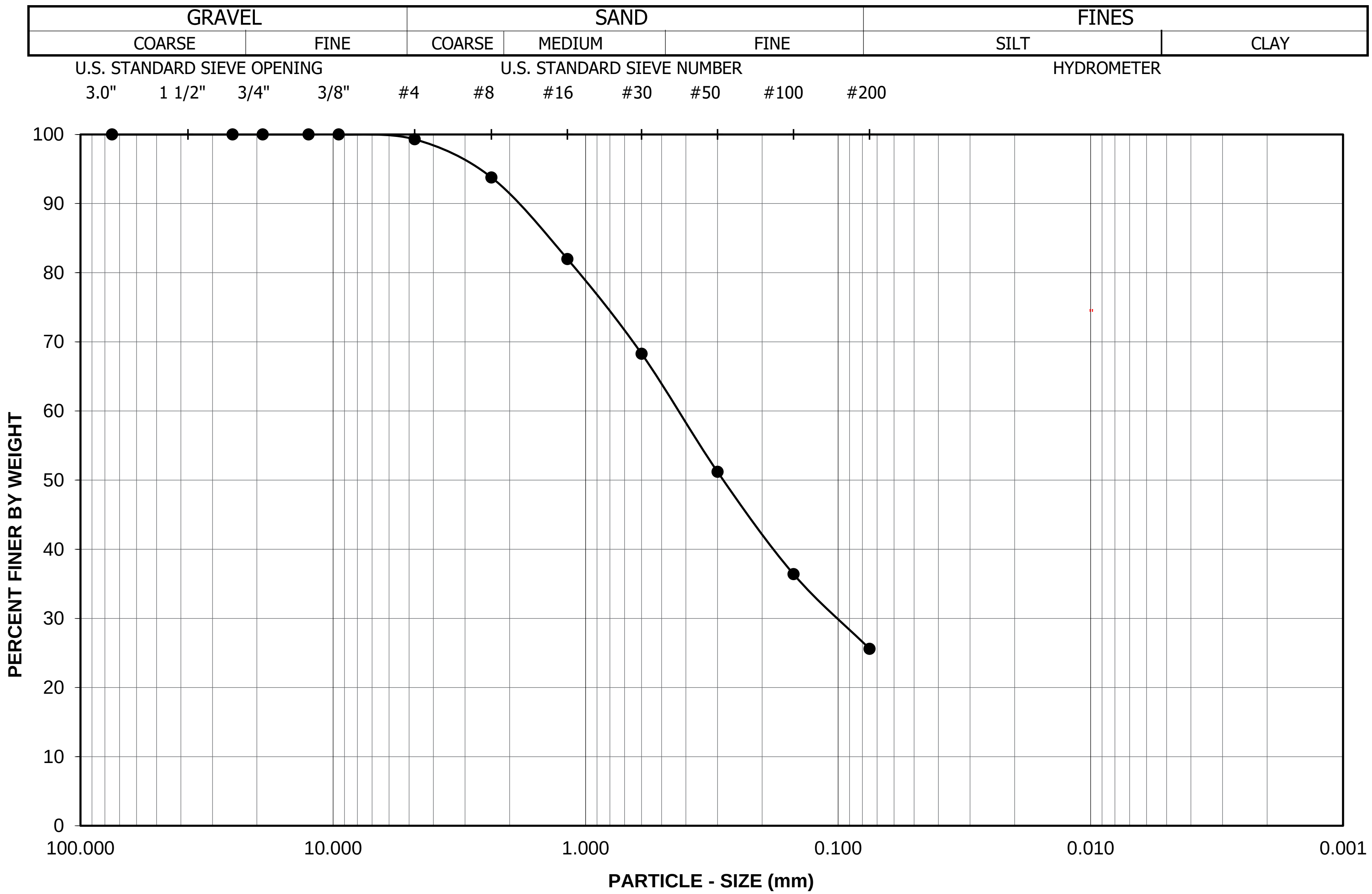
After Wet Sieve	Container No.	BA
	Wt. of Dry Soil + Container (g)	555.1
	Wt. of Container (g)	278.3
	Dry Wt. of Soil Retained on # 200 Sieve (g)	276.8

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000		100.0
1/2"	12.500		100.0
3/8"	9.500	0.0	100.0
#4	4.750	2.5	99.3
#8	2.360	22.8	93.8
#16	1.180	66.3	82.0
#30	0.600	116.8	68.3
#50	0.300	179.5	51.2
#100	0.150	233.9	36.4
#200	0.075	273.7	25.6
PAN			

GRAVEL: **1 %**
SAND: **73 %**
FINES: **26 %**
GROUP SYMBOL: **SM**

Cu = D60/D10 = N/A
Cc = $(D30)^2/(D60*D10)$ = N/A

Remarks:



Project Name: Meridian West Upper Plateau GE

Project No.: 13226.001

Boring No.: TP-31 Sample No.: B-1

Depth (feet): 0 - 4.0 Soil Type : SM

Soil Identification: Silty Sand (SM), Reddish Brown.

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

GR:SA:FI : (%) 1 : 73 : 26

Sep-21

Sieve; TP-31, B-1 (07-27-21)

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS
ASTM D 6913

Project Name:	Meridian West Upper Plateau GE	Tested By:	FLM	Date:	08/31/21
Project No.:	13226.001	Checked By:	MRV	Date:	09/01/21
Boring No.:	TP-40	Depth (feet):	0 - 3.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand (SM), Dark Brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	20	Wt. of Air-Dry Soil + Cont. (g)	613.8
Wt. of Air-Dried Soil + Cont.(g)	613.8	Wt. of Dry Soil + Cont. (g)	613.8
Wt. of Container (g)	280.1	Wt. of Container No.______ (g)	280.1
Dry Wt. of Soil (g)	333.7	Moisture Content (%)	0.0

After Wet Sieve	Container No.	20
	Wt. of Dry Soil + Container (g)	504.7
	Wt. of Container (g)	280.1
	Dry Wt. of Soil Retained on # 200 Sieve (g)	224.6

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000		100.0
1/2"	12.500		100.0
3/8"	9.500		100.0
#4	4.750	0.0	100.0
#8	2.360	11.9	96.4
#16	1.180	46.6	86.0
#30	0.600	91.7	72.5
#50	0.300	144.4	56.7
#100	0.150	188.1	43.6
#200	0.075	221.4	33.7
PAN			

GRAVEL: **0 %**

SAND: **66 %**

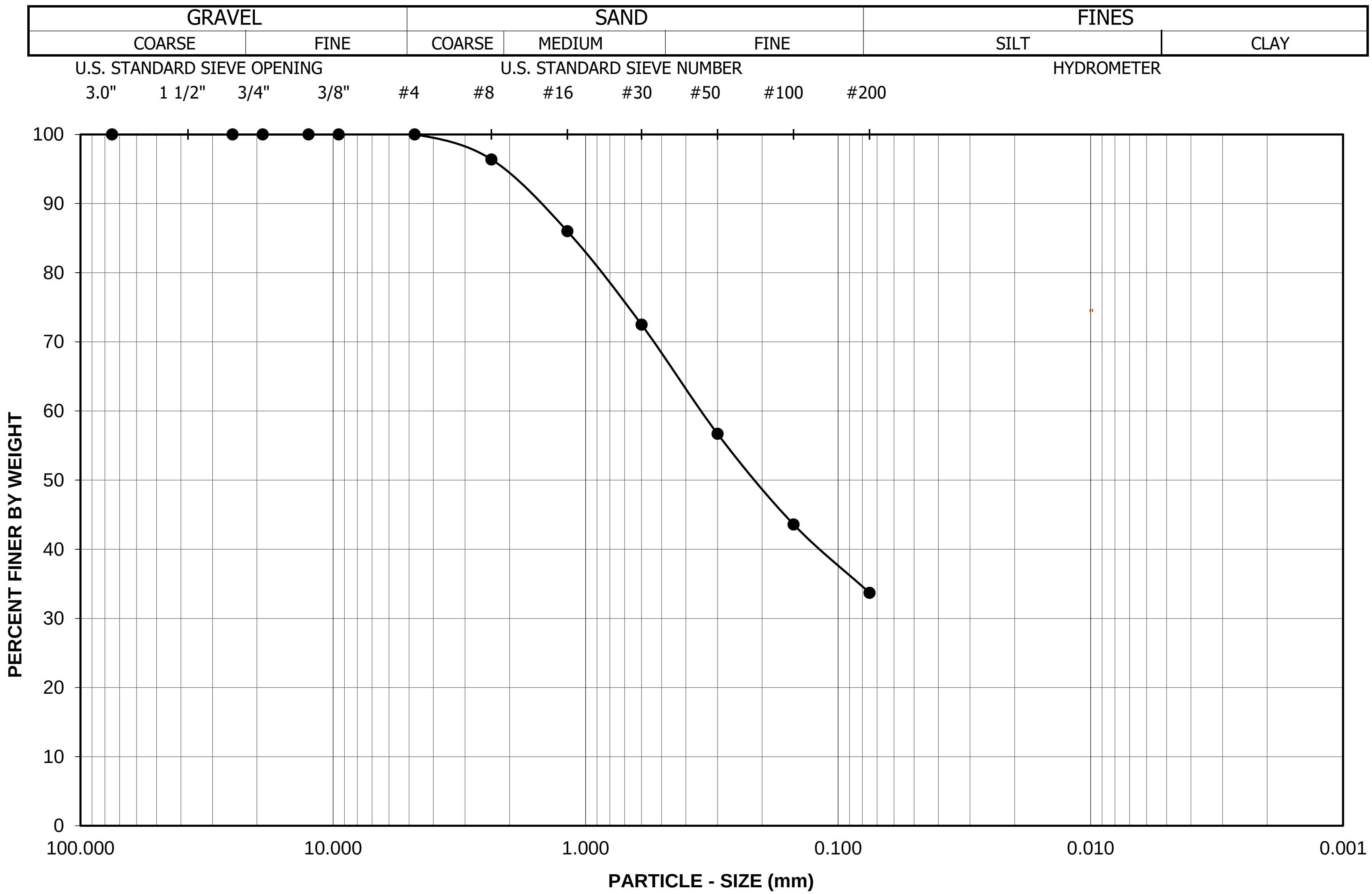
FINES: **34 %**

GROUP SYMBOL: **SM**

Cu = D60/D10 = N/A

Cc = $(D30)^2/(D60*D10)$ = N/A

Remarks:



Project Name: Meridian West Upper Plateau GE

Project No.: 13226.001

Boring No.: TP-40 Sample No.: B-1

Depth (feet): 0 - 3.0 Soil Type : SM

Soil Identification: Silty Sand (SM), Dark Brown.

GR:SA:FI : (%) 0 : 66 : 34

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Sep-21

APPENDIX C

EARTHWORK AND GRADING SPECIFICATIONS

APPENDIX C

LEIGHTON CONSULTING, INC.
EARTHWORK AND GRADING GUIDE SPECIFICATIONS

TABLE OF CONTENTS

C-1.0 GENERAL

C-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

C-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

C-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

C-2.0 PREPARATION OF AREAS TO BE FILLED

C-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc.. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974-00). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

C-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be overexcavated as specified in the following Section C-2.3. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

C-2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

C-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc.. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc.. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

C-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

C-3.0 FILL MATERIAL

C-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

C-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and placement methods are specifically accepted by Leighton Consulting, Inc.. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

C-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section C-3.1, and be free of hazardous materials ("contaminants") and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than (≤) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

C-4.0 FILL PLACEMENT AND COMPACTION

C-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section C-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

C-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

C-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density as determined by ASTM Test Method D 1557. For fills thicker than 15 feet (4.5 m), the portion of the fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

C-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc.. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

C-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc.. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

C-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

C-5.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc..

C-6.0 TRENCH BACKFILLS

C-6.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, 2003 Edition or more current (see also: http://www.dir.ca.gov/title8/sb4a6.html).

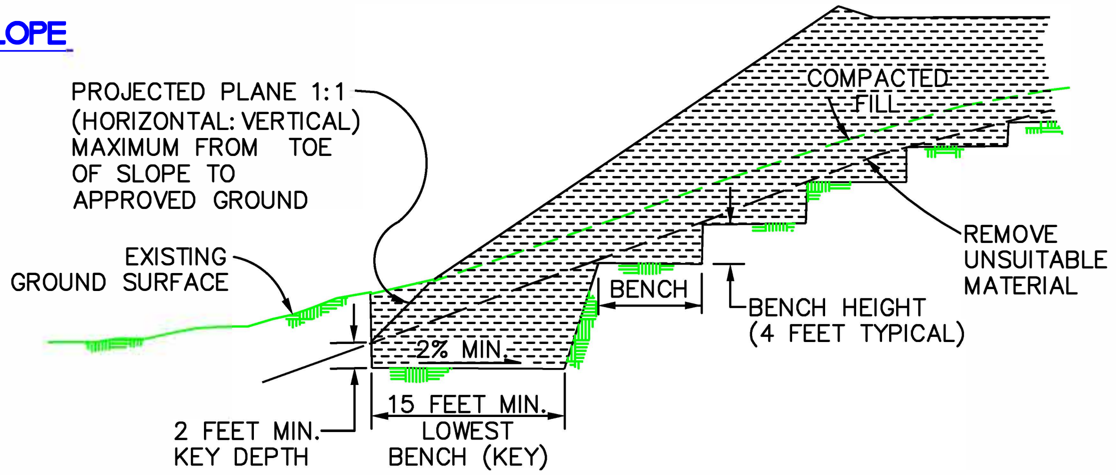
C-6.2 Bedding and Backfill

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the 2009 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise the pipe bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2009 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc..

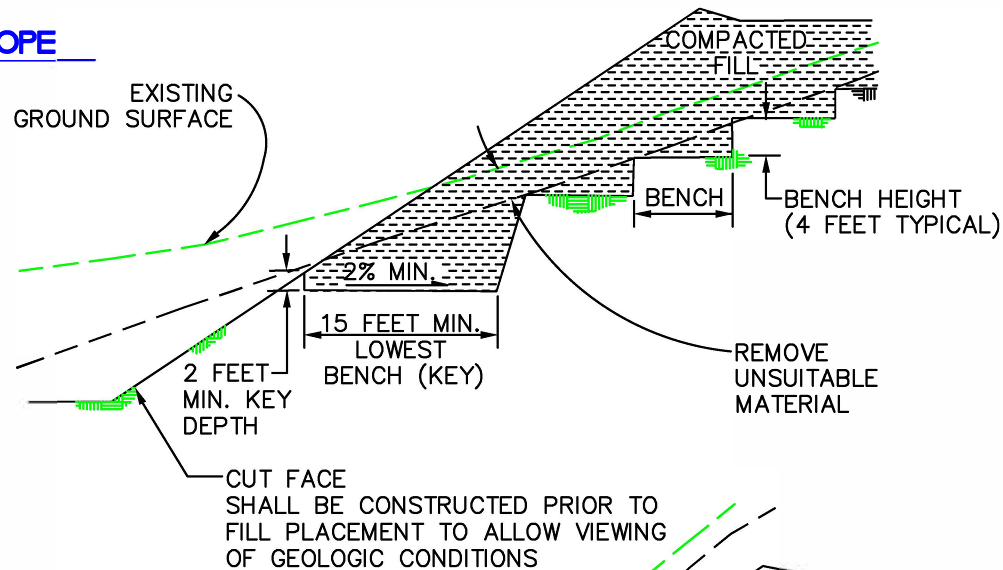
C-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

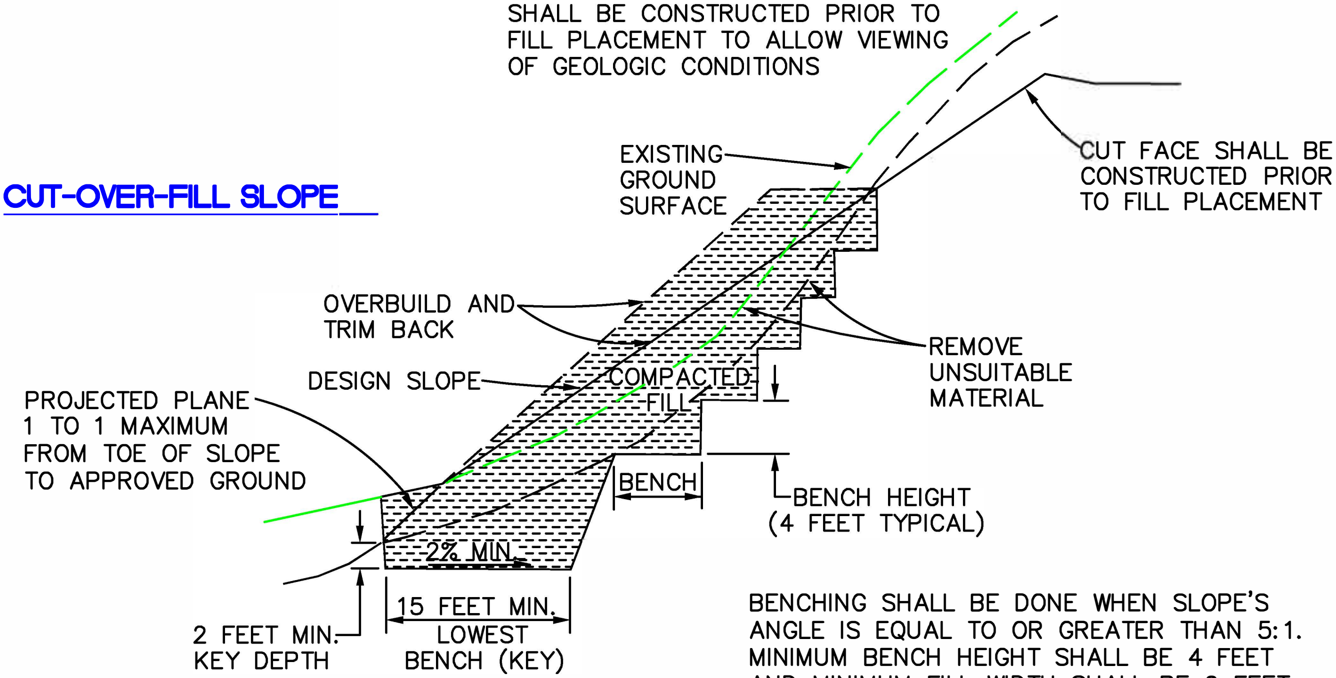
FILL SLOPE



FILL-OVER-CUT SLOPE

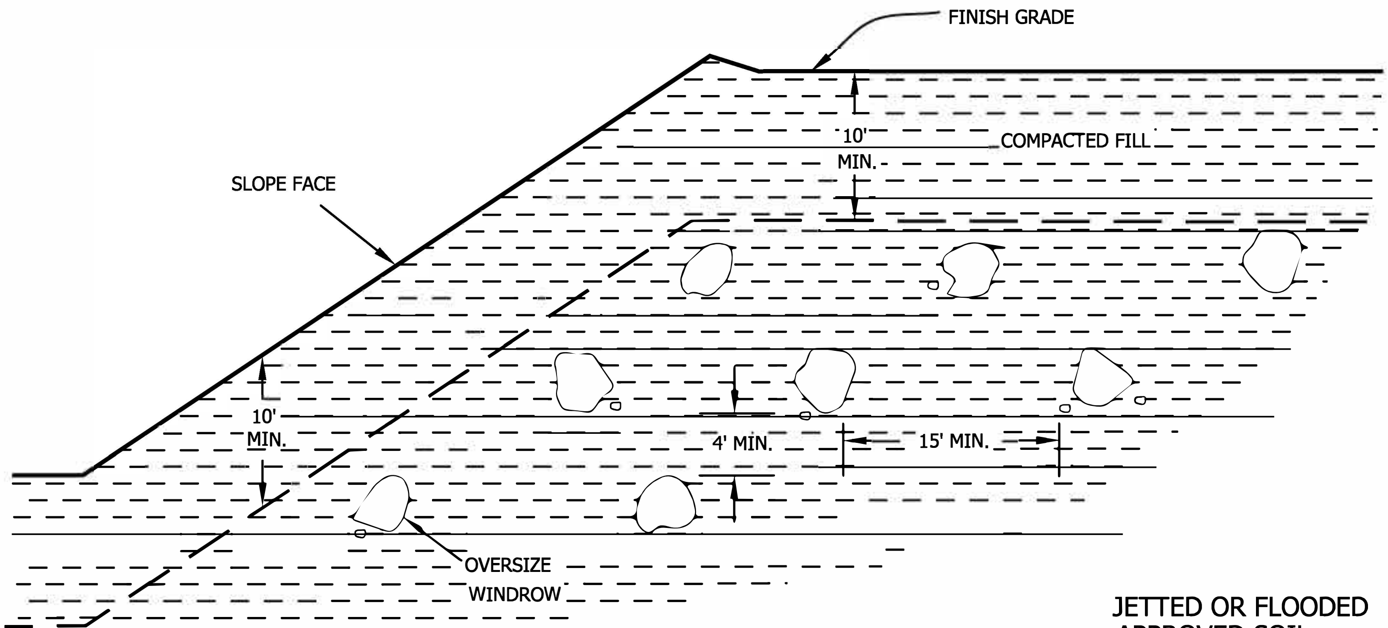


CUT-OVER-FILL SLOPE

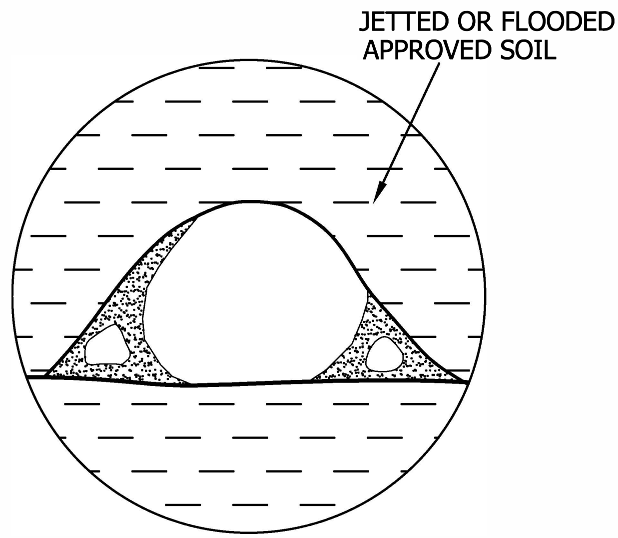


BENCHING SHALL BE DONE WHEN SLOPE'S ANGLE IS EQUAL TO OR GREATER THAN 5:1. MINIMUM BENCH HEIGHT SHALL BE 4 FEET AND MINIMUM FILL WIDTH SHALL BE 9 FEET.

KEYING AND BENCHING	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS A	Leighton

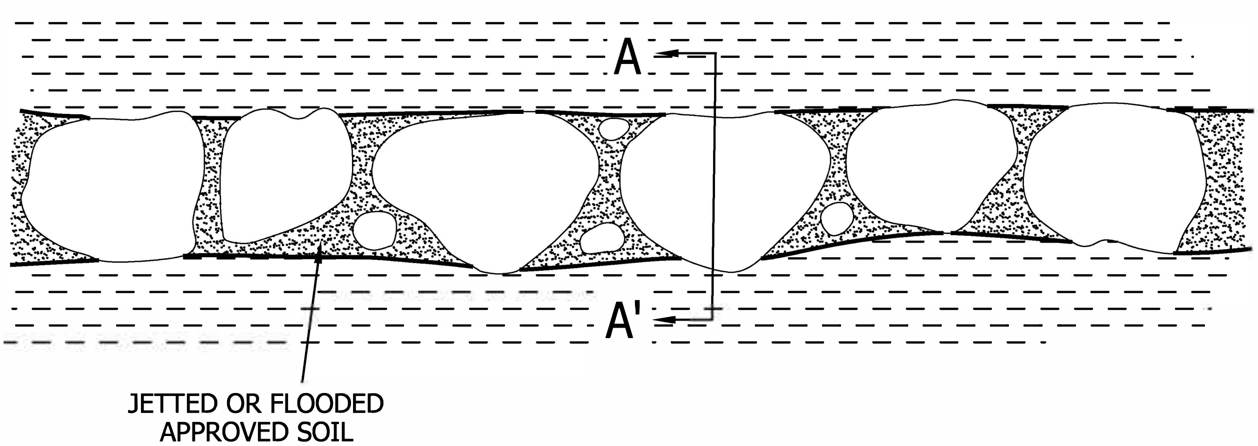


- Oversize rock is larger than 8 inches in largest dimension.
- Backfill with approved soil jetted or flooded in place to fill all the voids.
- Do not bury rock within 10 feet of finish grade.
- Windrow of buried rock shall be parallel to the finished slope face.

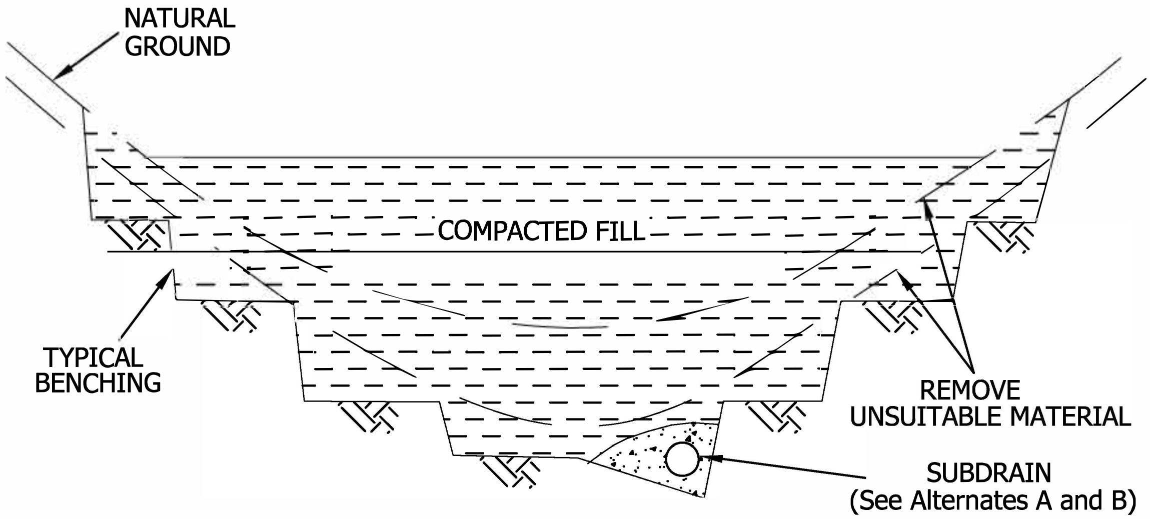


SECTION A-A'

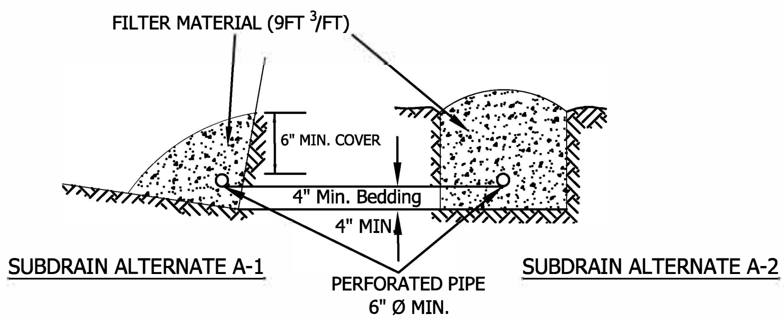
PROFILE ALONG WINDROW



OVERSIZE ROCK DISPOSAL	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS B	Leighton



SUBDRAIN ALTERNATE A

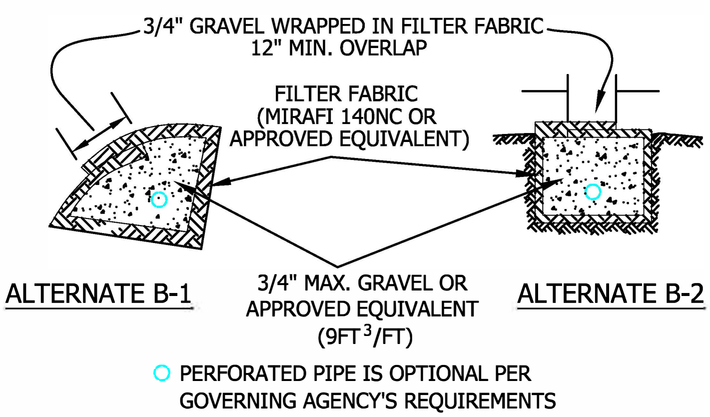


FILTER MATERIAL

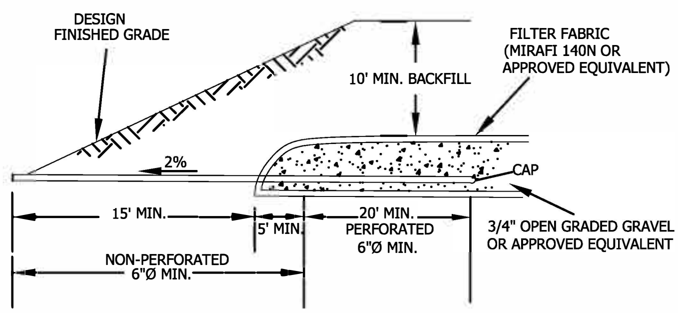
FILTER MATERIAL SHALL BE CLASS 2 PERMEABLE MATERIAL PER STATE OF CALIFORNIA STANDARD SPECIFICATION, OR APPROVED ALTERNATE. CLASS 2 GRADING AS FOLLOWS:

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

SUBDRAIN ALTERNATE B



DETAIL OF CANYON SUBDRAIN TERMINAL



CANYON SUBDRAIN	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS C	Leighton

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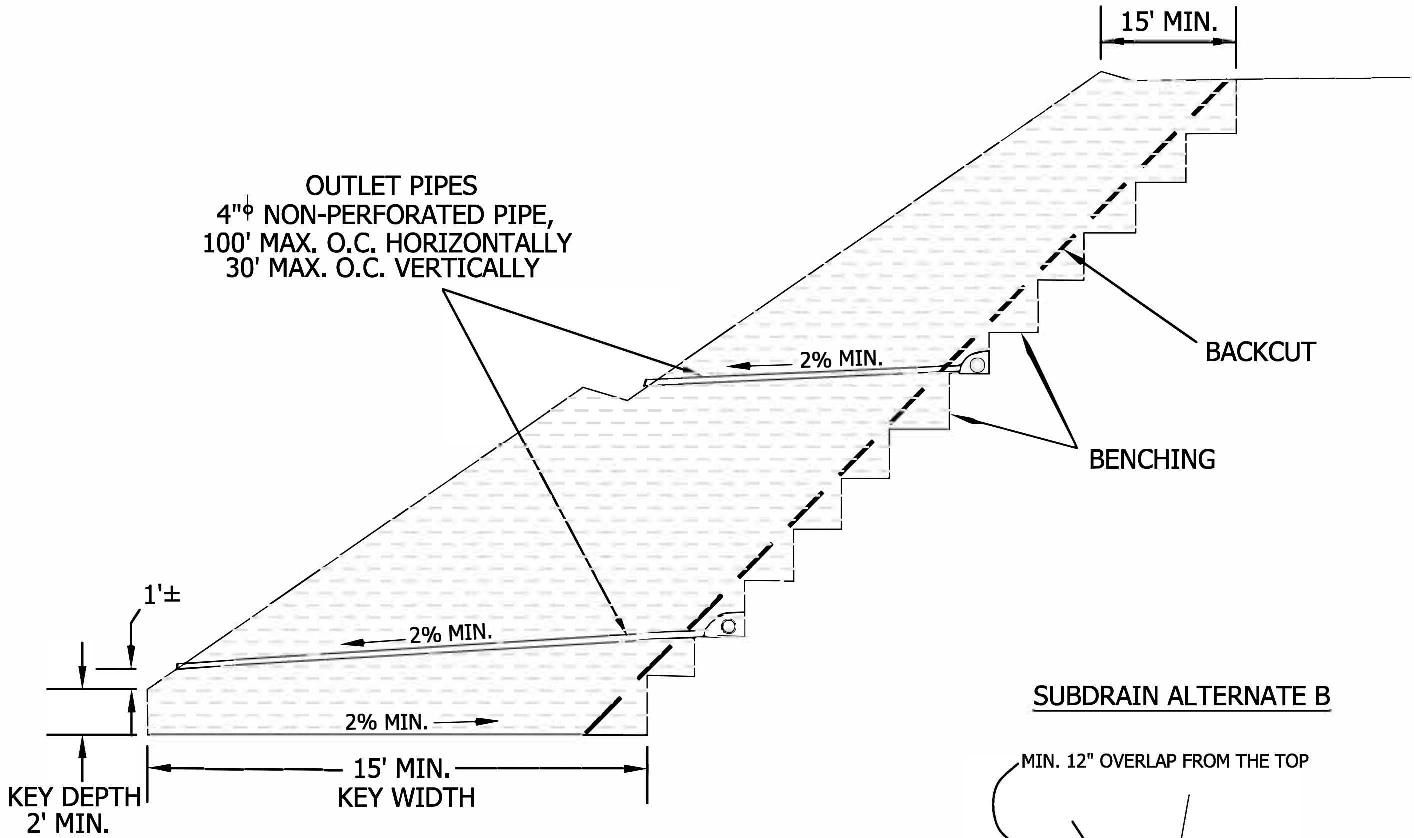
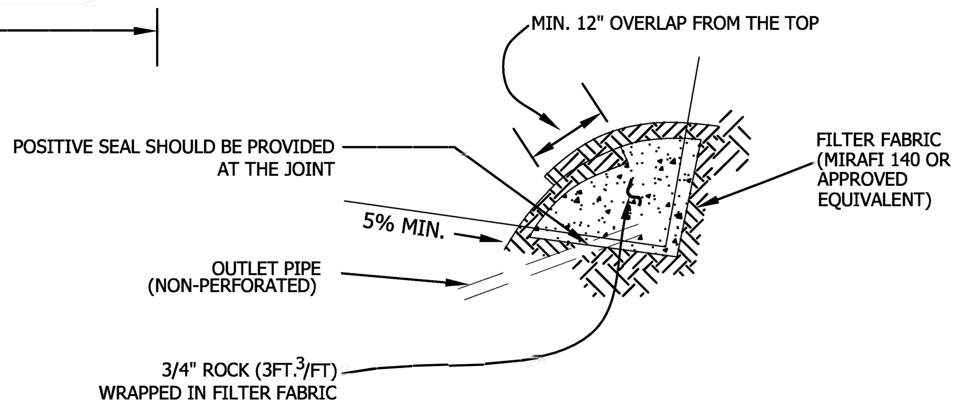
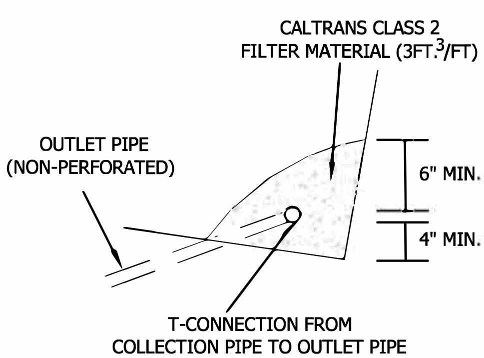


SUBDRAIN ALTERNATE B



SUBDRAIN ALTERNATE A



- SUBDRAIN INSTALLATION - Subdrain collector pipe shall be installed with perforations down or, unless otherwise designated by the geotechnical consultant. Outlet pipes shall be non-perforated pipe. The subdrain pipe shall have at least 8 perforations uniformly spaced per foot. Perforation shall be 1/4" to 1/2" if drilled holes are used. All subdrain pipes shall have a gradient at least 2% towards the outlet.
- SUBDRAIN PIPE - Subdrain pipe shall be ASTM D2751, ASTM D1527 (Schedule 40) or SDR 23.5 ABS pipe or ASTM D3034 (Schedule 40) or SDR 23.5 PVC pipe.
- All outlet pipe shall be placed in a trench and, after fill is placed above it, rodded to verify integrity.

BUTTRESS OR REPLACEMENT FILL SUBDRAINS	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS D	Leighton

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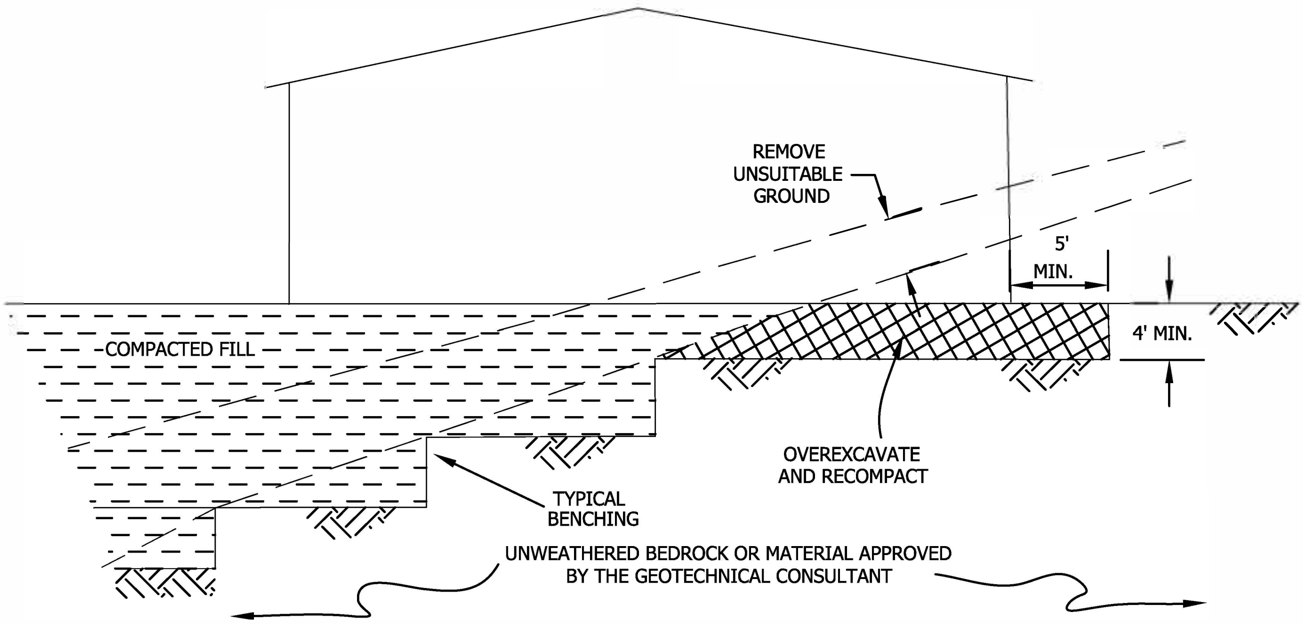
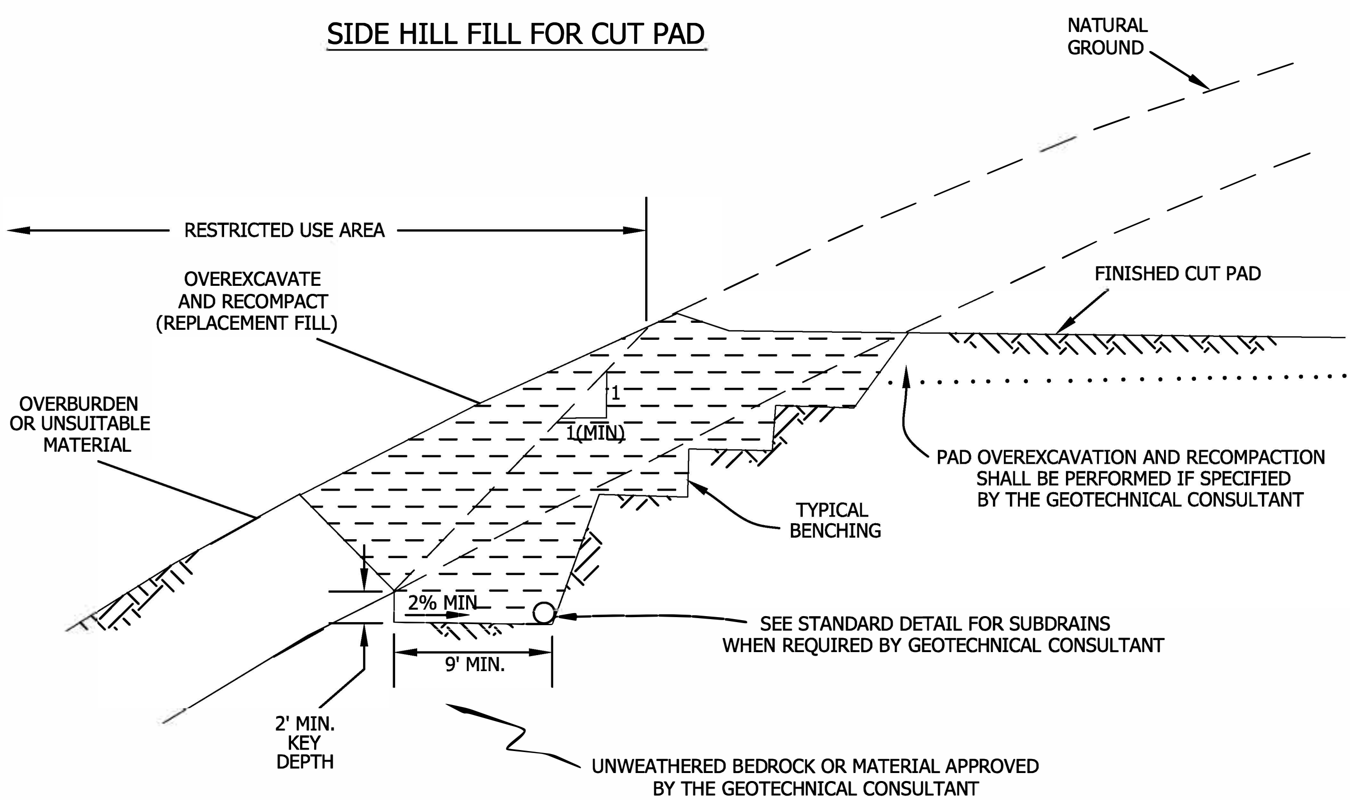
CUT-FILL TRANSITION LOT OVEREXCAVATION



SIDE HILL FILL FOR CUT PAD



TRANSITION LOT FILLS AND SIDE HILL FILLS	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS E	Leighton

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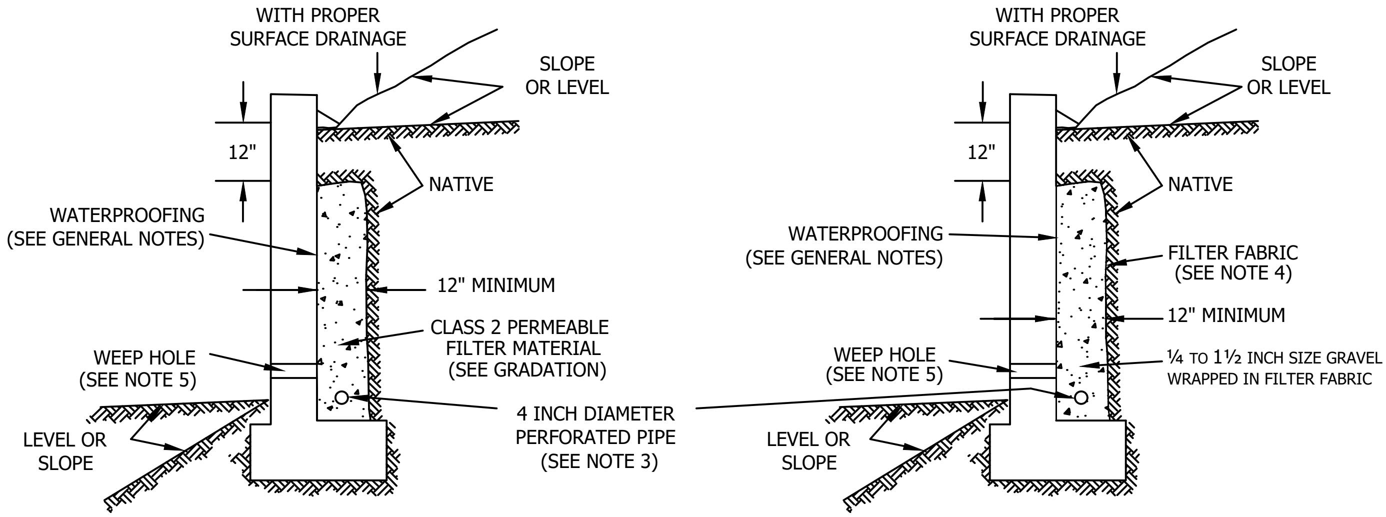
SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

OPTION 1: PIPE SURROUNDED WITH CLASS 2 PERMEABLE MATERIAL

OPTION 2: GRAVEL WRAPPED IN FILTER FABRIC



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL FOR WALLS 6 FEET OR LESS IN HEIGHT

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

Leighton

APPENDIX D

GBA - IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT

Important Information about This

Geotechnical-Engineering Report

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

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are <u>not</u> final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are <u>Not</u> Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will <u>not</u> of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are <u>not</u> building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

Appendix 4: Historical Site Conditions

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

Appendix 5: LID Infeasibility

N/A

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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: DRC Engineering, Inc. Date: 3/28/2022

Designed by: Kenny Hostetler Case No:

Company Project Number/Name: 20-750 Building B

BMP Identification

BMP NAME / ID: Watershed A/MWS A

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}= 0.60 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)*
A1	212,510	Roofs	1	0.89	189558.9			
A2	222,319	Concrete or Asphalt	1	0.89	198308.5			
A4	29,180	Ornamental Landscaping	0.1	0.11	3223.2			
A5	26,802	Ornamental Landscaping	0.1	0.11	2960.5			
A7	8,429	Ornamental Landscaping	0.1	0.11	931.1			
A8	5,363	Ornamental Landscaping	0.1	0.11	592.4			
A10	1,966	Concrete or Asphalt	1	0.89	1753.7			
A11	6,151	Ornamental Landscaping	0.1	0.11	679.4			
A12	21,434	Ornamental Landscaping	0.1	0.11	2367.6			
A14	1,813	Concrete or Asphalt	1	0.89	1617.2			
A16	14,092	Ornamental Landscaping	0.1	0.11	1556.6			
	550059	Total			403549.1	0.60	20177.5	22664

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: DRC Engineering, Inc. — Date: 3/28/2022

Designed by: Kenny Hostetler — Case No:

Company Project Number/Name: 20-750 Building B

BMP Identification

BMP NAME / ID: Watershed B/MWS B

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}= 0.60 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)*
B1	517,974	Roofs	1	0.89	462032.8			
B2	426,824	Concrete or Asphalt	1	0.89	380727			
B4	23,721	Ornamental Landscaping	0.1	0.11	2620.2			
B5	3,799	Ornamental Landscaping	0.1	0.11	419.6			
	972318	*Total*			845799.6	0.60	42290	45000

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: DRC Engineering, Inc.

Date: 3/28/2022

Designed by: Kenny Hostetler

Case No:

Company Project Number/Name: 20-750 Building B

BMP Identification

BMP NAME / ID: Watershed C/MWS C

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}= 0.60 inches

Drainage Management Area Tabulation

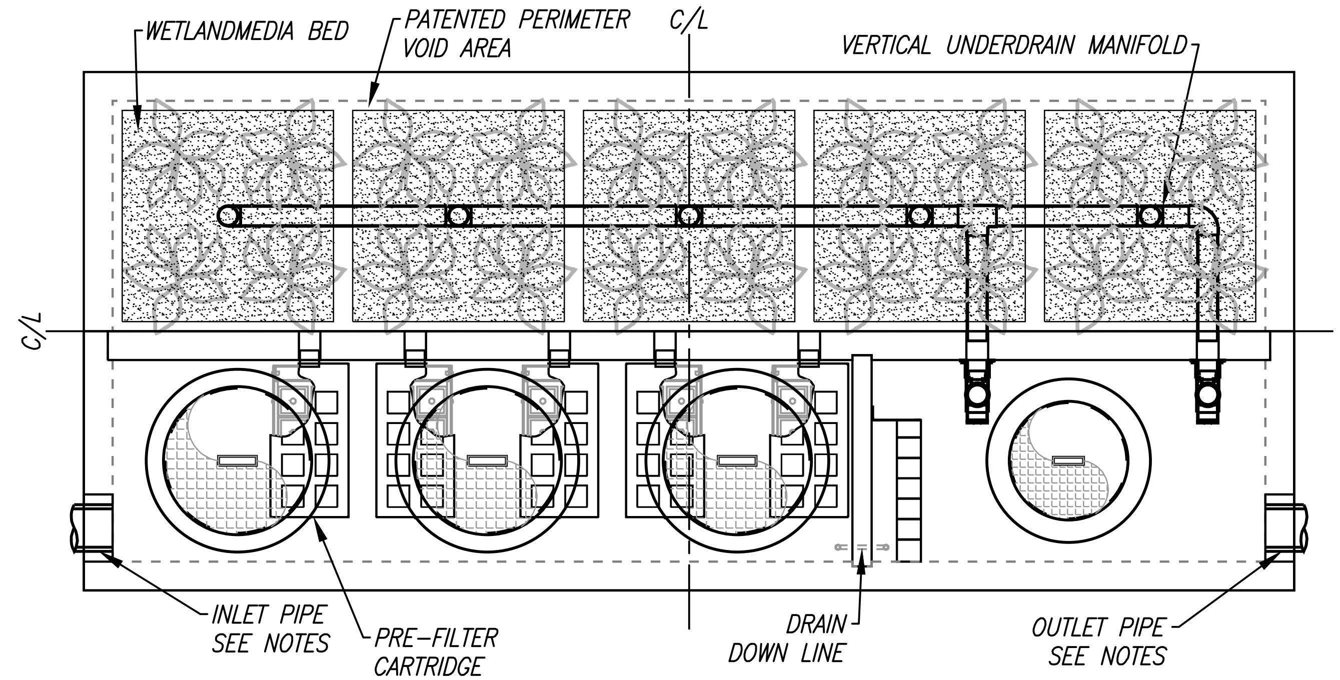
Insert additional rows if needed to accommodate all DMAs draining to the BMP

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)*
C1	*518,761*	*Roofs*	*1*	*0.89*	*462734.8*			
C2	*444,334*	*Concrete or Asphalt*	*1*	*0.89*	*396345.9*			
C3	*50,214*	*Ornamental Landscaping*	*0.1*	*0.11*	*5546.5*			
	1013309	**Total**			**864627.2**	**0.60**	**43231.4**	**45000**

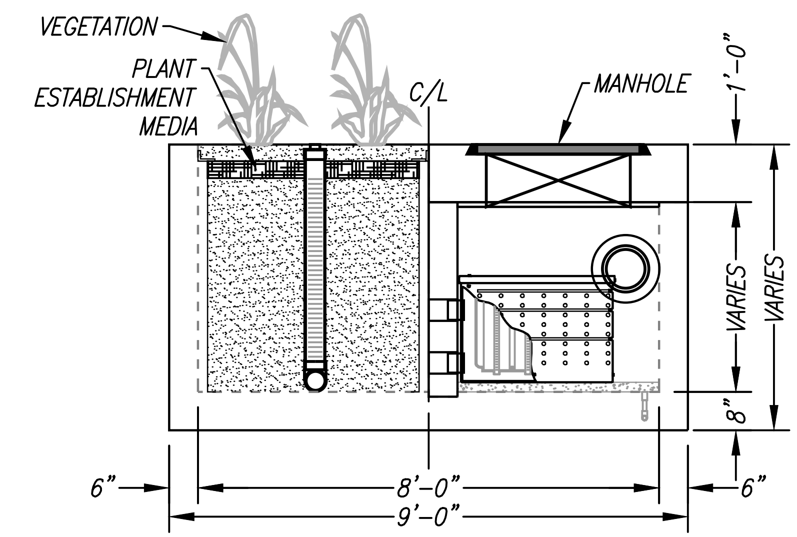
SITE SPECIFIC DATA

PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.577	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	3EA ø30"	OPEN PLANTER	ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



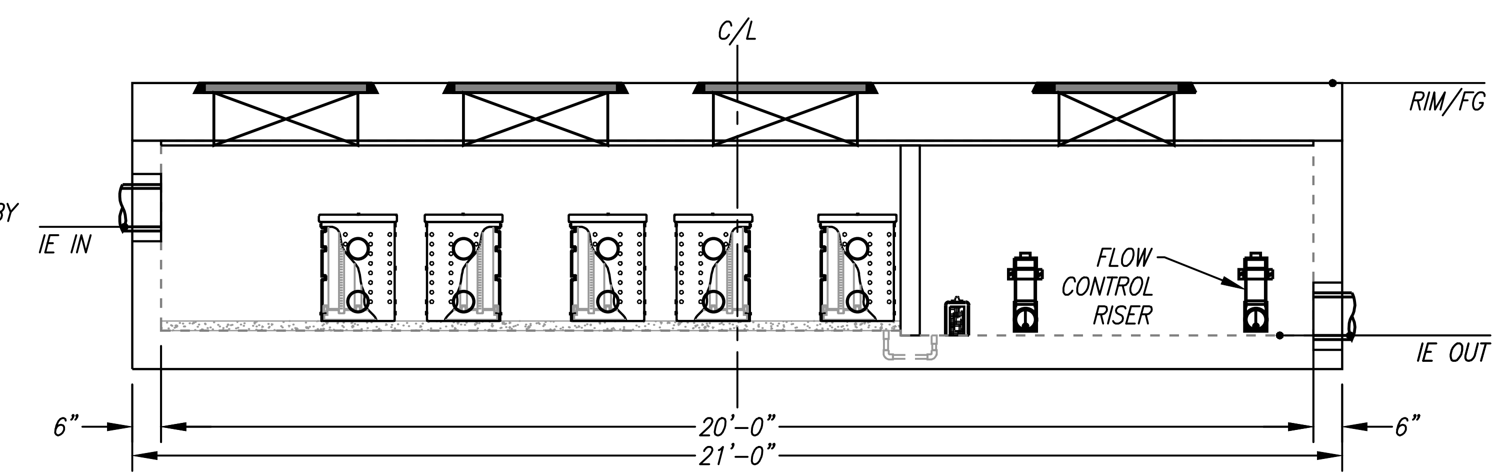
PLAN VIEW



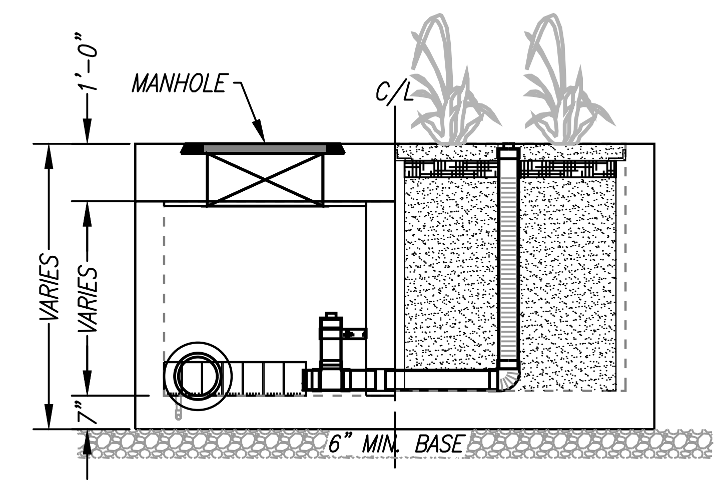
LEFT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.577
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.

MODULAR WETLANDS

Bio Clean
A Forterra Company

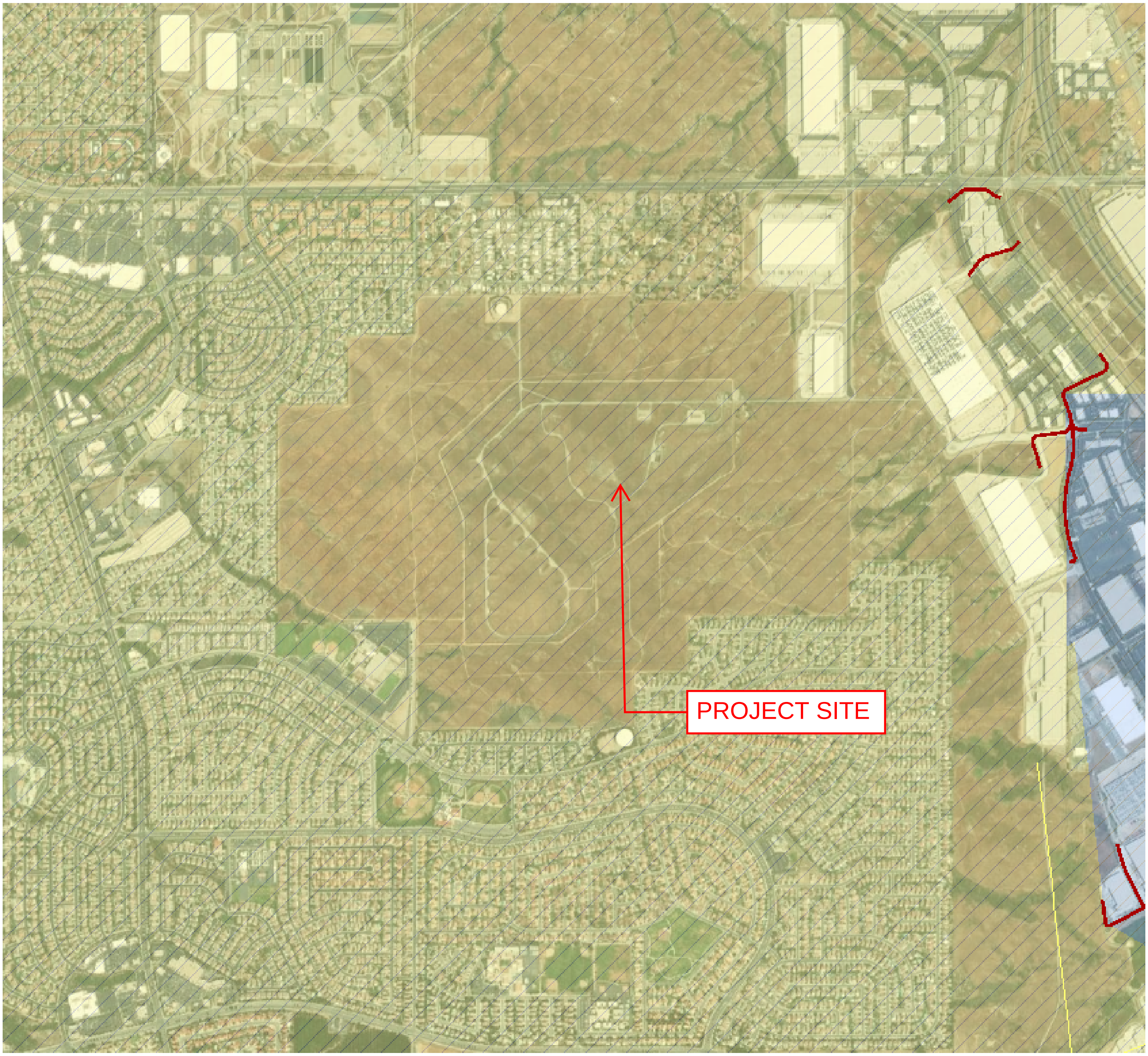
MWS-L-8-20-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

5/23/19TOLFE

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Riverside County SWCT²
Stormwater & Water Conservation Tracking Tool



☑ Hydromodification Exemption Areas

- Potentially Not Exempt
- Potentially Exempt

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

Study date 03/24/22 File: 20750BE242.out

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

Program License Serial Number 6310

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

English Units used in output format

20-750 Building B
Existing
2 year 24 hour

Drainage Area = 59.55(Ac.) = 0.093 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 59.55(Ac.) = 0.093 Sq. Mi.
Length along longest watercourse = 2433.00(Ft.)
Length along longest watercourse measured to centroid = 1195.00(Ft.)
Length along longest watercourse = 0.461 Mi.
Length along longest watercourse measured to centroid = 0.226 Mi.
Difference in elevation = 18.00(Ft.)
Slope along watercourse = 39.0629 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.152 Hr.
Lag time = 9.12 Min.
25% of lag time = 2.28 Min.
40% of lag time = 3.65 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]
59.55	1.60	95.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
59.55	4.00	238.20

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.600(In)
Area Averaged 100-Year Rainfall = 4.000(In)

Point rain (area averaged) = 1.600(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
59.550	77.00	0.000

Total Area Entered = 59.55(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
77.0	59.4	0.476	0.000	0.476	1.000	0.476
					Sum (F) =	0.476

Area averaged mean soil loss (F) (In/Hr) = 0.476
Minimum soil loss rate ((In/Hr)) = 0.238
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

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	54.826	7.085	4.252
2	0.167	109.653	30.101	18.065
3	0.250	164.479	28.058	16.839
4	0.333	219.305	11.440	6.865
5	0.417	274.132	6.420	3.853
6	0.500	328.958	4.417	2.651
7	0.583	383.785	3.196	1.918
8	0.667	438.611	2.314	1.389
9	0.750	493.437	1.749	1.050
10	0.833	548.264	1.477	0.887
11	0.917	603.090	1.106	0.664
12	1.000	657.916	0.863	0.518
13	1.083	712.743	0.629	0.377
14	1.167	767.569	0.548	0.329
15	1.250	822.395	0.598	0.359
			Sum = 100.000	Sum= 60.015

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	0.07	0.013	(0.844)	0.012	0.001
2	0.17	0.07	0.013	(0.841)	0.012	0.001
3	0.25	0.07	0.013	(0.838)	0.012	0.001
4	0.33	0.10	0.019	(0.834)	0.017	0.002

5	0.42	0.10	0.019	(0.831)	0.017	0.002
6	0.50	0.10	0.019	(0.828)	0.017	0.002
7	0.58	0.10	0.019	(0.825)	0.017	0.002
8	0.67	0.10	0.019	(0.821)	0.017	0.002
9	0.75	0.10	0.019	(0.818)	0.017	0.002
10	0.83	0.13	0.026	(0.815)	0.023	0.003
11	0.92	0.13	0.026	(0.812)	0.023	0.003
12	1.00	0.13	0.026	(0.808)	0.023	0.003
13	1.08	0.10	0.019	(0.805)	0.017	0.002
14	1.17	0.10	0.019	(0.802)	0.017	0.002
15	1.25	0.10	0.019	(0.799)	0.017	0.002
16	1.33	0.10	0.019	(0.796)	0.017	0.002
17	1.42	0.10	0.019	(0.793)	0.017	0.002
18	1.50	0.10	0.019	(0.789)	0.017	0.002
19	1.58	0.10	0.019	(0.786)	0.017	0.002
20	1.67	0.10	0.019	(0.783)	0.017	0.002
21	1.75	0.10	0.019	(0.780)	0.017	0.002
22	1.83	0.13	0.026	(0.777)	0.023	0.003
23	1.92	0.13	0.026	(0.774)	0.023	0.003
24	2.00	0.13	0.026	(0.771)	0.023	0.003
25	2.08	0.13	0.026	(0.767)	0.023	0.003
26	2.17	0.13	0.026	(0.764)	0.023	0.003
27	2.25	0.13	0.026	(0.761)	0.023	0.003
28	2.33	0.13	0.026	(0.758)	0.023	0.003
29	2.42	0.13	0.026	(0.755)	0.023	0.003
30	2.50	0.13	0.026	(0.752)	0.023	0.003
31	2.58	0.17	0.032	(0.749)	0.029	0.003
32	2.67	0.17	0.032	(0.746)	0.029	0.003
33	2.75	0.17	0.032	(0.743)	0.029	0.003
34	2.83	0.17	0.032	(0.740)	0.029	0.003
35	2.92	0.17	0.032	(0.737)	0.029	0.003
36	3.00	0.17	0.032	(0.734)	0.029	0.003
37	3.08	0.17	0.032	(0.731)	0.029	0.003
38	3.17	0.17	0.032	(0.728)	0.029	0.003
39	3.25	0.17	0.032	(0.724)	0.029	0.003
40	3.33	0.17	0.032	(0.721)	0.029	0.003
41	3.42	0.17	0.032	(0.718)	0.029	0.003
42	3.50	0.17	0.032	(0.715)	0.029	0.003
43	3.58	0.17	0.032	(0.712)	0.029	0.003
44	3.67	0.17	0.032	(0.709)	0.029	0.003
45	3.75	0.17	0.032	(0.706)	0.029	0.003
46	3.83	0.20	0.038	(0.704)	0.035	0.004
47	3.92	0.20	0.038	(0.701)	0.035	0.004
48	4.00	0.20	0.038	(0.698)	0.035	0.004
49	4.08	0.20	0.038	(0.695)	0.035	0.004
50	4.17	0.20	0.038	(0.692)	0.035	0.004
51	4.25	0.20	0.038	(0.689)	0.035	0.004
52	4.33	0.23	0.045	(0.686)	0.040	0.004
53	4.42	0.23	0.045	(0.683)	0.040	0.004
54	4.50	0.23	0.045	(0.680)	0.040	0.004
55	4.58	0.23	0.045	(0.677)	0.040	0.004
56	4.67	0.23	0.045	(0.674)	0.040	0.004
57	4.75	0.23	0.045	(0.671)	0.040	0.004
58	4.83	0.27	0.051	(0.668)	0.046	0.005
59	4.92	0.27	0.051	(0.665)	0.046	0.005
60	5.00	0.27	0.051	(0.663)	0.046	0.005
61	5.08	0.20	0.038	(0.660)	0.035	0.004
62	5.17	0.20	0.038	(0.657)	0.035	0.004
63	5.25	0.20	0.038	(0.654)	0.035	0.004
64	5.33	0.23	0.045	(0.651)	0.040	0.004

65	5.42	0.23	0.045	(0.648)	0.040	0.004
66	5.50	0.23	0.045	(0.645)	0.040	0.004
67	5.58	0.27	0.051	(0.643)	0.046	0.005
68	5.67	0.27	0.051	(0.640)	0.046	0.005
69	5.75	0.27	0.051	(0.637)	0.046	0.005
70	5.83	0.27	0.051	(0.634)	0.046	0.005
71	5.92	0.27	0.051	(0.631)	0.046	0.005
72	6.00	0.27	0.051	(0.628)	0.046	0.005
73	6.08	0.30	0.058	(0.626)	0.052	0.006
74	6.17	0.30	0.058	(0.623)	0.052	0.006
75	6.25	0.30	0.058	(0.620)	0.052	0.006
76	6.33	0.30	0.058	(0.617)	0.052	0.006
77	6.42	0.30	0.058	(0.615)	0.052	0.006
78	6.50	0.30	0.058	(0.612)	0.052	0.006
79	6.58	0.33	0.064	(0.609)	0.058	0.006
80	6.67	0.33	0.064	(0.606)	0.058	0.006
81	6.75	0.33	0.064	(0.604)	0.058	0.006
82	6.83	0.33	0.064	(0.601)	0.058	0.006
83	6.92	0.33	0.064	(0.598)	0.058	0.006
84	7.00	0.33	0.064	(0.595)	0.058	0.006
85	7.08	0.33	0.064	(0.593)	0.058	0.006
86	7.17	0.33	0.064	(0.590)	0.058	0.006
87	7.25	0.33	0.064	(0.587)	0.058	0.006
88	7.33	0.37	0.070	(0.585)	0.063	0.007
89	7.42	0.37	0.070	(0.582)	0.063	0.007
90	7.50	0.37	0.070	(0.579)	0.063	0.007
91	7.58	0.40	0.077	(0.577)	0.069	0.008
92	7.67	0.40	0.077	(0.574)	0.069	0.008
93	7.75	0.40	0.077	(0.571)	0.069	0.008
94	7.83	0.43	0.083	(0.569)	0.075	0.008
95	7.92	0.43	0.083	(0.566)	0.075	0.008
96	8.00	0.43	0.083	(0.563)	0.075	0.008
97	8.08	0.50	0.096	(0.561)	0.086	0.010
98	8.17	0.50	0.096	(0.558)	0.086	0.010
99	8.25	0.50	0.096	(0.556)	0.086	0.010
100	8.33	0.50	0.096	(0.553)	0.086	0.010
101	8.42	0.50	0.096	(0.550)	0.086	0.010
102	8.50	0.50	0.096	(0.548)	0.086	0.010
103	8.58	0.53	0.102	(0.545)	0.092	0.010
104	8.67	0.53	0.102	(0.543)	0.092	0.010
105	8.75	0.53	0.102	(0.540)	0.092	0.010
106	8.83	0.57	0.109	(0.538)	0.098	0.011
107	8.92	0.57	0.109	(0.535)	0.098	0.011
108	9.00	0.57	0.109	(0.533)	0.098	0.011
109	9.08	0.63	0.122	(0.530)	0.109	0.012
110	9.17	0.63	0.122	(0.528)	0.109	0.012
111	9.25	0.63	0.122	(0.525)	0.109	0.012
112	9.33	0.67	0.128	(0.523)	0.115	0.013
113	9.42	0.67	0.128	(0.520)	0.115	0.013
114	9.50	0.67	0.128	(0.518)	0.115	0.013
115	9.58	0.70	0.134	(0.515)	0.121	0.013
116	9.67	0.70	0.134	(0.513)	0.121	0.013
117	9.75	0.70	0.134	(0.510)	0.121	0.013
118	9.83	0.73	0.141	(0.508)	0.127	0.014
119	9.92	0.73	0.141	(0.505)	0.127	0.014
120	10.00	0.73	0.141	(0.503)	0.127	0.014
121	10.08	0.50	0.096	(0.500)	0.086	0.010
122	10.17	0.50	0.096	(0.498)	0.086	0.010
123	10.25	0.50	0.096	(0.496)	0.086	0.010
124	10.33	0.50	0.096	(0.493)	0.086	0.010

125	10.42	0.50	0.096	(0.491)	0.086	0.010
126	10.50	0.50	0.096	(0.488)	0.086	0.010
127	10.58	0.67	0.128	(0.486)	0.115	0.013
128	10.67	0.67	0.128	(0.484)	0.115	0.013
129	10.75	0.67	0.128	(0.481)	0.115	0.013
130	10.83	0.67	0.128	(0.479)	0.115	0.013
131	10.92	0.67	0.128	(0.476)	0.115	0.013
132	11.00	0.67	0.128	(0.474)	0.115	0.013
133	11.08	0.63	0.122	(0.472)	0.109	0.012
134	11.17	0.63	0.122	(0.469)	0.109	0.012
135	11.25	0.63	0.122	(0.467)	0.109	0.012
136	11.33	0.63	0.122	(0.465)	0.109	0.012
137	11.42	0.63	0.122	(0.463)	0.109	0.012
138	11.50	0.63	0.122	(0.460)	0.109	0.012
139	11.58	0.57	0.109	(0.458)	0.098	0.011
140	11.67	0.57	0.109	(0.456)	0.098	0.011
141	11.75	0.57	0.109	(0.453)	0.098	0.011
142	11.83	0.60	0.115	(0.451)	0.104	0.012
143	11.92	0.60	0.115	(0.449)	0.104	0.012
144	12.00	0.60	0.115	(0.447)	0.104	0.012
145	12.08	0.83	0.160	(0.444)	0.144	0.016
146	12.17	0.83	0.160	(0.442)	0.144	0.016
147	12.25	0.83	0.160	(0.440)	0.144	0.016
148	12.33	0.87	0.166	(0.438)	0.150	0.017
149	12.42	0.87	0.166	(0.436)	0.150	0.017
150	12.50	0.87	0.166	(0.433)	0.150	0.017
151	12.58	0.93	0.179	(0.431)	0.161	0.018
152	12.67	0.93	0.179	(0.429)	0.161	0.018
153	12.75	0.93	0.179	(0.427)	0.161	0.018
154	12.83	0.97	0.186	(0.425)	0.167	0.019
155	12.92	0.97	0.186	(0.423)	0.167	0.019
156	13.00	0.97	0.186	(0.420)	0.167	0.019
157	13.08	1.13	0.218	(0.418)	0.196	0.022
158	13.17	1.13	0.218	(0.416)	0.196	0.022
159	13.25	1.13	0.218	(0.414)	0.196	0.022
160	13.33	1.13	0.218	(0.412)	0.196	0.022
161	13.42	1.13	0.218	(0.410)	0.196	0.022
162	13.50	1.13	0.218	(0.408)	0.196	0.022
163	13.58	0.77	0.147	(0.406)	0.132	0.015
164	13.67	0.77	0.147	(0.404)	0.132	0.015
165	13.75	0.77	0.147	(0.402)	0.132	0.015
166	13.83	0.77	0.147	(0.400)	0.132	0.015
167	13.92	0.77	0.147	(0.398)	0.132	0.015
168	14.00	0.77	0.147	(0.395)	0.132	0.015
169	14.08	0.90	0.173	(0.393)	0.156	0.017
170	14.17	0.90	0.173	(0.391)	0.156	0.017
171	14.25	0.90	0.173	(0.389)	0.156	0.017
172	14.33	0.87	0.166	(0.387)	0.150	0.017
173	14.42	0.87	0.166	(0.385)	0.150	0.017
174	14.50	0.87	0.166	(0.384)	0.150	0.017
175	14.58	0.87	0.166	(0.382)	0.150	0.017
176	14.67	0.87	0.166	(0.380)	0.150	0.017
177	14.75	0.87	0.166	(0.378)	0.150	0.017
178	14.83	0.83	0.160	(0.376)	0.144	0.016
179	14.92	0.83	0.160	(0.374)	0.144	0.016
180	15.00	0.83	0.160	(0.372)	0.144	0.016
181	15.08	0.80	0.154	(0.370)	0.138	0.015
182	15.17	0.80	0.154	(0.368)	0.138	0.015
183	15.25	0.80	0.154	(0.366)	0.138	0.015
184	15.33	0.77	0.147	(0.364)	0.132	0.015

185	15.42	0.77	0.147	(0.362)	0.132	0.015
186	15.50	0.77	0.147	(0.361)	0.132	0.015
187	15.58	0.63	0.122	(0.359)	0.109	0.012
188	15.67	0.63	0.122	(0.357)	0.109	0.012
189	15.75	0.63	0.122	(0.355)	0.109	0.012
190	15.83	0.63	0.122	(0.353)	0.109	0.012
191	15.92	0.63	0.122	(0.351)	0.109	0.012
192	16.00	0.63	0.122	(0.350)	0.109	0.012
193	16.08	0.13	0.026	(0.348)	0.023	0.003
194	16.17	0.13	0.026	(0.346)	0.023	0.003
195	16.25	0.13	0.026	(0.344)	0.023	0.003
196	16.33	0.13	0.026	(0.343)	0.023	0.003
197	16.42	0.13	0.026	(0.341)	0.023	0.003
198	16.50	0.13	0.026	(0.339)	0.023	0.003
199	16.58	0.10	0.019	(0.337)	0.017	0.002
200	16.67	0.10	0.019	(0.336)	0.017	0.002
201	16.75	0.10	0.019	(0.334)	0.017	0.002
202	16.83	0.10	0.019	(0.332)	0.017	0.002
203	16.92	0.10	0.019	(0.331)	0.017	0.002
204	17.00	0.10	0.019	(0.329)	0.017	0.002
205	17.08	0.17	0.032	(0.327)	0.029	0.003
206	17.17	0.17	0.032	(0.326)	0.029	0.003
207	17.25	0.17	0.032	(0.324)	0.029	0.003
208	17.33	0.17	0.032	(0.322)	0.029	0.003
209	17.42	0.17	0.032	(0.321)	0.029	0.003
210	17.50	0.17	0.032	(0.319)	0.029	0.003
211	17.58	0.17	0.032	(0.317)	0.029	0.003
212	17.67	0.17	0.032	(0.316)	0.029	0.003
213	17.75	0.17	0.032	(0.314)	0.029	0.003
214	17.83	0.13	0.026	(0.313)	0.023	0.003
215	17.92	0.13	0.026	(0.311)	0.023	0.003
216	18.00	0.13	0.026	(0.310)	0.023	0.003
217	18.08	0.13	0.026	(0.308)	0.023	0.003
218	18.17	0.13	0.026	(0.307)	0.023	0.003
219	18.25	0.13	0.026	(0.305)	0.023	0.003
220	18.33	0.13	0.026	(0.304)	0.023	0.003
221	18.42	0.13	0.026	(0.302)	0.023	0.003
222	18.50	0.13	0.026	(0.301)	0.023	0.003
223	18.58	0.10	0.019	(0.299)	0.017	0.002
224	18.67	0.10	0.019	(0.298)	0.017	0.002
225	18.75	0.10	0.019	(0.296)	0.017	0.002
226	18.83	0.07	0.013	(0.295)	0.012	0.001
227	18.92	0.07	0.013	(0.294)	0.012	0.001
228	19.00	0.07	0.013	(0.292)	0.012	0.001
229	19.08	0.10	0.019	(0.291)	0.017	0.002
230	19.17	0.10	0.019	(0.289)	0.017	0.002
231	19.25	0.10	0.019	(0.288)	0.017	0.002
232	19.33	0.13	0.026	(0.287)	0.023	0.003
233	19.42	0.13	0.026	(0.285)	0.023	0.003
234	19.50	0.13	0.026	(0.284)	0.023	0.003
235	19.58	0.10	0.019	(0.283)	0.017	0.002
236	19.67	0.10	0.019	(0.281)	0.017	0.002
237	19.75	0.10	0.019	(0.280)	0.017	0.002
238	19.83	0.07	0.013	(0.279)	0.012	0.001
239	19.92	0.07	0.013	(0.278)	0.012	0.001
240	20.00	0.07	0.013	(0.276)	0.012	0.001
241	20.08	0.10	0.019	(0.275)	0.017	0.002
242	20.17	0.10	0.019	(0.274)	0.017	0.002
243	20.25	0.10	0.019	(0.273)	0.017	0.002
244	20.33	0.10	0.019	(0.272)	0.017	0.002

245	20.42	0.10	0.019	(0.271)	0.017	0.002
246	20.50	0.10	0.019	(0.269)	0.017	0.002
247	20.58	0.10	0.019	(0.268)	0.017	0.002
248	20.67	0.10	0.019	(0.267)	0.017	0.002
249	20.75	0.10	0.019	(0.266)	0.017	0.002
250	20.83	0.07	0.013	(0.265)	0.012	0.001
251	20.92	0.07	0.013	(0.264)	0.012	0.001
252	21.00	0.07	0.013	(0.263)	0.012	0.001
253	21.08	0.10	0.019	(0.262)	0.017	0.002
254	21.17	0.10	0.019	(0.261)	0.017	0.002
255	21.25	0.10	0.019	(0.260)	0.017	0.002
256	21.33	0.07	0.013	(0.259)	0.012	0.001
257	21.42	0.07	0.013	(0.258)	0.012	0.001
258	21.50	0.07	0.013	(0.257)	0.012	0.001
259	21.58	0.10	0.019	(0.256)	0.017	0.002
260	21.67	0.10	0.019	(0.255)	0.017	0.002
261	21.75	0.10	0.019	(0.254)	0.017	0.002
262	21.83	0.07	0.013	(0.253)	0.012	0.001
263	21.92	0.07	0.013	(0.252)	0.012	0.001
264	22.00	0.07	0.013	(0.251)	0.012	0.001
265	22.08	0.10	0.019	(0.251)	0.017	0.002
266	22.17	0.10	0.019	(0.250)	0.017	0.002
267	22.25	0.10	0.019	(0.249)	0.017	0.002
268	22.33	0.07	0.013	(0.248)	0.012	0.001
269	22.42	0.07	0.013	(0.247)	0.012	0.001
270	22.50	0.07	0.013	(0.247)	0.012	0.001
271	22.58	0.07	0.013	(0.246)	0.012	0.001
272	22.67	0.07	0.013	(0.245)	0.012	0.001
273	22.75	0.07	0.013	(0.245)	0.012	0.001
274	22.83	0.07	0.013	(0.244)	0.012	0.001
275	22.92	0.07	0.013	(0.243)	0.012	0.001
276	23.00	0.07	0.013	(0.243)	0.012	0.001
277	23.08	0.07	0.013	(0.242)	0.012	0.001
278	23.17	0.07	0.013	(0.242)	0.012	0.001
279	23.25	0.07	0.013	(0.241)	0.012	0.001
280	23.33	0.07	0.013	(0.241)	0.012	0.001
281	23.42	0.07	0.013	(0.240)	0.012	0.001
282	23.50	0.07	0.013	(0.240)	0.012	0.001
283	23.58	0.07	0.013	(0.239)	0.012	0.001
284	23.67	0.07	0.013	(0.239)	0.012	0.001
285	23.75	0.07	0.013	(0.239)	0.012	0.001
286	23.83	0.07	0.013	(0.238)	0.012	0.001
287	23.92	0.07	0.013	(0.238)	0.012	0.001
288	24.00	0.07	0.013	(0.238)	0.012	0.001

(Loss Rate Not Used)

Sum = 100.0 Sum = 1.9

Flood volume = Effective rainfall 0.16(In)
times area 59.5(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
Total soil loss = 1.44(In)
Total soil loss = 7.145(Ac.Ft)
Total rainfall = 1.60(In)
Flood volume = 34582.6 Cubic Feet
Total soil loss = 311243.6 Cubic Feet

Peak flow rate of this hydrograph = 1.279(CFS)

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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       0.0000      0.01  Q         |         |         |         |
  0+10       0.0002      0.03  Q         |         |         |         |
  0+15       0.0006      0.05  Q         |         |         |         |
  0+20       0.0010      0.06  Q         |         |         |         |
  0+25       0.0015      0.08  Q         |         |         |         |
  0+30       0.0022      0.09  Q         |         |         |         |
  0+35       0.0029      0.10  Q         |         |         |         |
  0+40       0.0036      0.10  Q         |         |         |         |
  0+45       0.0043      0.11  Q         |         |         |         |
  0+50       0.0051      0.11  Q         |         |         |         |
  0+55       0.0059      0.12  Q         |         |         |         |
  1+ 0       0.0069      0.14  Q         |         |         |         |
  1+ 5       0.0078      0.14  Q         |         |         |         |
  1+10       0.0087      0.13  Q         |         |         |         |
  1+15       0.0096      0.12  Q         |         |         |         |
  1+20       0.0104      0.12  Q         |         |         |         |
  1+25       0.0112      0.12  Q         |         |         |         |
  1+30       0.0121      0.12  Q         |         |         |         |
  1+35       0.0129      0.12  Q         |         |         |         |
  1+40       0.0137      0.12  Q         |         |         |         |
  1+45       0.0145      0.12  Q         |         |         |         |
  1+50       0.0153      0.12  Q         |         |         |         |
  1+55       0.0162      0.13  Q         |         |         |         |
  2+ 0       0.0172      0.14  Q         |         |         |         |
  2+ 5       0.0182      0.15  Q         |         |         |         |
  2+10       0.0192      0.15  Q         |         |         |         |
  2+15       0.0202      0.15  QV        |         |         |         |
  2+20       0.0212      0.15  QV        |         |         |         |
  2+25       0.0223      0.15  QV        |         |         |         |
  2+30       0.0233      0.15  QV        |         |         |         |
  2+35       0.0244      0.15  QV        |         |         |         |
  2+40       0.0255      0.17  QV        |         |         |         |
  2+45       0.0268      0.18  QV        |         |         |         |
  2+50       0.0280      0.18  QV        |         |         |         |
  2+55       0.0293      0.19  QV        |         |         |         |
  3+ 0       0.0306      0.19  QV        |         |         |         |
  3+ 5       0.0319      0.19  QV        |         |         |         |
  3+10       0.0332      0.19  QV        |         |         |         |
  3+15       0.0345      0.19  QV        |         |         |         |
  3+20       0.0358      0.19  QV        |         |         |         |
  3+25       0.0371      0.19  QV        |         |         |         |
  3+30       0.0384      0.19  QV        |         |         |         |
  3+35       0.0398      0.19  Q V       |         |         |         |
  3+40       0.0411      0.19  Q V       |         |         |         |
  3+45       0.0424      0.19  Q V       |         |         |         |
  3+50       0.0438      0.19  Q V       |         |         |         |
  3+55       0.0452      0.21  Q V       |         |         |         |
  4+ 0       0.0467      0.22  Q V       |         |         |         |
  4+ 5       0.0482      0.22  Q V       |         |         |         |
  4+10       0.0497      0.22  Q V       |         |         |         |
  4+15       0.0513      0.23  Q V       |         |         |         |
  4+20       0.0529      0.23  Q V       |         |         |         |
  4+25       0.0545      0.24  Q V       |         |         |         |
  4+30       0.0563      0.25  |QV       |         |         |         |
  4+35       0.0581      0.26  |QV       |         |         |         |
```

```
4+40       0.0599      0.26  |Q V      |         |         |         |
4+45       0.0617      0.26  |Q V      |         |         |         |
4+50       0.0635      0.27  |Q V      |         |         |         |
4+55       0.0655      0.28  |Q V      |         |         |         |
5+ 0       0.0675      0.29  |Q V      |         |         |         |
5+ 5       0.0695      0.29  |Q V      |         |         |         |
5+10       0.0714      0.27  |Q V      |         |         |         |
5+15       0.0731      0.25  |Q V      |         |         |         |
5+20       0.0748      0.25  Q  V      |         |         |         |
5+25       0.0765      0.25  |Q V      |         |         |         |
5+30       0.0784      0.26  |Q V      |         |         |         |
5+35       0.0802      0.27  |Q  V     |         |         |         |
5+40       0.0821      0.28  |Q  V     |         |         |         |
5+45       0.0842      0.29  |Q  V     |         |         |         |
5+50       0.0862      0.30  |Q  V     |         |         |         |
5+55       0.0883      0.30  |Q  V     |         |         |         |
6+ 0       0.0904      0.30  |Q  V     |         |         |         |
6+ 5       0.0925      0.31  |Q  V     |         |         |         |
6+10       0.0947      0.32  |Q  V     |         |         |         |
6+15       0.0969      0.33  |Q  V     |         |         |         |
6+20       0.0992      0.33  |Q  V     |         |         |         |
6+25       0.1016      0.34  |Q   V    |         |         |         |
6+30       0.1039      0.34  |Q   V    |         |         |         |
6+35       0.1063      0.34  |Q   V    |         |         |         |
6+40       0.1087      0.36  |Q   V    |         |         |         |
6+45       0.1113      0.37  |Q   V    |         |         |         |
6+50       0.1138      0.37  |Q   V    |         |         |         |
6+55       0.1164      0.38  |Q   V    |         |         |         |
7+ 0       0.1191      0.38  |Q   V    |         |         |         |
7+ 5       0.1217      0.38  |Q    V   |         |         |         |
7+10       0.1243      0.38  |Q    V   |         |         |         |
7+15       0.1269      0.38  |Q    V   |         |         |         |
7+20       0.1296      0.39  |Q    V   |         |         |         |
7+25       0.1323      0.40  |Q    V   |         |         |         |
7+30       0.1351      0.41  |Q    V   |         |         |         |
7+35       0.1380      0.42  |Q    V   |         |         |         |
7+40       0.1410      0.43  |Q     V  |         |         |         |
7+45       0.1440      0.44  |Q     V  |         |         |         |
7+50       0.1471      0.45  |Q     V  |         |         |         |
7+55       0.1503      0.47  |Q     V  |         |         |         |
8+ 0       0.1536      0.48  |Q     V  |         |         |         |
8+ 5       0.1570      0.49  |Q     V  |         |         |         |
8+10       0.1606      0.52  | Q     V |         |         |         |
8+15       0.1643      0.54  | Q     V |         |         |         |
8+20       0.1681      0.55  | Q     V |         |         |         |
8+25       0.1720      0.56  | Q     V |         |         |         |
8+30       0.1759      0.56  | Q     V |         |         |         |
8+35       0.1798      0.57  | Q      V|         |         |         |
8+40       0.1838      0.58  | Q      V|         |         |         |
8+45       0.1879      0.60  | Q      V|         |         |         |
8+50       0.1921      0.61  | Q      V|         |         |         |
8+55       0.1964      0.62  | Q      V|         |         |         |
9+ 0       0.2007      0.63  | Q       V         |         |         |
9+ 5       0.2052      0.65  | Q       V         |         |         |
9+10       0.2098      0.67  | Q       V         |         |         |
9+15       0.2146      0.70  | Q       V         |         |         |
9+20       0.2195      0.71  | Q       |V        |         |         |
9+25       0.2245      0.73  | Q       |V        |         |         |
9+30       0.2296      0.74  | Q       |V        |         |         |
9+35       0.2348      0.75  |  Q      |V        |         |         |
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 9+40       0.2401      0.77  |  Q      | V       |         |         |
 9+45       0.2455      0.78  |  Q      | V       |         |         |
 9+50       0.2510      0.79  |  Q      | V       |         |         |
 9+55       0.2565      0.81  |  Q      | V       |         |         |
10+ 0       0.2622      0.82  |  Q      |  V      |         |         |
10+ 5       0.2678      0.81  |  Q      |  V      |         |         |
10+10       0.2729      0.73  | Q       |  V      |         |         |
10+15       0.2774      0.66  | Q       |  V      |         |         |
10+20       0.2818      0.63  | Q       |   V     |         |         |
10+25       0.2861      0.62  | Q       |   V     |         |         |
10+30       0.2902      0.61  | Q       |   V     |         |         |
10+35       0.2945      0.61  | Q       |   V     |         |         |
10+40       0.2990      0.67  | Q       |    V    |         |         |
10+45       0.3040      0.72  | Q       |    V    |         |         |
10+50       0.3090      0.73  | Q       |    V    |         |         |
10+55       0.3141      0.74  | Q       |    V    |         |         |
11+ 0       0.3193      0.75  | Q       |     V   |         |         |
11+ 5       0.3245      0.75  |  Q      |     V   |         |         |
11+10       0.3296      0.74  | Q       |     V   |         |         |
11+15       0.3346      0.73  | Q       |     V   |         |         |
11+20       0.3397      0.73  | Q       |      V  |         |         |
11+25       0.3447      0.73  | Q       |      V  |         |         |
11+30       0.3497      0.73  | Q       |      V  |         |         |
11+35       0.3547      0.73  | Q       |      V  |         |         |
11+40       0.3596      0.70  | Q       |       V |         |         |
11+45       0.3643      0.68  | Q       |       V |         |         |
11+50       0.3689      0.68  | Q       |       V |         |         |
11+55       0.3736      0.68  | Q       |       V |         |         |
12+ 0       0.3784      0.69  | Q       |        V|         |         |
12+ 5       0.3833      0.71  | Q       |        V|         |         |
12+10       0.3887      0.79  |  Q      |        V|         |         |
12+15       0.3947      0.87  |  Q      |        V|         |         |
12+20       0.4009      0.90  |  Q      |         V         |         |
12+25       0.4073      0.93  |  Q      |         V         |         |
12+30       0.4138      0.95  |  Q      |         V         |         |
12+35       0.4205      0.97  |  Q      |         |V        |         |
12+40       0.4274      1.00  |   Q     |         |V        |         |
12+45       0.4345      1.03  |   Q     |         |V        |         |
12+50       0.4417      1.05  |   Q     |         | V       |         |
12+55       0.4490      1.07  |   Q     |         | V       |         |
13+ 0       0.4565      1.08  |   Q     |         |  V      |         |
13+ 5       0.4641      1.11  |   Q     |         |  V      |         |
13+10       0.4722      1.17  |   Q     |         |  V      |         |
13+15       0.4807      1.23  |   Q     |         |   V     |         |
13+20       0.4893      1.25  |    Q    |         |   V     |         |
13+25       0.4981      1.27  |    Q    |         |    V    |         |
13+30       0.5069      1.28  |    Q    |         |    V    |         |
13+35       0.5155      1.26  |    Q    |         |    V    |         |
13+40       0.5233      1.13  |   Q     |         |     V   |         |
13+45       0.5304      1.02  |   Q     |         |     V   |         |
13+50       0.5371      0.97  |  Q      |         |      V  |         |
13+55       0.5436      0.95  |  Q      |         |      V  |         |
14+ 0       0.5500      0.93  |  Q      |         |      V  |         |
14+ 5       0.5565      0.93  |  Q      |         |       V |         |
14+10       0.5631      0.97  |  Q      |         |       V |         |
14+15       0.5701      1.01  |   Q     |         |       V |         |
14+20       0.5771      1.01  |   Q     |         |        V|         |
14+25       0.5840      1.01  |   Q     |         |        V|         |
14+30       0.5909      1.00  |   Q     |         |        V|         |
14+35       0.5978      1.00  |  Q      |         |         V         |
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14+40       0.6046      1.00  |  Q      |         |         V         |
14+45       0.6115      1.00  |  Q      |         |         V         |
14+50       0.6183      0.99  |  Q      |         |         |V        |
14+55       0.6251      0.98  |  Q      |         |         |V        |
15+ 0       0.6318      0.97  |  Q      |         |         |V        |
15+ 5       0.6385      0.97  |  Q      |         |         | V       |
15+10       0.6450      0.95  |  Q      |         |         | V       |
15+15       0.6515      0.94  |  Q      |         |         | V       |
15+20       0.6579      0.93  |  Q      |         |         |  V      |
15+25       0.6643      0.92  |  Q      |         |         |  V      |
15+30       0.6705      0.90  |  Q      |         |         |  V      |
15+35       0.6766      0.89  |  Q      |         |         |   V     |
15+40       0.6824      0.84  |  Q      |         |         |   V     |
15+45       0.6878      0.79  |  Q      |         |         |   V     |
15+50       0.6931      0.77  |  Q      |         |         |   V     |
15+55       0.6983      0.76  |  Q      |         |         |    V    |
16+ 0       0.7035      0.75  |  Q      |         |         |    V    |
16+ 5       0.7084      0.71  | Q       |         |         |    V    |
16+10       0.7120      0.53  | Q       |         |         |    V    |
16+15       0.7145      0.36  |Q        |         |         |    V    |
16+20       0.7165      0.29  |Q        |         |         |     V   |
16+25       0.7183      0.26  |Q        |         |         |     V   |
16+30       0.7199      0.23  Q         |         |         |     V   |
16+35       0.7213      0.21  Q         |         |         |     V   |
16+40       0.7225      0.18  Q         |         |         |     V   |
16+45       0.7236      0.16  Q         |         |         |     V   |
16+50       0.7246      0.15  Q         |         |         |     V   |
16+55       0.7256      0.14  Q         |         |         |     V   |
17+ 0       0.7265      0.13  Q         |         |         |     V   |
17+ 5       0.7274      0.13  Q         |         |         |     V   |
17+10       0.7284      0.15  Q         |         |         |     V   |
17+15       0.7296      0.17  Q         |         |         |     V   |
17+20       0.7308      0.18  Q         |         |         |     V   |
17+25       0.7320      0.18  Q         |         |         |     V   |
17+30       0.7333      0.18  Q         |         |         |     V   |
17+35       0.7346      0.19  Q         |         |         |      V  |
17+40       0.7358      0.19  Q         |         |         |      V  |
17+45       0.7371      0.19  Q         |         |         |      V  |
17+50       0.7384      0.19  Q         |         |         |      V  |
17+55       0.7396      0.18  Q         |         |         |      V  |
18+ 0       0.7408      0.17  Q         |         |         |      V  |
18+ 5       0.7419      0.16  Q         |         |         |      V  |
18+10       0.7430      0.16  Q         |         |         |      V  |
18+15       0.7441      0.16  Q         |         |         |      V  |
18+20       0.7452      0.16  Q         |         |         |      V  |
18+25       0.7462      0.16  Q         |         |         |      V  |
18+30       0.7473      0.16  Q         |         |         |      V  |
18+35       0.7484      0.15  Q         |         |         |      V  |
18+40       0.7493      0.14  Q         |         |         |      V  |
18+45       0.7502      0.13  Q         |         |         |      V  |
18+50       0.7511      0.12  Q         |         |         |      V  |
18+55       0.7518      0.11  Q         |         |         |      V  |
19+ 0       0.7525      0.10  Q         |         |         |      V  |
19+ 5       0.7531      0.09  Q         |         |         |      V  |
19+10       0.7538      0.10  Q         |         |         |      V  |
19+15       0.7545      0.11  Q         |         |         |       V |
19+20       0.7553      0.11  Q         |         |         |       V |
19+25       0.7562      0.13  Q         |         |         |       V |
19+30       0.7571      0.14  Q         |         |         |       V |
19+35       0.7581      0.14  Q         |         |         |       V |
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19+40	0.7590	0.13	Q				V
19+45	0.7599	0.12	Q				V
19+50	0.7607	0.12	Q				V
19+55	0.7614	0.10	Q				V
20+ 0	0.7620	0.09	Q				V
20+ 5	0.7626	0.09	Q				V
20+10	0.7633	0.10	Q				V
20+15	0.7641	0.11	Q				V
20+20	0.7648	0.11	Q				V
20+25	0.7656	0.11	Q				V
20+30	0.7664	0.11	Q				V
20+35	0.7672	0.11	Q				V
20+40	0.7679	0.11	Q				V
20+45	0.7687	0.11	Q				V
20+50	0.7695	0.11	Q				V
20+55	0.7702	0.10	Q				V
21+ 0	0.7708	0.09	Q				V
21+ 5	0.7714	0.09	Q				V
21+10	0.7721	0.10	Q				V
21+15	0.7728	0.11	Q				V
21+20	0.7736	0.11	Q				V
21+25	0.7742	0.10	Q				V
21+30	0.7748	0.09	Q				V
21+35	0.7754	0.09	Q				V
21+40	0.7761	0.10	Q				V
21+45	0.7768	0.11	Q				V
21+50	0.7775	0.11	Q				V
21+55	0.7782	0.10	Q				V
22+ 0	0.7788	0.09	Q				V
22+ 5	0.7794	0.09	Q				V
22+10	0.7800	0.10	Q				V
22+15	0.7808	0.11	Q				V
22+20	0.7815	0.11	Q				V
22+25	0.7822	0.10	Q				V
22+30	0.7828	0.09	Q				V
22+35	0.7833	0.08	Q				V
22+40	0.7839	0.08	Q				V
22+45	0.7845	0.08	Q				V
22+50	0.7850	0.08	Q				V
22+55	0.7855	0.08	Q				V
23+ 0	0.7861	0.08	Q				V
23+ 5	0.7866	0.08	Q				V
23+10	0.7872	0.08	Q				V
23+15	0.7877	0.08	Q				V
23+20	0.7882	0.08	Q				V
23+25	0.7887	0.08	Q				V
23+30	0.7893	0.08	Q				V
23+35	0.7898	0.08	Q				V
23+40	0.7903	0.08	Q				V
23+45	0.7909	0.08	Q				V
23+50	0.7914	0.08	Q				V
23+55	0.7919	0.08	Q				V
24+ 0	0.7925	0.08	Q				V
24+ 5	0.7929	0.07	Q				V
24+10	0.7933	0.05	Q				V
24+15	0.7935	0.03	Q				V
24+20	0.7936	0.02	Q				V
24+25	0.7937	0.01	Q				V
24+30	0.7937	0.01	Q				V
24+35	0.7938	0.01	Q				V

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   24+40       0.7938       0.01  Q        |        |        |       V|
   24+45       0.7939       0.00  Q        |        |        |       V|
   24+50       0.7939       0.00  Q        |        |        |       V|
   24+55       0.7939       0.00  Q        |        |        |       V|
   25+ 0       0.7939       0.00  Q        |        |        |       V|
   25+ 5       0.7939       0.00  Q        |        |        |       V|
   25+10       0.7939       0.00  Q        |        |        |        V
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 03/24/22 File: 20750bpa242.out

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

Program License Serial Number 6310

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

English Units used in output format

20-750 Building B
Proposed - Area A
2 year 24 hour

Drainage Area = 13.00(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.00(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1009.00(Ft.)
Length along longest watercourse measured to centroid = 370.00(Ft.)
Length along longest watercourse = 0.191 Mi.
Length along longest watercourse measured to centroid = 0.070 Mi.
Difference in elevation = 12.70(Ft.)
Slope along watercourse = 66.4579 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.031 Hr.
Lag time = 1.89 Min.
25% of lag time = 0.47 Min.
40% of lag time = 0.76 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]
13.00	1.60	20.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.00	4.00	52.00

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.600(In)
Area Averaged 100-Year Rainfall = 4.000(In)

Point rain (area averaged) = 1.600(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.000	69.00	0.900

Total Area Entered = 13.00(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.900	0.109	1.000	0.109
					Sum (F) =	0.109

Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Note: User entry of the f value
Soil low loss rate (decimal) = 0.180

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	264.610	52.732	6.909
2	0.167	529.220	39.165	5.131
3	0.250	793.831	6.567	0.860
4	0.333	1058.441	1.536	0.201
			Sum = 100.000	Sum= 13.102

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	0.07	0.013	(0.065)	0.002	0.010
2	0.17	0.07	0.013	(0.065)	0.002	0.010
3	0.25	0.07	0.013	(0.065)	0.002	0.010
4	0.33	0.10	0.019	(0.065)	0.003	0.016
5	0.42	0.10	0.019	(0.064)	0.003	0.016
6	0.50	0.10	0.019	(0.064)	0.003	0.016
7	0.58	0.10	0.019	(0.064)	0.003	0.016
8	0.67	0.10	0.019	(0.064)	0.003	0.016
9	0.75	0.10	0.019	(0.063)	0.003	0.016
10	0.83	0.13	0.026	(0.063)	0.005	0.021
11	0.92	0.13	0.026	(0.063)	0.005	0.021
12	1.00	0.13	0.026	(0.063)	0.005	0.021
13	1.08	0.10	0.019	(0.062)	0.003	0.016
14	1.17	0.10	0.019	(0.062)	0.003	0.016

15	1.25	0.10	0.019	(0.062)	0.003	0.016
16	1.33	0.10	0.019	(0.062)	0.003	0.016
17	1.42	0.10	0.019	(0.061)	0.003	0.016
18	1.50	0.10	0.019	(0.061)	0.003	0.016
19	1.58	0.10	0.019	(0.061)	0.003	0.016
20	1.67	0.10	0.019	(0.061)	0.003	0.016
21	1.75	0.10	0.019	(0.060)	0.003	0.016
22	1.83	0.13	0.026	(0.060)	0.005	0.021
23	1.92	0.13	0.026	(0.060)	0.005	0.021
24	2.00	0.13	0.026	(0.060)	0.005	0.021
25	2.08	0.13	0.026	(0.059)	0.005	0.021
26	2.17	0.13	0.026	(0.059)	0.005	0.021
27	2.25	0.13	0.026	(0.059)	0.005	0.021
28	2.33	0.13	0.026	(0.059)	0.005	0.021
29	2.42	0.13	0.026	(0.058)	0.005	0.021
30	2.50	0.13	0.026	(0.058)	0.005	0.021
31	2.58	0.17	0.032	(0.058)	0.006	0.026
32	2.67	0.17	0.032	(0.058)	0.006	0.026
33	2.75	0.17	0.032	(0.057)	0.006	0.026
34	2.83	0.17	0.032	(0.057)	0.006	0.026
35	2.92	0.17	0.032	(0.057)	0.006	0.026
36	3.00	0.17	0.032	(0.057)	0.006	0.026
37	3.08	0.17	0.032	(0.057)	0.006	0.026
38	3.17	0.17	0.032	(0.056)	0.006	0.026
39	3.25	0.17	0.032	(0.056)	0.006	0.026
40	3.33	0.17	0.032	(0.056)	0.006	0.026
41	3.42	0.17	0.032	(0.056)	0.006	0.026
42	3.50	0.17	0.032	(0.055)	0.006	0.026
43	3.58	0.17	0.032	(0.055)	0.006	0.026
44	3.67	0.17	0.032	(0.055)	0.006	0.026
45	3.75	0.17	0.032	(0.055)	0.006	0.026
46	3.83	0.20	0.038	(0.054)	0.007	0.031
47	3.92	0.20	0.038	(0.054)	0.007	0.031
48	4.00	0.20	0.038	(0.054)	0.007	0.031
49	4.08	0.20	0.038	(0.054)	0.007	0.031
50	4.17	0.20	0.038	(0.054)	0.007	0.031
51	4.25	0.20	0.038	(0.053)	0.007	0.031
52	4.33	0.23	0.045	(0.053)	0.008	0.037
53	4.42	0.23	0.045	(0.053)	0.008	0.037
54	4.50	0.23	0.045	(0.053)	0.008	0.037
55	4.58	0.23	0.045	(0.052)	0.008	0.037
56	4.67	0.23	0.045	(0.052)	0.008	0.037
57	4.75	0.23	0.045	(0.052)	0.008	0.037
58	4.83	0.27	0.051	(0.052)	0.009	0.042
59	4.92	0.27	0.051	(0.051)	0.009	0.042
60	5.00	0.27	0.051	(0.051)	0.009	0.042
61	5.08	0.20	0.038	(0.051)	0.007	0.031
62	5.17	0.20	0.038	(0.051)	0.007	0.031
63	5.25	0.20	0.038	(0.051)	0.007	0.031
64	5.33	0.23	0.045	(0.050)	0.008	0.037
65	5.42	0.23	0.045	(0.050)	0.008	0.037
66	5.50	0.23	0.045	(0.050)	0.008	0.037
67	5.58	0.27	0.051	(0.050)	0.009	0.042
68	5.67	0.27	0.051	(0.049)	0.009	0.042
69	5.75	0.27	0.051	(0.049)	0.009	0.042
70	5.83	0.27	0.051	(0.049)	0.009	0.042
71	5.92	0.27	0.051	(0.049)	0.009	0.042
72	6.00	0.27	0.051	(0.049)	0.009	0.042
73	6.08	0.30	0.058	(0.048)	0.010	0.047
74	6.17	0.30	0.058	(0.048)	0.010	0.047

75	6.25	0.30	0.058	(0.048)	0.010	0.047
76	6.33	0.30	0.058	(0.048)	0.010	0.047
77	6.42	0.30	0.058	(0.048)	0.010	0.047
78	6.50	0.30	0.058	(0.047)	0.010	0.047
79	6.58	0.33	0.064	(0.047)	0.012	0.052
80	6.67	0.33	0.064	(0.047)	0.012	0.052
81	6.75	0.33	0.064	(0.047)	0.012	0.052
82	6.83	0.33	0.064	(0.046)	0.012	0.052
83	6.92	0.33	0.064	(0.046)	0.012	0.052
84	7.00	0.33	0.064	(0.046)	0.012	0.052
85	7.08	0.33	0.064	(0.046)	0.012	0.052
86	7.17	0.33	0.064	(0.046)	0.012	0.052
87	7.25	0.33	0.064	(0.045)	0.012	0.052
88	7.33	0.37	0.070	(0.045)	0.013	0.058
89	7.42	0.37	0.070	(0.045)	0.013	0.058
90	7.50	0.37	0.070	(0.045)	0.013	0.058
91	7.58	0.40	0.077	(0.045)	0.014	0.063
92	7.67	0.40	0.077	(0.044)	0.014	0.063
93	7.75	0.40	0.077	(0.044)	0.014	0.063
94	7.83	0.43	0.083	(0.044)	0.015	0.068
95	7.92	0.43	0.083	(0.044)	0.015	0.068
96	8.00	0.43	0.083	(0.044)	0.015	0.068
97	8.08	0.50	0.096	(0.043)	0.017	0.079
98	8.17	0.50	0.096	(0.043)	0.017	0.079
99	8.25	0.50	0.096	(0.043)	0.017	0.079
100	8.33	0.50	0.096	(0.043)	0.017	0.079
101	8.42	0.50	0.096	(0.043)	0.017	0.079
102	8.50	0.50	0.096	(0.042)	0.017	0.079
103	8.58	0.53	0.102	(0.042)	0.018	0.084
104	8.67	0.53	0.102	(0.042)	0.018	0.084
105	8.75	0.53	0.102	(0.042)	0.018	0.084
106	8.83	0.57	0.109	(0.042)	0.020	0.089
107	8.92	0.57	0.109	(0.041)	0.020	0.089
108	9.00	0.57	0.109	(0.041)	0.020	0.089
109	9.08	0.63	0.122	(0.041)	0.022	0.100
110	9.17	0.63	0.122	(0.041)	0.022	0.100
111	9.25	0.63	0.122	(0.041)	0.022	0.100
112	9.33	0.67	0.128	(0.040)	0.023	0.105
113	9.42	0.67	0.128	(0.040)	0.023	0.105
114	9.50	0.67	0.128	(0.040)	0.023	0.105
115	9.58	0.70	0.134	(0.040)	0.024	0.110
116	9.67	0.70	0.134	(0.040)	0.024	0.110
117	9.75	0.70	0.134	(0.039)	0.024	0.110
118	9.83	0.73	0.141	(0.039)	0.025	0.115
119	9.92	0.73	0.141	(0.039)	0.025	0.115
120	10.00	0.73	0.141	(0.039)	0.025	0.115
121	10.08	0.50	0.096	(0.039)	0.017	0.079
122	10.17	0.50	0.096	(0.039)	0.017	0.079
123	10.25	0.50	0.096	(0.038)	0.017	0.079
124	10.33	0.50	0.096	(0.038)	0.017	0.079
125	10.42	0.50	0.096	(0.038)	0.017	0.079
126	10.50	0.50	0.096	(0.038)	0.017	0.079
127	10.58	0.67	0.128	(0.038)	0.023	0.105
128	10.67	0.67	0.128	(0.037)	0.023	0.105
129	10.75	0.67	0.128	(0.037)	0.023	0.105
130	10.83	0.67	0.128	(0.037)	0.023	0.105
131	10.92	0.67	0.128	(0.037)	0.023	0.105
132	11.00	0.67	0.128	(0.037)	0.023	0.105
133	11.08	0.63	0.122	(0.036)	0.022	0.100
134	11.17	0.63	0.122	(0.036)	0.022	0.100

135	11.25	0.63	0.122	(0.036)	0.022	0.100
136	11.33	0.63	0.122	(0.036)	0.022	0.100
137	11.42	0.63	0.122	(0.036)	0.022	0.100
138	11.50	0.63	0.122	(0.036)	0.022	0.100
139	11.58	0.57	0.109	(0.035)	0.020	0.089
140	11.67	0.57	0.109	(0.035)	0.020	0.089
141	11.75	0.57	0.109	(0.035)	0.020	0.089
142	11.83	0.60	0.115	(0.035)	0.021	0.094
143	11.92	0.60	0.115	(0.035)	0.021	0.094
144	12.00	0.60	0.115	(0.035)	0.021	0.094
145	12.08	0.83	0.160	(0.034)	0.029	0.131
146	12.17	0.83	0.160	(0.034)	0.029	0.131
147	12.25	0.83	0.160	(0.034)	0.029	0.131
148	12.33	0.87	0.166	(0.034)	0.030	0.136
149	12.42	0.87	0.166	(0.034)	0.030	0.136
150	12.50	0.87	0.166	(0.034)	0.030	0.136
151	12.58	0.93	0.179	(0.033)	0.032	0.147
152	12.67	0.93	0.179	(0.033)	0.032	0.147
153	12.75	0.93	0.179	(0.033)	0.032	0.147
154	12.83	0.97	0.186	0.033	(0.033)	0.153
155	12.92	0.97	0.186	0.033	(0.033)	0.153
156	13.00	0.97	0.186	0.033	(0.033)	0.153
157	13.08	1.13	0.218	0.032	(0.039)	0.185
158	13.17	1.13	0.218	0.032	(0.039)	0.185
159	13.25	1.13	0.218	0.032	(0.039)	0.186
160	13.33	1.13	0.218	0.032	(0.039)	0.186
161	13.42	1.13	0.218	0.032	(0.039)	0.186
162	13.50	1.13	0.218	0.032	(0.039)	0.186
163	13.58	0.77	0.147	(0.031)	0.026	0.121
164	13.67	0.77	0.147	(0.031)	0.026	0.121
165	13.75	0.77	0.147	(0.031)	0.026	0.121
166	13.83	0.77	0.147	(0.031)	0.026	0.121
167	13.92	0.77	0.147	(0.031)	0.026	0.121
168	14.00	0.77	0.147	(0.031)	0.026	0.121
169	14.08	0.90	0.173	0.030	(0.031)	0.142
170	14.17	0.90	0.173	0.030	(0.031)	0.143
171	14.25	0.90	0.173	0.030	(0.031)	0.143
172	14.33	0.87	0.166	(0.030)	0.030	0.136
173	14.42	0.87	0.166	0.030	(0.030)	0.137
174	14.50	0.87	0.166	0.030	(0.030)	0.137
175	14.58	0.87	0.166	0.030	(0.030)	0.137
176	14.67	0.87	0.166	0.029	(0.030)	0.137
177	14.75	0.87	0.166	0.029	(0.030)	0.137
178	14.83	0.83	0.160	(0.029)	0.029	0.131
179	14.92	0.83	0.160	(0.029)	0.029	0.131
180	15.00	0.83	0.160	0.029	(0.029)	0.131
181	15.08	0.80	0.154	(0.029)	0.028	0.126
182	15.17	0.80	0.154	(0.028)	0.028	0.126
183	15.25	0.80	0.154	(0.028)	0.028	0.126
184	15.33	0.77	0.147	(0.028)	0.026	0.121
185	15.42	0.77	0.147	(0.028)	0.026	0.121
186	15.50	0.77	0.147	(0.028)	0.026	0.121
187	15.58	0.63	0.122	(0.028)	0.022	0.100
188	15.67	0.63	0.122	(0.028)	0.022	0.100
189	15.75	0.63	0.122	(0.027)	0.022	0.100
190	15.83	0.63	0.122	(0.027)	0.022	0.100
191	15.92	0.63	0.122	(0.027)	0.022	0.100
192	16.00	0.63	0.122	(0.027)	0.022	0.100
193	16.08	0.13	0.026	(0.027)	0.005	0.021
194	16.17	0.13	0.026	(0.027)	0.005	0.021

195	16.25	0.13	0.026	(0.027)	0.005	0.021
196	16.33	0.13	0.026	(0.026)	0.005	0.021
197	16.42	0.13	0.026	(0.026)	0.005	0.021
198	16.50	0.13	0.026	(0.026)	0.005	0.021
199	16.58	0.10	0.019	(0.026)	0.003	0.016
200	16.67	0.10	0.019	(0.026)	0.003	0.016
201	16.75	0.10	0.019	(0.026)	0.003	0.016
202	16.83	0.10	0.019	(0.026)	0.003	0.016
203	16.92	0.10	0.019	(0.026)	0.003	0.016
204	17.00	0.10	0.019	(0.025)	0.003	0.016
205	17.08	0.17	0.032	(0.025)	0.006	0.026
206	17.17	0.17	0.032	(0.025)	0.006	0.026
207	17.25	0.17	0.032	(0.025)	0.006	0.026
208	17.33	0.17	0.032	(0.025)	0.006	0.026
209	17.42	0.17	0.032	(0.025)	0.006	0.026
210	17.50	0.17	0.032	(0.025)	0.006	0.026
211	17.58	0.17	0.032	(0.025)	0.006	0.026
212	17.67	0.17	0.032	(0.024)	0.006	0.026
213	17.75	0.17	0.032	(0.024)	0.006	0.026
214	17.83	0.13	0.026	(0.024)	0.005	0.021
215	17.92	0.13	0.026	(0.024)	0.005	0.021
216	18.00	0.13	0.026	(0.024)	0.005	0.021
217	18.08	0.13	0.026	(0.024)	0.005	0.021
218	18.17	0.13	0.026	(0.024)	0.005	0.021
219	18.25	0.13	0.026	(0.024)	0.005	0.021
220	18.33	0.13	0.026	(0.023)	0.005	0.021
221	18.42	0.13	0.026	(0.023)	0.005	0.021
222	18.50	0.13	0.026	(0.023)	0.005	0.021
223	18.58	0.10	0.019	(0.023)	0.003	0.016
224	18.67	0.10	0.019	(0.023)	0.003	0.016
225	18.75	0.10	0.019	(0.023)	0.003	0.016
226	18.83	0.07	0.013	(0.023)	0.002	0.010
227	18.92	0.07	0.013	(0.023)	0.002	0.010
228	19.00	0.07	0.013	(0.023)	0.002	0.010
229	19.08	0.10	0.019	(0.022)	0.003	0.016
230	19.17	0.10	0.019	(0.022)	0.003	0.016
231	19.25	0.10	0.019	(0.022)	0.003	0.016
232	19.33	0.13	0.026	(0.022)	0.005	0.021
233	19.42	0.13	0.026	(0.022)	0.005	0.021
234	19.50	0.13	0.026	(0.022)	0.005	0.021
235	19.58	0.10	0.019	(0.022)	0.003	0.016
236	19.67	0.10	0.019	(0.022)	0.003	0.016
237	19.75	0.10	0.019	(0.022)	0.003	0.016
238	19.83	0.07	0.013	(0.022)	0.002	0.010
239	19.92	0.07	0.013	(0.021)	0.002	0.010
240	20.00	0.07	0.013	(0.021)	0.002	0.010
241	20.08	0.10	0.019	(0.021)	0.003	0.016
242	20.17	0.10	0.019	(0.021)	0.003	0.016
243	20.25	0.10	0.019	(0.021)	0.003	0.016
244	20.33	0.10	0.019	(0.021)	0.003	0.016
245	20.42	0.10	0.019	(0.021)	0.003	0.016
246	20.50	0.10	0.019	(0.021)	0.003	0.016
247	20.58	0.10	0.019	(0.021)	0.003	0.016
248	20.67	0.10	0.019	(0.021)	0.003	0.016
249	20.75	0.10	0.019	(0.021)	0.003	0.016
250	20.83	0.07	0.013	(0.020)	0.002	0.010
251	20.92	0.07	0.013	(0.020)	0.002	0.010
252	21.00	0.07	0.013	(0.020)	0.002	0.010
253	21.08	0.10	0.019	(0.020)	0.003	0.016
254	21.17	0.10	0.019	(0.020)	0.003	0.016

255	21.25	0.10	0.019	(0.020)	0.003	0.016
256	21.33	0.07	0.013	(0.020)	0.002	0.010
257	21.42	0.07	0.013	(0.020)	0.002	0.010
258	21.50	0.07	0.013	(0.020)	0.002	0.010
259	21.58	0.10	0.019	(0.020)	0.003	0.016
260	21.67	0.10	0.019	(0.020)	0.003	0.016
261	21.75	0.10	0.019	(0.020)	0.003	0.016
262	21.83	0.07	0.013	(0.020)	0.002	0.010
263	21.92	0.07	0.013	(0.020)	0.002	0.010
264	22.00	0.07	0.013	(0.019)	0.002	0.010
265	22.08	0.10	0.019	(0.019)	0.003	0.016
266	22.17	0.10	0.019	(0.019)	0.003	0.016
267	22.25	0.10	0.019	(0.019)	0.003	0.016
268	22.33	0.07	0.013	(0.019)	0.002	0.010
269	22.42	0.07	0.013	(0.019)	0.002	0.010
270	22.50	0.07	0.013	(0.019)	0.002	0.010
271	22.58	0.07	0.013	(0.019)	0.002	0.010
272	22.67	0.07	0.013	(0.019)	0.002	0.010
273	22.75	0.07	0.013	(0.019)	0.002	0.010
274	22.83	0.07	0.013	(0.019)	0.002	0.010
275	22.92	0.07	0.013	(0.019)	0.002	0.010
276	23.00	0.07	0.013	(0.019)	0.002	0.010
277	23.08	0.07	0.013	(0.019)	0.002	0.010
278	23.17	0.07	0.013	(0.019)	0.002	0.010
279	23.25	0.07	0.013	(0.019)	0.002	0.010
280	23.33	0.07	0.013	(0.019)	0.002	0.010
281	23.42	0.07	0.013	(0.019)	0.002	0.010
282	23.50	0.07	0.013	(0.019)	0.002	0.010
283	23.58	0.07	0.013	(0.019)	0.002	0.010
284	23.67	0.07	0.013	(0.018)	0.002	0.010
285	23.75	0.07	0.013	(0.018)	0.002	0.010
286	23.83	0.07	0.013	(0.018)	0.002	0.010
287	23.92	0.07	0.013	(0.018)	0.002	0.010
288	24.00	0.07	0.013	(0.018)	0.002	0.010

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.8

Flood volume = Effective rainfall 1.32(In)
times area 13.0(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 0.28(In)
Total soil loss = 0.307(Ac.Ft)
Total rainfall = 1.60(In)
Flood volume = 62108.9 Cubic Feet
Total soil loss = 13393.2 Cubic Feet

Peak flow rate of this hydrograph = 2.438(CFS)

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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	0.0005	0.07	Q	|	|	|	|
0+10	0.0014	0.13	Q	|	|	|	|
0+15	0.0023	0.14	Q	|	|	|	|
0+20	0.0035	0.17	Q	|	|	|	|
0+25	0.0049	0.20	Q	|	|	|	|

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0+30       0.0063      0.21  Q         |         |         |         |
0+35       0.0077      0.21  Q         |         |         |         |
0+40       0.0091      0.21  Q         |         |         |         |
0+45       0.0106      0.21  Q         |         |         |         |
0+50       0.0122      0.24  Q         |         |         |         |
0+55       0.0141      0.27  VQ        |         |         |         |
1+ 0       0.0160      0.27  VQ        |         |         |         |
1+ 5       0.0176      0.24  Q         |         |         |         |
1+10       0.0191      0.21  Q         |         |         |         |
1+15       0.0205      0.21  Q         |         |         |         |
1+20       0.0219      0.21  Q         |         |         |         |
1+25       0.0234      0.21  Q         |         |         |         |
1+30       0.0248      0.21  Q         |         |         |         |
1+35       0.0262      0.21  Q         |         |         |         |
1+40       0.0276      0.21  Q         |         |         |         |
1+45       0.0290      0.21  Q         |         |         |         |
1+50       0.0307      0.24  Q         |         |         |         |
1+55       0.0326      0.27  VQ        |         |         |         |
2+ 0       0.0345      0.27  VQ        |         |         |         |
2+ 5       0.0363      0.28  |Q        |         |         |         |
2+10       0.0382      0.28  |Q        |         |         |         |
2+15       0.0401      0.28  |Q        |         |         |         |
2+20       0.0420      0.28  |Q        |         |         |         |
2+25       0.0439      0.28  |Q        |         |         |         |
2+30       0.0458      0.28  |Q        |         |         |         |
2+35       0.0480      0.31  |Q        |         |         |         |
2+40       0.0503      0.34  |Q        |         |         |         |
2+45       0.0527      0.34  |Q        |         |         |         |
2+50       0.0550      0.34  |Q        |         |         |         |
2+55       0.0574      0.34  |Q        |         |         |         |
3+ 0       0.0598      0.34  |Q        |         |         |         |
3+ 5       0.0621      0.34  |Q        |         |         |         |
3+10       0.0645      0.34  |Q        |         |         |         |
3+15       0.0669      0.34  |Q        |         |         |         |
3+20       0.0692      0.34  |Q        |         |         |         |
3+25       0.0716      0.34  |QV       |         |         |         |
3+30       0.0740      0.34  |QV       |         |         |         |
3+35       0.0763      0.34  |QV       |         |         |         |
3+40       0.0787      0.34  |QV       |         |         |         |
3+45       0.0811      0.34  |QV       |         |         |         |
3+50       0.0837      0.38  |QV       |         |         |         |
3+55       0.0865      0.41  |QV       |         |         |         |
4+ 0       0.0893      0.41  |QV       |         |         |         |
4+ 5       0.0922      0.41  |QV       |         |         |         |
4+10       0.0950      0.41  |QV       |         |         |         |
4+15       0.0979      0.41  |QV       |         |         |         |
4+20       0.1010      0.45  |QV       |         |         |         |
4+25       0.1042      0.48  |QV       |         |         |         |
4+30       0.1076      0.48  |Q V      |         |         |         |
4+35       0.1109      0.48  |Q V      |         |         |         |
4+40       0.1142      0.48  |Q V      |         |         |         |
4+45       0.1175      0.48  |Q V      |         |         |         |
4+50       0.1211      0.52  | QV      |         |         |         |
4+55       0.1248      0.54  | QV      |         |         |         |
5+ 0       0.1286      0.55  | QV      |         |         |         |
5+ 5       0.1319      0.48  |Q V      |         |         |         |
5+10       0.1348      0.42  |Q V      |         |         |         |
5+15       0.1377      0.41  |Q V      |         |         |         |
5+20       0.1408      0.45  |Q V      |         |         |         |
5+25       0.1440      0.48  |Q  V     |         |         |         |
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 5+30       0.1473      0.48  |Q  V     |         |         |         |
 5+35       0.1509      0.52  | Q V     |         |         |         |
 5+40       0.1547      0.54  | Q V     |         |         |         |
 5+45       0.1584      0.55  | Q V     |         |         |         |
 5+50       0.1622      0.55  | Q V     |         |         |         |
 5+55       0.1660      0.55  | Q V     |         |         |         |
 6+ 0       0.1698      0.55  | Q V     |         |         |         |
 6+ 5       0.1739      0.59  | Q V     |         |         |         |
 6+10       0.1781      0.61  | Q V     |         |         |         |
 6+15       0.1823      0.62  | Q  V    |         |         |         |
 6+20       0.1866      0.62  | Q  V    |         |         |         |
 6+25       0.1909      0.62  | Q  V    |         |         |         |
 6+30       0.1951      0.62  | Q  V    |         |         |         |
 6+35       0.1996      0.66  | Q  V    |         |         |         |
 6+40       0.2043      0.68  | Q  V    |         |         |         |
 6+45       0.2091      0.69  | Q  V    |         |         |         |
 6+50       0.2138      0.69  | Q  V    |         |         |         |
 6+55       0.2186      0.69  | Q   V   |         |         |         |
 7+ 0       0.2233      0.69  | Q   V   |         |         |         |
 7+ 5       0.2280      0.69  | Q   V   |         |         |         |
 7+10       0.2328      0.69  | Q   V   |         |         |         |
 7+15       0.2375      0.69  | Q   V   |         |         |         |
 7+20       0.2425      0.72  | Q   V   |         |         |         |
 7+25       0.2477      0.75  |  Q  V   |         |         |         |
 7+30       0.2529      0.76  |  Q   V  |         |         |         |
 7+35       0.2583      0.79  |  Q   V  |         |         |         |
 7+40       0.2640      0.82  |  Q   V  |         |         |         |
 7+45       0.2697      0.82  |  Q   V  |         |         |         |
 7+50       0.2756      0.86  |  Q   V  |         |         |         |
 7+55       0.2817      0.89  |  Q   V  |         |         |         |
 8+ 0       0.2879      0.89  |  Q    V |         |         |         |
 8+ 5       0.2945      0.97  |  Q    V |         |         |         |
 8+10       0.3015      1.02  |   Q   V |         |         |         |
 8+15       0.3086      1.03  |   Q   V |         |         |         |
 8+20       0.3157      1.03  |   Q   V |         |         |         |
 8+25       0.3229      1.03  |   Q    V|         |         |         |
 8+30       0.3300      1.03  |   Q    V|         |         |         |
 8+35       0.3373      1.07  |   Q    V|         |         |         |
 8+40       0.3449      1.10  |   Q    V|         |         |         |
 8+45       0.3524      1.10  |   Q    V|         |         |         |
 8+50       0.3603      1.14  |   Q     V         |         |         |
 8+55       0.3683      1.16  |   Q     V         |         |         |
 9+ 0       0.3763      1.17  |   Q     V         |         |         |
 9+ 5       0.3849      1.24  |   Q     V         |         |         |
 9+10       0.3938      1.30  |    Q    |V        |         |         |
 9+15       0.4028      1.30  |    Q    |V        |         |         |
 9+20       0.4120      1.34  |    Q    |V        |         |         |
 9+25       0.4215      1.37  |    Q    |V        |         |         |
 9+30       0.4309      1.37  |    Q    | V       |         |         |
 9+35       0.4407      1.41  |    Q    | V       |         |         |
 9+40       0.4506      1.44  |    Q    | V       |         |         |
 9+45       0.4605      1.44  |    Q    | V       |         |         |
 9+50       0.4707      1.48  |    Q    |  V      |         |         |
 9+55       0.4811      1.51  |     Q   |  V      |         |         |
10+ 0       0.4915      1.51  |     Q   |  V      |         |         |
10+ 5       0.5002      1.26  |    Q    |   V     |         |         |
10+10       0.5076      1.07  |   Q     |   V     |         |         |
10+15       0.5147      1.04  |   Q     |   V     |         |         |
10+20       0.5218      1.03  |   Q     |   V     |         |         |
10+25       0.5289      1.03  |   Q     |   V     |         |         |
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10+30       0.5360      1.03  |   Q     |    V    |         |         |
10+35       0.5444      1.21  |   Q     |    V    |         |         |
10+40       0.5537      1.35  |    Q    |    V    |         |         |
10+45       0.5631      1.37  |    Q    |    V    |         |         |
10+50       0.5726      1.38  |    Q    |     V   |         |         |
10+55       0.5821      1.38  |    Q    |     V   |         |         |
11+ 0       0.5916      1.38  |    Q    |     V   |         |         |
11+ 5       0.6008      1.34  |    Q    |     V   |         |         |
11+10       0.6098      1.31  |    Q    |      V  |         |         |
11+15       0.6188      1.31  |    Q    |      V  |         |         |
11+20       0.6278      1.31  |    Q    |      V  |         |         |
11+25       0.6368      1.31  |    Q    |      V  |         |         |
11+30       0.6458      1.31  |    Q    |       V |         |         |
11+35       0.6543      1.23  |   Q     |       V |         |         |
11+40       0.6625      1.18  |   Q     |       V |         |         |
11+45       0.6705      1.17  |   Q     |       V |         |         |
11+50       0.6788      1.21  |   Q     |        V|         |         |
11+55       0.6873      1.23  |   Q     |        V|         |         |
12+ 0       0.6958      1.24  |   Q     |        V|         |         |
12+ 5       0.7061      1.49  |    Q    |        V|         |         |
12+10       0.7177      1.68  |     Q   |         V         |         |
12+15       0.7295      1.71  |     Q   |         V         |         |
12+20       0.7416      1.76  |      Q  |         V         |         |
12+25       0.7539      1.78  |      Q  |         |V        |         |
12+30       0.7662      1.79  |      Q  |         |V        |         |
12+35       0.7790      1.86  |      Q  |         |V        |         |
12+40       0.7922      1.91  |      Q  |         | V       |         |
12+45       0.8054      1.92  |      Q  |         | V       |         |
12+50       0.8190      1.97  |      Q  |         | V       |         |
12+55       0.8327      2.00  |      Q  |         |  V      |         |
13+ 0       0.8465      2.00  |       Q |         |  V      |         |
13+ 5       0.8619      2.23  |       Q |         |   V     |         |
13+10       0.8784      2.40  |        Q|         |   V     |         |
13+15       0.8951      2.42  |        Q|         |    V    |         |
13+20       0.9118      2.43  |        Q|         |    V    |         |
13+25       0.9286      2.44  |        Q|         |     V   |         |
13+30       0.9454      2.44  |        Q|         |     V   |         |
13+35       0.9591      1.99  |      Q  |         |     V   |         |
13+40       0.9705      1.65  |     Q   |         |      V  |         |
13+45       0.9814      1.60  |     Q   |         |      V  |         |
13+50       0.9923      1.58  |     Q   |         |      V  |         |
13+55       1.0032      1.58  |     Q   |         |       V |         |
14+ 0       1.0141      1.58  |     Q   |         |       V |         |
14+ 5       1.0261      1.73  |     Q   |         |       V |         |
14+10       1.0388      1.84  |      Q  |         |        V|         |
14+15       1.0516      1.86  |      Q  |         |        V|         |
14+20       1.0642      1.83  |      Q  |         |        V|         |
14+25       1.0766      1.80  |      Q  |         |         V         |
14+30       1.0889      1.79  |      Q  |         |         V         |
14+35       1.1012      1.79  |      Q  |         |         V         |
14+40       1.1136      1.80  |      Q  |         |         |V        |
14+45       1.1260      1.80  |      Q  |         |         |V        |
14+50       1.1381      1.76  |      Q  |         |         |V        |
14+55       1.1500      1.73  |     Q   |         |         | V       |
15+ 0       1.1618      1.72  |     Q   |         |         | V       |
15+ 5       1.1734      1.68  |     Q   |         |         | V       |
15+10       1.1848      1.66  |     Q   |         |         |  V      |
15+15       1.1962      1.65  |     Q   |         |         |  V      |
15+20       1.2073      1.61  |     Q   |         |         |  V      |
15+25       1.2183      1.59  |     Q   |         |         |   V     |
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15+30       1.2292      1.58  |     Q   |         |         |   V     |
15+35       1.2391      1.44  |    Q    |         |         |   V     |
15+40       1.2482      1.33  |    Q    |         |         |    V    |
15+45       1.2573      1.31  |    Q    |         |         |    V    |
15+50       1.2663      1.31  |    Q    |         |         |    V    |
15+55       1.2753      1.31  |    Q    |         |         |    V    |
16+ 0       1.2843      1.31  |    Q    |         |         |     V   |
16+ 5       1.2895      0.76  |  Q      |         |         |     V   |
16+10       1.2920      0.36  |Q        |         |         |     V   |
16+15       1.2940      0.29  |Q        |         |         |     V   |
16+20       1.2959      0.28  |Q        |         |         |     V   |
16+25       1.2978      0.28  |Q        |         |         |     V   |
16+30       1.2997      0.28  |Q        |         |         |     V   |
16+35       1.3013      0.24  Q         |         |         |     V   |
16+40       1.3028      0.21  Q         |         |         |     V   |
16+45       1.3042      0.21  Q         |         |         |     V   |
16+50       1.3056      0.21  Q         |         |         |     V   |
16+55       1.3070      0.21  Q         |         |         |     V   |
17+ 0       1.3085      0.21  Q         |         |         |     V   |
17+ 5       1.3104      0.28  |Q        |         |         |     V   |
17+10       1.3127      0.33  |Q        |         |         |     V   |
17+15       1.3150      0.34  |Q        |         |         |     V   |
17+20       1.3174      0.34  |Q        |         |         |     V   |
17+25       1.3198      0.34  |Q        |         |         |      V  |
17+30       1.3221      0.34  |Q        |         |         |      V  |
17+35       1.3245      0.34  |Q        |         |         |      V  |
17+40       1.3269      0.34  |Q        |         |         |      V  |
17+45       1.3292      0.34  |Q        |         |         |      V  |
17+50       1.3314      0.31  |Q        |         |         |      V  |
17+55       1.3333      0.28  |Q        |         |         |      V  |
18+ 0       1.3352      0.28  |Q        |         |         |      V  |
18+ 5       1.3371      0.28  |Q        |         |         |      V  |
18+10       1.3390      0.28  |Q        |         |         |      V  |
18+15       1.3409      0.28  |Q        |         |         |      V  |
18+20       1.3428      0.28  |Q        |         |         |      V  |
18+25       1.3447      0.28  |Q        |         |         |      V  |
18+30       1.3466      0.28  |Q        |         |         |      V  |
18+35       1.3482      0.24  Q         |         |         |      V  |
18+40       1.3497      0.21  Q         |         |         |      V  |
18+45       1.3511      0.21  Q         |         |         |      V  |
18+50       1.3523      0.17  Q         |         |         |      V  |
18+55       1.3533      0.14  Q         |         |         |      V  |
19+ 0       1.3542      0.14  Q         |         |         |      V  |
19+ 5       1.3554      0.17  Q         |         |         |       V |
19+10       1.3568      0.20  Q         |         |         |       V |
19+15       1.3582      0.21  Q         |         |         |       V |
19+20       1.3599      0.24  Q         |         |         |       V |
19+25       1.3617      0.27  |Q        |         |         |       V |
19+30       1.3636      0.27  |Q        |         |         |       V |
19+35       1.3653      0.24  Q         |         |         |       V |
19+40       1.3667      0.21  Q         |         |         |       V |
19+45       1.3682      0.21  Q         |         |         |       V |
19+50       1.3693      0.17  Q         |         |         |       V |
19+55       1.3703      0.14  Q         |         |         |       V |
20+ 0       1.3713      0.14  Q         |         |         |       V |
20+ 5       1.3725      0.17  Q         |         |         |       V |
20+10       1.3739      0.20  Q         |         |         |       V |
20+15       1.3753      0.21  Q         |         |         |       V |
20+20       1.3767      0.21  Q         |         |         |       V |
20+25       1.3781      0.21  Q         |         |         |       V |
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20+30	1.3795	0.21	Q	|	|	|	V |
20+35	1.3810	0.21	Q	|	|	|	V |
20+40	1.3824	0.21	Q	|	|	|	V |
20+45	1.3838	0.21	Q	|	|	|	V |
20+50	1.3850	0.17	Q	|	|	|	V |
20+55	1.3860	0.14	Q	|	|	|	V |
21+ 0	1.3869	0.14	Q	|	|	|	V |
21+ 5	1.3881	0.17	Q	|	|	|	V |
21+10	1.3895	0.20	Q	|	|	|	V |
21+15	1.3909	0.21	Q	|	|	|	V|
21+20	1.3921	0.17	Q	|	|	|	V|
21+25	1.3931	0.14	Q	|	|	|	V|
21+30	1.3940	0.14	Q	|	|	|	V|
21+35	1.3952	0.17	Q	|	|	|	V|
21+40	1.3966	0.20	Q	|	|	|	V|
21+45	1.3980	0.21	Q	|	|	|	V|
21+50	1.3992	0.17	Q	|	|	|	V|
21+55	1.4002	0.14	Q	|	|	|	V|
22+ 0	1.4011	0.14	Q	|	|	|	V|
22+ 5	1.4023	0.17	Q	|	|	|	V|
22+10	1.4037	0.20	Q	|	|	|	V|
22+15	1.4051	0.21	Q	|	|	|	V|
22+20	1.4063	0.17	Q	|	|	|	V|
22+25	1.4073	0.14	Q	|	|	|	V|
22+30	1.4082	0.14	Q	|	|	|	V|
22+35	1.4092	0.14	Q	|	|	|	V|
22+40	1.4101	0.14	Q	|	|	|	V|
22+45	1.4111	0.14	Q	|	|	|	V|
22+50	1.4120	0.14	Q	|	|	|	V|
22+55	1.4130	0.14	Q	|	|	|	V|
23+ 0	1.4139	0.14	Q	|	|	|	V|
23+ 5	1.4149	0.14	Q	|	|	|	V|
23+10	1.4158	0.14	Q	|	|	|	V|
23+15	1.4168	0.14	Q	|	|	|	V|
23+20	1.4177	0.14	Q	|	|	|	V|
23+25	1.4187	0.14	Q	|	|	|	V|
23+30	1.4196	0.14	Q	|	|	|	V|
23+35	1.4205	0.14	Q	|	|	|	V|
23+40	1.4215	0.14	Q	|	|	|	V|
23+45	1.4224	0.14	Q	|	|	|	V|
23+50	1.4234	0.14	Q	|	|	|	V|
23+55	1.4243	0.14	Q	|	|	|	V|
24+ 0	1.4253	0.14	Q	|	|	|	V|
24+ 5	1.4257	0.07	Q	|	|	|	V|
24+10	1.4258	0.01	Q	|	|	|	V|
24+15	1.4258	0.00	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 03/24/22 File: 20750bpb242.out

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

Program License Serial Number 6310

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

English Units used in output format

20-750 Building B
Proposed Area B
2 year 24 hour

Drainage Area = 22.80(Ac.) = 0.036 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 22.80(Ac.) = 0.036 Sq. Mi.
Length along longest watercourse = 1736.00(Ft.)
Length along longest watercourse measured to centroid = 355.00(Ft.)
Length along longest watercourse = 0.329 Mi.
Length along longest watercourse measured to centroid = 0.067 Mi.
Difference in elevation = 13.50(Ft.)
Slope along watercourse = 41.0599 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.042 Hr.
Lag time = 2.51 Min.
25% of lag time = 0.63 Min.
40% of lag time = 1.00 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 1.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
22.80	1.60	36.48

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
22.80	4.00	91.20

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.600(In)
Area Averaged 100-Year Rainfall = 4.000(In)

Point rain (area averaged) = 1.600(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
22.800	69.00	0.900

Total Area Entered = 22.80(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.900	0.109	1.000	0.109
					Sum (F) =	0.109

Area averaged mean soil loss (F) (In/Hr) = 0.109
Minimum soil loss rate ((In/Hr)) = 0.055
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

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	199.596	43.331	9.957
2	0.167	399.192	43.396	9.972
3	0.250	598.788	8.810	2.024
4	0.333	798.384	3.422	0.786
5	0.417	997.980	1.040	0.239
			Sum = 100.000	Sum= 22.978

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	0.07	0.013	(0.193)	0.002	0.010
2	0.17	0.07	0.013	(0.193)	0.002	0.010
3	0.25	0.07	0.013	(0.192)	0.002	0.010
4	0.33	0.10	0.019	(0.191)	0.003	0.016
5	0.42	0.10	0.019	(0.190)	0.003	0.016
6	0.50	0.10	0.019	(0.190)	0.003	0.016
7	0.58	0.10	0.019	(0.189)	0.003	0.016
8	0.67	0.10	0.019	(0.188)	0.003	0.016
9	0.75	0.10	0.019	(0.187)	0.003	0.016
10	0.83	0.13	0.026	(0.187)	0.005	0.021
11	0.92	0.13	0.026	(0.186)	0.005	0.021
12	1.00	0.13	0.026	(0.185)	0.005	0.021
13	1.08	0.10	0.019	(0.184)	0.003	0.016
14	1.17	0.10	0.019	(0.184)	0.003	0.016

15	1.25	0.10	0.019	(0.183)	0.003	0.016
16	1.33	0.10	0.019	(0.182)	0.003	0.016
17	1.42	0.10	0.019	(0.182)	0.003	0.016
18	1.50	0.10	0.019	(0.181)	0.003	0.016
19	1.58	0.10	0.019	(0.180)	0.003	0.016
20	1.67	0.10	0.019	(0.179)	0.003	0.016
21	1.75	0.10	0.019	(0.179)	0.003	0.016
22	1.83	0.13	0.026	(0.178)	0.005	0.021
23	1.92	0.13	0.026	(0.177)	0.005	0.021
24	2.00	0.13	0.026	(0.176)	0.005	0.021
25	2.08	0.13	0.026	(0.176)	0.005	0.021
26	2.17	0.13	0.026	(0.175)	0.005	0.021
27	2.25	0.13	0.026	(0.174)	0.005	0.021
28	2.33	0.13	0.026	(0.174)	0.005	0.021
29	2.42	0.13	0.026	(0.173)	0.005	0.021
30	2.50	0.13	0.026	(0.172)	0.005	0.021
31	2.58	0.17	0.032	(0.172)	0.006	0.026
32	2.67	0.17	0.032	(0.171)	0.006	0.026
33	2.75	0.17	0.032	(0.170)	0.006	0.026
34	2.83	0.17	0.032	(0.169)	0.006	0.026
35	2.92	0.17	0.032	(0.169)	0.006	0.026
36	3.00	0.17	0.032	(0.168)	0.006	0.026
37	3.08	0.17	0.032	(0.167)	0.006	0.026
38	3.17	0.17	0.032	(0.167)	0.006	0.026
39	3.25	0.17	0.032	(0.166)	0.006	0.026
40	3.33	0.17	0.032	(0.165)	0.006	0.026
41	3.42	0.17	0.032	(0.165)	0.006	0.026
42	3.50	0.17	0.032	(0.164)	0.006	0.026
43	3.58	0.17	0.032	(0.163)	0.006	0.026
44	3.67	0.17	0.032	(0.162)	0.006	0.026
45	3.75	0.17	0.032	(0.162)	0.006	0.026
46	3.83	0.20	0.038	(0.161)	0.007	0.031
47	3.92	0.20	0.038	(0.160)	0.007	0.031
48	4.00	0.20	0.038	(0.160)	0.007	0.031
49	4.08	0.20	0.038	(0.159)	0.007	0.031
50	4.17	0.20	0.038	(0.158)	0.007	0.031
51	4.25	0.20	0.038	(0.158)	0.007	0.031
52	4.33	0.23	0.045	(0.157)	0.008	0.037
53	4.42	0.23	0.045	(0.156)	0.008	0.037
54	4.50	0.23	0.045	(0.156)	0.008	0.037
55	4.58	0.23	0.045	(0.155)	0.008	0.037
56	4.67	0.23	0.045	(0.154)	0.008	0.037
57	4.75	0.23	0.045	(0.154)	0.008	0.037
58	4.83	0.27	0.051	(0.153)	0.009	0.042
59	4.92	0.27	0.051	(0.152)	0.009	0.042
60	5.00	0.27	0.051	(0.152)	0.009	0.042
61	5.08	0.20	0.038	(0.151)	0.007	0.031
62	5.17	0.20	0.038	(0.150)	0.007	0.031
63	5.25	0.20	0.038	(0.150)	0.007	0.031
64	5.33	0.23	0.045	(0.149)	0.008	0.037
65	5.42	0.23	0.045	(0.148)	0.008	0.037
66	5.50	0.23	0.045	(0.148)	0.008	0.037
67	5.58	0.27	0.051	(0.147)	0.009	0.042
68	5.67	0.27	0.051	(0.147)	0.009	0.042
69	5.75	0.27	0.051	(0.146)	0.009	0.042
70	5.83	0.27	0.051	(0.145)	0.009	0.042
71	5.92	0.27	0.051	(0.145)	0.009	0.042
72	6.00	0.27	0.051	(0.144)	0.009	0.042
73	6.08	0.30	0.058	(0.143)	0.010	0.047
74	6.17	0.30	0.058	(0.143)	0.010	0.047

75	6.25	0.30	0.058	(0.142)	0.010	0.047
76	6.33	0.30	0.058	(0.141)	0.010	0.047
77	6.42	0.30	0.058	(0.141)	0.010	0.047
78	6.50	0.30	0.058	(0.140)	0.010	0.047
79	6.58	0.33	0.064	(0.140)	0.012	0.052
80	6.67	0.33	0.064	(0.139)	0.012	0.052
81	6.75	0.33	0.064	(0.138)	0.012	0.052
82	6.83	0.33	0.064	(0.138)	0.012	0.052
83	6.92	0.33	0.064	(0.137)	0.012	0.052
84	7.00	0.33	0.064	(0.136)	0.012	0.052
85	7.08	0.33	0.064	(0.136)	0.012	0.052
86	7.17	0.33	0.064	(0.135)	0.012	0.052
87	7.25	0.33	0.064	(0.135)	0.012	0.052
88	7.33	0.37	0.070	(0.134)	0.013	0.058
89	7.42	0.37	0.070	(0.133)	0.013	0.058
90	7.50	0.37	0.070	(0.133)	0.013	0.058
91	7.58	0.40	0.077	(0.132)	0.014	0.063
92	7.67	0.40	0.077	(0.131)	0.014	0.063
93	7.75	0.40	0.077	(0.131)	0.014	0.063
94	7.83	0.43	0.083	(0.130)	0.015	0.068
95	7.92	0.43	0.083	(0.130)	0.015	0.068
96	8.00	0.43	0.083	(0.129)	0.015	0.068
97	8.08	0.50	0.096	(0.128)	0.017	0.079
98	8.17	0.50	0.096	(0.128)	0.017	0.079
99	8.25	0.50	0.096	(0.127)	0.017	0.079
100	8.33	0.50	0.096	(0.127)	0.017	0.079
101	8.42	0.50	0.096	(0.126)	0.017	0.079
102	8.50	0.50	0.096	(0.125)	0.017	0.079
103	8.58	0.53	0.102	(0.125)	0.018	0.084
104	8.67	0.53	0.102	(0.124)	0.018	0.084
105	8.75	0.53	0.102	(0.124)	0.018	0.084
106	8.83	0.57	0.109	(0.123)	0.020	0.089
107	8.92	0.57	0.109	(0.123)	0.020	0.089
108	9.00	0.57	0.109	(0.122)	0.020	0.089
109	9.08	0.63	0.122	(0.121)	0.022	0.100
110	9.17	0.63	0.122	(0.121)	0.022	0.100
111	9.25	0.63	0.122	(0.120)	0.022	0.100
112	9.33	0.67	0.128	(0.120)	0.023	0.105
113	9.42	0.67	0.128	(0.119)	0.023	0.105
114	9.50	0.67	0.128	(0.119)	0.023	0.105
115	9.58	0.70	0.134	(0.118)	0.024	0.110
116	9.67	0.70	0.134	(0.117)	0.024	0.110
117	9.75	0.70	0.134	(0.117)	0.024	0.110
118	9.83	0.73	0.141	(0.116)	0.025	0.115
119	9.92	0.73	0.141	(0.116)	0.025	0.115
120	10.00	0.73	0.141	(0.115)	0.025	0.115
121	10.08	0.50	0.096	(0.115)	0.017	0.079
122	10.17	0.50	0.096	(0.114)	0.017	0.079
123	10.25	0.50	0.096	(0.113)	0.017	0.079
124	10.33	0.50	0.096	(0.113)	0.017	0.079
125	10.42	0.50	0.096	(0.112)	0.017	0.079
126	10.50	0.50	0.096	(0.112)	0.017	0.079
127	10.58	0.67	0.128	(0.111)	0.023	0.105
128	10.67	0.67	0.128	(0.111)	0.023	0.105
129	10.75	0.67	0.128	(0.110)	0.023	0.105
130	10.83	0.67	0.128	(0.110)	0.023	0.105
131	10.92	0.67	0.128	(0.109)	0.023	0.105
132	11.00	0.67	0.128	(0.109)	0.023	0.105
133	11.08	0.63	0.122	(0.108)	0.022	0.100
134	11.17	0.63	0.122	(0.108)	0.022	0.100

135	11.25	0.63	0.122	(0.107)	0.022	0.100
136	11.33	0.63	0.122	(0.106)	0.022	0.100
137	11.42	0.63	0.122	(0.106)	0.022	0.100
138	11.50	0.63	0.122	(0.105)	0.022	0.100
139	11.58	0.57	0.109	(0.105)	0.020	0.089
140	11.67	0.57	0.109	(0.104)	0.020	0.089
141	11.75	0.57	0.109	(0.104)	0.020	0.089
142	11.83	0.60	0.115	(0.103)	0.021	0.094
143	11.92	0.60	0.115	(0.103)	0.021	0.094
144	12.00	0.60	0.115	(0.102)	0.021	0.094
145	12.08	0.83	0.160	(0.102)	0.029	0.131
146	12.17	0.83	0.160	(0.101)	0.029	0.131
147	12.25	0.83	0.160	(0.101)	0.029	0.131
148	12.33	0.87	0.166	(0.100)	0.030	0.136
149	12.42	0.87	0.166	(0.100)	0.030	0.136
150	12.50	0.87	0.166	(0.099)	0.030	0.136
151	12.58	0.93	0.179	(0.099)	0.032	0.147
152	12.67	0.93	0.179	(0.098)	0.032	0.147
153	12.75	0.93	0.179	(0.098)	0.032	0.147
154	12.83	0.97	0.186	(0.097)	0.033	0.152
155	12.92	0.97	0.186	(0.097)	0.033	0.152
156	13.00	0.97	0.186	(0.096)	0.033	0.152
157	13.08	1.13	0.218	(0.096)	0.039	0.178
158	13.17	1.13	0.218	(0.095)	0.039	0.178
159	13.25	1.13	0.218	(0.095)	0.039	0.178
160	13.33	1.13	0.218	(0.094)	0.039	0.178
161	13.42	1.13	0.218	(0.094)	0.039	0.178
162	13.50	1.13	0.218	(0.093)	0.039	0.178
163	13.58	0.77	0.147	(0.093)	0.026	0.121
164	13.67	0.77	0.147	(0.092)	0.026	0.121
165	13.75	0.77	0.147	(0.092)	0.026	0.121
166	13.83	0.77	0.147	(0.092)	0.026	0.121
167	13.92	0.77	0.147	(0.091)	0.026	0.121
168	14.00	0.77	0.147	(0.091)	0.026	0.121
169	14.08	0.90	0.173	(0.090)	0.031	0.142
170	14.17	0.90	0.173	(0.090)	0.031	0.142
171	14.25	0.90	0.173	(0.089)	0.031	0.142
172	14.33	0.87	0.166	(0.089)	0.030	0.136
173	14.42	0.87	0.166	(0.088)	0.030	0.136
174	14.50	0.87	0.166	(0.088)	0.030	0.136
175	14.58	0.87	0.166	(0.087)	0.030	0.136
176	14.67	0.87	0.166	(0.087)	0.030	0.136
177	14.75	0.87	0.166	(0.086)	0.030	0.136
178	14.83	0.83	0.160	(0.086)	0.029	0.131
179	14.92	0.83	0.160	(0.086)	0.029	0.131
180	15.00	0.83	0.160	(0.085)	0.029	0.131
181	15.08	0.80	0.154	(0.085)	0.028	0.126
182	15.17	0.80	0.154	(0.084)	0.028	0.126
183	15.25	0.80	0.154	(0.084)	0.028	0.126
184	15.33	0.77	0.147	(0.083)	0.026	0.121
185	15.42	0.77	0.147	(0.083)	0.026	0.121
186	15.50	0.77	0.147	(0.083)	0.026	0.121
187	15.58	0.63	0.122	(0.082)	0.022	0.100
188	15.67	0.63	0.122	(0.082)	0.022	0.100
189	15.75	0.63	0.122	(0.081)	0.022	0.100
190	15.83	0.63	0.122	(0.081)	0.022	0.100
191	15.92	0.63	0.122	(0.080)	0.022	0.100
192	16.00	0.63	0.122	(0.080)	0.022	0.100
193	16.08	0.13	0.026	(0.080)	0.005	0.021
194	16.17	0.13	0.026	(0.079)	0.005	0.021

195	16.25	0.13	0.026	(0.079)	0.005	0.021
196	16.33	0.13	0.026	(0.078)	0.005	0.021
197	16.42	0.13	0.026	(0.078)	0.005	0.021
198	16.50	0.13	0.026	(0.078)	0.005	0.021
199	16.58	0.10	0.019	(0.077)	0.003	0.016
200	16.67	0.10	0.019	(0.077)	0.003	0.016
201	16.75	0.10	0.019	(0.076)	0.003	0.016
202	16.83	0.10	0.019	(0.076)	0.003	0.016
203	16.92	0.10	0.019	(0.076)	0.003	0.016
204	17.00	0.10	0.019	(0.075)	0.003	0.016
205	17.08	0.17	0.032	(0.075)	0.006	0.026
206	17.17	0.17	0.032	(0.075)	0.006	0.026
207	17.25	0.17	0.032	(0.074)	0.006	0.026
208	17.33	0.17	0.032	(0.074)	0.006	0.026
209	17.42	0.17	0.032	(0.073)	0.006	0.026
210	17.50	0.17	0.032	(0.073)	0.006	0.026
211	17.58	0.17	0.032	(0.073)	0.006	0.026
212	17.67	0.17	0.032	(0.072)	0.006	0.026
213	17.75	0.17	0.032	(0.072)	0.006	0.026
214	17.83	0.13	0.026	(0.072)	0.005	0.021
215	17.92	0.13	0.026	(0.071)	0.005	0.021
216	18.00	0.13	0.026	(0.071)	0.005	0.021
217	18.08	0.13	0.026	(0.071)	0.005	0.021
218	18.17	0.13	0.026	(0.070)	0.005	0.021
219	18.25	0.13	0.026	(0.070)	0.005	0.021
220	18.33	0.13	0.026	(0.070)	0.005	0.021
221	18.42	0.13	0.026	(0.069)	0.005	0.021
222	18.50	0.13	0.026	(0.069)	0.005	0.021
223	18.58	0.10	0.019	(0.069)	0.003	0.016
224	18.67	0.10	0.019	(0.068)	0.003	0.016
225	18.75	0.10	0.019	(0.068)	0.003	0.016
226	18.83	0.07	0.013	(0.068)	0.002	0.010
227	18.92	0.07	0.013	(0.067)	0.002	0.010
228	19.00	0.07	0.013	(0.067)	0.002	0.010
229	19.08	0.10	0.019	(0.067)	0.003	0.016
230	19.17	0.10	0.019	(0.066)	0.003	0.016
231	19.25	0.10	0.019	(0.066)	0.003	0.016
232	19.33	0.13	0.026	(0.066)	0.005	0.021
233	19.42	0.13	0.026	(0.065)	0.005	0.021
234	19.50	0.13	0.026	(0.065)	0.005	0.021
235	19.58	0.10	0.019	(0.065)	0.003	0.016
236	19.67	0.10	0.019	(0.064)	0.003	0.016
237	19.75	0.10	0.019	(0.064)	0.003	0.016
238	19.83	0.07	0.013	(0.064)	0.002	0.010
239	19.92	0.07	0.013	(0.064)	0.002	0.010
240	20.00	0.07	0.013	(0.063)	0.002	0.010
241	20.08	0.10	0.019	(0.063)	0.003	0.016
242	20.17	0.10	0.019	(0.063)	0.003	0.016
243	20.25	0.10	0.019	(0.062)	0.003	0.016
244	20.33	0.10	0.019	(0.062)	0.003	0.016
245	20.42	0.10	0.019	(0.062)	0.003	0.016
246	20.50	0.10	0.019	(0.062)	0.003	0.016
247	20.58	0.10	0.019	(0.061)	0.003	0.016
248	20.67	0.10	0.019	(0.061)	0.003	0.016
249	20.75	0.10	0.019	(0.061)	0.003	0.016
250	20.83	0.07	0.013	(0.061)	0.002	0.010
251	20.92	0.07	0.013	(0.060)	0.002	0.010
252	21.00	0.07	0.013	(0.060)	0.002	0.010
253	21.08	0.10	0.019	(0.060)	0.003	0.016
254	21.17	0.10	0.019	(0.060)	0.003	0.016

255	21.25	0.10	0.019	(0.059)	0.003	0.016
256	21.33	0.07	0.013	(0.059)	0.002	0.010
257	21.42	0.07	0.013	(0.059)	0.002	0.010
258	21.50	0.07	0.013	(0.059)	0.002	0.010
259	21.58	0.10	0.019	(0.059)	0.003	0.016
260	21.67	0.10	0.019	(0.058)	0.003	0.016
261	21.75	0.10	0.019	(0.058)	0.003	0.016
262	21.83	0.07	0.013	(0.058)	0.002	0.010
263	21.92	0.07	0.013	(0.058)	0.002	0.010
264	22.00	0.07	0.013	(0.058)	0.002	0.010
265	22.08	0.10	0.019	(0.057)	0.003	0.016
266	22.17	0.10	0.019	(0.057)	0.003	0.016
267	22.25	0.10	0.019	(0.057)	0.003	0.016
268	22.33	0.07	0.013	(0.057)	0.002	0.010
269	22.42	0.07	0.013	(0.057)	0.002	0.010
270	22.50	0.07	0.013	(0.057)	0.002	0.010
271	22.58	0.07	0.013	(0.056)	0.002	0.010
272	22.67	0.07	0.013	(0.056)	0.002	0.010
273	22.75	0.07	0.013	(0.056)	0.002	0.010
274	22.83	0.07	0.013	(0.056)	0.002	0.010
275	22.92	0.07	0.013	(0.056)	0.002	0.010
276	23.00	0.07	0.013	(0.056)	0.002	0.010
277	23.08	0.07	0.013	(0.055)	0.002	0.010
278	23.17	0.07	0.013	(0.055)	0.002	0.010
279	23.25	0.07	0.013	(0.055)	0.002	0.010
280	23.33	0.07	0.013	(0.055)	0.002	0.010
281	23.42	0.07	0.013	(0.055)	0.002	0.010
282	23.50	0.07	0.013	(0.055)	0.002	0.010
283	23.58	0.07	0.013	(0.055)	0.002	0.010
284	23.67	0.07	0.013	(0.055)	0.002	0.010
285	23.75	0.07	0.013	(0.055)	0.002	0.010
286	23.83	0.07	0.013	(0.055)	0.002	0.010
287	23.92	0.07	0.013	(0.055)	0.002	0.010
288	24.00	0.07	0.013	(0.055)	0.002	0.010

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.7

Flood volume = Effective rainfall 1.31(In)
times area 22.8(Ac.)/[(In)/(Ft.)] = 2.5(Ac.Ft)
Total soil loss = 0.29(In)
Total soil loss = 0.547(Ac.Ft)
Total rainfall = 1.60(In)
Flood volume = 108581.5 Cubic Feet
Total soil loss = 23835.0 Cubic Feet

Peak flow rate of this hydrograph = 5.102(CFS)

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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))

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 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
   0+ 5       0.0076      1.10  V   Q     |         |         |         |
   0+10       0.0159      1.21  V   Q     |         |         |         |
   0+15       0.0244      1.23  V   Q     |         |         |         |
   0+20       0.0333      1.29  V    Q    |         |         |         |
   0+25       0.0426      1.35  V    Q    |         |         |         |
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0+30       0.0519      1.36  V    Q    |         |         |         |
0+35       0.0613      1.36  V    Q    |         |         |         |
0+40       0.0707      1.36  V    Q    |         |         |         |
0+45       0.0800      1.36  V    Q    |         |         |         |
0+50       0.0898      1.41  V    Q    |         |         |         |
0+55       0.0999      1.47  V    Q    |         |         |         |
1+ 0       0.1101      1.48  V    Q    |         |         |         |
1+ 5       0.1199      1.43  |V   Q    |         |         |         |
1+10       0.1294      1.38  |V   Q    |         |         |         |
1+15       0.1388      1.37  |V   Q    |         |         |         |
1+20       0.1482      1.36  |V   Q    |         |         |         |
1+25       0.1576      1.36  |V   Q    |         |         |         |
1+30       0.1670      1.36  |V   Q    |         |         |         |
1+35       0.1763      1.36  |V   Q    |         |         |         |
1+40       0.1857      1.36  |V   Q    |         |         |         |
1+45       0.1951      1.36  |V   Q    |         |         |         |
1+50       0.2048      1.41  |V   Q    |         |         |         |
1+55       0.2149      1.47  |V   Q    |         |         |         |
2+ 0       0.2251      1.48  |V   Q    |         |         |         |
2+ 5       0.2353      1.48  | V  Q    |         |         |         |
2+10       0.2455      1.48  | V  Q    |         |         |         |
2+15       0.2557      1.48  | V  Q    |         |         |         |
2+20       0.2659      1.48  | V  Q    |         |         |         |
2+25       0.2762      1.48  | V  Q    |         |         |         |
2+30       0.2864      1.48  | V  Q    |         |         |         |
2+35       0.2969      1.53  | V   Q   |         |         |         |
2+40       0.3079      1.59  | V   Q   |         |         |         |
2+45       0.3189      1.60  | V   Q   |         |         |         |
2+50       0.3299      1.60  | V   Q   |         |         |         |
2+55       0.3409      1.60  |  V  Q   |         |         |         |
3+ 0       0.3520      1.60  |  V  Q   |         |         |         |
3+ 5       0.3630      1.60  |  V  Q   |         |         |         |
3+10       0.3741      1.60  |  V  Q   |         |         |         |
3+15       0.3851      1.60  |  V  Q   |         |         |         |
3+20       0.3962      1.60  |  V  Q   |         |         |         |
3+25       0.4072      1.60  |  V  Q   |         |         |         |
3+30       0.4182      1.60  |  V  Q   |         |         |         |
3+35       0.4293      1.60  |  V  Q   |         |         |         |
3+40       0.4403      1.60  |  V  Q   |         |         |         |
3+45       0.4514      1.60  |   V Q   |         |         |         |
3+50       0.4628      1.66  |   V Q   |         |         |         |
3+55       0.4745      1.71  |   V Q   |         |         |         |
4+ 0       0.4864      1.72  |   V Q   |         |         |         |
4+ 5       0.4982      1.72  |   V Q   |         |         |         |
4+10       0.5101      1.72  |   V Q   |         |         |         |
4+15       0.5220      1.72  |   V Q   |         |         |         |
4+20       0.5342      1.78  |   V  Q  |         |         |         |
4+25       0.5468      1.83  |   V  Q  |         |         |         |
4+30       0.5595      1.84  |   V  Q  |         |         |         |
4+35       0.5722      1.84  |    V Q  |         |         |         |
4+40       0.5849      1.84  |    V Q  |         |         |         |
4+45       0.5976      1.84  |    V Q  |         |         |         |
4+50       0.6106      1.90  |    V Q  |         |         |         |
4+55       0.6240      1.95  |    V Q  |         |         |         |
5+ 0       0.6375      1.96  |    V Q  |         |         |         |
5+ 5       0.6503      1.86  |    V Q  |         |         |         |
5+10       0.6624      1.76  |    V Q  |         |         |         |
5+15       0.6744      1.73  |    VQ   |         |         |         |
5+20       0.6866      1.78  |     VQ  |         |         |         |
5+25       0.6992      1.83  |     VQ  |         |         |         |
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 5+30       0.7119      1.84  |     VQ  |         |         |         |
 5+35       0.7250      1.90  |     VQ  |         |         |         |
 5+40       0.7384      1.95  |     VQ  |         |         |         |
 5+45       0.7519      1.96  |     VQ  |         |         |         |
 5+50       0.7654      1.96  |     VQ  |         |         |         |
 5+55       0.7789      1.97  |     VQ  |         |         |         |
 6+ 0       0.7925      1.97  |      Q  |         |         |         |
 6+ 5       0.8064      2.02  |      VQ |         |         |         |
 6+10       0.8206      2.07  |      VQ |         |         |         |
 6+15       0.8349      2.08  |      VQ |         |         |         |
 6+20       0.8493      2.08  |      VQ |         |         |         |
 6+25       0.8637      2.09  |      VQ |         |         |         |
 6+30       0.8780      2.09  |      VQ |         |         |         |
 6+35       0.8928      2.14  |      VQ |         |         |         |
 6+40       0.9078      2.19  |       Q |         |         |         |
 6+45       0.9230      2.20  |       Q |         |         |         |
 6+50       0.9382      2.21  |       Q |         |         |         |
 6+55       0.9534      2.21  |       Q |         |         |         |
 7+ 0       0.9686      2.21  |       Q |         |         |         |
 7+ 5       0.9838      2.21  |       Q |         |         |         |
 7+10       0.9990      2.21  |       Q |         |         |         |
 7+15       1.0142      2.21  |       QV|         |         |         |
 7+20       1.0297      2.26  |        Q|         |         |         |
 7+25       1.0456      2.31  |        Q|         |         |         |
 7+30       1.0616      2.32  |        Q|         |         |         |
 7+35       1.0780      2.38  |        Q|         |         |         |
 7+40       1.0948      2.43  |        Q|         |         |         |
 7+45       1.1116      2.44  |        Q|         |         |         |
 7+50       1.1288      2.50  |        QV         |         |         |
 7+55       1.1464      2.55  |         Q         |         |         |
 8+ 0       1.1640      2.56  |         Q         |         |         |
 8+ 5       1.1824      2.67  |         Q         |         |         |
 8+10       1.2015      2.78  |         VQ        |         |         |
 8+15       1.2208      2.80  |         VQ        |         |         |
 8+20       1.2402      2.81  |         |Q        |         |         |
 8+25       1.2595      2.81  |         |Q        |         |         |
 8+30       1.2789      2.81  |         |Q        |         |         |
 8+35       1.2986      2.86  |         |Q        |         |         |
 8+40       1.3186      2.91  |         |Q        |         |         |
 8+45       1.3388      2.92  |         |Q        |         |         |
 8+50       1.3593      2.98  |         |QV       |         |         |
 8+55       1.3802      3.03  |         | Q       |         |         |
 9+ 0       1.4012      3.05  |         | Q       |         |         |
 9+ 5       1.4229      3.15  |         | Q       |         |         |
 9+10       1.4454      3.26  |         | VQ      |         |         |
 9+15       1.4680      3.28  |         |  Q      |         |         |
 9+20       1.4910      3.34  |         |  Q      |         |         |
 9+25       1.5144      3.40  |         |  Q      |         |         |
 9+30       1.5379      3.41  |         |  Q      |         |         |
 9+35       1.5617      3.46  |         |  Q      |         |         |
 9+40       1.5859      3.52  |         |   Q     |         |         |
 9+45       1.6102      3.53  |         |   Q     |         |         |
 9+50       1.6349      3.58  |         |   Q     |         |         |
 9+55       1.6600      3.64  |         |   Q     |         |         |
10+ 0       1.6851      3.65  |         |   Q     |         |         |
10+ 5       1.7077      3.29  |         |  Q V    |         |         |
10+10       1.7279      2.92  |         |Q   V    |         |         |
10+15       1.7475      2.85  |         |Q   V    |         |         |
10+20       1.7669      2.82  |         |Q   V    |         |         |
10+25       1.7862      2.81  |         |Q   V    |         |         |
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10+30       1.8056      2.81  |         |Q    V   |         |         |
10+35       1.8267      3.07  |         | Q   V   |         |         |
10+40       1.8497      3.33  |         |  Q  V   |         |         |
10+45       1.8730      3.39  |         |  Q  V   |         |         |
10+50       1.8965      3.41  |         |  Q  V   |         |         |
10+55       1.9200      3.41  |         |  Q   V  |         |         |
11+ 0       1.9435      3.41  |         |  Q   V  |         |         |
11+ 5       1.9666      3.36  |         |  Q   V  |         |         |
11+10       1.9894      3.31  |         |  Q   V  |         |         |
11+15       2.0121      3.30  |         |  Q   V  |         |         |
11+20       2.0348      3.29  |         |  Q    V |         |         |
11+25       2.0575      3.29  |         |  Q    V |         |         |
11+30       2.0802      3.29  |         |  Q    V |         |         |
11+35       2.1021      3.19  |         | Q     V |         |         |
11+40       2.1233      3.08  |         | Q     V |         |         |
11+45       2.1444      3.06  |         | Q      V|         |         |
11+50       2.1658      3.11  |         | Q      V|         |         |
11+55       2.1876      3.16  |         | Q      V|         |         |
12+ 0       2.2094      3.17  |         | Q      V|         |         |
12+ 5       2.2337      3.54  |         |   Q    V|         |         |
12+10       2.2606      3.90  |         |    Q    V         |         |
12+15       2.2880      3.98  |         |    Q    V         |         |
12+20       2.3160      4.06  |         |     Q   V         |         |
12+25       2.3443      4.12  |         |     Q   V         |         |
12+30       2.3728      4.13  |         |     Q   |V        |         |
12+35       2.4020      4.24  |         |     Q   |V        |         |
12+40       2.4319      4.35  |         |      Q  |V        |         |
12+45       2.4620      4.37  |         |      Q  |V        |         |
12+50       2.4925      4.43  |         |      Q  | V       |         |
12+55       2.5234      4.48  |         |      Q  | V       |         |
13+ 0       2.5543      4.49  |         |      Q  | V       |         |
13+ 5       2.5871      4.76  |         |        Q| V       |         |
13+10       2.6217      5.02  |         |         Q  V      |         |
13+15       2.6566      5.08  |         |         Q  V      |         |
13+20       2.6917      5.10  |         |         Q  V      |         |
13+25       2.7269      5.10  |         |         Q   V     |         |
13+30       2.7620      5.10  |         |         Q   V     |         |
13+35       2.7932      4.53  |         |       Q |   V     |         |
13+40       2.8204      3.95  |         |    Q    |    V    |         |
13+45       2.8468      3.83  |         |    Q    |    V    |         |
13+50       2.8729      3.79  |         |    Q    |    V    |         |
13+55       2.8989      3.77  |         |    Q    |    V    |         |
14+ 0       2.9249      3.77  |         |    Q    |    V    |         |
14+ 5       2.9523      3.98  |         |    Q    |     V   |         |
14+10       2.9812      4.19  |         |     Q   |     V   |         |
14+15       3.0104      4.24  |         |     Q   |     V   |         |
14+20       3.0393      4.20  |         |     Q   |     V   |         |
14+25       3.0679      4.15  |         |     Q   |      V  |         |
14+30       3.0964      4.14  |         |     Q   |      V  |         |
14+35       3.1249      4.14  |         |     Q   |      V  |         |
14+40       3.1534      4.14  |         |     Q   |       V |         |
14+45       3.1819      4.14  |         |     Q   |       V |         |
14+50       3.2100      4.08  |         |     Q   |       V |         |
14+55       3.2378      4.03  |         |     Q   |       V |         |
15+ 0       3.2655      4.02  |         |     Q   |        V|         |
15+ 5       3.2928      3.97  |         |    Q    |        V|         |
15+10       3.3197      3.91  |         |    Q    |        V|         |
15+15       3.3466      3.90  |         |    Q    |        V|         |
15+20       3.3731      3.84  |         |    Q    |        V|         |
15+25       3.3992      3.79  |         |    Q    |         V         |
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15+30       3.4252      3.78  |         |    Q    |         V         |
15+35       3.4498      3.57  |         |   Q     |         V         |
15+40       3.4729      3.36  |         |  Q      |         V         |
15+45       3.4957      3.31  |         |  Q      |         |V        |
15+50       3.5184      3.30  |         |  Q      |         |V        |
15+55       3.5411      3.29  |         |  Q      |         |V        |
16+ 0       3.5638      3.29  |         |  Q      |         |V        |
16+ 5       3.5811      2.51  |         Q         |         |V        |
16+10       3.5929      1.72  |     Q   |         |         |V        |
16+15       3.6037      1.56  |     Q   |         |         | V       |
16+20       3.6140      1.50  |     Q   |         |         | V       |
16+25       3.6243      1.48  |    Q    |         |         | V       |
16+30       3.6345      1.48  |    Q    |         |         | V       |
16+35       3.6443      1.43  |    Q    |         |         | V       |
16+40       3.6538      1.38  |    Q    |         |         | V       |
16+45       3.6632      1.37  |    Q    |         |         | V       |
16+50       3.6726      1.36  |    Q    |         |         | V       |
16+55       3.6820      1.36  |    Q    |         |         | V       |
17+ 0       3.6914      1.36  |    Q    |         |         | V       |
17+ 5       3.7015      1.47  |    Q    |         |         | V       |
17+10       3.7123      1.57  |     Q   |         |         | V       |
17+15       3.7233      1.59  |     Q   |         |         |  V      |
17+20       3.7343      1.60  |     Q   |         |         |  V      |
17+25       3.7453      1.60  |     Q   |         |         |  V      |
17+30       3.7564      1.60  |     Q   |         |         |  V      |
17+35       3.7674      1.60  |     Q   |         |         |  V      |
17+40       3.7784      1.60  |     Q   |         |         |  V      |
17+45       3.7895      1.60  |     Q   |         |         |  V      |
17+50       3.8002      1.55  |     Q   |         |         |  V      |
17+55       3.8105      1.50  |    Q    |         |         |  V      |
18+ 0       3.8207      1.49  |    Q    |         |         |  V      |
18+ 5       3.8310      1.48  |    Q    |         |         |   V     |
18+10       3.8412      1.48  |    Q    |         |         |   V     |
18+15       3.8514      1.48  |    Q    |         |         |   V     |
18+20       3.8616      1.48  |    Q    |         |         |   V     |
18+25       3.8718      1.48  |    Q    |         |         |   V     |
18+30       3.8820      1.48  |    Q    |         |         |   V     |
18+35       3.8919      1.43  |    Q    |         |         |   V     |
18+40       3.9013      1.38  |    Q    |         |         |   V     |
18+45       3.9108      1.37  |    Q    |         |         |   V     |
18+50       3.9198      1.31  |    Q    |         |         |   V     |
18+55       3.9285      1.26  |    Q    |         |         |   V     |
19+ 0       3.9370      1.25  |   Q     |         |         |   V     |
19+ 5       3.9460      1.29  |    Q    |         |         |    V    |
19+10       3.9552      1.35  |    Q    |         |         |    V    |
19+15       3.9646      1.36  |    Q    |         |         |    V    |
19+20       3.9743      1.41  |    Q    |         |         |    V    |
19+25       3.9844      1.47  |    Q    |         |         |    V    |
19+30       3.9946      1.48  |    Q    |         |         |    V    |
19+35       4.0044      1.43  |    Q    |         |         |    V    |
19+40       4.0139      1.38  |    Q    |         |         |    V    |
19+45       4.0233      1.37  |    Q    |         |         |    V    |
19+50       4.0324      1.31  |    Q    |         |         |    V    |
19+55       4.0410      1.26  |    Q    |         |         |    V    |
20+ 0       4.0496      1.25  |   Q     |         |         |    V    |
20+ 5       4.0585      1.29  |    Q    |         |         |     V   |
20+10       4.0678      1.35  |    Q    |         |         |     V   |
20+15       4.0771      1.36  |    Q    |         |         |     V   |
20+20       4.0865      1.36  |    Q    |         |         |     V   |
20+25       4.0959      1.36  |    Q    |         |         |     V   |
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20+30	4.1053	1.36	Q			V
20+35	4.1146	1.36	Q			V
20+40	4.1240	1.36	Q			V
20+45	4.1334	1.36	Q			V
20+50	4.1424	1.31	Q			V
20+55	4.1511	1.26	Q			V
21+ 0	4.1597	1.25	Q			V
21+ 5	4.1686	1.29	Q			V
21+10	4.1778	1.35	Q			V
21+15	4.1872	1.36	Q			V
21+20	4.1962	1.31	Q			V
21+25	4.2049	1.26	Q			V
21+30	4.2134	1.25	Q			V
21+35	4.2224	1.29	Q			V
21+40	4.2316	1.35	Q			V
21+45	4.2410	1.36	Q			V
21+50	4.2500	1.31	Q			V
21+55	4.2586	1.26	Q			V
22+ 0	4.2672	1.25	Q			V
22+ 5	4.2762	1.29	Q			V
22+10	4.2854	1.35	Q			V
22+15	4.2948	1.36	Q			V
22+20	4.3038	1.31	Q			V
22+25	4.3124	1.26	Q			V
22+30	4.3210	1.25	Q			V
22+35	4.3296	1.24	Q			V
22+40	4.3381	1.24	Q			V
22+45	4.3467	1.24	Q			V
22+50	4.3552	1.24	Q			V
22+55	4.3638	1.24	Q			V
23+ 0	4.3723	1.24	Q			V
23+ 5	4.3809	1.24	Q			V
23+10	4.3894	1.24	Q			V
23+15	4.3980	1.24	Q			V
23+20	4.4065	1.24	Q			V
23+25	4.4151	1.24	Q			V
23+30	4.4236	1.24	Q			V
23+35	4.4322	1.24	Q			V
23+40	4.4407	1.24	Q			V
23+45	4.4493	1.24	Q			V
23+50	4.4578	1.24	Q			V
23+55	4.4664	1.24	Q			V
24+ 0	4.4749	1.24	Q			V
24+ 5	4.4827	1.14	Q			V
24+10	4.4898	1.03	Q			V
24+15	4.4968	1.01	Q			V
24+20	4.5037	1.00	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 03/24/22 File: 20750BPC242.out

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

Program License Serial Number 6310

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

English Units used in output format

20-750 Building B
PROPOSED
2 YEAR 24 HOUR

Drainage Area = 23.70(Ac.) = 0.037 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 23.70(Ac.) = 0.037 Sq. Mi.
Length along longest watercourse = 795.00(Ft.)
Length along longest watercourse measured to centroid = 475.00(Ft.)
Length along longest watercourse = 0.151 Mi.
Length along longest watercourse measured to centroid = 0.090 Mi.
Difference in elevation = 6.80(Ft.)
Slope along watercourse = 45.1623 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
23.70	1.60	37.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
23.70	4.00	94.80

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.600(In)
Area Averaged 100-Year Rainfall = 4.000(In)

Point rain (area averaged) = 1.600(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
23.700	69.00	0.900

Total Area Entered = 23.70(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.900	0.109	1.000	0.109
					Sum (F) =	0.109

Area averaged mean soil loss (F) (In/Hr) = 0.109
Minimum soil loss rate ((In/Hr)) = 0.055
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

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	244.817	50.211	11.993
2	0.167	489.635	40.377	9.644
3	0.250	734.452	7.191	1.718
4	0.333	979.270	2.221	0.530
			Sum = 100.000	Sum= 23.885

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	0.07	0.013	(0.193)	0.002	0.010
2	0.17	0.07	0.013	(0.193)	0.002	0.010
3	0.25	0.07	0.013	(0.192)	0.002	0.010
4	0.33	0.10	0.019	(0.191)	0.003	0.016
5	0.42	0.10	0.019	(0.190)	0.003	0.016
6	0.50	0.10	0.019	(0.190)	0.003	0.016
7	0.58	0.10	0.019	(0.189)	0.003	0.016
8	0.67	0.10	0.019	(0.188)	0.003	0.016
9	0.75	0.10	0.019	(0.187)	0.003	0.016
10	0.83	0.13	0.026	(0.187)	0.005	0.021
11	0.92	0.13	0.026	(0.186)	0.005	0.021
12	1.00	0.13	0.026	(0.185)	0.005	0.021
13	1.08	0.10	0.019	(0.184)	0.003	0.016
14	1.17	0.10	0.019	(0.184)	0.003	0.016
15	1.25	0.10	0.019	(0.183)	0.003	0.016

16	1.33	0.10	0.019	(0.182)	0.003	0.016
17	1.42	0.10	0.019	(0.182)	0.003	0.016
18	1.50	0.10	0.019	(0.181)	0.003	0.016
19	1.58	0.10	0.019	(0.180)	0.003	0.016
20	1.67	0.10	0.019	(0.179)	0.003	0.016
21	1.75	0.10	0.019	(0.179)	0.003	0.016
22	1.83	0.13	0.026	(0.178)	0.005	0.021
23	1.92	0.13	0.026	(0.177)	0.005	0.021
24	2.00	0.13	0.026	(0.176)	0.005	0.021
25	2.08	0.13	0.026	(0.176)	0.005	0.021
26	2.17	0.13	0.026	(0.175)	0.005	0.021
27	2.25	0.13	0.026	(0.174)	0.005	0.021
28	2.33	0.13	0.026	(0.174)	0.005	0.021
29	2.42	0.13	0.026	(0.173)	0.005	0.021
30	2.50	0.13	0.026	(0.172)	0.005	0.021
31	2.58	0.17	0.032	(0.172)	0.006	0.026
32	2.67	0.17	0.032	(0.171)	0.006	0.026
33	2.75	0.17	0.032	(0.170)	0.006	0.026
34	2.83	0.17	0.032	(0.169)	0.006	0.026
35	2.92	0.17	0.032	(0.169)	0.006	0.026
36	3.00	0.17	0.032	(0.168)	0.006	0.026
37	3.08	0.17	0.032	(0.167)	0.006	0.026
38	3.17	0.17	0.032	(0.167)	0.006	0.026
39	3.25	0.17	0.032	(0.166)	0.006	0.026
40	3.33	0.17	0.032	(0.165)	0.006	0.026
41	3.42	0.17	0.032	(0.165)	0.006	0.026
42	3.50	0.17	0.032	(0.164)	0.006	0.026
43	3.58	0.17	0.032	(0.163)	0.006	0.026
44	3.67	0.17	0.032	(0.162)	0.006	0.026
45	3.75	0.17	0.032	(0.162)	0.006	0.026
46	3.83	0.20	0.038	(0.161)	0.007	0.031
47	3.92	0.20	0.038	(0.160)	0.007	0.031
48	4.00	0.20	0.038	(0.160)	0.007	0.031
49	4.08	0.20	0.038	(0.159)	0.007	0.031
50	4.17	0.20	0.038	(0.158)	0.007	0.031
51	4.25	0.20	0.038	(0.158)	0.007	0.031
52	4.33	0.23	0.045	(0.157)	0.008	0.037
53	4.42	0.23	0.045	(0.156)	0.008	0.037
54	4.50	0.23	0.045	(0.156)	0.008	0.037
55	4.58	0.23	0.045	(0.155)	0.008	0.037
56	4.67	0.23	0.045	(0.154)	0.008	0.037
57	4.75	0.23	0.045	(0.154)	0.008	0.037
58	4.83	0.27	0.051	(0.153)	0.009	0.042
59	4.92	0.27	0.051	(0.152)	0.009	0.042
60	5.00	0.27	0.051	(0.152)	0.009	0.042
61	5.08	0.20	0.038	(0.151)	0.007	0.031
62	5.17	0.20	0.038	(0.150)	0.007	0.031
63	5.25	0.20	0.038	(0.150)	0.007	0.031
64	5.33	0.23	0.045	(0.149)	0.008	0.037
65	5.42	0.23	0.045	(0.148)	0.008	0.037
66	5.50	0.23	0.045	(0.148)	0.008	0.037
67	5.58	0.27	0.051	(0.147)	0.009	0.042
68	5.67	0.27	0.051	(0.147)	0.009	0.042
69	5.75	0.27	0.051	(0.146)	0.009	0.042
70	5.83	0.27	0.051	(0.145)	0.009	0.042
71	5.92	0.27	0.051	(0.145)	0.009	0.042
72	6.00	0.27	0.051	(0.144)	0.009	0.042
73	6.08	0.30	0.058	(0.143)	0.010	0.047
74	6.17	0.30	0.058	(0.143)	0.010	0.047
75	6.25	0.30	0.058	(0.142)	0.010	0.047

76	6.33	0.30	0.058	(0.141)	0.010	0.047
77	6.42	0.30	0.058	(0.141)	0.010	0.047
78	6.50	0.30	0.058	(0.140)	0.010	0.047
79	6.58	0.33	0.064	(0.140)	0.012	0.052
80	6.67	0.33	0.064	(0.139)	0.012	0.052
81	6.75	0.33	0.064	(0.138)	0.012	0.052
82	6.83	0.33	0.064	(0.138)	0.012	0.052
83	6.92	0.33	0.064	(0.137)	0.012	0.052
84	7.00	0.33	0.064	(0.136)	0.012	0.052
85	7.08	0.33	0.064	(0.136)	0.012	0.052
86	7.17	0.33	0.064	(0.135)	0.012	0.052
87	7.25	0.33	0.064	(0.135)	0.012	0.052
88	7.33	0.37	0.070	(0.134)	0.013	0.058
89	7.42	0.37	0.070	(0.133)	0.013	0.058
90	7.50	0.37	0.070	(0.133)	0.013	0.058
91	7.58	0.40	0.077	(0.132)	0.014	0.063
92	7.67	0.40	0.077	(0.131)	0.014	0.063
93	7.75	0.40	0.077	(0.131)	0.014	0.063
94	7.83	0.43	0.083	(0.130)	0.015	0.068
95	7.92	0.43	0.083	(0.130)	0.015	0.068
96	8.00	0.43	0.083	(0.129)	0.015	0.068
97	8.08	0.50	0.096	(0.128)	0.017	0.079
98	8.17	0.50	0.096	(0.128)	0.017	0.079
99	8.25	0.50	0.096	(0.127)	0.017	0.079
100	8.33	0.50	0.096	(0.127)	0.017	0.079
101	8.42	0.50	0.096	(0.126)	0.017	0.079
102	8.50	0.50	0.096	(0.125)	0.017	0.079
103	8.58	0.53	0.102	(0.125)	0.018	0.084
104	8.67	0.53	0.102	(0.124)	0.018	0.084
105	8.75	0.53	0.102	(0.124)	0.018	0.084
106	8.83	0.57	0.109	(0.123)	0.020	0.089
107	8.92	0.57	0.109	(0.123)	0.020	0.089
108	9.00	0.57	0.109	(0.122)	0.020	0.089
109	9.08	0.63	0.122	(0.121)	0.022	0.100
110	9.17	0.63	0.122	(0.121)	0.022	0.100
111	9.25	0.63	0.122	(0.120)	0.022	0.100
112	9.33	0.67	0.128	(0.120)	0.023	0.105
113	9.42	0.67	0.128	(0.119)	0.023	0.105
114	9.50	0.67	0.128	(0.119)	0.023	0.105
115	9.58	0.70	0.134	(0.118)	0.024	0.110
116	9.67	0.70	0.134	(0.117)	0.024	0.110
117	9.75	0.70	0.134	(0.117)	0.024	0.110
118	9.83	0.73	0.141	(0.116)	0.025	0.115
119	9.92	0.73	0.141	(0.116)	0.025	0.115
120	10.00	0.73	0.141	(0.115)	0.025	0.115
121	10.08	0.50	0.096	(0.115)	0.017	0.079
122	10.17	0.50	0.096	(0.114)	0.017	0.079
123	10.25	0.50	0.096	(0.113)	0.017	0.079
124	10.33	0.50	0.096	(0.113)	0.017	0.079
125	10.42	0.50	0.096	(0.112)	0.017	0.079
126	10.50	0.50	0.096	(0.112)	0.017	0.079
127	10.58	0.67	0.128	(0.111)	0.023	0.105
128	10.67	0.67	0.128	(0.111)	0.023	0.105
129	10.75	0.67	0.128	(0.110)	0.023	0.105
130	10.83	0.67	0.128	(0.110)	0.023	0.105
131	10.92	0.67	0.128	(0.109)	0.023	0.105
132	11.00	0.67	0.128	(0.109)	0.023	0.105
133	11.08	0.63	0.122	(0.108)	0.022	0.100
134	11.17	0.63	0.122	(0.108)	0.022	0.100
135	11.25	0.63	0.122	(0.107)	0.022	0.100

136	11.33	0.63	0.122	(0.106)	0.022	0.100
137	11.42	0.63	0.122	(0.106)	0.022	0.100
138	11.50	0.63	0.122	(0.105)	0.022	0.100
139	11.58	0.57	0.109	(0.105)	0.020	0.089
140	11.67	0.57	0.109	(0.104)	0.020	0.089
141	11.75	0.57	0.109	(0.104)	0.020	0.089
142	11.83	0.60	0.115	(0.103)	0.021	0.094
143	11.92	0.60	0.115	(0.103)	0.021	0.094
144	12.00	0.60	0.115	(0.102)	0.021	0.094
145	12.08	0.83	0.160	(0.102)	0.029	0.131
146	12.17	0.83	0.160	(0.101)	0.029	0.131
147	12.25	0.83	0.160	(0.101)	0.029	0.131
148	12.33	0.87	0.166	(0.100)	0.030	0.136
149	12.42	0.87	0.166	(0.100)	0.030	0.136
150	12.50	0.87	0.166	(0.099)	0.030	0.136
151	12.58	0.93	0.179	(0.099)	0.032	0.147
152	12.67	0.93	0.179	(0.098)	0.032	0.147
153	12.75	0.93	0.179	(0.098)	0.032	0.147
154	12.83	0.97	0.186	(0.097)	0.033	0.152
155	12.92	0.97	0.186	(0.097)	0.033	0.152
156	13.00	0.97	0.186	(0.096)	0.033	0.152
157	13.08	1.13	0.218	(0.096)	0.039	0.178
158	13.17	1.13	0.218	(0.095)	0.039	0.178
159	13.25	1.13	0.218	(0.095)	0.039	0.178
160	13.33	1.13	0.218	(0.094)	0.039	0.178
161	13.42	1.13	0.218	(0.094)	0.039	0.178
162	13.50	1.13	0.218	(0.093)	0.039	0.178
163	13.58	0.77	0.147	(0.093)	0.026	0.121
164	13.67	0.77	0.147	(0.092)	0.026	0.121
165	13.75	0.77	0.147	(0.092)	0.026	0.121
166	13.83	0.77	0.147	(0.092)	0.026	0.121
167	13.92	0.77	0.147	(0.091)	0.026	0.121
168	14.00	0.77	0.147	(0.091)	0.026	0.121
169	14.08	0.90	0.173	(0.090)	0.031	0.142
170	14.17	0.90	0.173	(0.090)	0.031	0.142
171	14.25	0.90	0.173	(0.089)	0.031	0.142
172	14.33	0.87	0.166	(0.089)	0.030	0.136
173	14.42	0.87	0.166	(0.088)	0.030	0.136
174	14.50	0.87	0.166	(0.088)	0.030	0.136
175	14.58	0.87	0.166	(0.087)	0.030	0.136
176	14.67	0.87	0.166	(0.087)	0.030	0.136
177	14.75	0.87	0.166	(0.086)	0.030	0.136
178	14.83	0.83	0.160	(0.086)	0.029	0.131
179	14.92	0.83	0.160	(0.086)	0.029	0.131
180	15.00	0.83	0.160	(0.085)	0.029	0.131
181	15.08	0.80	0.154	(0.085)	0.028	0.126
182	15.17	0.80	0.154	(0.084)	0.028	0.126
183	15.25	0.80	0.154	(0.084)	0.028	0.126
184	15.33	0.77	0.147	(0.083)	0.026	0.121
185	15.42	0.77	0.147	(0.083)	0.026	0.121
186	15.50	0.77	0.147	(0.083)	0.026	0.121
187	15.58	0.63	0.122	(0.082)	0.022	0.100
188	15.67	0.63	0.122	(0.082)	0.022	0.100
189	15.75	0.63	0.122	(0.081)	0.022	0.100
190	15.83	0.63	0.122	(0.081)	0.022	0.100
191	15.92	0.63	0.122	(0.080)	0.022	0.100
192	16.00	0.63	0.122	(0.080)	0.022	0.100
193	16.08	0.13	0.026	(0.080)	0.005	0.021
194	16.17	0.13	0.026	(0.079)	0.005	0.021
195	16.25	0.13	0.026	(0.079)	0.005	0.021

196	16.33	0.13	0.026	(0.078)	0.005	0.021
197	16.42	0.13	0.026	(0.078)	0.005	0.021
198	16.50	0.13	0.026	(0.078)	0.005	0.021
199	16.58	0.10	0.019	(0.077)	0.003	0.016
200	16.67	0.10	0.019	(0.077)	0.003	0.016
201	16.75	0.10	0.019	(0.076)	0.003	0.016
202	16.83	0.10	0.019	(0.076)	0.003	0.016
203	16.92	0.10	0.019	(0.076)	0.003	0.016
204	17.00	0.10	0.019	(0.075)	0.003	0.016
205	17.08	0.17	0.032	(0.075)	0.006	0.026
206	17.17	0.17	0.032	(0.075)	0.006	0.026
207	17.25	0.17	0.032	(0.074)	0.006	0.026
208	17.33	0.17	0.032	(0.074)	0.006	0.026
209	17.42	0.17	0.032	(0.073)	0.006	0.026
210	17.50	0.17	0.032	(0.073)	0.006	0.026
211	17.58	0.17	0.032	(0.073)	0.006	0.026
212	17.67	0.17	0.032	(0.072)	0.006	0.026
213	17.75	0.17	0.032	(0.072)	0.006	0.026
214	17.83	0.13	0.026	(0.072)	0.005	0.021
215	17.92	0.13	0.026	(0.071)	0.005	0.021
216	18.00	0.13	0.026	(0.071)	0.005	0.021
217	18.08	0.13	0.026	(0.071)	0.005	0.021
218	18.17	0.13	0.026	(0.070)	0.005	0.021
219	18.25	0.13	0.026	(0.070)	0.005	0.021
220	18.33	0.13	0.026	(0.070)	0.005	0.021
221	18.42	0.13	0.026	(0.069)	0.005	0.021
222	18.50	0.13	0.026	(0.069)	0.005	0.021
223	18.58	0.10	0.019	(0.069)	0.003	0.016
224	18.67	0.10	0.019	(0.068)	0.003	0.016
225	18.75	0.10	0.019	(0.068)	0.003	0.016
226	18.83	0.07	0.013	(0.068)	0.002	0.010
227	18.92	0.07	0.013	(0.067)	0.002	0.010
228	19.00	0.07	0.013	(0.067)	0.002	0.010
229	19.08	0.10	0.019	(0.067)	0.003	0.016
230	19.17	0.10	0.019	(0.066)	0.003	0.016
231	19.25	0.10	0.019	(0.066)	0.003	0.016
232	19.33	0.13	0.026	(0.066)	0.005	0.021
233	19.42	0.13	0.026	(0.065)	0.005	0.021
234	19.50	0.13	0.026	(0.065)	0.005	0.021
235	19.58	0.10	0.019	(0.065)	0.003	0.016
236	19.67	0.10	0.019	(0.064)	0.003	0.016
237	19.75	0.10	0.019	(0.064)	0.003	0.016
238	19.83	0.07	0.013	(0.064)	0.002	0.010
239	19.92	0.07	0.013	(0.064)	0.002	0.010
240	20.00	0.07	0.013	(0.063)	0.002	0.010
241	20.08	0.10	0.019	(0.063)	0.003	0.016
242	20.17	0.10	0.019	(0.063)	0.003	0.016
243	20.25	0.10	0.019	(0.062)	0.003	0.016
244	20.33	0.10	0.019	(0.062)	0.003	0.016
245	20.42	0.10	0.019	(0.062)	0.003	0.016
246	20.50	0.10	0.019	(0.062)	0.003	0.016
247	20.58	0.10	0.019	(0.061)	0.003	0.016
248	20.67	0.10	0.019	(0.061)	0.003	0.016
249	20.75	0.10	0.019	(0.061)	0.003	0.016
250	20.83	0.07	0.013	(0.061)	0.002	0.010
251	20.92	0.07	0.013	(0.060)	0.002	0.010
252	21.00	0.07	0.013	(0.060)	0.002	0.010
253	21.08	0.10	0.019	(0.060)	0.003	0.016
254	21.17	0.10	0.019	(0.060)	0.003	0.016
255	21.25	0.10	0.019	(0.059)	0.003	0.016

256	21.33	0.07	0.013	(0.059)	0.002	0.010
257	21.42	0.07	0.013	(0.059)	0.002	0.010
258	21.50	0.07	0.013	(0.059)	0.002	0.010
259	21.58	0.10	0.019	(0.059)	0.003	0.016
260	21.67	0.10	0.019	(0.058)	0.003	0.016
261	21.75	0.10	0.019	(0.058)	0.003	0.016
262	21.83	0.07	0.013	(0.058)	0.002	0.010
263	21.92	0.07	0.013	(0.058)	0.002	0.010
264	22.00	0.07	0.013	(0.058)	0.002	0.010
265	22.08	0.10	0.019	(0.057)	0.003	0.016
266	22.17	0.10	0.019	(0.057)	0.003	0.016
267	22.25	0.10	0.019	(0.057)	0.003	0.016
268	22.33	0.07	0.013	(0.057)	0.002	0.010
269	22.42	0.07	0.013	(0.057)	0.002	0.010
270	22.50	0.07	0.013	(0.057)	0.002	0.010
271	22.58	0.07	0.013	(0.056)	0.002	0.010
272	22.67	0.07	0.013	(0.056)	0.002	0.010
273	22.75	0.07	0.013	(0.056)	0.002	0.010
274	22.83	0.07	0.013	(0.056)	0.002	0.010
275	22.92	0.07	0.013	(0.056)	0.002	0.010
276	23.00	0.07	0.013	(0.056)	0.002	0.010
277	23.08	0.07	0.013	(0.055)	0.002	0.010
278	23.17	0.07	0.013	(0.055)	0.002	0.010
279	23.25	0.07	0.013	(0.055)	0.002	0.010
280	23.33	0.07	0.013	(0.055)	0.002	0.010
281	23.42	0.07	0.013	(0.055)	0.002	0.010
282	23.50	0.07	0.013	(0.055)	0.002	0.010
283	23.58	0.07	0.013	(0.055)	0.002	0.010
284	23.67	0.07	0.013	(0.055)	0.002	0.010
285	23.75	0.07	0.013	(0.055)	0.002	0.010
286	23.83	0.07	0.013	(0.055)	0.002	0.010
287	23.92	0.07	0.013	(0.055)	0.002	0.010
288	24.00	0.07	0.013	(0.055)	0.002	0.010

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.7

Flood volume = Effective rainfall 1.31(In)
times area 23.7(Ac.)/[(In)/(Ft.)] = 2.6(Ac.Ft)
Total soil loss = 0.29(In)
Total soil loss = 0.569(Ac.Ft)
Total rainfall = 1.60(In)
Flood volume = 112867.4 Cubic Feet
Total soil loss = 24775.8 Cubic Feet

Peak flow rate of this hydrograph = 4.264(CFS)

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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	0.0009	0.13	Q	|	|	|	|
0+10	0.0024	0.23	Q	|	|	|	|
0+15	0.0041	0.25	Q	|	|	|	|
0+20	0.0063	0.31	VQ	|	|	|	|
0+25	0.0088	0.36	VQ	|	|	|	|
0+30	0.0114	0.37	VQ	|	|	|	|

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0+35       0.0140      0.38  VQ        |         |         |         |
0+40       0.0165      0.38  VQ        |         |         |         |
0+45       0.0191      0.38  VQ        |         |         |         |
0+50       0.0222      0.44  VQ        |         |         |         |
0+55       0.0255      0.49  VQ        |         |         |         |
1+ 0       0.0290      0.50  VQ        |         |         |         |
1+ 5       0.0320      0.44  VQ        |         |         |         |
1+10       0.0347      0.39  VQ        |         |         |         |
1+15       0.0373      0.38  VQ        |         |         |         |
1+20       0.0399      0.38  VQ        |         |         |         |
1+25       0.0425      0.38  VQ        |         |         |         |
1+30       0.0450      0.38  VQ        |         |         |         |
1+35       0.0476      0.38  VQ        |         |         |         |
1+40       0.0502      0.38  VQ        |         |         |         |
1+45       0.0528      0.38  VQ        |         |         |         |
1+50       0.0558      0.44  VQ        |         |         |         |
1+55       0.0592      0.49  VQ        |         |         |         |
2+ 0       0.0627      0.50  VQ        |         |         |         |
2+ 5       0.0661      0.50  |VQ       |         |         |         |
2+10       0.0696      0.50  |VQ       |         |         |         |
2+15       0.0730      0.50  |VQ       |         |         |         |
2+20       0.0765      0.50  |VQ       |         |         |         |
2+25       0.0799      0.50  |VQ       |         |         |         |
2+30       0.0834      0.50  |VQ       |         |         |         |
2+35       0.0873      0.56  |VQ       |         |         |         |
2+40       0.0915      0.62  |VQ       |         |         |         |
2+45       0.0958      0.62  |VQ       |         |         |         |
2+50       0.1001      0.63  |VQ       |         |         |         |
2+55       0.1044      0.63  |VQ       |         |         |         |
3+ 0       0.1088      0.63  |VQ       |         |         |         |
3+ 5       0.1131      0.63  |VQ       |         |         |         |
3+10       0.1174      0.63  |VQ       |         |         |         |
3+15       0.1217      0.63  |VQ       |         |         |         |
3+20       0.1260      0.63  |VQ       |         |         |         |
3+25       0.1304      0.63  | Q       |         |         |         |
3+30       0.1347      0.63  | Q       |         |         |         |
3+35       0.1390      0.63  | Q       |         |         |         |
3+40       0.1433      0.63  | Q       |         |         |         |
3+45       0.1476      0.63  | Q       |         |         |         |
3+50       0.1524      0.69  | Q       |         |         |         |
3+55       0.1575      0.74  | Q       |         |         |         |
4+ 0       0.1626      0.75  | Q       |         |         |         |
4+ 5       0.1678      0.75  | VQ      |         |         |         |
4+10       0.1730      0.75  | VQ      |         |         |         |
4+15       0.1782      0.75  | VQ      |         |         |         |
4+20       0.1838      0.82  | VQ      |         |         |         |
4+25       0.1898      0.87  | VQ      |         |         |         |
4+30       0.1958      0.88  |  Q      |         |         |         |
4+35       0.2018      0.88  |  Q      |         |         |         |
4+40       0.2079      0.88  |  Q      |         |         |         |
4+45       0.2139      0.88  |  Q      |         |         |         |
4+50       0.2204      0.94  |  Q      |         |         |         |
4+55       0.2272      0.99  |  Q      |         |         |         |
5+ 0       0.2341      1.00  |  VQ     |         |         |         |
5+ 5       0.2402      0.88  |  Q      |         |         |         |
5+10       0.2455      0.78  |  Q      |         |         |         |
5+15       0.2507      0.76  |  Q      |         |         |         |
5+20       0.2564      0.82  |  Q      |         |         |         |
5+25       0.2623      0.87  |  QV     |         |         |         |
5+30       0.2683      0.88  |  QV     |         |         |         |
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 5+35       0.2748      0.94  |  QV     |         |         |         |
 5+40       0.2817      0.99  |  QV     |         |         |         |
 5+45       0.2885      1.00  |   Q     |         |         |         |
 5+50       0.2955      1.00  |   Q     |         |         |         |
 5+55       0.3024      1.00  |   Q     |         |         |         |
 6+ 0       0.3093      1.00  |   Q     |         |         |         |
 6+ 5       0.3166      1.07  |   Q     |         |         |         |
 6+10       0.3243      1.12  |   QV    |         |         |         |
 6+15       0.3321      1.13  |   QV    |         |         |         |
 6+20       0.3398      1.13  |   QV    |         |         |         |
 6+25       0.3476      1.13  |   QV    |         |         |         |
 6+30       0.3554      1.13  |   QV    |         |         |         |
 6+35       0.3636      1.19  |   QV    |         |         |         |
 6+40       0.3721      1.24  |   QV    |         |         |         |
 6+45       0.3808      1.25  |    Q    |         |         |         |
 6+50       0.3894      1.25  |    QV   |         |         |         |
 6+55       0.3980      1.25  |    QV   |         |         |         |
 7+ 0       0.4067      1.25  |    QV   |         |         |         |
 7+ 5       0.4153      1.25  |    QV   |         |         |         |
 7+10       0.4240      1.25  |    QV   |         |         |         |
 7+15       0.4326      1.25  |    QV   |         |         |         |
 7+20       0.4417      1.32  |    QV   |         |         |         |
 7+25       0.4511      1.37  |    QV   |         |         |         |
 7+30       0.4606      1.38  |    Q V  |         |         |         |
 7+35       0.4705      1.44  |    Q V  |         |         |         |
 7+40       0.4808      1.49  |    Q V  |         |         |         |
 7+45       0.4911      1.50  |     QV  |         |         |         |
 7+50       0.5019      1.57  |     QV  |         |         |         |
 7+55       0.5131      1.62  |     QV  |         |         |         |
 8+ 0       0.5243      1.63  |     Q V |         |         |         |
 8+ 5       0.5364      1.76  |      QV |         |         |         |
 8+10       0.5492      1.86  |      QV |         |         |         |
 8+15       0.5621      1.88  |      QV |         |         |         |
 8+20       0.5750      1.88  |      QV |         |         |         |
 8+25       0.5880      1.88  |      Q V|         |         |         |
 8+30       0.6009      1.88  |      Q V|         |         |         |
 8+35       0.6143      1.94  |      Q V|         |         |         |
 8+40       0.6281      1.99  |      Q V|         |         |         |
 8+45       0.6419      2.00  |       QV|         |         |         |
 8+50       0.6561      2.07  |       Q V         |         |         |
 8+55       0.6707      2.12  |       Q V         |         |         |
 9+ 0       0.6854      2.13  |       Q V         |         |         |
 9+ 5       0.7009      2.26  |        QV         |         |         |
 9+10       0.7172      2.36  |        Q|V        |         |         |
 9+15       0.7336      2.38  |        Q|V        |         |         |
 9+20       0.7504      2.45  |        Q|V        |         |         |
 9+25       0.7676      2.50  |        Q|V        |         |         |
 9+30       0.7849      2.51  |         Q V       |         |         |
 9+35       0.8026      2.57  |         Q V       |         |         |
 9+40       0.8206      2.62  |         Q V       |         |         |
 9+45       0.8387      2.63  |         Q V       |         |         |
 9+50       0.8573      2.70  |         Q  V      |         |         |
 9+55       0.8762      2.75  |         Q  V      |         |         |
10+ 0       0.8952      2.76  |         |Q V      |         |         |
10+ 5       0.9112      2.32  |        Q|   V     |         |         |
10+10       0.9247      1.96  |      Q  |   V     |         |         |
10+15       0.9378      1.90  |      Q  |   V     |         |         |
10+20       0.9507      1.88  |      Q  |   V     |         |         |
10+25       0.9637      1.88  |      Q  |   V     |         |         |
10+30       0.9767      1.88  |      Q  |    V    |         |         |
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10+35       0.9918      2.20  |       Q |    V    |         |         |
10+40       1.0086      2.45  |        Q|    V    |         |         |
10+45       1.0258      2.49  |        Q|    V    |         |         |
10+50       1.0431      2.51  |         Q     V   |         |         |
10+55       1.0604      2.51  |         Q     V   |         |         |
11+ 0       1.0776      2.51  |         Q     V   |         |         |
11+ 5       1.0945      2.45  |        Q|     V   |         |         |
11+10       1.1110      2.39  |        Q|      V  |         |         |
11+15       1.1274      2.39  |        Q|      V  |         |         |
11+20       1.1438      2.38  |        Q|      V  |         |         |
11+25       1.1602      2.38  |        Q|      V  |         |         |
11+30       1.1766      2.38  |        Q|       V |         |         |
11+35       1.1922      2.26  |        Q|       V |         |         |
11+40       1.2070      2.16  |       Q |       V |         |         |
11+45       1.2217      2.14  |       Q |       V |         |         |
11+50       1.2369      2.19  |       Q |        V|         |         |
11+55       1.2523      2.25  |       Q |        V|         |         |
12+ 0       1.2679      2.25  |        Q|        V|         |         |
12+ 5       1.2864      2.70  |         Q        V|         |         |
12+10       1.3075      3.05  |         | Q       V         |         |
12+15       1.3289      3.12  |         | Q       V         |         |
12+20       1.3509      3.20  |         | Q       V         |         |
12+25       1.3733      3.25  |         | Q       |V        |         |
12+30       1.3958      3.26  |         |  Q      |V        |         |
12+35       1.4191      3.39  |         |  Q      |V        |         |
12+40       1.4431      3.49  |         |  Q      | V       |         |
12+45       1.4672      3.51  |         |   Q     | V       |         |
12+50       1.4919      3.57  |         |   Q     |  V      |         |
12+55       1.5168      3.63  |         |   Q     |  V      |         |
13+ 0       1.5419      3.63  |         |   Q     |  V      |         |
13+ 5       1.5691      3.95  |         |    Q    |   V     |         |
13+10       1.5980      4.20  |         |     Q   |   V     |         |
13+15       1.6273      4.25  |         |     Q   |    V    |         |
13+20       1.6567      4.26  |         |      Q  |    V    |         |
13+25       1.6860      4.26  |         |      Q  |     V   |         |
13+30       1.7154      4.26  |         |      Q  |     V   |         |
13+35       1.7400      3.57  |         |   Q     |     V   |         |
13+40       1.7608      3.01  |         | Q       |      V  |         |
13+45       1.7808      2.92  |         |Q        |      V  |         |
13+50       1.8007      2.88  |         |Q        |      V  |         |
13+55       1.8206      2.88  |         |Q        |       V |         |
14+ 0       1.8404      2.88  |         |Q        |       V |         |
14+ 5       1.8620      3.14  |         | Q       |       V |         |
14+10       1.8850      3.34  |         |  Q      |        V|         |
14+15       1.9083      3.37  |         |  Q      |        V|         |
14+20       1.9311      3.32  |         |  Q      |        V|         |
14+25       1.9537      3.27  |         |  Q      |         V         |
14+30       1.9762      3.26  |         |  Q      |         V         |
14+35       1.9986      3.26  |         |  Q      |         V         |
14+40       2.0211      3.26  |         |  Q      |         |V        |
14+45       2.0435      3.26  |         |  Q      |         |V        |
14+50       2.0655      3.20  |         | Q       |         |V        |
14+55       2.0872      3.15  |         | Q       |         | V       |
15+ 0       2.1088      3.14  |         | Q       |         | V       |
15+ 5       2.1300      3.07  |         | Q       |         | V       |
15+10       2.1508      3.02  |         | Q       |         |  V      |
15+15       2.1715      3.01  |         | Q       |         |  V      |
15+20       2.1918      2.95  |         |Q        |         |  V      |
15+25       2.2118      2.90  |         |Q        |         |   V     |
15+30       2.2317      2.89  |         |Q        |         |   V     |
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15+35       2.2498      2.63  |         Q         |         |   V     |
15+40       2.2665      2.43  |        Q|         |         |   V     |
15+45       2.2830      2.39  |        Q|         |         |    V    |
15+50       2.2994      2.38  |        Q|         |         |    V    |
15+55       2.3158      2.38  |        Q|         |         |    V    |
16+ 0       2.3323      2.38  |        Q|         |         |     V   |
16+ 5       2.3422      1.44  |    Q    |         |         |     V   |
16+10       2.3468      0.68  | Q       |         |         |     V   |
16+15       2.3506      0.54  | Q       |         |         |     V   |
16+20       2.3540      0.50  | Q       |         |         |     V   |
16+25       2.3575      0.50  | Q       |         |         |     V   |
16+30       2.3609      0.50  | Q       |         |         |     V   |
16+35       2.3640      0.44  |Q        |         |         |     V   |
16+40       2.3666      0.39  |Q        |         |         |     V   |
16+45       2.3692      0.38  |Q        |         |         |     V   |
16+50       2.3718      0.38  |Q        |         |         |     V   |
16+55       2.3744      0.38  |Q        |         |         |     V   |
17+ 0       2.3770      0.38  |Q        |         |         |     V   |
17+ 5       2.3805      0.50  | Q       |         |         |     V   |
17+10       2.3846      0.60  | Q       |         |         |     V   |
17+15       2.3889      0.62  | Q       |         |         |     V   |
17+20       2.3932      0.63  | Q       |         |         |     V   |
17+25       2.3976      0.63  | Q       |         |         |      V  |
17+30       2.4019      0.63  | Q       |         |         |      V  |
17+35       2.4062      0.63  | Q       |         |         |      V  |
17+40       2.4105      0.63  | Q       |         |         |      V  |
17+45       2.4148      0.63  | Q       |         |         |      V  |
17+50       2.4187      0.56  | Q       |         |         |      V  |
17+55       2.4222      0.51  | Q       |         |         |      V  |
18+ 0       2.4257      0.50  | Q       |         |         |      V  |
18+ 5       2.4292      0.50  | Q       |         |         |      V  |
18+10       2.4326      0.50  | Q       |         |         |      V  |
18+15       2.4361      0.50  | Q       |         |         |      V  |
18+20       2.4395      0.50  | Q       |         |         |      V  |
18+25       2.4430      0.50  | Q       |         |         |      V  |
18+30       2.4464      0.50  | Q       |         |         |      V  |
18+35       2.4495      0.44  |Q        |         |         |      V  |
18+40       2.4521      0.39  |Q        |         |         |      V  |
18+45       2.4548      0.38  |Q        |         |         |      V  |
18+50       2.4569      0.31  |Q        |         |         |      V  |
18+55       2.4587      0.26  |Q        |         |         |      V  |
19+ 0       2.4605      0.25  |Q        |         |         |      V  |
19+ 5       2.4626      0.31  |Q        |         |         |       V |
19+10       2.4651      0.36  |Q        |         |         |       V |
19+15       2.4677      0.37  |Q        |         |         |       V |
19+20       2.4707      0.44  |Q        |         |         |       V |
19+25       2.4741      0.49  |Q        |         |         |       V |
19+30       2.4775      0.50  |Q        |         |         |       V |
19+35       2.4806      0.44  |Q        |         |         |       V |
19+40       2.4832      0.39  |Q        |         |         |       V |
19+45       2.4858      0.38  |Q        |         |         |       V |
19+50       2.4880      0.31  |Q        |         |         |       V |
19+55       2.4898      0.26  |Q        |         |         |       V |
20+ 0       2.4916      0.25  |Q        |         |         |       V |
20+ 5       2.4937      0.31  |Q        |         |         |       V |
20+10       2.4962      0.36  |Q        |         |         |       V |
20+15       2.4988      0.37  |Q        |         |         |       V |
20+20       2.5014      0.38  |Q        |         |         |       V |
20+25       2.5040      0.38  |Q        |         |         |       V |
20+30       2.5066      0.38  |Q        |         |         |       V |
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   20+35       2.5092      0.38  |Q          |          |          |       V |
   20+40       2.5118      0.38  |Q          |          |          |       V |
   20+45       2.5143      0.38  |Q          |          |          |       V |
   20+50       2.5165      0.31  |Q          |          |          |       V |
   20+55       2.5183      0.26  |Q          |          |          |       V |
   21+ 0       2.5201      0.25  |Q          |          |          |       V |
   21+ 5       2.5222      0.31  |Q          |          |          |       V |
   21+10       2.5247      0.36  |Q          |          |          |       V |
   21+15       2.5273      0.37  |Q          |          |          |        V|
   21+20       2.5295      0.31  |Q          |          |          |        V|
   21+25       2.5313      0.26  |Q          |          |          |        V|
   21+30       2.5330      0.25  |Q          |          |          |        V|
   21+35       2.5352      0.31  |Q          |          |          |        V|
   21+40       2.5377      0.36  |Q          |          |          |        V|
   21+45       2.5403      0.37  |Q          |          |          |        V|
   21+50       2.5424      0.31  |Q          |          |          |        V|
   21+55       2.5442      0.26  |Q          |          |          |        V|
   22+ 0       2.5460      0.25  |Q          |          |          |        V|
   22+ 5       2.5481      0.31  |Q          |          |          |        V|
   22+10       2.5506      0.36  |Q          |          |          |        V|
   22+15       2.5532      0.37  |Q          |          |          |        V|
   22+20       2.5554      0.31  |Q          |          |          |        V|
   22+25       2.5572      0.26  |Q          |          |          |        V|
   22+30       2.5589      0.25  |Q          |          |          |        V|
   22+35       2.5607      0.25  |Q          |          |          |        V|
   22+40       2.5624      0.25  |Q          |          |          |        V|
   22+45       2.5641      0.25  |Q          |          |          |        V|
   22+50       2.5658      0.25  |Q          |          |          |        V|
   22+55       2.5676      0.25  |Q          |          |          |        V|
   23+ 0       2.5693      0.25  |Q          |          |          |        V|
   23+ 5       2.5710      0.25  |Q          |          |          |        V|
   23+10       2.5727      0.25  |Q          |          |          |        V|
   23+15       2.5745      0.25  |Q          |          |          |        V|
   23+20       2.5762      0.25  |Q          |          |          |        V|
   23+25       2.5779      0.25  |Q          |          |          |        V|
   23+30       2.5797      0.25  |Q          |          |          |        V|
   23+35       2.5814      0.25  |Q          |          |          |        V|
   23+40       2.5831      0.25  |Q          |          |          |        V|
   23+45       2.5848      0.25  |Q          |          |          |        V|
   23+50       2.5866      0.25  |Q          |          |          |        V|
   23+55       2.5883      0.25  |Q          |          |          |        V|
   24+ 0       2.5900      0.25  |Q          |          |          |        V|
   24+ 5       2.5909      0.12  Q           |          |          |        V|
   24+10       2.5910      0.02  Q           |          |          |        V|
   24+15       2.5911      0.01  Q           |          |          |        V|
-----------------------------------------------------------------------
```

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	2.440	5	805	62,136	------	------	------	Area A
2	Manual	5.100	5	800	196,164	------	------	------	Area B
3	Manual	4.260	5	800	112,857	------	------	------	Area C
5	Reservoir	0.274	5	1110	61,928	1	103.38	46,474	Area A Outflow
6	Reservoir	0.501	5	1460	195,068	2	104.07	163,815	Area B Outflow
7	Reservoir	0.508	5	1075	112,817	3	103.70	85,086	Area C Outflow
9	Combine	1.268	5	1445	369,813	5, 6, 7,	------	------	Total Outflow

20-750 Building B.gpw	Return Period: 2 Year	Wednesday, 03 / 30 / 2022

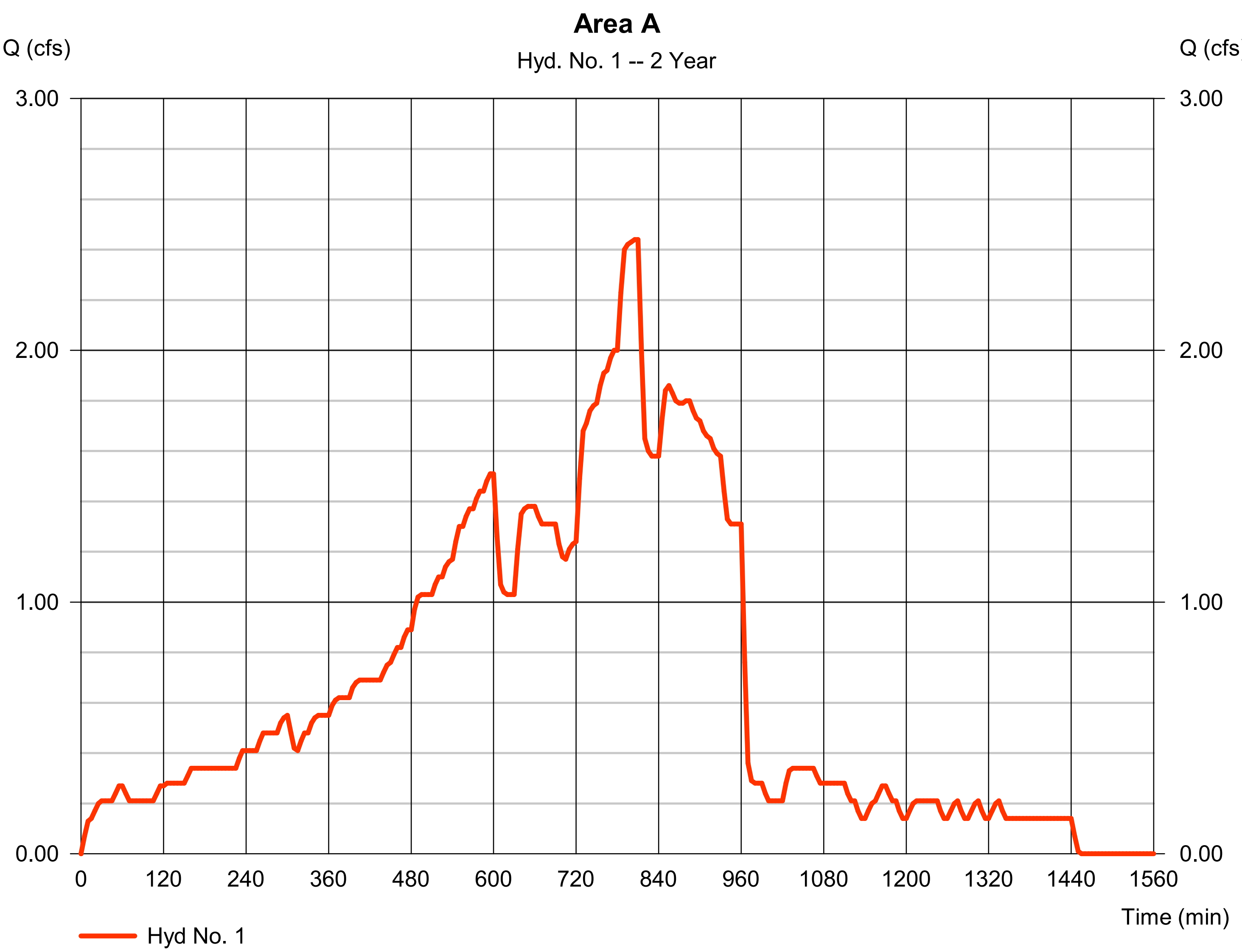
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 1

Area A

Hydrograph type	= Manual	Peak discharge	= 2.440 cfs
Storm frequency	= 2 yrs	Time to peak	= 805 min
Time interval	= 5 min	Hyd. volume	= 62,136 cuft



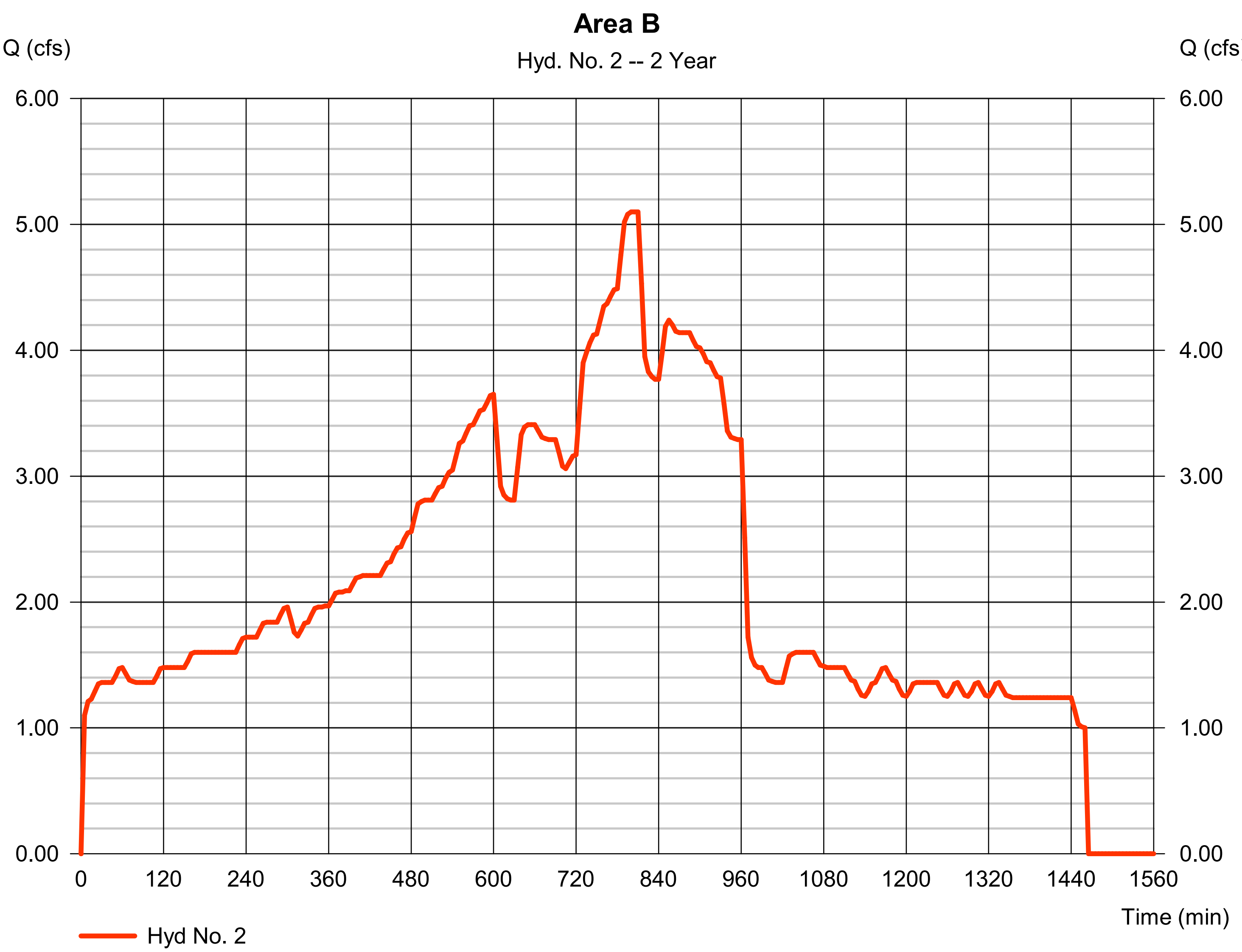
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 2

Area B

Hydrograph type	= Manual	Peak discharge	= 5.100 cfs
Storm frequency	= 2 yrs	Time to peak	= 800 min
Time interval	= 5 min	Hyd. volume	= 196,164 cuft



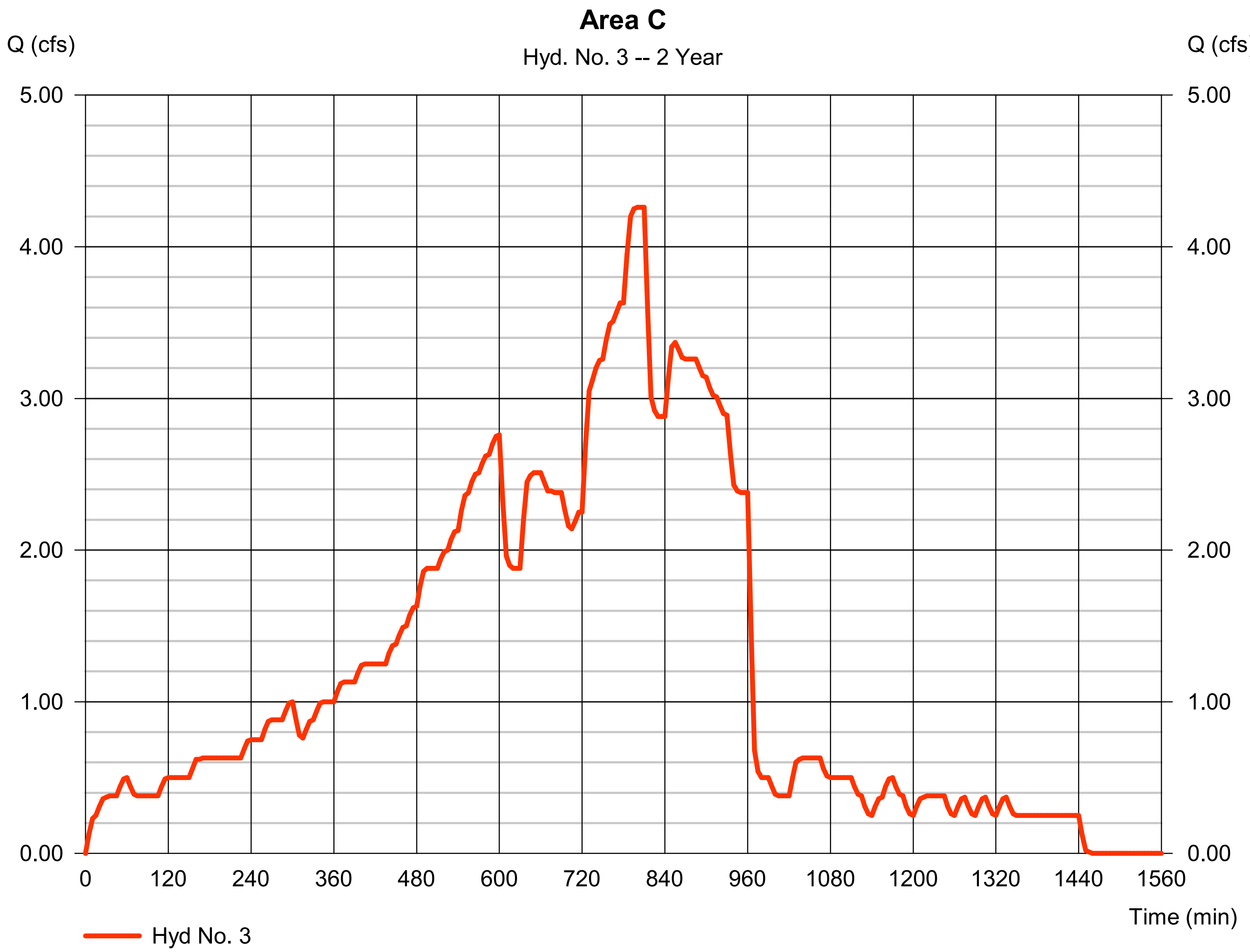
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 — Wednesday, 03 / 30 / 2022

Hyd. No. 3

Area C

Hydrograph type	= Manual	Peak discharge	= 4.260 cfs
Storm frequency	= 2 yrs	Time to peak	= 800 min
Time interval	= 5 min	Hyd. volume	= 112,857 cuft



Hydrograph Report

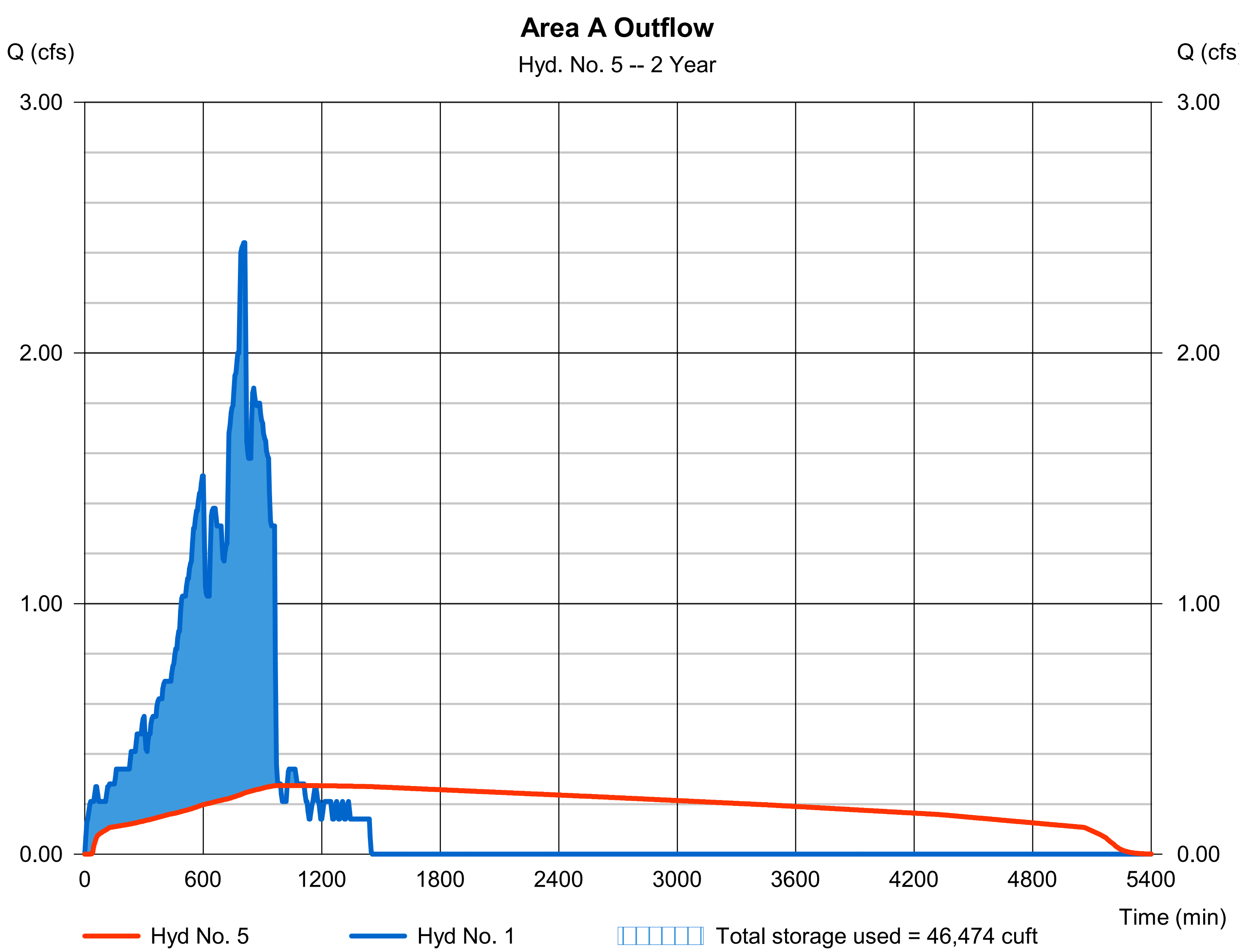
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 5

Area A Outflow

Hydrograph type	= Reservoir	Peak discharge	= 0.274 cfs
Storm frequency	= 2 yrs	Time to peak	= 1110 min
Time interval	= 5 min	Hyd. volume	= 61,928 cuft
Inflow hyd. No.	= 1 - Area A	Max. Elevation	= 103.38 ft
Reservoir name	= Detention System A	Max. Storage	= 46,474 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Pond No. 1 - Detention System A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 5.00 x 5.00 ft, Barrel Len = 990.00 ft, No. Barrels = 4, Slope = 0.10%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.60	100.60	n/a	1,142	1,142
1.20	101.20	n/a	5,873	7,015
1.80	101.80	n/a	9,281	16,296
2.40	102.40	n/a	10,930	27,226
2.99	103.00	n/a	11,668	38,894
3.59	103.59	n/a	11,667	50,561
4.19	104.19	n/a	10,939	61,500
4.79	104.79	n/a	9,263	70,763
5.39	105.39	n/a	5,867	76,630
5.99	105.99	n/a	1,140	77,770

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.40	0.00	0.00	0.00
Span (in)	= 2.40	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.00	0.00	0.00	0.00
Length (ft)	= 0.08	0.00	0.00	0.00
Slope (%)	= 0.10	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.75	0.00	0.00	0.00
Crest El. (ft)	= 103.45	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.06	114	100.06	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.000
0.12	228	100.12	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.001
0.18	343	100.18	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.002
0.24	457	100.24	0.04 oc	---	---	---	0.00	---	---	---	---	---	0.041
0.30	571	100.30	0.06 oc	---	---	---	0.00	---	---	---	---	---	0.064
0.36	685	100.36	0.08 ic	---	---	---	0.00	---	---	---	---	---	0.077
0.42	799	100.42	0.09 ic	---	---	---	0.00	---	---	---	---	---	0.085
0.48	913	100.48	0.09 ic	---	---	---	0.00	---	---	---	---	---	0.093
0.54	1,028	100.54	0.10 ic	---	---	---	0.00	---	---	---	---	---	0.100
0.60	1,142	100.60	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.107
0.66	1,729	100.66	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.113
0.72	2,317	100.72	0.12 ic	---	---	---	0.00	---	---	---	---	---	0.119
0.78	2,904	100.78	0.12 ic	---	---	---	0.00	---	---	---	---	---	0.125
0.84	3,491	100.84	0.13 ic	---	---	---	0.00	---	---	---	---	---	0.130
0.90	4,078	100.90	0.14 ic	---	---	---	0.00	---	---	---	---	---	0.135
0.96	4,666	100.96	0.14 ic	---	---	---	0.00	---	---	---	---	---	0.140
1.02	5,253	101.02	0.14 ic	---	---	---	0.00	---	---	---	---	---	0.145
1.08	5,840	101.08	0.15 ic	---	---	---	0.00	---	---	---	---	---	0.150
1.14	6,428	101.14	0.15 ic	---	---	---	0.00	---	---	---	---	---	0.154
1.20	7,015	101.20	0.16 ic	---	---	---	0.00	---	---	---	---	---	0.158
1.26	7,943	101.26	0.16 ic	---	---	---	0.00	---	---	---	---	---	0.163
1.32	8,871	101.32	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.167
1.38	9,799	101.38	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.171
1.44	10,727	101.44	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.175
1.50	11,656	101.50	0.18 ic	---	---	---	0.00	---	---	---	---	---	0.179
1.56	12,584	101.56	0.18 ic	---	---	---	0.00	---	---	---	---	---	0.183
1.62	13,512	101.62	0.19 ic	---	---	---	0.00	---	---	---	---	---	0.186
1.68	14,440	101.68	0.19 ic	---	---	---	0.00	---	---	---	---	---	0.190
1.74	15,368	101.74	0.19 ic	---	---	---	0.00	---	---	---	---	---	0.194
1.80	16,296	101.80	0.20 ic	---	---	---	0.00	---	---	---	---	---	0.197
1.86	17,389	101.86	0.20 ic	---	---	---	0.00	---	---	---	---	---	0.200

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Detention System A

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.92	18,482	101.92	0.20 ic	---	---	---	0.00	---	---	---	---	---	0.204
1.98	19,575	101.98	0.21 ic	---	---	---	0.00	---	---	---	---	---	0.207
2.04	20,668	102.04	0.21 ic	---	---	---	0.00	---	---	---	---	---	0.210
2.10	21,761	102.10	0.21 ic	---	---	---	0.00	---	---	---	---	---	0.214
2.16	22,854	102.16	0.22 ic	---	---	---	0.00	---	---	---	---	---	0.217
2.22	23,947	102.22	0.22 ic	---	---	---	0.00	---	---	---	---	---	0.220
2.28	25,040	102.28	0.22 ic	---	---	---	0.00	---	---	---	---	---	0.223
2.34	26,133	102.34	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.226
2.40	27,226	102.40	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.229
2.46	28,393	102.46	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.232
2.52	29,559	102.52	0.24 ic	---	---	---	0.00	---	---	---	---	---	0.235
2.58	30,726	102.58	0.24 ic	---	---	---	0.00	---	---	---	---	---	0.238
2.64	31,893	102.64	0.24 ic	---	---	---	0.00	---	---	---	---	---	0.241
2.70	33,060	102.70	0.24 ic	---	---	---	0.00	---	---	---	---	---	0.244
2.76	34,227	102.76	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.246
2.82	35,393	102.82	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.249
2.88	36,560	102.88	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.252
2.94	37,727	102.94	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.255
2.99	38,894	103.00	0.26 ic	---	---	---	0.00	---	---	---	---	---	0.257
3.05	40,061	103.05	0.26 ic	---	---	---	0.00	---	---	---	---	---	0.260
3.11	41,227	103.11	0.26 ic	---	---	---	0.00	---	---	---	---	---	0.263
3.17	42,394	103.17	0.27 ic	---	---	---	0.00	---	---	---	---	---	0.265
3.23	43,561	103.23	0.27 ic	---	---	---	0.00	---	---	---	---	---	0.268
3.29	44,727	103.29	0.27 ic	---	---	---	0.00	---	---	---	---	---	0.270
3.35	45,894	103.35	0.27 ic	---	---	---	0.00	---	---	---	---	---	0.273
3.41	47,061	103.41	0.28 ic	---	---	---	0.00	---	---	---	---	---	0.275
3.47	48,227	103.47	0.28 ic	---	---	---	0.01	---	---	---	---	---	0.287
3.53	49,394	103.53	0.28 ic	---	---	---	0.06	---	---	---	---	---	0.341
3.59	50,561	103.59	0.28 ic	---	---	---	0.14	---	---	---	---	---	0.419
3.65	51,655	103.65	0.29 ic	---	---	---	0.23	---	---	---	---	---	0.515
3.71	52,749	103.71	0.29 ic	---	---	---	0.34	---	---	---	---	---	0.626
3.77	53,843	103.77	0.29 ic	---	---	---	0.46	---	---	---	---	---	0.750
3.83	54,937	103.83	0.29 ic	---	---	---	0.59	---	---	---	---	---	0.886
3.89	56,031	103.89	0.29 ic	---	---	---	0.74	---	---	---	---	---	1.032
3.95	57,124	103.95	0.30 ic	---	---	---	0.89	---	---	---	---	---	1.189
4.01	58,218	104.01	0.30 ic	---	---	---	1.06	---	---	---	---	---	1.355
4.07	59,312	104.07	0.30 ic	---	---	---	1.23	---	---	---	---	---	1.530
4.13	60,406	104.13	0.30 ic	---	---	---	1.41	---	---	---	---	---	1.714
4.19	61,500	104.19	0.31 ic	---	---	---	1.60	---	---	---	---	---	1.906
4.25	62,426	104.25	0.31 ic	---	---	---	1.80	---	---	---	---	---	2.105
4.31	63,353	104.31	0.31 ic	---	---	---	2.00	---	---	---	---	---	2.312
4.37	64,279	104.37	0.31 ic	---	---	---	2.21	---	---	---	---	---	2.526
4.43	65,205	104.43	0.31 ic	---	---	---	2.43	---	---	---	---	---	2.747
4.49	66,131	104.49	0.32 ic	---	---	---	2.66	---	---	---	---	---	2.975
4.55	67,058	104.55	0.32 ic	---	---	---	2.89	---	---	---	---	---	3.210
4.61	67,984	104.61	0.32 ic	---	---	---	3.13	---	---	---	---	---	3.451
4.67	68,910	104.67	0.32 ic	---	---	---	3.37	---	---	---	---	---	3.698
4.73	69,837	104.73	0.33 ic	---	---	---	3.63	---	---	---	---	---	3.951
4.79	70,763	104.79	0.33 ic	---	---	---	3.88	---	---	---	---	---	4.210
4.85	71,350	104.85	0.33 ic	---	---	---	4.15	---	---	---	---	---	4.475
4.91	71,936	104.91	0.33 ic	---	---	---	4.41	---	---	---	---	---	4.746
4.97	72,523	104.97	0.33 ic	---	---	---	4.69	---	---	---	---	---	5.022
5.03	73,110	105.03	0.34 ic	---	---	---	4.97	---	---	---	---	---	5.304
5.09	73,696	105.09	0.34 ic	---	---	---	5.25	---	---	---	---	---	5.590
5.15	74,283	105.15	0.34 ic	---	---	---	5.54	---	---	---	---	---	5.883
5.21	74,870	105.21	0.34 ic	---	---	---	5.84	---	---	---	---	---	6.180
5.27	75,457	105.27	0.34 ic	---	---	---	6.14	---	---	---	---	---	6.482
5.33	76,043	105.33	0.35 ic	---	---	---	6.44	---	---	---	---	---	6.789
5.39	76,630	105.39	0.35 ic	---	---	---	6.75	---	---	---	---	---	7.102
5.45	76,744	105.45	0.35 ic	---	---	---	7.07	---	---	---	---	---	7.419
5.51	76,858	105.51	0.35 ic	---	---	---	7.39	---	---	---	---	---	7.740
5.57	76,972	105.57	0.35 ic	---	---	---	7.71	---	---	---	---	---	8.067
5.63	77,086	105.63	0.36 ic	---	---	---	8.04	---	---	---	---	---	8.398
5.69	77,200	105.69	0.36 ic	---	---	---	8.38	---	---	---	---	---	8.733
5.75	77,314	105.75	0.36 ic	---	---	---	8.71	---	---	---	---	---	9.073
5.81	77,428	105.81	0.36 ic	---	---	---	9.06	---	---	---	---	---	9.418
5.87	77,542	105.87	0.36 ic	---	---	---	9.40	---	---	---	---	---	9.767
5.93	77,656	105.93	0.37 ic	---	---	---	9.75	---	---	---	---	---	10.12
5.99	77,770	105.99	0.37 ic	---	---	---	10.11	---	---	---	---	---	10.48

...End

Hydrograph Report

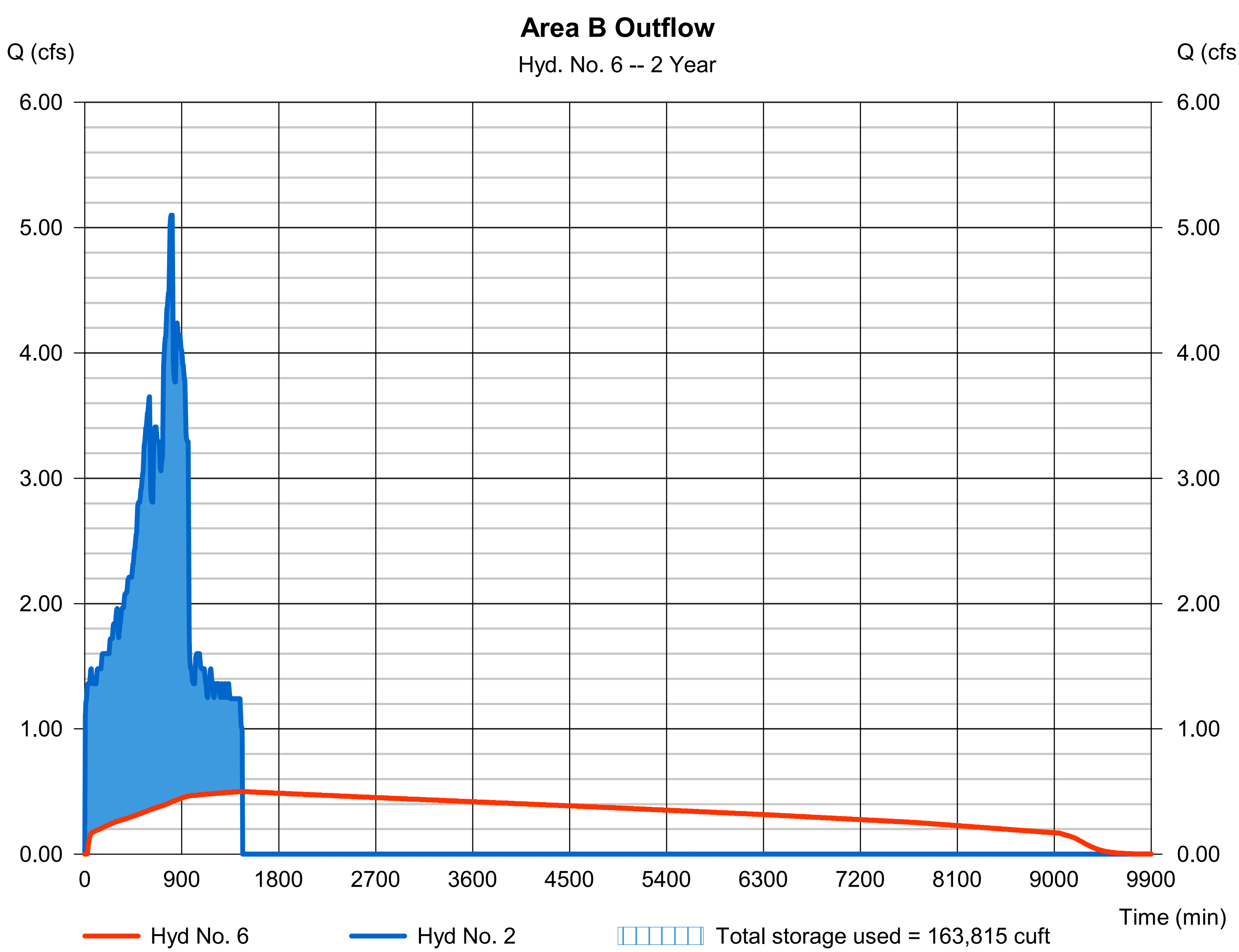
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 6

Area B Outflow

Hydrograph type	= Reservoir	Peak discharge	= 0.501 cfs
Storm frequency	= 2 yrs	Time to peak	= 1460 min
Time interval	= 5 min	Hyd. volume	= 195,068 cuft
Inflow hyd. No.	= 2 - Area B	Max. Elevation	= 104.07 ft
Reservoir name	= Detention System B	Max. Storage	= 163,815 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Detention System B

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 5.00 x 5.00 ft, Barrel Len = 700.00 ft, No. Barrels = 15, Slope = 0.10%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.57	100.57	n/a	4,299	4,299
1.14	101.14	n/a	17,051	21,350
1.71	101.71	n/a	24,280	45,630
2.28	102.28	n/a	27,931	73,562
2.85	102.85	n/a	29,566	103,128
3.42	103.42	n/a	29,564	132,691
3.99	103.99	n/a	27,924	160,615
4.56	104.56	n/a	24,298	184,913
5.13	105.13	n/a	17,011	201,924
5.70	105.70	n/a	4,285	206,208

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.10	0.00	0.00	0.00
Span (in)	= 3.10	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.00	0.00	0.00	0.00
Length (ft)	= 0.08	0.00	0.00	0.00
Slope (%)	= 0.10	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.60	0.00	0.00	0.00
Crest El. (ft)	= 104.10	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.06	430	100.06	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.000
0.11	860	100.11	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.001
0.17	1,290	100.17	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.002
0.23	1,720	100.23	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.003
0.28	2,150	100.29	0.06 oc	---	---	---	0.00	---	---	---	---	---	0.056
0.34	2,580	100.34	0.10 oc	---	---	---	0.00	---	---	---	---	---	0.099
0.40	3,009	100.40	0.13 oc	---	---	---	0.00	---	---	---	---	---	0.128
0.46	3,439	100.46	0.14 ic	---	---	---	0.00	---	---	---	---	---	0.144
0.51	3,869	100.51	0.16 ic	---	---	---	0.00	---	---	---	---	---	0.156
0.57	4,299	100.57	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.168
0.63	6,004	100.63	0.18 ic	---	---	---	0.00	---	---	---	---	---	0.178
0.68	7,709	100.68	0.19 ic	---	---	---	0.00	---	---	---	---	---	0.188
0.74	9,414	100.74	0.20 ic	---	---	---	0.00	---	---	---	---	---	0.197
0.80	11,120	100.80	0.21 ic	---	---	---	0.00	---	---	---	---	---	0.206
0.85	12,825	100.86	0.21 ic	---	---	---	0.00	---	---	---	---	---	0.215
0.91	14,530	100.91	0.22 ic	---	---	---	0.00	---	---	---	---	---	0.223
0.97	16,235	100.97	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.231
1.03	17,940	101.03	0.24 ic	---	---	---	0.00	---	---	---	---	---	0.239
1.08	19,645	101.08	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.246
1.14	21,350	101.14	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.254
1.20	23,778	101.20	0.26 ic	---	---	---	0.00	---	---	---	---	---	0.261
1.25	26,206	101.25	0.27 ic	---	---	---	0.00	---	---	---	---	---	0.268
1.31	28,634	101.31	0.27 ic	---	---	---	0.00	---	---	---	---	---	0.274
1.37	31,062	101.37	0.28 ic	---	---	---	0.00	---	---	---	---	---	0.281
1.42	33,490	101.43	0.29 ic	---	---	---	0.00	---	---	---	---	---	0.287
1.48	35,918	101.48	0.29 ic	---	---	---	0.00	---	---	---	---	---	0.294
1.54	38,346	101.54	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.300
1.60	40,774	101.60	0.31 ic	---	---	---	0.00	---	---	---	---	---	0.306
1.65	43,202	101.65	0.31 ic	---	---	---	0.00	---	---	---	---	---	0.312
1.71	45,630	101.71	0.32 ic	---	---	---	0.00	---	---	---	---	---	0.317
1.77	48,423	101.77	0.32 ic	---	---	---	0.00	---	---	---	---	---	0.323

Continues on next page...

Detention System B

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.82	51,217	101.82	0.33 ic	---	---	---	0.00	---	---	---	---	---	0.329
1.88	54,010	101.88	0.33 ic	---	---	---	0.00	---	---	---	---	---	0.334
1.94	56,803	101.94	0.34 ic	---	---	---	0.00	---	---	---	---	---	0.339
2.00	59,596	102.00	0.34 ic	---	---	---	0.00	---	---	---	---	---	0.345
2.05	62,389	102.05	0.35 ic	---	---	---	0.00	---	---	---	---	---	0.350
2.11	65,182	102.11	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.355
2.17	67,975	102.17	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.360
2.22	70,768	102.22	0.37 ic	---	---	---	0.00	---	---	---	---	---	0.365
2.28	73,562	102.28	0.37 ic	---	---	---	0.00	---	---	---	---	---	0.370
2.34	76,518	102.34	0.37 ic	---	---	---	0.00	---	---	---	---	---	0.375
2.39	79,475	102.39	0.38 ic	---	---	---	0.00	---	---	---	---	---	0.380
2.45	82,431	102.45	0.38 ic	---	---	---	0.00	---	---	---	---	---	0.385
2.51	85,388	102.51	0.39 ic	---	---	---	0.00	---	---	---	---	---	0.389
2.57	88,345	102.57	0.39 ic	---	---	---	0.00	---	---	---	---	---	0.394
2.62	91,301	102.62	0.40 ic	---	---	---	0.00	---	---	---	---	---	0.398
2.68	94,258	102.68	0.40 ic	---	---	---	0.00	---	---	---	---	---	0.403
2.74	97,215	102.74	0.41 ic	---	---	---	0.00	---	---	---	---	---	0.407
2.79	100,171	102.79	0.41 ic	---	---	---	0.00	---	---	---	---	---	0.412
2.85	103,128	102.85	0.42 ic	---	---	---	0.00	---	---	---	---	---	0.416
2.91	106,084	102.91	0.42 ic	---	---	---	0.00	---	---	---	---	---	0.421
2.96	109,041	102.96	0.42 ic	---	---	---	0.00	---	---	---	---	---	0.425
3.02	111,997	103.02	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.429
3.08	114,953	103.08	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.433
3.13	117,910	103.14	0.44 ic	---	---	---	0.00	---	---	---	---	---	0.437
3.19	120,866	103.19	0.44 ic	---	---	---	0.00	---	---	---	---	---	0.442
3.25	123,822	103.25	0.45 ic	---	---	---	0.00	---	---	---	---	---	0.446
3.31	126,779	103.31	0.45 ic	---	---	---	0.00	---	---	---	---	---	0.450
3.36	129,735	103.36	0.45 ic	---	---	---	0.00	---	---	---	---	---	0.454
3.42	132,691	103.42	0.46 ic	---	---	---	0.00	---	---	---	---	---	0.458
3.48	135,484	103.48	0.46 ic	---	---	---	0.00	---	---	---	---	---	0.462
3.53	138,276	103.53	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.466
3.59	141,069	103.59	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.470
3.65	143,861	103.65	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.473
3.70	146,653	103.71	0.48 ic	---	---	---	0.00	---	---	---	---	---	0.477
3.76	149,446	103.76	0.48 ic	---	---	---	0.00	---	---	---	---	---	0.481
3.82	152,238	103.82	0.48 ic	---	---	---	0.00	---	---	---	---	---	0.485
3.88	155,030	103.88	0.49 ic	---	---	---	0.00	---	---	---	---	---	0.488
3.93	157,823	103.93	0.49 ic	---	---	---	0.00	---	---	---	---	---	0.492
3.99	160,615	103.99	0.50 ic	---	---	---	0.00	---	---	---	---	---	0.496
4.05	163,045	104.05	0.50 ic	---	---	---	0.00	---	---	---	---	---	0.499
4.10	165,475	104.10	0.50 ic	---	---	---	0.00	---	---	---	---	---	0.505
4.16	167,905	104.16	0.51 ic	---	---	---	0.13	---	---	---	---	---	0.637
4.22	170,334	104.22	0.51 ic	---	---	---	0.35	---	---	---	---	---	0.861
4.28	172,764	104.28	0.51 ic	---	---	---	0.63	---	---	---	---	---	1.148
4.33	175,194	104.33	0.52 ic	---	---	---	0.97	---	---	---	---	---	1.485
4.39	177,624	104.39	0.52 ic	---	---	---	1.35	---	---	---	---	---	1.866
4.45	180,053	104.45	0.52 ic	---	---	---	1.76	---	---	---	---	---	2.286
4.50	182,483	104.50	0.53 ic	---	---	---	2.21	---	---	---	---	---	2.743
4.56	184,913	104.56	0.53 ic	---	---	---	2.70	---	---	---	---	---	3.232
4.62	186,614	104.62	0.53 ic	---	---	---	3.22	---	---	---	---	---	3.753
4.67	188,315	104.67	0.54 ic	---	---	---	3.77	---	---	---	---	---	4.303
4.73	190,016	104.73	0.54 ic	---	---	---	4.34	---	---	---	---	---	4.881
4.79	191,717	104.79	0.54 ic	---	---	---	4.94	---	---	---	---	---	5.485
4.85	193,418	104.85	0.55 ic	---	---	---	5.57	---	---	---	---	---	6.115
4.90	195,119	104.90	0.55 ic	---	---	---	6.22	---	---	---	---	---	6.770
4.96	196,820	104.96	0.55 ic	---	---	---	6.89	---	---	---	---	---	7.447
5.02	198,522	105.02	0.56 ic	---	---	---	7.59	---	---	---	---	---	8.148
5.07	200,223	105.07	0.56 ic	---	---	---	8.31	---	---	---	---	---	8.871
5.13	201,924	105.13	0.56 ic	---	---	---	9.05	---	---	---	---	---	9.615
5.19	202,352	105.19	0.57 ic	---	---	---	9.81	---	---	---	---	---	10.38
5.24	202,781	105.24	0.57 ic	---	---	---	10.59	---	---	---	---	---	11.16
5.30	203,209	105.30	0.57 ic	---	---	---	11.40	---	---	---	---	---	11.97
5.36	203,638	105.36	0.58 ic	---	---	---	12.22	---	---	---	---	---	12.79
5.42	204,066	105.42	0.58 ic	---	---	---	13.06	---	---	---	---	---	13.64
5.47	204,495	105.47	0.58 ic	---	---	---	13.91	---	---	---	---	---	14.50
5.53	204,923	105.53	0.59 ic	---	---	---	14.79	---	---	---	---	---	15.38
5.59	205,351	105.59	0.59 ic	---	---	---	15.68	---	---	---	---	---	16.27
5.64	205,780	105.64	0.59 ic	---	---	---	16.59	---	---	---	---	---	17.19
5.70	206,208	105.70	0.60 ic	---	---	---	17.52	---	---	---	---	---	18.12

...End

Hydrograph Report

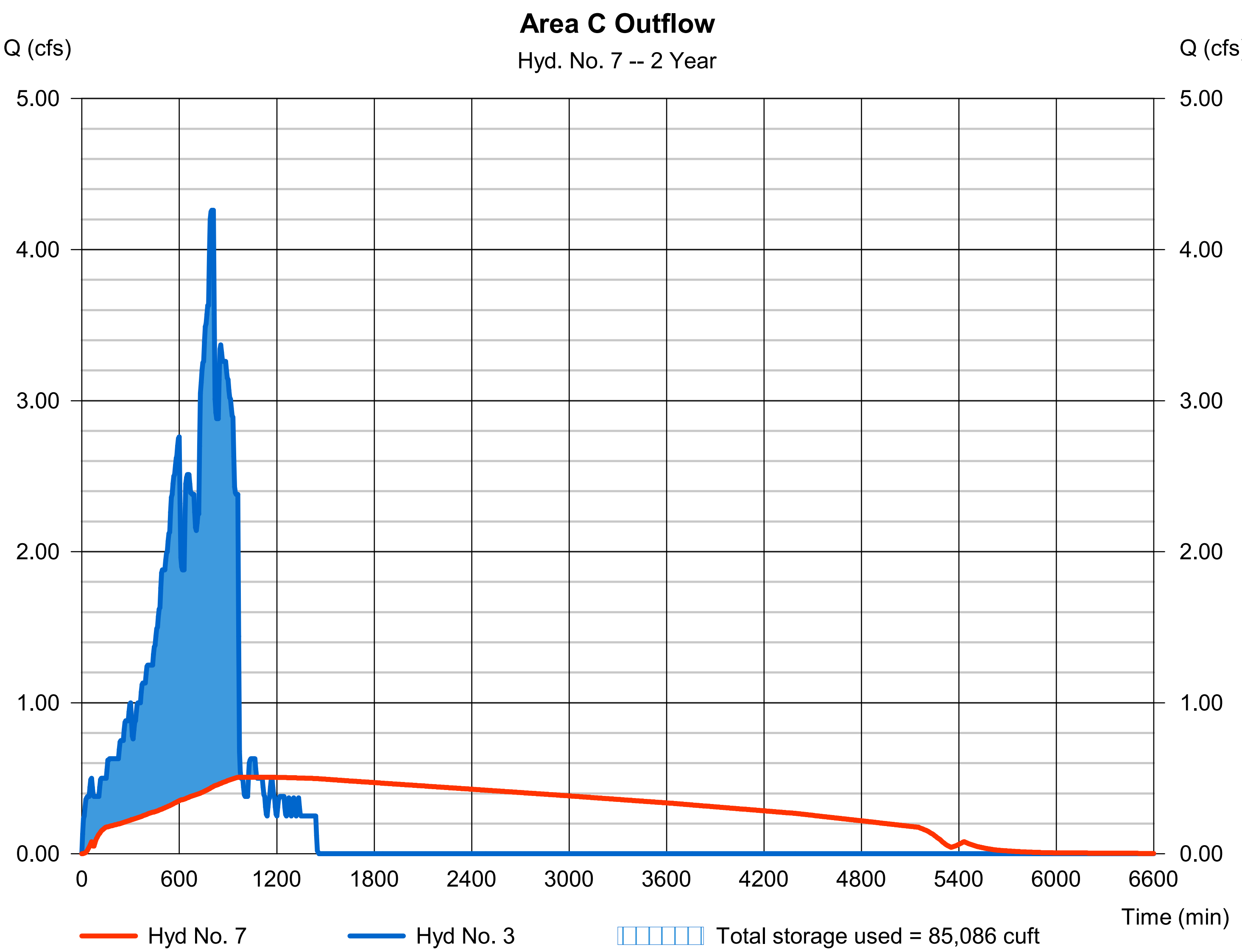
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 — Wednesday, 03 / 30 / 2022

Hyd. No. 7

Area C Outflow

Hydrograph type	= Reservoir	Peak discharge	= 0.508 cfs
Storm frequency	= 2 yrs	Time to peak	= 1075 min
Time interval	= 5 min	Hyd. volume	= 112,817 cuft
Inflow hyd. No.	= 3 - Area C	Max. Elevation	= 103.70 ft
Reservoir name	= Detention System C	Max. Storage	= 85,086 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Pond No. 3 - Detention System C

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 5.00 x 5.00 ft, Barrel Len = 600.00 ft, No. Barrels = 10, Slope = 0.10%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.56	100.56	n/a	2,767	2,767
1.12	101.12	n/a	10,019	12,786
1.68	101.68	n/a	13,792	26,578
2.24	102.24	n/a	15,733	42,311
2.80	102.80	n/a	16,626	58,936
3.36	103.36	n/a	16,624	75,560
3.92	103.92	n/a	15,723	91,283
4.48	104.48	n/a	13,783	105,066
5.04	105.04	n/a	10,010	115,076
5.60	105.60	n/a	2,758	117,833

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.20	0.00	0.00	0.00
Span (in)	= 3.20	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.00	0.00	0.00	0.00
Length (ft)	= 0.08	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.20	0.00	0.00	0.00
Crest El. (ft)	= 103.80	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.06	277	100.06	0.01 ic	---	---	---	0.00	---	---	---	---	---	0.007
0.11	553	100.11	0.03 ic	---	---	---	0.00	---	---	---	---	---	0.025
0.17	830	100.17	0.05 ic	---	---	---	0.00	---	---	---	---	---	0.052
0.22	1,107	100.22	0.08 ic	---	---	---	0.00	---	---	---	---	---	0.081
0.28	1,384	100.28	0.04 oc	---	---	---	0.00	---	---	---	---	---	0.042
0.34	1,660	100.34	0.10 oc	---	---	---	0.00	---	---	---	---	---	0.096
0.39	1,937	100.39	0.13 oc	---	---	---	0.00	---	---	---	---	---	0.129
0.45	2,214	100.45	0.15 ic	---	---	---	0.00	---	---	---	---	---	0.151
0.50	2,490	100.50	0.16 ic	---	---	---	0.00	---	---	---	---	---	0.164
0.56	2,767	100.56	0.18 ic	---	---	---	0.00	---	---	---	---	---	0.176
0.62	3,769	100.62	0.19 ic	---	---	---	0.00	---	---	---	---	---	0.187
0.67	4,771	100.67	0.20 ic	---	---	---	0.00	---	---	---	---	---	0.197
0.73	5,773	100.73	0.21 ic	---	---	---	0.00	---	---	---	---	---	0.207
0.78	6,775	100.78	0.22 ic	---	---	---	0.00	---	---	---	---	---	0.217
0.84	7,776	100.84	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.226
0.90	8,778	100.90	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.235
0.95	9,780	100.95	0.24 ic	---	---	---	0.00	---	---	---	---	---	0.243
1.01	10,782	101.01	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.251
1.06	11,784	101.06	0.26 ic	---	---	---	0.00	---	---	---	---	---	0.259
1.12	12,786	101.12	0.27 ic	---	---	---	0.00	---	---	---	---	---	0.267
1.18	14,165	101.18	0.27 ic	---	---	---	0.00	---	---	---	---	---	0.275
1.23	15,544	101.23	0.28 ic	---	---	---	0.00	---	---	---	---	---	0.282
1.29	16,923	101.29	0.29 ic	---	---	---	0.00	---	---	---	---	---	0.289
1.34	18,303	101.34	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.296
1.40	19,682	101.40	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.303
1.46	21,061	101.46	0.31 ic	---	---	---	0.00	---	---	---	---	---	0.309
1.51	22,440	101.51	0.32 ic	---	---	---	0.00	---	---	---	---	---	0.316
1.57	23,819	101.57	0.32 ic	---	---	---	0.00	---	---	---	---	---	0.322
1.62	25,199	101.62	0.33 ic	---	---	---	0.00	---	---	---	---	---	0.328
1.68	26,578	101.68	0.33 ic	---	---	---	0.00	---	---	---	---	---	0.334
1.74	28,151	101.74	0.34 ic	---	---	---	0.00	---	---	---	---	---	0.340

Continues on next page...

Detention System C

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.79	29,724	101.79	0.35 ic	---	---	---	0.00	---	---	---	---	---	0.346
1.85	31,298	101.85	0.35 ic	---	---	---	0.00	---	---	---	---	---	0.352
1.90	32,871	101.90	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.358
1.96	34,444	101.96	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.363
2.02	36,018	102.02	0.37 ic	---	---	---	0.00	---	---	---	---	---	0.369
2.07	37,591	102.07	0.37 ic	---	---	---	0.00	---	---	---	---	---	0.374
2.13	39,164	102.13	0.38 ic	---	---	---	0.00	---	---	---	---	---	0.380
2.18	40,737	102.18	0.39 ic	---	---	---	0.00	---	---	---	---	---	0.385
2.24	42,311	102.24	0.39 ic	---	---	---	0.00	---	---	---	---	---	0.390
2.30	43,973	102.30	0.40 ic	---	---	---	0.00	---	---	---	---	---	0.395
2.35	45,636	102.35	0.40 ic	---	---	---	0.00	---	---	---	---	---	0.401
2.41	47,298	102.41	0.41 ic	---	---	---	0.00	---	---	---	---	---	0.406
2.46	48,961	102.46	0.41 ic	---	---	---	0.00	---	---	---	---	---	0.410
2.52	50,624	102.52	0.42 ic	---	---	---	0.00	---	---	---	---	---	0.415
2.58	52,286	102.58	0.42 ic	---	---	---	0.00	---	---	---	---	---	0.420
2.63	53,949	102.63	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.425
2.69	55,611	102.69	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.430
2.74	57,274	102.74	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.434
2.80	58,936	102.80	0.44 ic	---	---	---	0.00	---	---	---	---	---	0.439
2.86	60,599	102.86	0.44 ic	---	---	---	0.00	---	---	---	---	---	0.444
2.91	62,261	102.91	0.45 ic	---	---	---	0.00	---	---	---	---	---	0.448
2.97	63,923	102.97	0.45 ic	---	---	---	0.00	---	---	---	---	---	0.453
3.02	65,586	103.02	0.46 ic	---	---	---	0.00	---	---	---	---	---	0.457
3.08	67,248	103.08	0.46 ic	---	---	---	0.00	---	---	---	---	---	0.462
3.14	68,910	103.14	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.466
3.19	70,573	103.19	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.470
3.25	72,235	103.25	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.475
3.30	73,898	103.30	0.48 ic	---	---	---	0.00	---	---	---	---	---	0.479
3.36	75,560	103.36	0.48 ic	---	---	---	0.00	---	---	---	---	---	0.483
3.42	77,132	103.42	0.49 ic	---	---	---	0.00	---	---	---	---	---	0.487
3.47	78,704	103.47	0.49 ic	---	---	---	0.00	---	---	---	---	---	0.491
3.53	80,277	103.53	0.50 ic	---	---	---	0.00	---	---	---	---	---	0.495
3.58	81,849	103.58	0.50 ic	---	---	---	0.00	---	---	---	---	---	0.499
3.64	83,421	103.64	0.50 ic	---	---	---	0.00	---	---	---	---	---	0.504
3.70	84,993	103.70	0.51 ic	---	---	---	0.00	---	---	---	---	---	0.508
3.75	86,566	103.75	0.51 ic	---	---	---	0.00	---	---	---	---	---	0.511
3.81	88,138	103.81	0.52 ic	---	---	---	0.01	---	---	---	---	---	0.521
3.86	89,710	103.86	0.52 ic	---	---	---	0.12	---	---	---	---	---	0.638
3.92	91,283	103.92	0.52 ic	---	---	---	0.30	---	---	---	---	---	0.828
3.98	92,661	103.98	0.53 ic	---	---	---	0.54	---	---	---	---	---	1.068
4.03	94,039	104.03	0.53 ic	---	---	---	0.82	---	---	---	---	---	1.350
4.09	95,418	104.09	0.53 ic	---	---	---	1.13	---	---	---	---	---	1.667
4.14	96,796	104.14	0.54 ic	---	---	---	1.48	---	---	---	---	---	2.017
4.20	98,174	104.20	0.54 ic	---	---	---	1.85	---	---	---	---	---	2.396
4.26	99,553	104.26	0.55 ic	---	---	---	2.26	---	---	---	---	---	2.802
4.31	100,931	104.31	0.55 ic	---	---	---	2.68	---	---	---	---	---	3.234
4.37	102,309	104.37	0.55 ic	---	---	---	3.14	---	---	---	---	---	3.689
4.42	103,688	104.42	0.56 ic	---	---	---	3.61	---	---	---	---	---	4.168
4.48	105,066	104.48	0.56 ic	---	---	---	4.11	---	---	---	---	---	4.669
4.54	106,067	104.54	0.56 ic	---	---	---	4.63	---	---	---	---	---	5.190
4.59	107,068	104.59	0.57 ic	---	---	---	5.16	---	---	---	---	---	5.731
4.65	108,069	104.65	0.57 ic	---	---	---	5.72	---	---	---	---	---	6.292
4.70	109,070	104.70	0.57 ic	---	---	---	6.30	---	---	---	---	---	6.872
4.76	110,071	104.76	0.58 ic	---	---	---	6.89	---	---	---	---	---	7.469
4.82	111,072	104.82	0.58 ic	---	---	---	7.50	---	---	---	---	---	8.084
4.87	112,073	104.87	0.59 ic	---	---	---	8.13	---	---	---	---	---	8.717
4.93	113,074	104.93	0.59 ic	---	---	---	8.78	---	---	---	---	---	9.365
4.98	114,075	104.98	0.59 ic	---	---	---	9.44	---	---	---	---	---	10.03
5.04	115,076	105.04	0.60 ic	---	---	---	10.12	---	---	---	---	---	10.71
5.10	115,352	105.10	0.60 ic	---	---	---	10.81	---	---	---	---	---	11.41
5.15	115,627	105.15	0.60 ic	---	---	---	11.52	---	---	---	---	---	12.12
5.21	115,903	105.21	0.61 ic	---	---	---	12.24	---	---	---	---	---	12.85
5.26	116,179	105.26	0.61 ic	---	---	---	12.98	---	---	---	---	---	13.59
5.32	116,455	105.32	0.61 ic	---	---	---	13.73	---	---	---	---	---	14.34
5.38	116,730	105.38	0.62 ic	---	---	---	14.49	---	---	---	---	---	15.11
5.43	117,006	105.43	0.62 ic	---	---	---	15.27	---	---	---	---	---	15.89
5.49	117,282	105.49	0.62 ic	---	---	---	16.07	---	---	---	---	---	16.69
5.54	117,558	105.54	0.63 ic	---	---	---	16.87	---	---	---	---	---	17.50
5.60	117,833	105.60	0.63 ic	---	---	---	17.69	---	---	---	---	---	18.32

...End

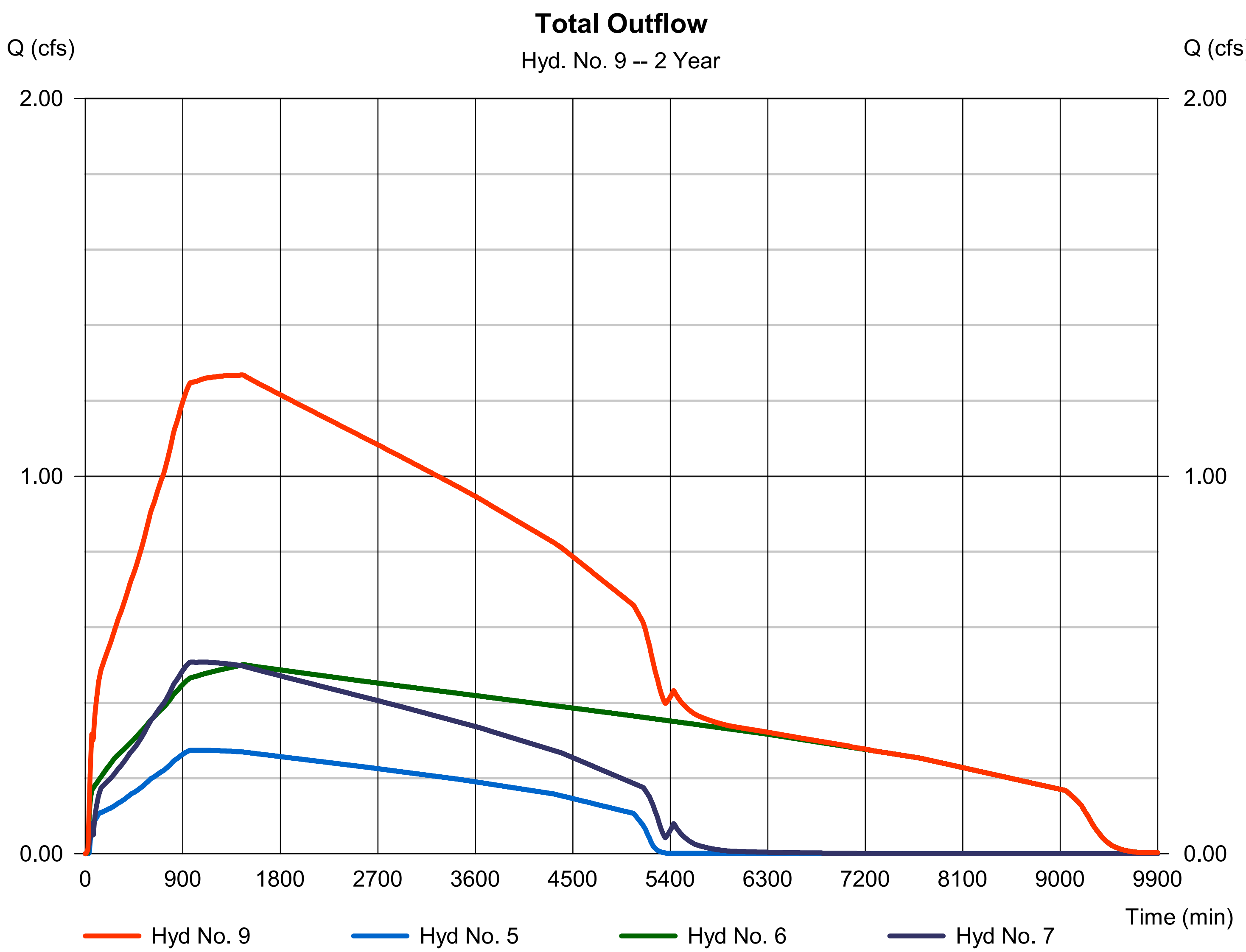
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 9

Total Outflow

Hydrograph type	= Combine	Peak discharge	= 1.268 cfs
Storm frequency	= 2 yrs	Time to peak	= 1445 min
Time interval	= 5 min	Hyd. volume	= 369,813 cuft
Inflow hyds.	= 5, 6, 7	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	6.720	5	810	165,438	------	------	------	Area A
2	Manual	12.78	5	810	377,706	------	------	------	Area B
3	Manual	10.76	5	810	282,303	------	------	------	Area C
5	Reservoir	5.484	5	815	165,230	1	105.07	73,478	Area A Outflow
6	Reservoir	9.808	5	890	376,584	2	105.14	202,032	Area B Outflow
7	Reservoir	9.811	5	815	282,263	3	104.97	113,745	Area C Outflow
9	Combine	24.72	5	815	824,076	5, 6, 7,	------	------	Total Outflow

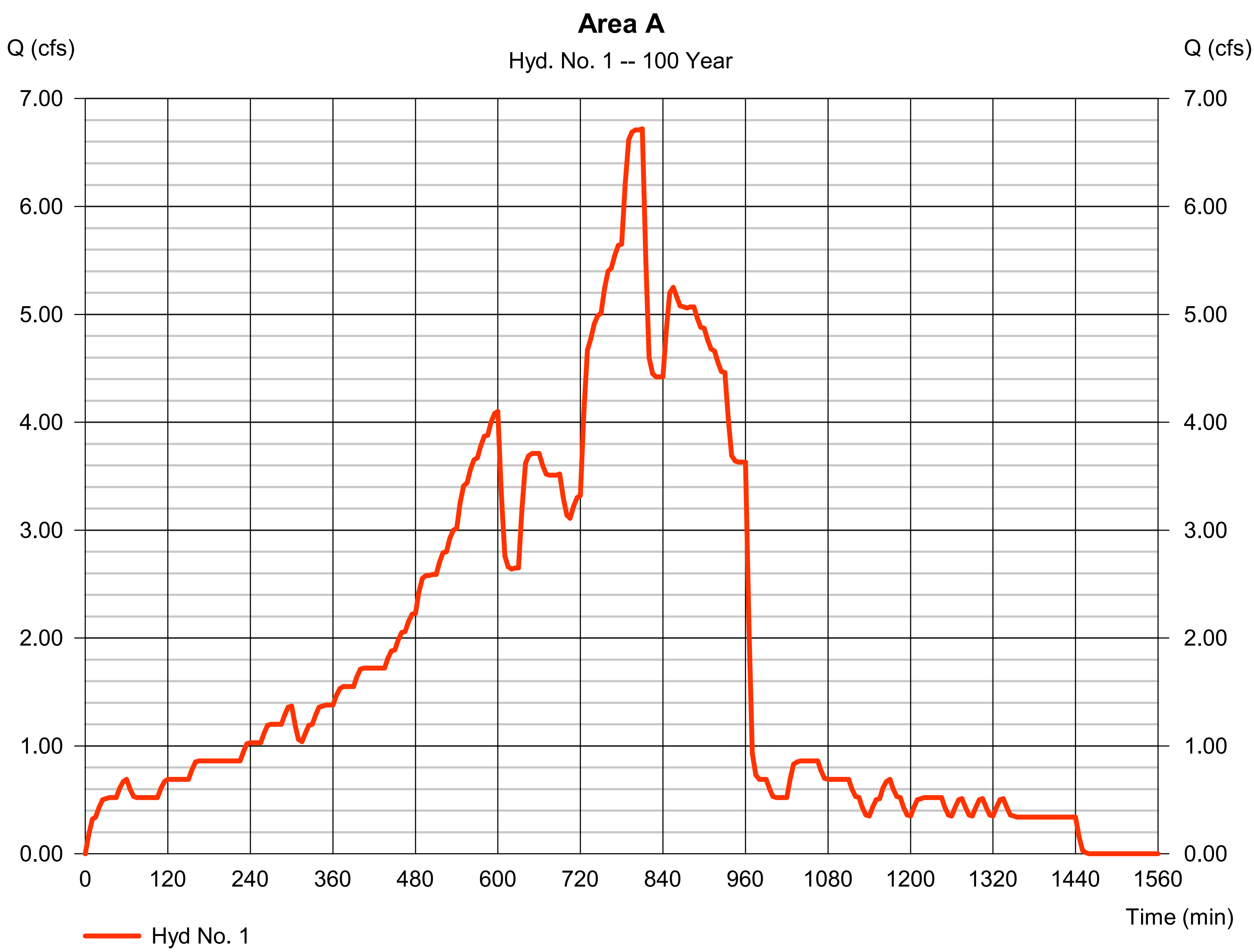
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 1

Area A

Hydrograph type	= Manual	Peak discharge	= 6.720 cfs
Storm frequency	= 100 yrs	Time to peak	= 810 min
Time interval	= 5 min	Hyd. volume	= 165,438 cuft



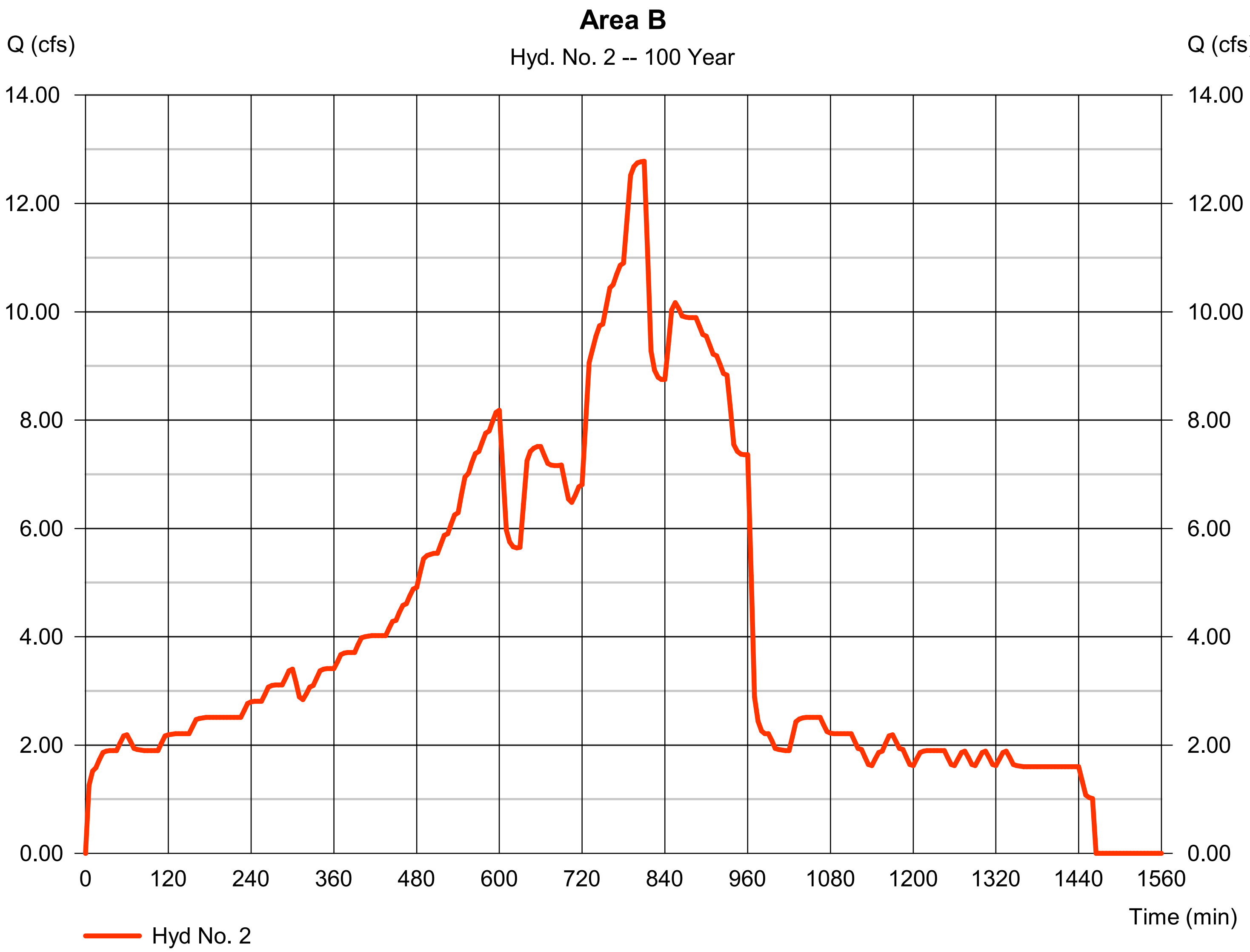
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 2

Area B

Hydrograph type	= Manual	Peak discharge	= 12.78 cfs
Storm frequency	= 100 yrs	Time to peak	= 810 min
Time interval	= 5 min	Hyd. volume	= 377,706 cuft



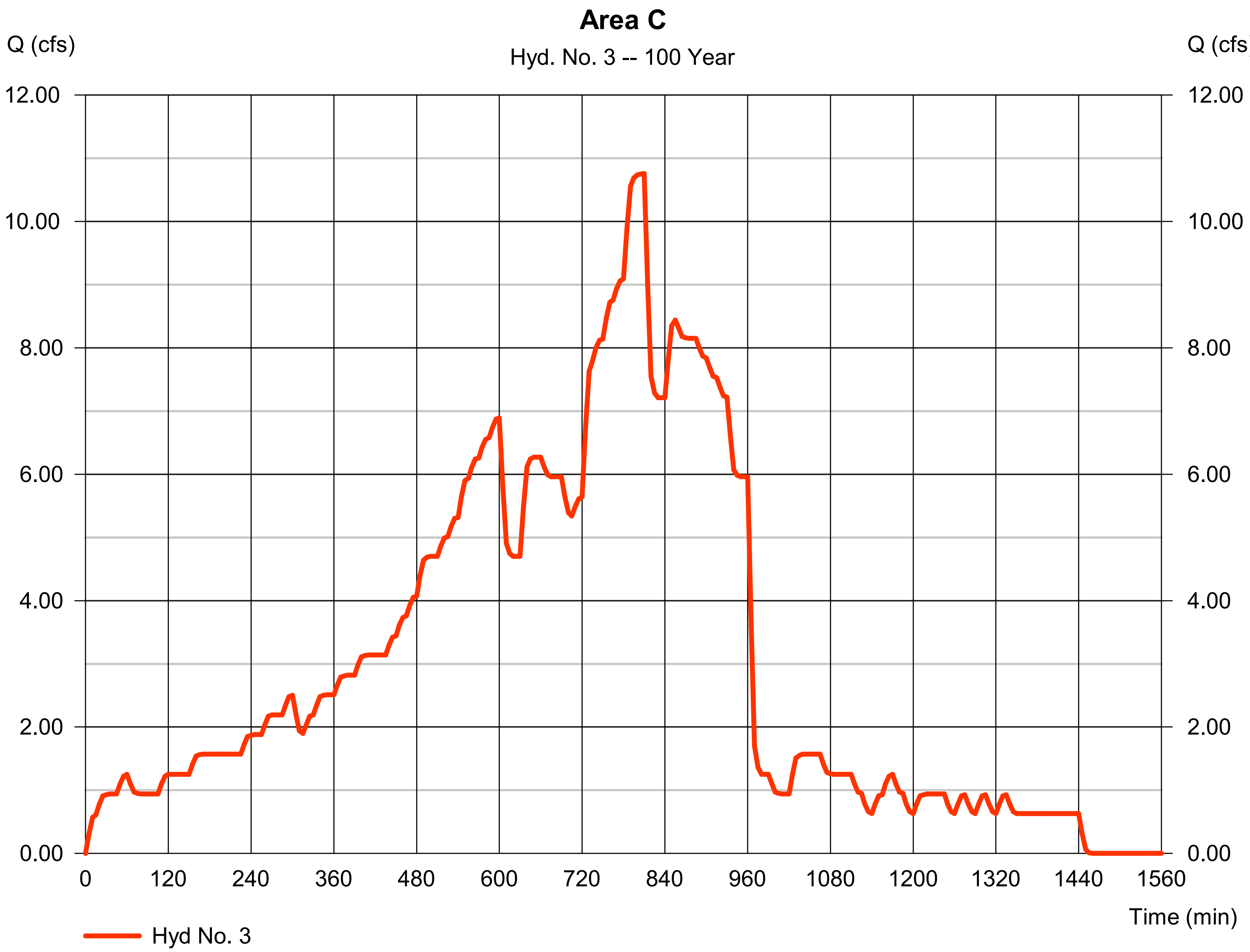
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 3

Area C

Hydrograph type	= Manual	Peak discharge	= 10.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 810 min
Time interval	= 5 min	Hyd. volume	= 282,303 cuft



Hydrograph Report

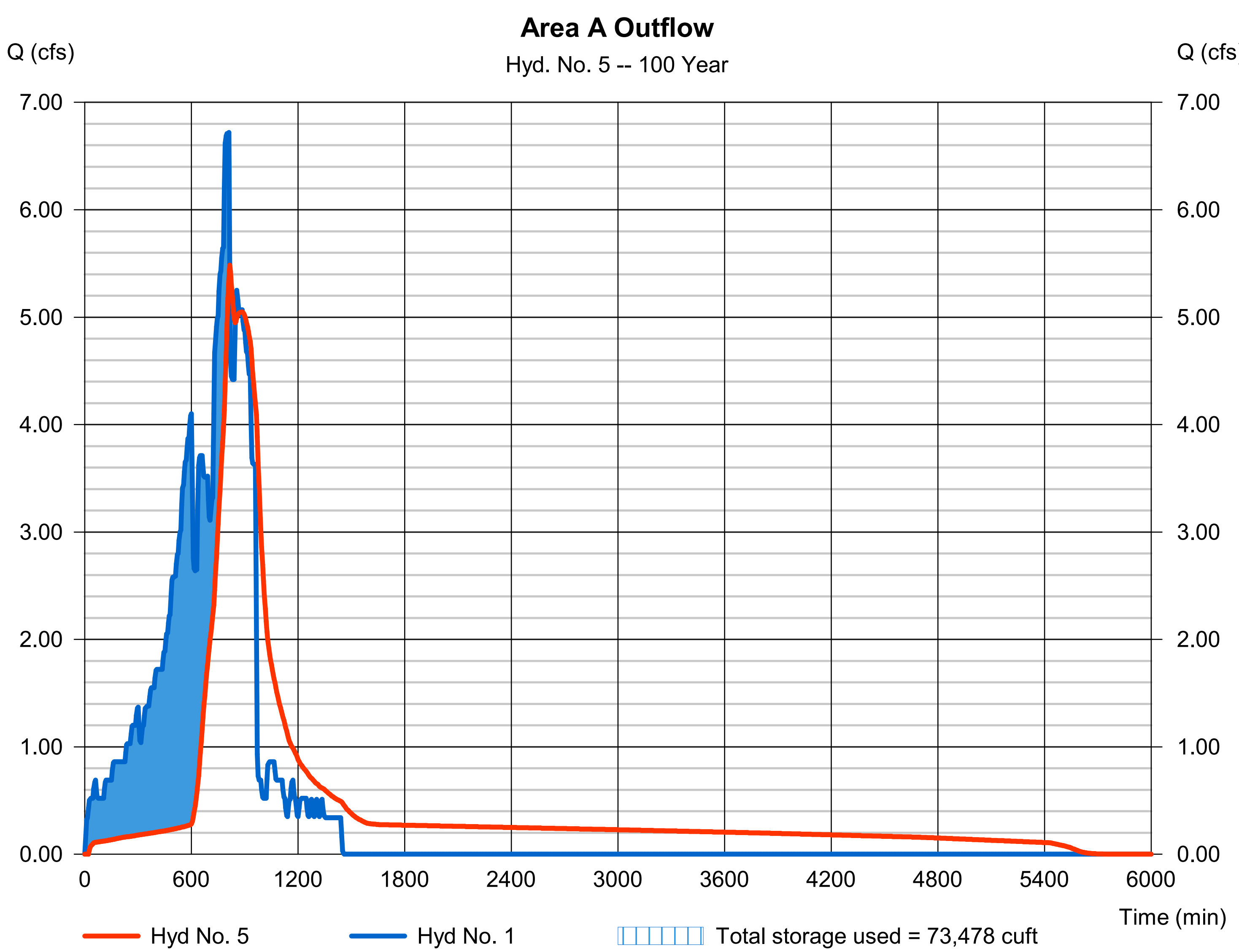
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 5

Area A Outflow

Hydrograph type	= Reservoir	Peak discharge	= 5.484 cfs
Storm frequency	= 100 yrs	Time to peak	= 815 min
Time interval	= 5 min	Hyd. volume	= 165,230 cuft
Inflow hyd. No.	= 1 - Area A	Max. Elevation	= 105.07 ft
Reservoir name	= Detention System A	Max. Storage	= 73,478 cuft

Storage Indication method used.



Hydrograph Report

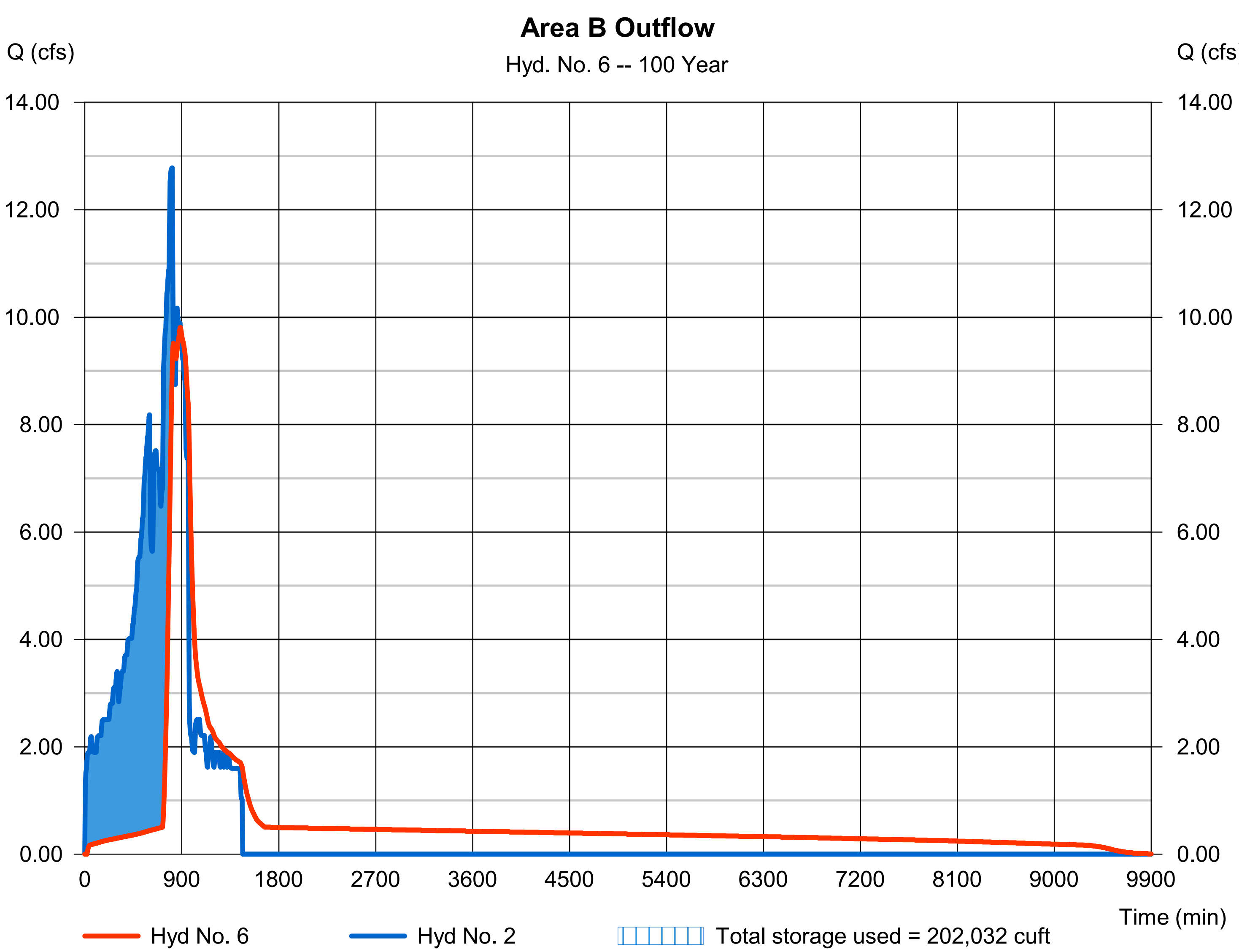
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 6

Area B Outflow

Hydrograph type	= Reservoir	Peak discharge	= 9.808 cfs
Storm frequency	= 100 yrs	Time to peak	= 890 min
Time interval	= 5 min	Hyd. volume	= 376,584 cuft
Inflow hyd. No.	= 2 - Area B	Max. Elevation	= 105.14 ft
Reservoir name	= Detention System B	Max. Storage	= 202,032 cuft

Storage Indication method used.



Hydrograph Report

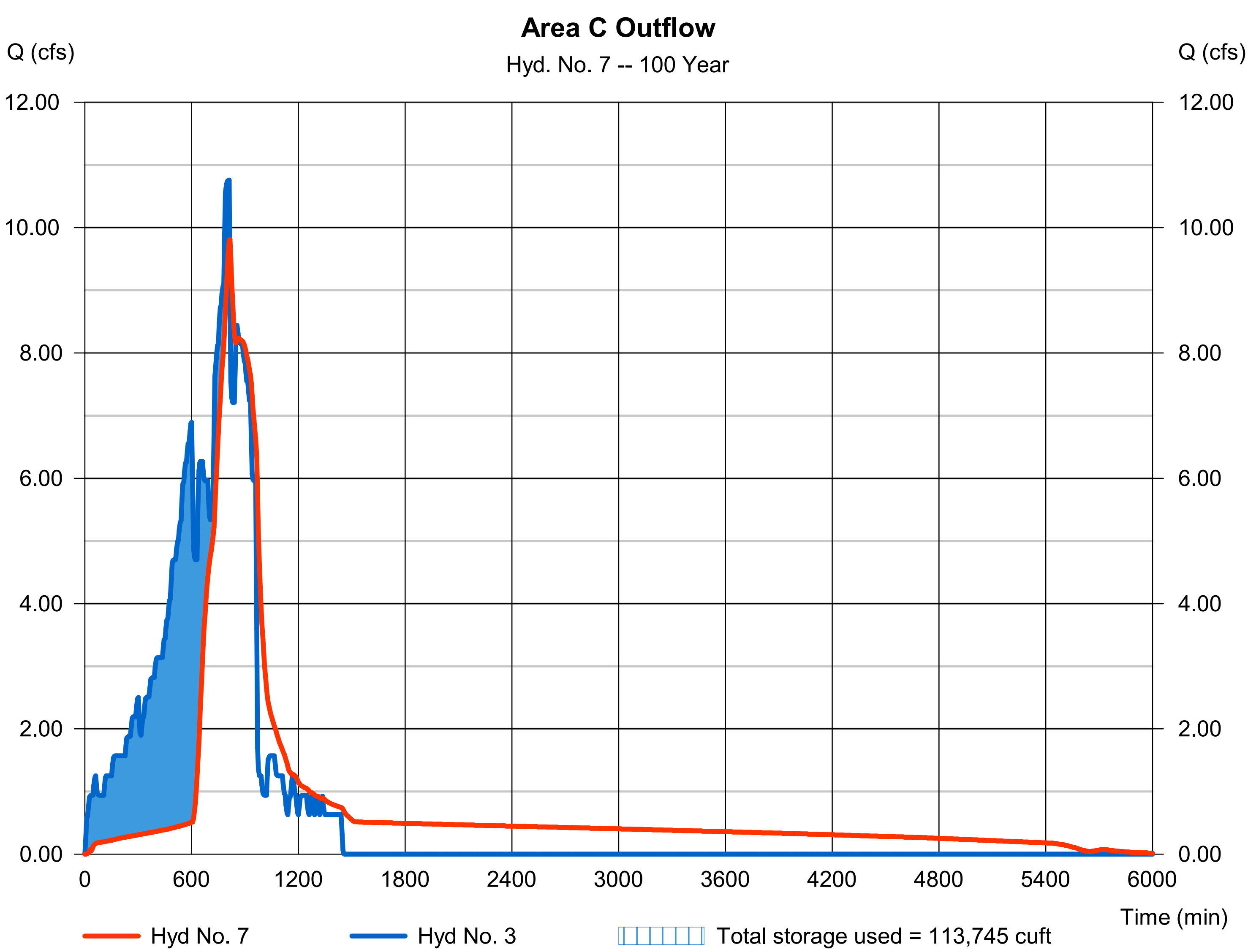
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 7

Area C Outflow

Hydrograph type	= Reservoir	Peak discharge	= 9.811 cfs
Storm frequency	= 100 yrs	Time to peak	= 815 min
Time interval	= 5 min	Hyd. volume	= 282,263 cuft
Inflow hyd. No.	= 3 - Area C	Max. Elevation	= 104.97 ft
Reservoir name	= Detention System C	Max. Storage	= 113,745 cuft

Storage Indication method used.



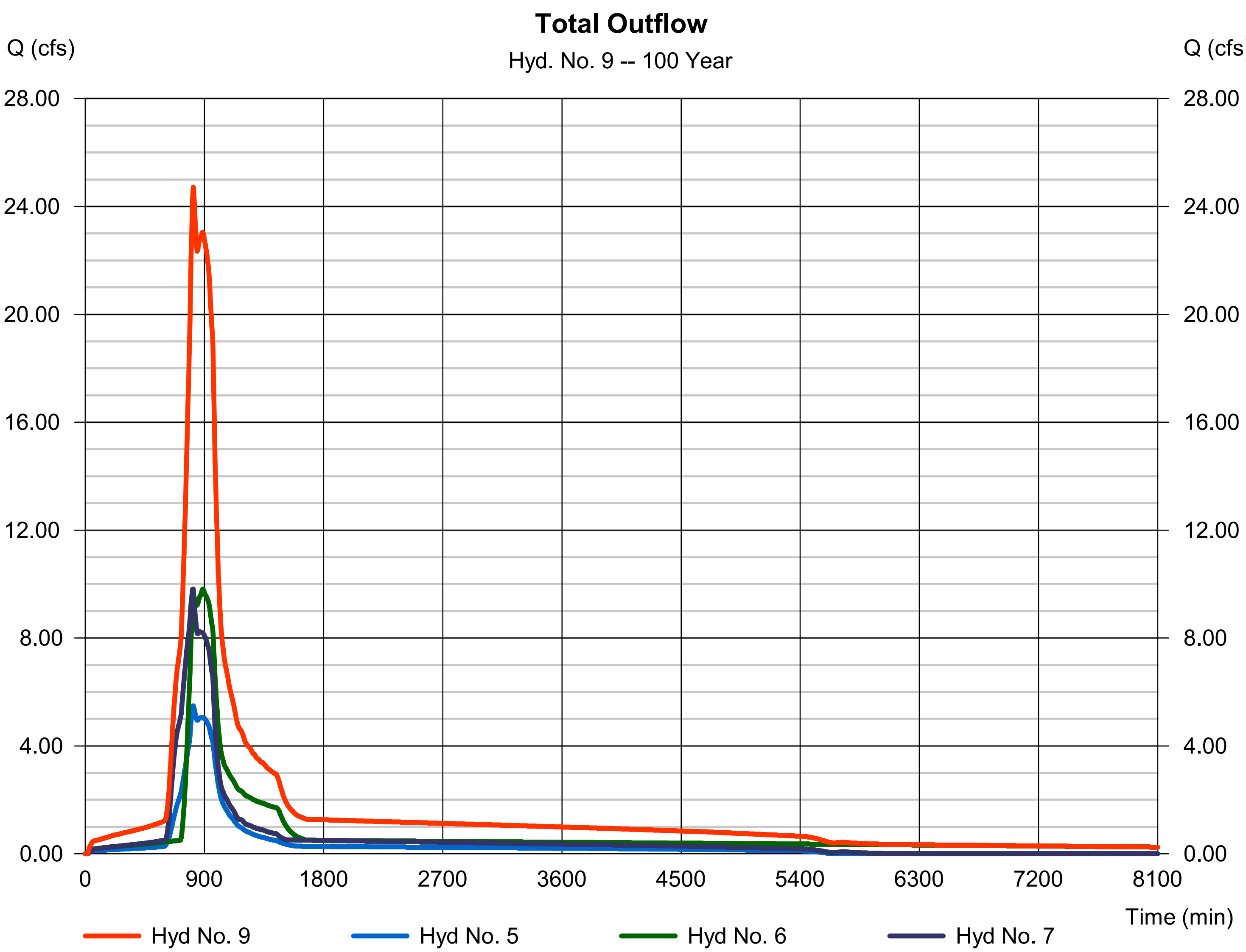
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Wednesday, 03 / 30 / 2022

Hyd. No. 9

Total Outflow

Hydrograph type	= Combine	Peak discharge	= 24.72 cfs
Storm frequency	= 100 yrs	Time to peak	= 815 min
Time interval	= 5 min	Hyd. volume	= 824,076 cuft
Inflow hyds.	= 5, 6, 7	Contrib. drain. area	= 0.000 ac



Hydraflow Table of Contents

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

To be included in Final WQMP

Appendix 9: O&M

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

To be included in Final WQMP

Appendix 10: Educational Materials

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

To be included in Final WQMP