
Appendix F:

Hydrology and Water Quality Supporting Information

THIS PAGE INTENTIONALLY LEFT BLANK

F.1 - Preliminary Hydrology and Hydraulics Report

THIS PAGE INTENTIONALLY LEFT BLANK

La Sierra & Alhambra

Preliminary Hydrology & Hydraulics Report

6251 Alhambra Ave.
Riverside, CA 92505

November 2024

Prepared for:

Louisa Feletto
Louisa.Feletto@meritagehomes.com
Meritage Homes
5 Peters Canyon Rd, Suite 310
Irvine, CA 92602
(949) 299-3833

Prepared by:

Kimley»»Horn

Kirk Myers, PE
Kirk.Myers@kimley-horn.com
Kimley-Horn and Associates, Inc.
3801 University Ave, Suite 300
Riverside, CA 92501
(951) 543-9868

KHA Project # 195261018

Kirkpatrick P. Myers, P.E.

Date:

Table of Contents

1. Introduction	3
1.1 Project Description	3
1.2 Methodology	3
2. Drainage Characteristics	4
2.1 Existing Conditions	4
2.2 Proposed Conditions	5
3. Hydraulic Analysis	6
3.1 Detention Calculations	6
3.2 Storm Drain Pipe Calculations	6
3.3 Catch Basin Sizing	7
4. Conclusion	7
Appendix A: Existing Conditions	8
Appendix B: Proposed Conditions	9
Appendix C: Detention Calculations	10
Appendix D: Drainage Structure Calculations	11
Appendix E: References	12
Appendix F: Geotechnical Report	13

1. Introduction

Kimley-Horn and Associates has been retained to prepare a Final Hydrology Report for the proposed MLC La Sierra project in the City of Riverside. The purpose of this report is to demonstrate preliminary analysis of the hydrologic and hydraulic conditions associated with the development of the project site. To do so, the following is the scope of this report:

- Analyze the pre-development discharge patterns and points
- Discuss the post-development discharge patterns and points
- Determine the post-development un-mitigated flow rates for the 100-year events
- Analyze the post-development mitigation
- Demonstrate satisfaction of post-development mitigated flow rates
- Demonstrate compliance with the flood protection criteria

Even though this report discusses stormwater, this report is not a Stormwater Pollution Prevention Plan (SWPPP), a Groundwater Study, a Geotechnical Report, nor a Water Quality Management Plan (WQMP). Each of these separate reports discusses separate aspects of stormwater. Portions of the Geotechnical Report are utilized and referenced for the purpose of this report. Similarly, the requirements of the WQMP are considered for the stormwater mitigation and sizing of outlet structures for this project.

1.1 Project Description

The MLC La Sierra development will include single-family housing with associated residential landscaping, concrete hardscape and asphalt paving community streets. The site is located southwest of La Sierra Avenue, between Alhambra Avenue and Francisco Place in the City of Riverside, within Riverside County. For reference, see **Appendix A**.

The associated improvements include, but are not limited to onsite and offsite grading, domestic water service, sanitary sewer service, storm drain infrastructure, street improvements, concrete and asphalt pavement, landscaping and irrigation. The proposed development is approximately 9.87-acres. The proposed single-family residential lots will be homeowner maintained. The private streets, open space, common area landscape, park amenities, and storm drain infrastructure onsite will be maintained by the future homeowner's association. Public streets and public storm drain systems will be maintained by the City of Riverside.

1.2 Methodology

The hydrologic and hydraulic analyses were completed following the methods outlined in the RCFC & WCD Hydrology Manual. The unit hydrograph method was used to determine the hydrograph volumes and peak flows for the 100-year, 1-hour, 3-hour, and 24-hour storm event durations using the CivilD Unit Hydrograph Riverside County software. The results of the analyses are included in **Appendix B**. Per the Riverside County Hydraulic Manual (2024), Bentley's PondPack V8i was used to complete the basin routing using the Modified Pul's Method. The results of the analyses are included in **Appendix C**.

The rainfall data used for the analyses is important for the flow and runoff results. For the unit hydrograph analysis, point precipitation data based upon the NOAA 14 Atlas for rainfall depth and intensity. See **Appendix E** for more information.

The type of soil and soil conditions are major factors affecting infiltration and resultant storm water runoff. The Natural Resources Conservation Service (NRCS) has classified soil into one general hydrologic soil group for comparing infiltration and runoff rates. The group is based on properties that influence runoff, such as water infiltration rate, texture, natural discharge and moisture condition. The runoff potential is based on the amount of runoff at the end of a long duration storm that occurs after wetting and swelling of the soil not protected by vegetation. Using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey online tool and the Stormwater Facility Mapping online tool for Riverside County, it was determined the predominant hydrologic soil group classification is B. Soil group B is defined as soils having moderate infiltration rates (moderate runoff potential). These soils have a moderate rate of water transmission. The Geotechnical Report from SA Geotechnical Inc. dated December 22, 2023, measured an average infiltration rate of 1 in/hr for the site. A factor of safety of 3 was applied to achieve a design infiltration rate of 0.33 in/hr. See **Appendix F** for the soils information.

In addition, antecedent moisture condition (AMC) III was used to compute the 100-year peak flows based on the hydrology manual. The land use for the proposed drainage subareas were selected based on the percent impervious that characterizes each subarea in the proposed conditions. See Appendix C Plate D-5.6 for the impervious percentages that correspond to each land use. The combination of the soil and coverage type was used as the basis for selecting the appropriate curve numbers used to calculate the soil loss rates. See **Appendix E** for reference.

2. Drainage Characteristics

The site is located in Zone X per the Federal Emergency Management Administration (FEMA) Flood Insurance Rate Map (FIRM) panel 06065C0684G, dated August 28, 2008. Flood Zone X is defined by FEMA as the area determined to be outside the 100-year flood. No portion of the site is located within the special flood hazard area inundated by the 100-year flood.

For reference, see **Appendix E** for the FIRM Map.

2.1 Existing Conditions

The existing condition of the project site is predominantly vacant, and land cover consists mostly of dirt and light vegetation. There are 4 existing residential buildings on the site. On site drainage currently sheet flows in a south easterly direction towards the intersection of La Sierra Avenue and Francisco Place. Under existing conditions, the site is accepting 0.91 acres of offsite flows from the west hillside area below Alhambra Avenue. Onsite and offsite flows are transported along La Sierra Avenue via curb inlets and are collected by existing storm drains and discharge into an existing 36" RCP storm drain line.

See **Appendix A** for the Existing Hydrology Exhibit. A summary of the existing peak flows can be found in Table 1 below.

Table 1: Summary of Existing peak flows.

Drainage Area	Area (ac)	100-yr 1-hr peak flow (cfs)	100-yr 3-hr peak flow (cfs)	100-yr 24-hr peak flow (cfs)
A & OFF-1	10.79	26.24	15.34	5.96
Total	10.79	26.24	15.34	5.96

2.2 Proposed Conditions

Under the proposed condition, the project site will include two drainage areas (DA), A and C. The drainage areas will be sub-divided based on the proposed site grading and the location of the proposed storm drain inlets.

DA A1.1-1.7 will include approximately 7.79 acres along the easterly (Plan South) part of the site. Onsite flows will drain to proposed catch basins along the residential streets which will collect into several proposed catch basins. Flows from these catch basins will then discharge into a proposed underground stormwater infiltration chamber (DMA A Basin South). Overflows will exit the infiltration chambers and continue to the downstream modular wetland system (MWS) to treat the remainder of the design capture water quality volume (DCV) that could not be retained within the infiltration chambers due to the maximum 48-hour drawdown. Overflows above the water quality depth in the infiltration chambers will bypass the modular wetland system and discharge to the existing 36" RCP storm drain along La Sierra Ave via a proposed lateral connection.

DA A-OFF will include approximately 0.74 acres of the existing offsite run-on that is diverted along a proposed site wall prior to sheet flowing onto private Street A. Flows from DA A-OFF will be accepted onsite and routed through the proposed storm drain. Flow patterns will mirror those described for DA A1.1-A1.7 above.

DA C will include approximately 2.07 acres located along the northwesterly (Plan East) part of the site. The onsite flows will sheet flow to the hydraulically connected open bioretention basins (DMA C Basin East) for water quality treatment and flow attenuation. Overflows will exit the bioretention basins via a riser structure, and eventually discharge into the existing 36" RCP storm drain along La Sierra Ave via a proposed lateral connection to the existing manhole.

DA C-OFF will include approximately 0.17 acres of the existing offsite run-on that sheet flows into the proposed bioretention basins. Flows from DA C-OFF will be accepted onsite and routed through the proposed bioretention basins. Flow patterns will mirror those described for DA C above.

Table 2 shows a summary of the proposed unmitigated hydrologic flows for the 100-year storm events. See **Appendix B** for the Proposed Hydrology Exhibit and Proposed Unit Hydrograph Calculations.

Table 2: Summary of Proposed peak flows (unmitigated)

Drainage Area	Area (ac)	100-yr 1-hr peak flow (cfs)	100-yr 3-hr peak flow (cfs)	100-yr 24-hr peak flow (cfs)
A1.1-1.7 & A-OFF	8.54	27.5	14.42	5.33
C & C-OFF	2.24	7.21	12.14	1.4
Total	10.78	34.71	18.20	6.73

3. Hydraulic Analysis

3.1 Detention Calculations

As discussed in the post-development condition section, there is one proposed underground infiltration chamber system (DMA A Basin South) and one proposed bioretention basin (DMA C Basin East). Overflows from both Basin South and Basin North will overflow via proposed storm drain laterals into the existing 36” RCP storm drain line along La Sierra Avenue.

An orifice-weir plate will be placed in the downstream manhole of the DMA A Basin South underground infiltration chambers with two orifices and one weir to control the outflow from the basin. A 12” perpendicular orifice will be placed at the maximum 48-hr drawdown depth of 1.33ft from the bottom of the system to allow for the remainder of the water quality volume to be treated via the downstream modular wetland system (MWS). A 2.5’L x 0.5’H perpendicular orifice will be placed at a height of 3.83ft from the bottom to allow for overflows above the unreliably retained water quality volume height to bypass the modular wetland system. A 3ft long weir will be placed at a height of 4.76ft from the bottom to control the remainder of the discharge below the existing peak flows.

Overflows from DMA C Basin East will overflow via a riser structure in the basin and will also discharge into the 36” RCP storm drain line along La Sierra Ave. The proposed basin and riser combinations are also designed to attenuate peak flows for up to the existing 100-year 24-hour storm event.

Table 3 shows a summary of the proposed mitigated flows for the 100-year storm events. See **Appendix C** for the full calculations.

Table 3: Summary of Proposed peak flows (mitigated)

Drainage Area	Area (ac)	100-yr 1-hr peak flow (cfs)	100-yr 3-hr peak flow (cfs)	100-yr 24-hr peak flow (cfs)
A1.1-1.7 & A-OFF	8.54	20.08	12.18	4.66
C & C-OFF	2.24	3.45	2.24	1.21
Total	10.78	23.53	14.42	5.87

3.2 Storm Drain Pipe Calculations

Hydraulic calculations for storm drainpipes will be completed during final design. Each proposed storm drain lateral will be sized to convey the unmitigated 100-year peak flow from the rational method calculations while maintaining the hydraulic gradeline below the proposed ground surface elevation.

3.3 Catch Basin Sizing

Each proposed catch basin will be sized using FlowMaster to convey the 100-year peak flow from the rational method calculations during final design. Each inlet will be sized to maintain the 100-year ponding depth below the right-of-way elevation and below finished floor elevations. Inlets will include a clogging factor of 50%.

4. Conclusion

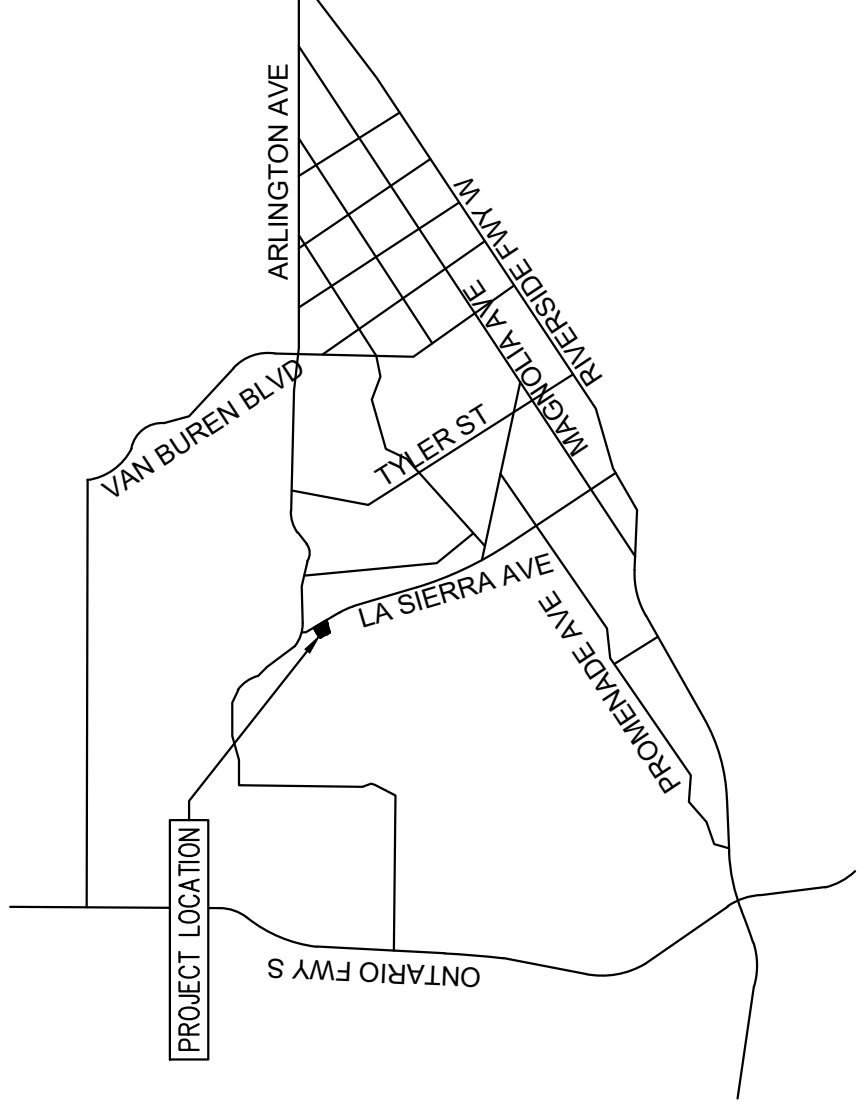
As a result of the hydrology, and hydraulic analysis, the proposed Project demonstrates compliance with the following:

- Sizing of the Project infiltration system to the extent necessary to limit peak flows to a level equal to, or less than the Project's existing conditions peak flows.
- Hydraulic sizing of the on-site Project pipe collection system will be completed during final design.
- Hydraulic sizing of the on-site Project catch basins will be completed during final design.

Appendix A: Existing Conditions

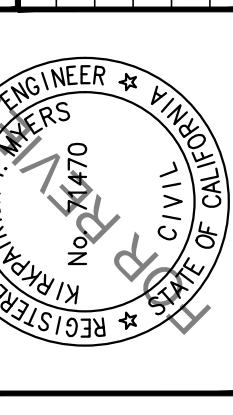
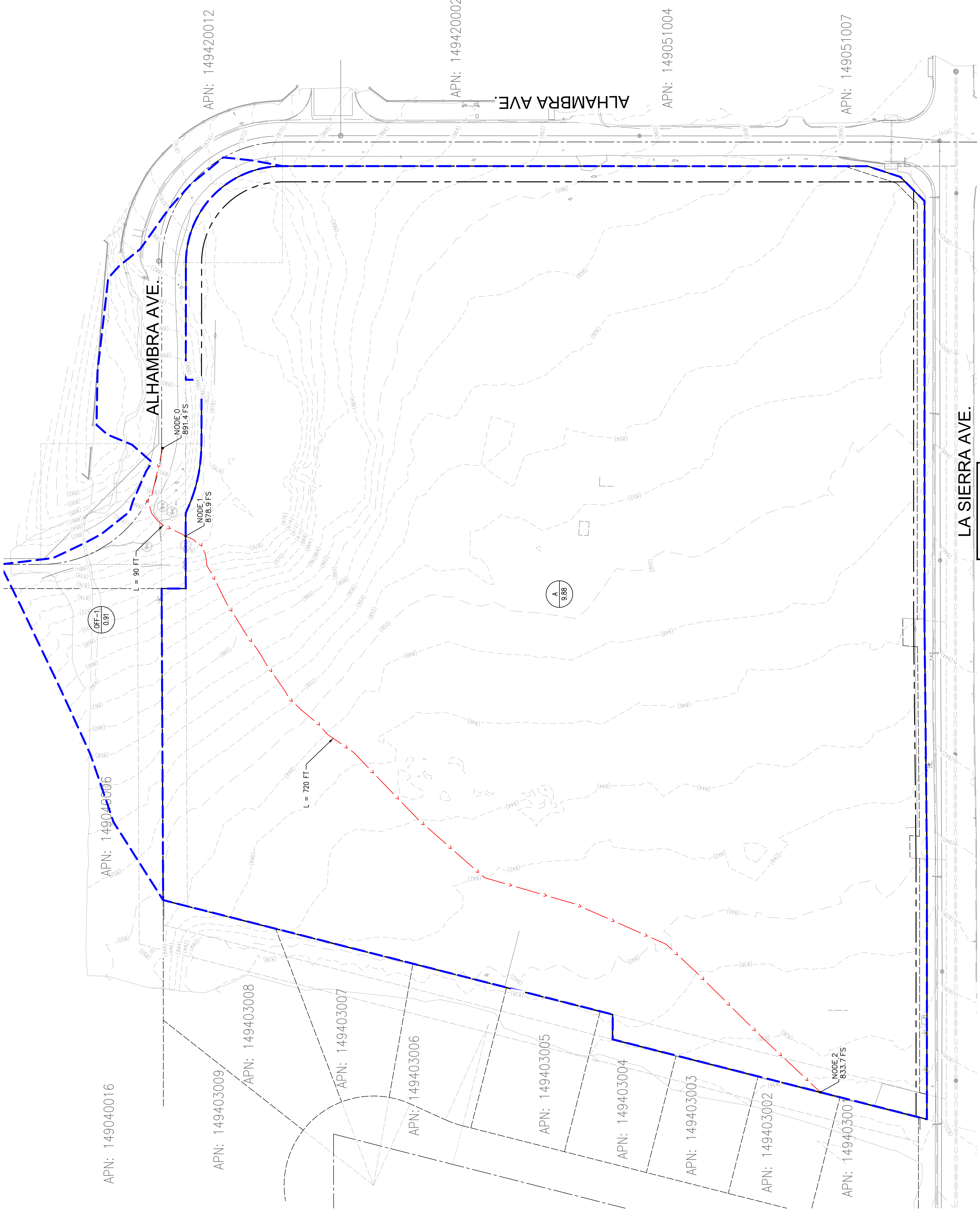
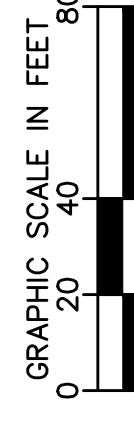
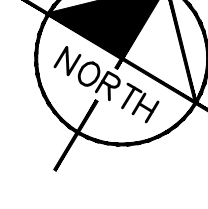
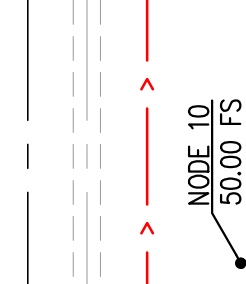
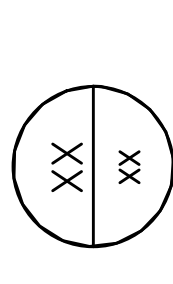
CITY OF RIVERSIDE EXISTING HYDROLOGY EXHIBIT LA SIERRA

VICINITY MAP



LEGEND

- EXISTING CONTOUR
- PROPERTY LINE
- DRAINAGE AREA BOUNDARY
- DRAINAGE AREA NAME
- AREA (IN ACRES)
- ROAD CENTERLINE
- EXISTING STORM DRAIN
- FLOW PATH
- NODE ID
- ELEVATION (IN FEET)



REVISIONS		DATE	BY

Kimley-Horn
3801 UNIVERSITY AVE, SUITE 300, RIVERSIDE, CA 92501
PHONE: (951) 543-8668 WWW.KIMLEY-HORN.COM

TENTATIVE TRACT MAP 39008
EXISTING HYDROLOGY EXHIBIT
LA SIERRA AVE. & ALHAMBRA AVE.

PROJ. # 195261018
SHEET 1 OF 1
DWG. NO. 195261018

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 10/24/24 File: LSE1100.out

+++++

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

Program License Serial Number 6658

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

English Units used in output format

LA SIERRA
100YR EXISTING UH
KIMLEY-HORN
1-HR

Drainage Area = 10.79(Ac.) = 0.017 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 10.79(Ac.) =
0.017 Sq. Mi.

USER Entry of lag time in hours
Lag time = 0.167 Hr.
Lag time = 10.02 Min.
25% of lag time = 2.51 Min.
40% of lag time = 4.01 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
10.79	0.46	4.96

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
10.79	1.24	13.38

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 0.460(In)
 Area Averaged 100-Year Rainfall = 1.240(In)

Point rain (area averaged) = 1.240(In)
 Areal adjustment factor = 99.99 %
 Adjusted average point rain = 1.240(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
10.790	75.00	0.000
Total Area Entered = 10.79(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec. %)	(In/Hr)	(Dec.)	(In/Hr)
75.0	88.0	0.153	0.000	0.153	1.000	0.153
Sum (F) =						0.153

Area averaged mean soil loss (F) (In/Hr) = 0.153
 Minimum soil loss rate ((In/Hr)) = 0.076
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.900

 Slope of intensity-duration curve for a 1 hour storm =0.5500

Unit Hydrograph
 FOOTHILL S-Curve

 Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	49.900	4.268
2	0.167	99.800	20.157
3	0.250	149.701	38.274
4	0.333	199.601	14.703
5	0.417	249.501	8.389
6	0.500	299.401	5.461
7	0.583	349.301	3.612
8	0.667	399.202	2.236
9	0.750	449.102	1.090
10	0.833	499.002	0.551
11	0.917	548.902	0.403
12	1.000	598.802	0.347
13	1.083	648.703	0.304
14	1.167	698.603	0.152

0+45	0.2855	9.49			VQ			
0+50	0.3818	13.98				V	Q	
0+55	0.5325	21.89						V
1+ 0	0.7132	26.24						Q
1+ 5	0.8170	15.08						V
1+10	0.8811	9.31			Q			
1+15	0.9186	5.44		Q				
1+20	0.9423	3.44		Q				
1+25	0.9568	2.10	Q					
1+30	0.9647	1.16	Q					
1+35	0.9692	0.65	Q					
1+40	0.9722	0.43	Q					
1+45	0.9744	0.32	Q					
1+50	0.9761	0.24	Q					
1+55	0.9770	0.13	Q					
2+ 0	0.9774	0.05	Q					
2+ 5	0.9774	0.01	Q					
2+10	0.9775	0.00	Q					



Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 10/24/24 File: LSE3100.out

+++++

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

Program License Serial Number 6658

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

English Units used in output format

LA SIERRA
100YR EXISTING UH
KIMLEY-HORN
3HR

Drainage Area = 10.79(Ac.) = 0.017 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 10.79(Ac.) =
0.017 Sq. Mi.

USER Entry of lag time in hours
Lag time = 0.167 Hr.
Lag time = 10.02 Min.
25% of lag time = 2.51 Min.
40% of lag time = 4.01 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
10.79	0.79	8.52

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
10.79	1.97	21.26

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 0.790(In)
 Area Averaged 100-Year Rainfall = 1.970(In)

Point rain (area averaged) = 1.970(In)
 Areal adjustment factor = 100.00 %
 Adjusted average point rain = 1.970(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
10.790	75.00	0.000
Total Area Entered = 10.79(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec. %)	(In/Hr)	(Dec.)	(In/Hr)
75.0	88.0	0.153	0.000	0.153	1.000	0.153
Sum (F) =						0.153

Area averaged mean soil loss (F) (In/Hr) = 0.153
 Minimum soil loss rate ((In/Hr)) = 0.076
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.900

Unit Hydrograph
 FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	49.900	4.268
2	0.167	99.800	20.157
3	0.250	149.701	38.274
4	0.333	199.601	14.703
5	0.417	249.501	8.389
6	0.500	299.401	5.461
7	0.583	349.301	3.612
8	0.667	399.202	2.236
9	0.750	449.102	1.090
10	0.833	499.002	0.551
11	0.917	548.902	0.403
12	1.000	598.802	0.347
13	1.083	648.703	0.304
14	1.167	698.603	0.152
15	1.250	748.503	0.053
		Sum = 100.000	Sum= 10.874

Flood volume = 59284.3 Cubic Feet
 Total soil loss = 17872.4 Cubic Feet

 Peak flow rate of this hydrograph = 15.339(CFS)

+++++
 3 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0005	0.07	Q					
0+10	0.0033	0.41	Q					
0+15	0.0104	1.03	V Q					
0+20	0.0188	1.22	V Q					
0+25	0.0283	1.37	V Q					
0+30	0.0408	1.81	V Q					
0+35	0.0553	2.11	V Q					
0+40	0.0716	2.37	V Q					
0+45	0.0882	2.40	V Q					
0+50	0.1064	2.65	V Q					
0+55	0.1245	2.62	V Q					
1+ 0	0.1415	2.47	Q					
1+ 5	0.1596	2.64	VQ					
1+10	0.1806	3.04	VQ					
1+15	0.2047	3.50	VQ					
1+20	0.2300	3.67	VQ					
1+25	0.2558	3.75	Q					
1+30	0.2830	3.95	QV					
1+35	0.3142	4.53	Q					
1+40	0.3467	4.72	QV					
1+45	0.3797	4.80	Q V					
1+50	0.4166	5.36	Q V					
1+55	0.4575	5.94	Q V					
2+ 0	0.4984	5.94	Q V					
2+ 5	0.5391	5.90	Q V					
2+10	0.5815	6.16	Q V					
2+15	0.6294	6.95	Q V					
2+20	0.6868	8.34	Q V					
2+25	0.7499	9.16	Q V					
2+30	0.8188	10.00	Q V					
2+35	0.9109	13.38	Q					
2+40	1.0159	15.24	VQ					
2+45	1.1215	15.34	Q V					
2+50	1.2034	11.88	Q					
2+55	1.2557	7.59	Q					
3+ 0	1.2946	5.65	Q					
3+ 5	1.3224	4.04	Q					

3+10	1. 3378	2. 24		Q				V	
3+15	1. 3468	1. 31		Q				V	
3+20	1. 3522	0. 78		Q				V	
3+25	1. 3556	0. 50	Q					V	
3+30	1. 3579	0. 33	Q					V	
3+35	1. 3593	0. 21	Q					V	
3+40	1. 3601	0. 12	Q					V	
3+45	1. 3606	0. 06	Q					V	
3+50	1. 3608	0. 03	Q					V	
3+55	1. 3609	0. 02	Q					V	
4+ 0	1. 3610	0. 01	Q					V	
4+ 5	1. 3610	0. 00	Q					V	
4+10	1. 3610	0. 00	Q					V	

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 10/24/24 File: LSE24100.out

+++++

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

Program License Serial Number 6658

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

English Units used in output format

LA SIERRA
100YR EXISTING UH
KIMLEY-HORN
24HR

Drainage Area = 10.79(Ac.) = 0.017 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 10.79(Ac.) =
0.017 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.167 Hr.
Lag time = 10.02 Min.
25% of lag time = 2.51 Min.
40% of lag time = 4.01 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]
10.79	1.92	20.72

100 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]
 10.79 5.07 54.71

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 1.920(In)
 Area Averaged 100-Year Rainfall = 5.070(In)

Point rain (area averaged) = 5.070(In)
 Areal adjustment factor = 100.00 %
 Adjusted average point rain = 5.070(In)

Sub-Area Data:

Area(Ac.) Runoff Index Impervious %
 10.790 75.00 0.000
 Total Area Entered = 10.79(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec. %)	(In/Hr)	(Dec.)	(In/Hr)
75.0	88.0	0.153	0.000	0.153	1.000	0.153
Sum (F) =						0.153

Area averaged mean soil loss (F) (In/Hr) = 0.153
 Minimum soil loss rate ((In/Hr)) = 0.076
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
 F O O T H I L L S - C u r v e

U n i t H y d r o g r a p h D a t a

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	49.900	4.268
2	0.167	99.800	20.157
3	0.250	149.701	38.274
4	0.333	199.601	14.703
5	0.417	249.501	8.389
6	0.500	299.401	5.461
7	0.583	349.301	3.612
8	0.667	399.202	2.236
9	0.750	449.102	1.090
10	0.833	499.002	0.551
11	0.917	548.902	0.403
12	1.000	598.802	0.347
13	1.083	648.703	0.304
14	1.167	698.603	0.152
15	1.250	748.503	0.053
		Sum = 100.000	Sum= 10.874

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)		Effective (In/Hr)
				Max	Low	
1	0.08	0.07	0.041	(0.271)	0.037	0.004
2	0.17	0.07	0.041	(0.270)	0.037	0.004
3	0.25	0.07	0.041	(0.269)	0.037	0.004
4	0.33	0.10	0.061	(0.268)	0.055	0.006
5	0.42	0.10	0.061	(0.267)	0.055	0.006
6	0.50	0.10	0.061	(0.266)	0.055	0.006
7	0.58	0.10	0.061	(0.265)	0.055	0.006
8	0.67	0.10	0.061	(0.264)	0.055	0.006
9	0.75	0.10	0.061	(0.263)	0.055	0.006
10	0.83	0.13	0.081	(0.262)	0.073	0.008
11	0.92	0.13	0.081	(0.260)	0.073	0.008
12	1.00	0.13	0.081	(0.259)	0.073	0.008
13	1.08	0.10	0.061	(0.258)	0.055	0.006
14	1.17	0.10	0.061	(0.257)	0.055	0.006
15	1.25	0.10	0.061	(0.256)	0.055	0.006
16	1.33	0.10	0.061	(0.255)	0.055	0.006
17	1.42	0.10	0.061	(0.254)	0.055	0.006
18	1.50	0.10	0.061	(0.253)	0.055	0.006
19	1.58	0.10	0.061	(0.252)	0.055	0.006
20	1.67	0.10	0.061	(0.251)	0.055	0.006
21	1.75	0.10	0.061	(0.250)	0.055	0.006
22	1.83	0.13	0.081	(0.249)	0.073	0.008
23	1.92	0.13	0.081	(0.248)	0.073	0.008
24	2.00	0.13	0.081	(0.247)	0.073	0.008
25	2.08	0.13	0.081	(0.246)	0.073	0.008
26	2.17	0.13	0.081	(0.245)	0.073	0.008
27	2.25	0.13	0.081	(0.244)	0.073	0.008
28	2.33	0.13	0.081	(0.243)	0.073	0.008
29	2.42	0.13	0.081	(0.242)	0.073	0.008
30	2.50	0.13	0.081	(0.241)	0.073	0.008
31	2.58	0.17	0.101	(0.240)	0.091	0.010
32	2.67	0.17	0.101	(0.239)	0.091	0.010
33	2.75	0.17	0.101	(0.238)	0.091	0.010
34	2.83	0.17	0.101	(0.237)	0.091	0.010
35	2.92	0.17	0.101	(0.236)	0.091	0.010
36	3.00	0.17	0.101	(0.235)	0.091	0.010
37	3.08	0.17	0.101	(0.234)	0.091	0.010
38	3.17	0.17	0.101	(0.233)	0.091	0.010
39	3.25	0.17	0.101	(0.233)	0.091	0.010
40	3.33	0.17	0.101	(0.232)	0.091	0.010
41	3.42	0.17	0.101	(0.231)	0.091	0.010
42	3.50	0.17	0.101	(0.230)	0.091	0.010
43	3.58	0.17	0.101	(0.229)	0.091	0.010

44	3. 67	0. 17	0. 101	(0. 228)	0. 091	0. 010
45	3. 75	0. 17	0. 101	(0. 227)	0. 091	0. 010
46	3. 83	0. 20	0. 122	(0. 226)	0. 110	0. 012
47	3. 92	0. 20	0. 122	(0. 225)	0. 110	0. 012
48	4. 00	0. 20	0. 122	(0. 224)	0. 110	0. 012
49	4. 08	0. 20	0. 122	(0. 223)	0. 110	0. 012
50	4. 17	0. 20	0. 122	(0. 222)	0. 110	0. 012
51	4. 25	0. 20	0. 122	(0. 221)	0. 110	0. 012
52	4. 33	0. 23	0. 142	(0. 220)	0. 128	0. 014
53	4. 42	0. 23	0. 142	(0. 219)	0. 128	0. 014
54	4. 50	0. 23	0. 142	(0. 218)	0. 128	0. 014
55	4. 58	0. 23	0. 142	(0. 217)	0. 128	0. 014
56	4. 67	0. 23	0. 142	(0. 216)	0. 128	0. 014
57	4. 75	0. 23	0. 142	(0. 215)	0. 128	0. 014
58	4. 83	0. 27	0. 162	(0. 214)	0. 146	0. 016
59	4. 92	0. 27	0. 162	(0. 214)	0. 146	0. 016
60	5. 00	0. 27	0. 162	(0. 213)	0. 146	0. 016
61	5. 08	0. 20	0. 122	(0. 212)	0. 110	0. 012
62	5. 17	0. 20	0. 122	(0. 211)	0. 110	0. 012
63	5. 25	0. 20	0. 122	(0. 210)	0. 110	0. 012
64	5. 33	0. 23	0. 142	(0. 209)	0. 128	0. 014
65	5. 42	0. 23	0. 142	(0. 208)	0. 128	0. 014
66	5. 50	0. 23	0. 142	(0. 207)	0. 128	0. 014
67	5. 58	0. 27	0. 162	(0. 206)	0. 146	0. 016
68	5. 67	0. 27	0. 162	(0. 205)	0. 146	0. 016
69	5. 75	0. 27	0. 162	(0. 204)	0. 146	0. 016
70	5. 83	0. 27	0. 162	(0. 203)	0. 146	0. 016
71	5. 92	0. 27	0. 162	(0. 203)	0. 146	0. 016
72	6. 00	0. 27	0. 162	(0. 202)	0. 146	0. 016
73	6. 08	0. 30	0. 183	(0. 201)	0. 164	0. 018
74	6. 17	0. 30	0. 183	(0. 200)	0. 164	0. 018
75	6. 25	0. 30	0. 183	(0. 199)	0. 164	0. 018
76	6. 33	0. 30	0. 183	(0. 198)	0. 164	0. 018
77	6. 42	0. 30	0. 183	(0. 197)	0. 164	0. 018
78	6. 50	0. 30	0. 183	(0. 196)	0. 164	0. 018
79	6. 58	0. 33	0. 203	(0. 195)	0. 183	0. 020
80	6. 67	0. 33	0. 203	(0. 195)	0. 183	0. 020
81	6. 75	0. 33	0. 203	(0. 194)	0. 183	0. 020
82	6. 83	0. 33	0. 203	(0. 193)	0. 183	0. 020
83	6. 92	0. 33	0. 203	(0. 192)	0. 183	0. 020
84	7. 00	0. 33	0. 203	(0. 191)	0. 183	0. 020
85	7. 08	0. 33	0. 203	(0. 190)	0. 183	0. 020
86	7. 17	0. 33	0. 203	(0. 189)	0. 183	0. 020
87	7. 25	0. 33	0. 203	(0. 188)	0. 183	0. 020
88	7. 33	0. 37	0. 223	0. 188 (0. 201)		0. 035
89	7. 42	0. 37	0. 223	0. 187 (0. 201)		0. 036
90	7. 50	0. 37	0. 223	0. 186 (0. 201)		0. 037
91	7. 58	0. 40	0. 243	0. 185 (0. 219)		0. 058
92	7. 67	0. 40	0. 243	0. 184 (0. 219)		0. 059
93	7. 75	0. 40	0. 243	0. 183 (0. 219)		0. 060
94	7. 83	0. 43	0. 264	0. 183 (0. 237)		0. 081

95	7.92	0.43	0.264	0.182	(0.237)	0.082
96	8.00	0.43	0.264	0.181	(0.237)	0.083
97	8.08	0.50	0.304	0.180	(0.274)	0.124
98	8.17	0.50	0.304	0.179	(0.274)	0.125
99	8.25	0.50	0.304	0.178	(0.274)	0.126
100	8.33	0.50	0.304	0.177	(0.274)	0.127
101	8.42	0.50	0.304	0.177	(0.274)	0.128
102	8.50	0.50	0.304	0.176	(0.274)	0.128
103	8.58	0.53	0.324	0.175	(0.292)	0.149
104	8.67	0.53	0.324	0.174	(0.292)	0.150
105	8.75	0.53	0.324	0.173	(0.292)	0.151
106	8.83	0.57	0.345	0.173	(0.310)	0.172
107	8.92	0.57	0.345	0.172	(0.310)	0.173
108	9.00	0.57	0.345	0.171	(0.310)	0.174
109	9.08	0.63	0.385	0.170	(0.347)	0.215
110	9.17	0.63	0.385	0.169	(0.347)	0.216
111	9.25	0.63	0.385	0.168	(0.347)	0.217
112	9.33	0.67	0.406	0.168	(0.365)	0.238
113	9.42	0.67	0.406	0.167	(0.365)	0.239
114	9.50	0.67	0.406	0.166	(0.365)	0.239
115	9.58	0.70	0.426	0.165	(0.383)	0.261
116	9.67	0.70	0.426	0.165	(0.383)	0.261
117	9.75	0.70	0.426	0.164	(0.383)	0.262
118	9.83	0.73	0.446	0.163	(0.402)	0.283
119	9.92	0.73	0.446	0.162	(0.402)	0.284
120	10.00	0.73	0.446	0.161	(0.402)	0.285
121	10.08	0.50	0.304	0.161	(0.274)	0.144
122	10.17	0.50	0.304	0.160	(0.274)	0.144
123	10.25	0.50	0.304	0.159	(0.274)	0.145
124	10.33	0.50	0.304	0.158	(0.274)	0.146
125	10.42	0.50	0.304	0.157	(0.274)	0.147
126	10.50	0.50	0.304	0.157	(0.274)	0.147
127	10.58	0.67	0.406	0.156	(0.365)	0.250
128	10.67	0.67	0.406	0.155	(0.365)	0.250
129	10.75	0.67	0.406	0.154	(0.365)	0.251
130	10.83	0.67	0.406	0.154	(0.365)	0.252
131	10.92	0.67	0.406	0.153	(0.365)	0.253
132	11.00	0.67	0.406	0.152	(0.365)	0.253
133	11.08	0.63	0.385	0.151	(0.347)	0.234
134	11.17	0.63	0.385	0.151	(0.347)	0.235
135	11.25	0.63	0.385	0.150	(0.347)	0.235
136	11.33	0.63	0.385	0.149	(0.347)	0.236
137	11.42	0.63	0.385	0.148	(0.347)	0.237
138	11.50	0.63	0.385	0.148	(0.347)	0.238
139	11.58	0.57	0.345	0.147	(0.310)	0.198
140	11.67	0.57	0.345	0.146	(0.310)	0.199
141	11.75	0.57	0.345	0.146	(0.310)	0.199
142	11.83	0.60	0.365	0.145	(0.329)	0.220
143	11.92	0.60	0.365	0.144	(0.329)	0.221
144	12.00	0.60	0.365	0.143	(0.329)	0.222
145	12.08	0.83	0.507	0.143	(0.456)	0.364

146	12. 17	0. 83	0. 507	0. 142	(0. 456)	0. 365
147	12. 25	0. 83	0. 507	0. 141	(0. 456)	0. 366
148	12. 33	0. 87	0. 527	0. 141	(0. 475)	0. 387
149	12. 42	0. 87	0. 527	0. 140	(0. 475)	0. 387
150	12. 50	0. 87	0. 527	0. 139	(0. 475)	0. 388
151	12. 58	0. 93	0. 568	0. 138	(0. 511)	0. 429
152	12. 67	0. 93	0. 568	0. 138	(0. 511)	0. 430
153	12. 75	0. 93	0. 568	0. 137	(0. 511)	0. 431
154	12. 83	0. 97	0. 588	0. 136	(0. 529)	0. 452
155	12. 92	0. 97	0. 588	0. 136	(0. 529)	0. 452
156	13. 00	0. 97	0. 588	0. 135	(0. 529)	0. 453
157	13. 08	1. 13	0. 690	0. 134	(0. 621)	0. 555
158	13. 17	1. 13	0. 690	0. 134	(0. 621)	0. 556
159	13. 25	1. 13	0. 690	0. 133	(0. 621)	0. 557
160	13. 33	1. 13	0. 690	0. 132	(0. 621)	0. 557
161	13. 42	1. 13	0. 690	0. 132	(0. 621)	0. 558
162	13. 50	1. 13	0. 690	0. 131	(0. 621)	0. 559
163	13. 58	0. 77	0. 466	0. 130	(0. 420)	0. 336
164	13. 67	0. 77	0. 466	0. 130	(0. 420)	0. 337
165	13. 75	0. 77	0. 466	0. 129	(0. 420)	0. 338
166	13. 83	0. 77	0. 466	0. 128	(0. 420)	0. 338
167	13. 92	0. 77	0. 466	0. 128	(0. 420)	0. 339
168	14. 00	0. 77	0. 466	0. 127	(0. 420)	0. 340
169	14. 08	0. 90	0. 548	0. 126	(0. 493)	0. 421
170	14. 17	0. 90	0. 548	0. 126	(0. 493)	0. 422
171	14. 25	0. 90	0. 548	0. 125	(0. 493)	0. 423
172	14. 33	0. 87	0. 527	0. 124	(0. 475)	0. 403
173	14. 42	0. 87	0. 527	0. 124	(0. 475)	0. 404
174	14. 50	0. 87	0. 527	0. 123	(0. 475)	0. 404
175	14. 58	0. 87	0. 527	0. 122	(0. 475)	0. 405
176	14. 67	0. 87	0. 527	0. 122	(0. 475)	0. 405
177	14. 75	0. 87	0. 527	0. 121	(0. 475)	0. 406
178	14. 83	0. 83	0. 507	0. 121	(0. 456)	0. 386
179	14. 92	0. 83	0. 507	0. 120	(0. 456)	0. 387
180	15. 00	0. 83	0. 507	0. 119	(0. 456)	0. 388
181	15. 08	0. 80	0. 487	0. 119	(0. 438)	0. 368
182	15. 17	0. 80	0. 487	0. 118	(0. 438)	0. 369
183	15. 25	0. 80	0. 487	0. 118	(0. 438)	0. 369
184	15. 33	0. 77	0. 466	0. 117	(0. 420)	0. 350
185	15. 42	0. 77	0. 466	0. 116	(0. 420)	0. 350
186	15. 50	0. 77	0. 466	0. 116	(0. 420)	0. 351
187	15. 58	0. 63	0. 385	0. 115	(0. 347)	0. 270
188	15. 67	0. 63	0. 385	0. 115	(0. 347)	0. 271
189	15. 75	0. 63	0. 385	0. 114	(0. 347)	0. 271
190	15. 83	0. 63	0. 385	0. 113	(0. 347)	0. 272
191	15. 92	0. 63	0. 385	0. 113	(0. 347)	0. 273
192	16. 00	0. 63	0. 385	0. 112	(0. 347)	0. 273
193	16. 08	0. 13	0. 081	(0. 112)	0. 073	0. 008
194	16. 17	0. 13	0. 081	(0. 111)	0. 073	0. 008
195	16. 25	0. 13	0. 081	(0. 110)	0. 073	0. 008
196	16. 33	0. 13	0. 081	(0. 110)	0. 073	0. 008

197	16.42	0.13	0.081	(0.109)	0.073	0.008
198	16.50	0.13	0.081	(0.109)	0.073	0.008
199	16.58	0.10	0.061	(0.108)	0.055	0.006
200	16.67	0.10	0.061	(0.108)	0.055	0.006
201	16.75	0.10	0.061	(0.107)	0.055	0.006
202	16.83	0.10	0.061	(0.107)	0.055	0.006
203	16.92	0.10	0.061	(0.106)	0.055	0.006
204	17.00	0.10	0.061	(0.106)	0.055	0.006
205	17.08	0.17	0.101	(0.105)	0.091	0.010
206	17.17	0.17	0.101	(0.104)	0.091	0.010
207	17.25	0.17	0.101	(0.104)	0.091	0.010
208	17.33	0.17	0.101	(0.103)	0.091	0.010
209	17.42	0.17	0.101	(0.103)	0.091	0.010
210	17.50	0.17	0.101	(0.102)	0.091	0.010
211	17.58	0.17	0.101	(0.102)	0.091	0.010
212	17.67	0.17	0.101	(0.101)	0.091	0.010
213	17.75	0.17	0.101	(0.101)	0.091	0.010
214	17.83	0.13	0.081	(0.100)	0.073	0.008
215	17.92	0.13	0.081	(0.100)	0.073	0.008
216	18.00	0.13	0.081	(0.099)	0.073	0.008
217	18.08	0.13	0.081	(0.099)	0.073	0.008
218	18.17	0.13	0.081	(0.098)	0.073	0.008
219	18.25	0.13	0.081	(0.098)	0.073	0.008
220	18.33	0.13	0.081	(0.097)	0.073	0.008
221	18.42	0.13	0.081	(0.097)	0.073	0.008
222	18.50	0.13	0.081	(0.097)	0.073	0.008
223	18.58	0.10	0.061	(0.096)	0.055	0.006
224	18.67	0.10	0.061	(0.096)	0.055	0.006
225	18.75	0.10	0.061	(0.095)	0.055	0.006
226	18.83	0.07	0.041	(0.095)	0.037	0.004
227	18.92	0.07	0.041	(0.094)	0.037	0.004
228	19.00	0.07	0.041	(0.094)	0.037	0.004
229	19.08	0.10	0.061	(0.093)	0.055	0.006
230	19.17	0.10	0.061	(0.093)	0.055	0.006
231	19.25	0.10	0.061	(0.092)	0.055	0.006
232	19.33	0.13	0.081	(0.092)	0.073	0.008
233	19.42	0.13	0.081	(0.092)	0.073	0.008
234	19.50	0.13	0.081	(0.091)	0.073	0.008
235	19.58	0.10	0.061	(0.091)	0.055	0.006
236	19.67	0.10	0.061	(0.090)	0.055	0.006
237	19.75	0.10	0.061	(0.090)	0.055	0.006
238	19.83	0.07	0.041	(0.090)	0.037	0.004
239	19.92	0.07	0.041	(0.089)	0.037	0.004
240	20.00	0.07	0.041	(0.089)	0.037	0.004
241	20.08	0.10	0.061	(0.088)	0.055	0.006
242	20.17	0.10	0.061	(0.088)	0.055	0.006
243	20.25	0.10	0.061	(0.088)	0.055	0.006
244	20.33	0.10	0.061	(0.087)	0.055	0.006
245	20.42	0.10	0.061	(0.087)	0.055	0.006
246	20.50	0.10	0.061	(0.086)	0.055	0.006
247	20.58	0.10	0.061	(0.086)	0.055	0.006

248	20.67	0.10	0.061	(0.086)	0.055	0.006
249	20.75	0.10	0.061	(0.085)	0.055	0.006
250	20.83	0.07	0.041	(0.085)	0.037	0.004
251	20.92	0.07	0.041	(0.085)	0.037	0.004
252	21.00	0.07	0.041	(0.084)	0.037	0.004
253	21.08	0.10	0.061	(0.084)	0.055	0.006
254	21.17	0.10	0.061	(0.084)	0.055	0.006
255	21.25	0.10	0.061	(0.083)	0.055	0.006
256	21.33	0.07	0.041	(0.083)	0.037	0.004
257	21.42	0.07	0.041	(0.083)	0.037	0.004
258	21.50	0.07	0.041	(0.082)	0.037	0.004
259	21.58	0.10	0.061	(0.082)	0.055	0.006
260	21.67	0.10	0.061	(0.082)	0.055	0.006
261	21.75	0.10	0.061	(0.082)	0.055	0.006
262	21.83	0.07	0.041	(0.081)	0.037	0.004
263	21.92	0.07	0.041	(0.081)	0.037	0.004
264	22.00	0.07	0.041	(0.081)	0.037	0.004
265	22.08	0.10	0.061	(0.080)	0.055	0.006
266	22.17	0.10	0.061	(0.080)	0.055	0.006
267	22.25	0.10	0.061	(0.080)	0.055	0.006
268	22.33	0.07	0.041	(0.080)	0.037	0.004
269	22.42	0.07	0.041	(0.079)	0.037	0.004
270	22.50	0.07	0.041	(0.079)	0.037	0.004
271	22.58	0.07	0.041	(0.079)	0.037	0.004
272	22.67	0.07	0.041	(0.079)	0.037	0.004
273	22.75	0.07	0.041	(0.079)	0.037	0.004
274	22.83	0.07	0.041	(0.078)	0.037	0.004
275	22.92	0.07	0.041	(0.078)	0.037	0.004
276	23.00	0.07	0.041	(0.078)	0.037	0.004
277	23.08	0.07	0.041	(0.078)	0.037	0.004
278	23.17	0.07	0.041	(0.078)	0.037	0.004
279	23.25	0.07	0.041	(0.077)	0.037	0.004
280	23.33	0.07	0.041	(0.077)	0.037	0.004
281	23.42	0.07	0.041	(0.077)	0.037	0.004
282	23.50	0.07	0.041	(0.077)	0.037	0.004
283	23.58	0.07	0.041	(0.077)	0.037	0.004
284	23.67	0.07	0.041	(0.077)	0.037	0.004
285	23.75	0.07	0.041	(0.077)	0.037	0.004
286	23.83	0.07	0.041	(0.077)	0.037	0.004
287	23.92	0.07	0.041	(0.076)	0.037	0.004
288	24.00	0.07	0.041	(0.076)	0.037	0.004

(Loss Rate Not Used)

Sum = 100.0 Sum = 30.8

Flood volume = Effective rainfall 2.57(In)
times area 10.8(Ac.)/[(In)/(Ft.)] = 2.3(Ac. Ft)
Total soil loss = 2.50(In)
Total soil loss = 2.248(Ac. Ft)
Total rainfall = 5.07(In)
Flood volume = 100667.6 Cubic Feet
Total soil loss = 97908.4 Cubic Feet

Peak flow rate of this hydrograph = 5.956(CFS)

+++++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

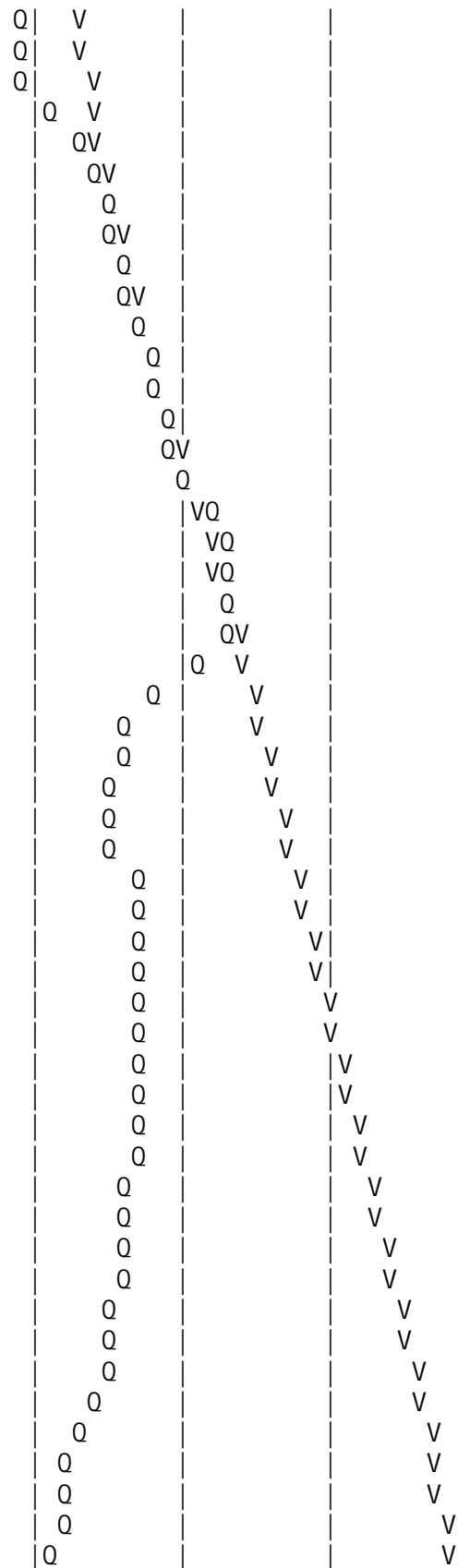
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000		0.00	Q				
0+10	0.0001		0.01	Q				
0+15	0.0003		0.03	Q				
0+20	0.0005		0.04	Q				
0+25	0.0008		0.04	Q				
0+30	0.0012		0.05	Q				
0+35	0.0016		0.06	Q				
0+40	0.0020		0.06	Q				
0+45	0.0025		0.06	Q				
0+50	0.0029		0.07	Q				
0+55	0.0034		0.07	Q				
1+ 0	0.0039		0.08	Q				
1+ 5	0.0045		0.08	Q				
1+10	0.0051		0.08	Q				
1+15	0.0056		0.07	Q				
1+20	0.0060		0.07	Q				
1+25	0.0065		0.07	Q				
1+30	0.0070		0.07	Q				
1+35	0.0074		0.07	Q				
1+40	0.0079		0.07	Q				
1+45	0.0084		0.07	Q				
1+50	0.0088		0.07	Q				
1+55	0.0093		0.07	Q				
2+ 0	0.0099		0.08	Q				
2+ 5	0.0104		0.08	Q				
2+10	0.0110		0.09	Q				
2+15	0.0116		0.09	Q				
2+20	0.0122		0.09	Q				
2+25	0.0128		0.09	Q				
2+30	0.0134		0.09	Q				
2+35	0.0140		0.09	Q				
2+40	0.0147		0.09	Q				
2+45	0.0154		0.10	Q				
2+50	0.0161		0.11	Q				
2+55	0.0168		0.11	Q				
3+ 0	0.0176		0.11	Q				
3+ 5	0.0183		0.11	Q				
3+10	0.0191		0.11	Q				
3+15	0.0199		0.11	Q				
3+20	0.0206		0.11	Q				

3+25	0. 0214	0. 11	Q
3+30	0. 0221	0. 11	Q
3+35	0. 0229	0. 11	Q
3+40	0. 0237	0. 11	Q
3+45	0. 0244	0. 11	Q
3+50	0. 0252	0. 11	Q
3+55	0. 0260	0. 12	Q
4+ 0	0. 0268	0. 12	Q
4+ 5	0. 0277	0. 13	Q
4+10	0. 0286	0. 13	Q
4+15	0. 0295	0. 13	Q
4+20	0. 0304	0. 13	Q
4+25	0. 0314	0. 14	Q
4+30	0. 0324	0. 15	Q
4+35	0. 0334	0. 15	Q
4+40	0. 0344	0. 15	Q
4+45	0. 0355	0. 15	Q
4+50	0. 0365	0. 15	Q
4+55	0. 0376	0. 16	Q
5+ 0	0. 0388	0. 17	Q
5+ 5	0. 0400	0. 17	Q
5+10	0. 0411	0. 16	Q
5+15	0. 0421	0. 15	Q
5+20	0. 0431	0. 14	Q
5+25	0. 0441	0. 14	Q
5+30	0. 0451	0. 15	Q
5+35	0. 0461	0. 15	Q
5+40	0. 0472	0. 16	Q
5+45	0. 0484	0. 17	Q
5+50	0. 0495	0. 17	Q
5+55	0. 0507	0. 17	Q
6+ 0	0. 0519	0. 17	Q
6+ 5	0. 0532	0. 18	Q
6+10	0. 0544	0. 18	Q
6+15	0. 0557	0. 19	Q
6+20	0. 0570	0. 19	Q
6+25	0. 0584	0. 20	QV
6+30	0. 0597	0. 20	QV
6+35	0. 0611	0. 20	QV
6+40	0. 0625	0. 20	QV
6+45	0. 0640	0. 21	QV
6+50	0. 0654	0. 22	QV
6+55	0. 0669	0. 22	QV
7+ 0	0. 0684	0. 22	QV
7+ 5	0. 0700	0. 22	QV
7+10	0. 0715	0. 22	QV
7+15	0. 0730	0. 22	QV
7+20	0. 0746	0. 23	QV
7+25	0. 0764	0. 26	Q
7+30	0. 0786	0. 33	Q
7+35	0. 0811	0. 37	Q

7+40	0.0841	0.43	Q			
7+45	0.0878	0.53	VQ			
7+50	0.0918	0.59	VQ			
7+55	0.0964	0.66	VQ			
8+ 0	0.1017	0.77	V Q			
8+ 5	0.1075	0.84	V Q			
8+10	0.1142	0.96	V Q			
8+15	0.1221	1.16	V Q			
8+20	0.1307	1.24	V Q			
8+25	0.1396	1.29	V Q			
8+30	0.1487	1.33	V Q			
8+35	0.1581	1.37	V Q			
8+40	0.1680	1.43	V Q			
8+45	0.1785	1.53	V Q			
8+50	0.1894	1.58	V Q			
8+55	0.2008	1.66	V Q			
9+ 0	0.2129	1.76	V Q			
9+ 5	0.2256	1.83	V Q			
9+10	0.2390	1.96	V Q			
9+15	0.2538	2.15	V Q			
9+20	0.2693	2.24	V Q			
9+25	0.2853	2.34	V Q			
9+30	0.3023	2.46	V Q			
9+35	0.3196	2.52	V Q			
9+40	0.3376	2.61	V Q			
9+45	0.3563	2.72	V Q			
9+50	0.3755	2.78	V Q			
9+55	0.3952	2.86	V Q			
10+ 0	0.4156	2.97	V Q			
10+ 5	0.4359	2.95	V Q			
10+10	0.4544	2.68	V Q			
10+15	0.4689	2.11	Q			
10+20	0.4820	1.90	QV			
10+25	0.4943	1.78	QV			
10+30	0.5061	1.71	Q V			
10+35	0.5179	1.71	Q V			
10+40	0.5310	1.91	Q V			
10+45	0.5470	2.33	Q			
10+50	0.5642	2.49	Q			
10+55	0.5820	2.58	Q			
11+ 0	0.6002	2.65	Q			
11+ 5	0.6187	2.68	Q			
11+10	0.6370	2.67	QV			
11+15	0.6549	2.60	QV			
11+20	0.6727	2.58	QV			
11+25	0.6905	2.58	QV			
11+30	0.7082	2.58	Q V			
11+35	0.7259	2.56	Q V			
11+40	0.7429	2.48	Q V			
11+45	0.7589	2.31	Q V			
11+50	0.7745	2.27	Q V			

11+55	0.7902	2.28
12+ 0	0.8064	2.35
12+ 5	0.8232	2.44
12+10	0.8422	2.77
12+15	0.8654	3.37
12+20	0.8904	3.62
12+25	0.9166	3.81
12+30	0.9440	3.98
12+35	0.9722	4.10
12+40	1.0015	4.25
12+45	1.0322	4.45
12+50	1.0635	4.55
12+55	1.0956	4.65
13+ 0	1.1285	4.78
13+ 5	1.1621	4.89
13+10	1.1976	5.15
13+15	1.2361	5.60
13+20	1.2759	5.78
13+25	1.3165	5.88
13+30	1.3575	5.96
13+35	1.3981	5.90
13+40	1.4356	5.45
13+45	1.4669	4.54
13+50	1.4958	4.19
13+55	1.5233	4.00
14+ 0	1.5501	3.88
14+ 5	1.5765	3.84
14+10	1.6039	3.97
14+15	1.6335	4.29
14+20	1.6638	4.41
14+25	1.6943	4.43
14+30	1.7246	4.40
14+35	1.7549	4.40
14+40	1.7852	4.40
14+45	1.8155	4.40
14+50	1.8458	4.40
14+55	1.8758	4.36
15+ 0	1.9053	4.28
15+ 5	1.9346	4.25
15+10	1.9634	4.19
15+15	1.9917	4.10
15+20	2.0196	4.06
15+25	2.0472	4.00
15+30	2.0740	3.90
15+35	2.1004	3.83
15+40	2.1255	3.64
15+45	2.1481	3.29
15+50	2.1698	3.16
15+55	2.1911	3.08
16+ 0	2.2120	3.04
16+ 5	2.2319	2.89



16+10	2. 2476	2. 29		Q			V
16+15	2. 2557	1. 18		Q			V
16+20	2. 2609	0. 75		Q			V
16+25	2. 2644	0. 50		Q			V
16+30	2. 2667	0. 34		Q			V
16+35	2. 2684	0. 24		Q			V
16+40	2. 2695	0. 17		Q			V
16+45	2. 2704	0. 13		Q			V
16+50	2. 2711	0. 11		Q			V
16+55	2. 2718	0. 09		Q			V
17+ 0	2. 2723	0. 08		Q			V
17+ 5	2. 2729	0. 08		Q			V
17+10	2. 2734	0. 08		Q			V
17+15	2. 2741	0. 09		Q			V
17+20	2. 2747	0. 10		Q			V
17+25	2. 2755	0. 10		Q			V
17+30	2. 2762	0. 11		Q			V
17+35	2. 2769	0. 11		Q			V
17+40	2. 2777	0. 11		Q			V
17+45	2. 2784	0. 11		Q			V
17+50	2. 2792	0. 11		Q			V
17+55	2. 2799	0. 10		Q			V
18+ 0	2. 2806	0. 10		Q			V
18+ 5	2. 2812	0. 09		Q			V
18+10	2. 2819	0. 09		Q			V
18+15	2. 2825	0. 09		Q			V
18+20	2. 2831	0. 09		Q			V
18+25	2. 2837	0. 09		Q			V
18+30	2. 2843	0. 09		Q			V
18+35	2. 2849	0. 09		Q			V
18+40	2. 2855	0. 08		Q			V
18+45	2. 2860	0. 07		Q			V
18+50	2. 2865	0. 07		Q			V
18+55	2. 2869	0. 06		Q			V
19+ 0	2. 2873	0. 05		Q			V
19+ 5	2. 2877	0. 05		Q			V
19+10	2. 2880	0. 05		Q			V
19+15	2. 2884	0. 06		Q			V
19+20	2. 2889	0. 06		Q			V
19+25	2. 2893	0. 07		Q			V
19+30	2. 2899	0. 08		Q			V
19+35	2. 2905	0. 08		Q			V
19+40	2. 2910	0. 08		Q			V
19+45	2. 2915	0. 07		Q			V
19+50	2. 2920	0. 07		Q			V
19+55	2. 2924	0. 06		Q			V
20+ 0	2. 2928	0. 05		Q			V
20+ 5	2. 2931	0. 05		Q			V
20+10	2. 2935	0. 05		Q			V
20+15	2. 2939	0. 06		Q			V
20+20	2. 2943	0. 06		Q			V

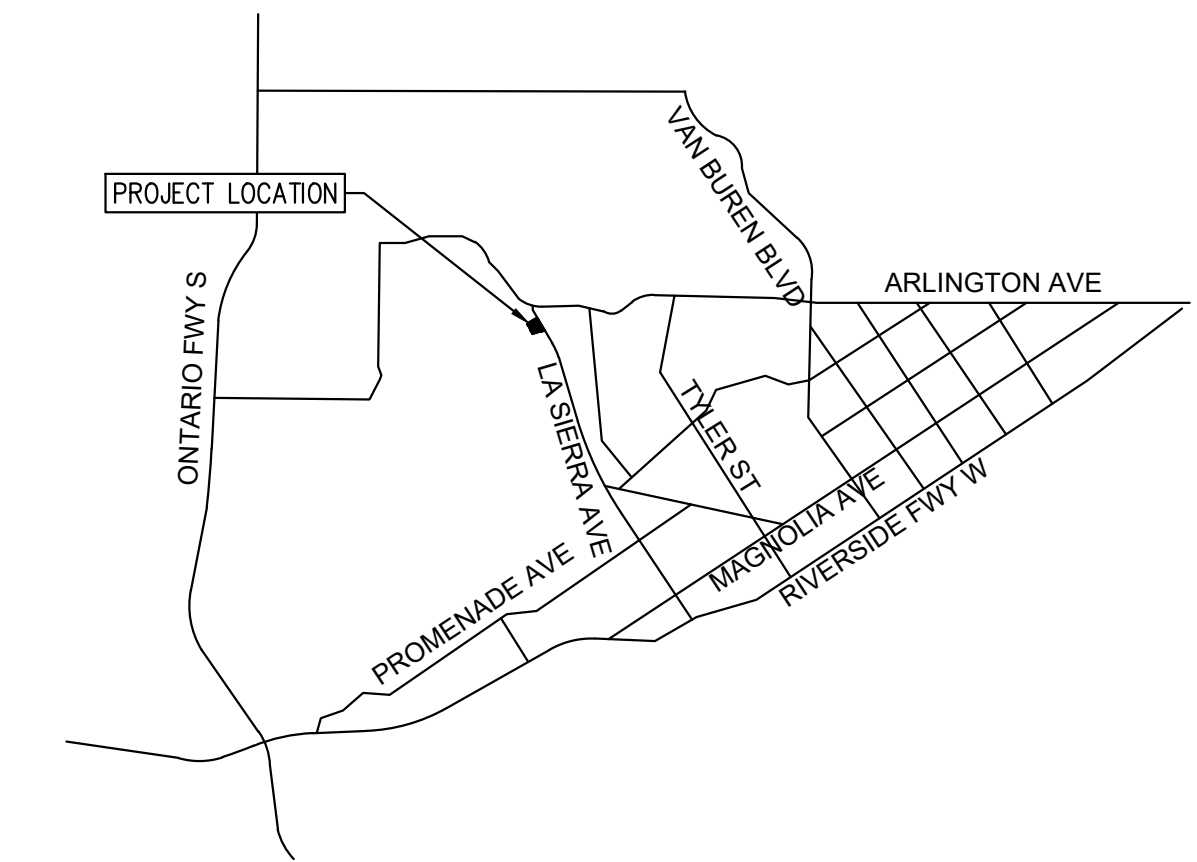
20+25	2. 2948	0.06	Q				V
20+30	2. 2952	0.06	Q				V
20+35	2. 2957	0.07	Q				V
20+40	2. 2961	0.07	Q				V
20+45	2. 2966	0.07	Q				V
20+50	2. 2970	0.07	Q				V
20+55	2. 2974	0.06	Q				V
21+ 0	2. 2978	0.05	Q				V
21+ 5	2. 2981	0.05	Q				V
21+10	2. 2985	0.05	Q				V
21+15	2. 2989	0.06	Q				V
21+20	2. 2993	0.06	Q				V
21+25	2. 2997	0.06	Q				V
21+30	2. 3001	0.05	Q				V
21+35	2. 3004	0.05	Q				V
21+40	2. 3008	0.05	Q				V
21+45	2. 3012	0.06	Q				V
21+50	2. 3016	0.06	Q				V
21+55	2. 3020	0.06	Q				V
22+ 0	2. 3024	0.05	Q				V
22+ 5	2. 3027	0.05	Q				V
22+10	2. 3031	0.05	Q				V
22+15	2. 3035	0.06	Q				V
22+20	2. 3039	0.06	Q				V
22+25	2. 3043	0.06	Q				V
22+30	2. 3047	0.05	Q				V
22+35	2. 3050	0.05	Q				V
22+40	2. 3053	0.05	Q				V
22+45	2. 3056	0.05	Q				V
22+50	2. 3059	0.05	Q				V
22+55	2. 3062	0.04	Q				V
23+ 0	2. 3065	0.04	Q				V
23+ 5	2. 3069	0.04	Q				V
23+10	2. 3072	0.04	Q				V
23+15	2. 3075	0.04	Q				V
23+20	2. 3078	0.04	Q				V
23+25	2. 3081	0.04	Q				V
23+30	2. 3084	0.04	Q				V
23+35	2. 3087	0.04	Q				V
23+40	2. 3090	0.04	Q				V
23+45	2. 3093	0.04	Q				V
23+50	2. 3096	0.04	Q				V
23+55	2. 3099	0.04	Q				V
24+ 0	2. 3102	0.04	Q				V
24+ 5	2. 3105	0.04	Q				V
24+10	2. 3107	0.03	Q				V
24+15	2. 3108	0.02	Q				V
24+20	2. 3109	0.01	Q				V
24+25	2. 3109	0.01	Q				V
24+30	2. 3110	0.00	Q				V
24+35	2. 3110	0.00	Q				V

24+40	2. 3110	0. 00	Q				V
24+45	2. 3110	0. 00	Q				V
24+50	2. 3110	0. 00	Q				V
24+55	2. 3110	0. 00	Q				V
25+ 0	2. 3110	0. 00	Q				V
25+ 5	2. 3110	0. 00	Q				V
25+10	2. 3110	0. 00	Q				V

Appendix B: Proposed Conditions

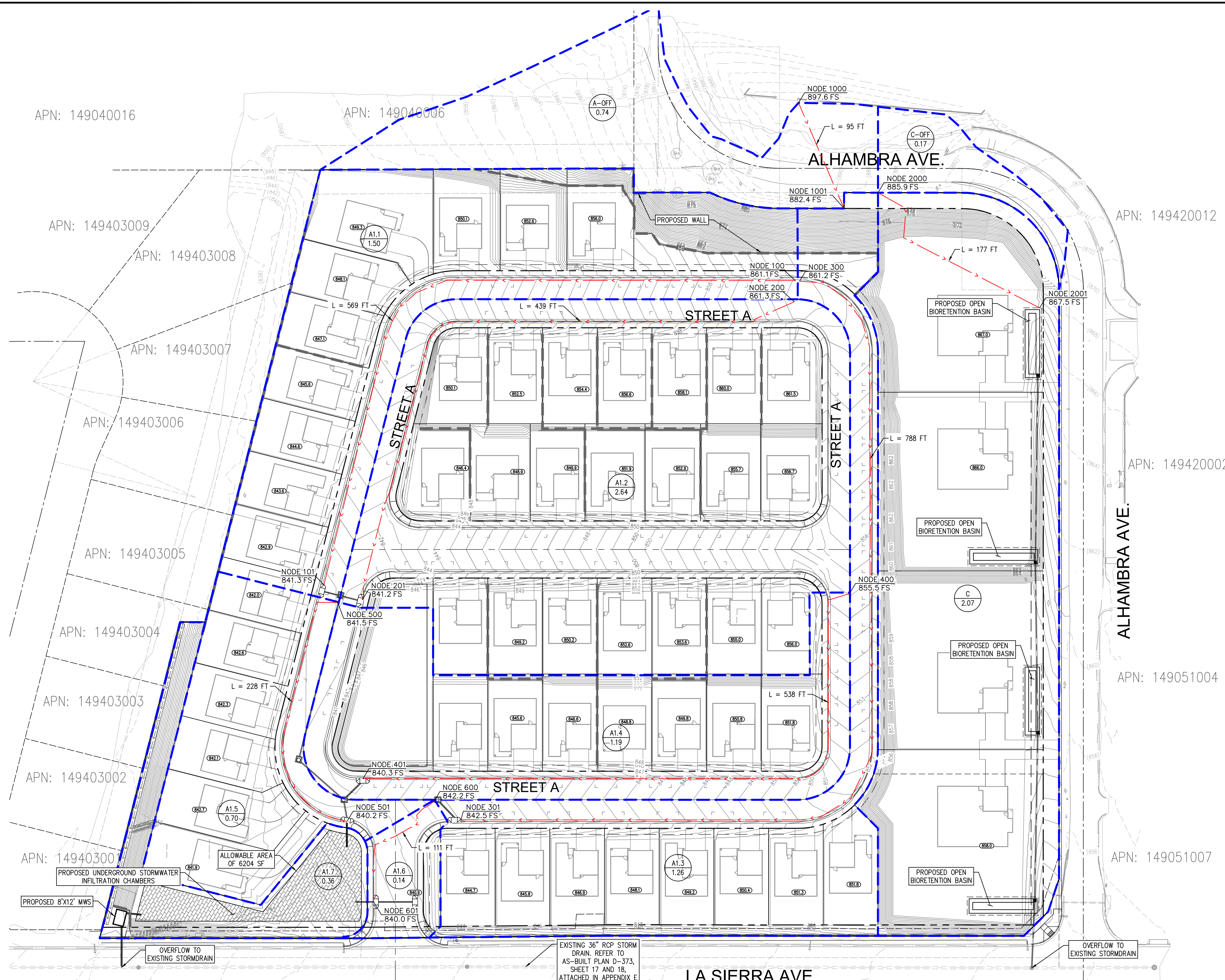
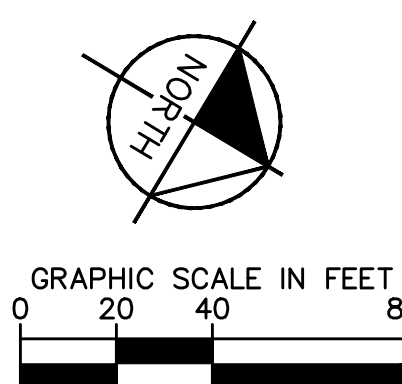
CITY OF RIVERSIDE PROPOSED HYDROLOGY EXHIBIT LA SIERRA

VICINITY MAP



LEGEND

- (xxx) EXISTING CONTOUR
- xxx PROPOSED CONTOUR
- PROPERTY LINE
- DMA BOUNDARY
- DRAINAGE MANAGEMENT AREA NAME
- AREA (IN ACRES)
- ROAD CENTERLINE
- PROPOSED STORM DRAIN
- PROPOSED WALL
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- FLOW PATH
- NODE ID
ELEVATION (IN FEET)
- UNDERGROUND INFILTRATION CHAMBERS



APN: 149040016

APN: 149040006

ALHAMBRA AVE.

APN: 149420012

APN: 149403009

APN: 149403008

STREET A

APN: 149420002

ALHAMBRA AVE.

APN: 149403006

APN: 149403005

APN: 149403004

APN: 149403003

APN: 149403002

APN: 149403001

APN: 149051004

APN: 149051007

APN: 149403001

ALLOWABLE AREA OF 6204 SF

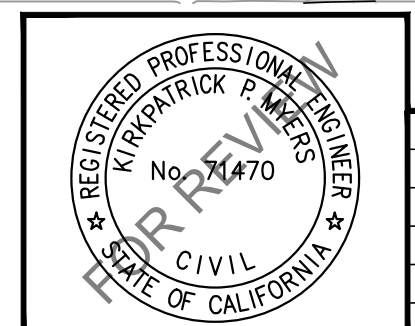
PROPOSED 8'x12' MWS

OVERFLOW TO EXISTING STORMDRAIN

EXISTING 36" RCP STORM DRAIN. REFER TO AS-BUILT PLAN D-373, SHEET 17 AND 18, ATTACHED IN APPENDIX E

LA SIERRA AVE.

OVERFLOW TO EXISTING STORMDRAIN



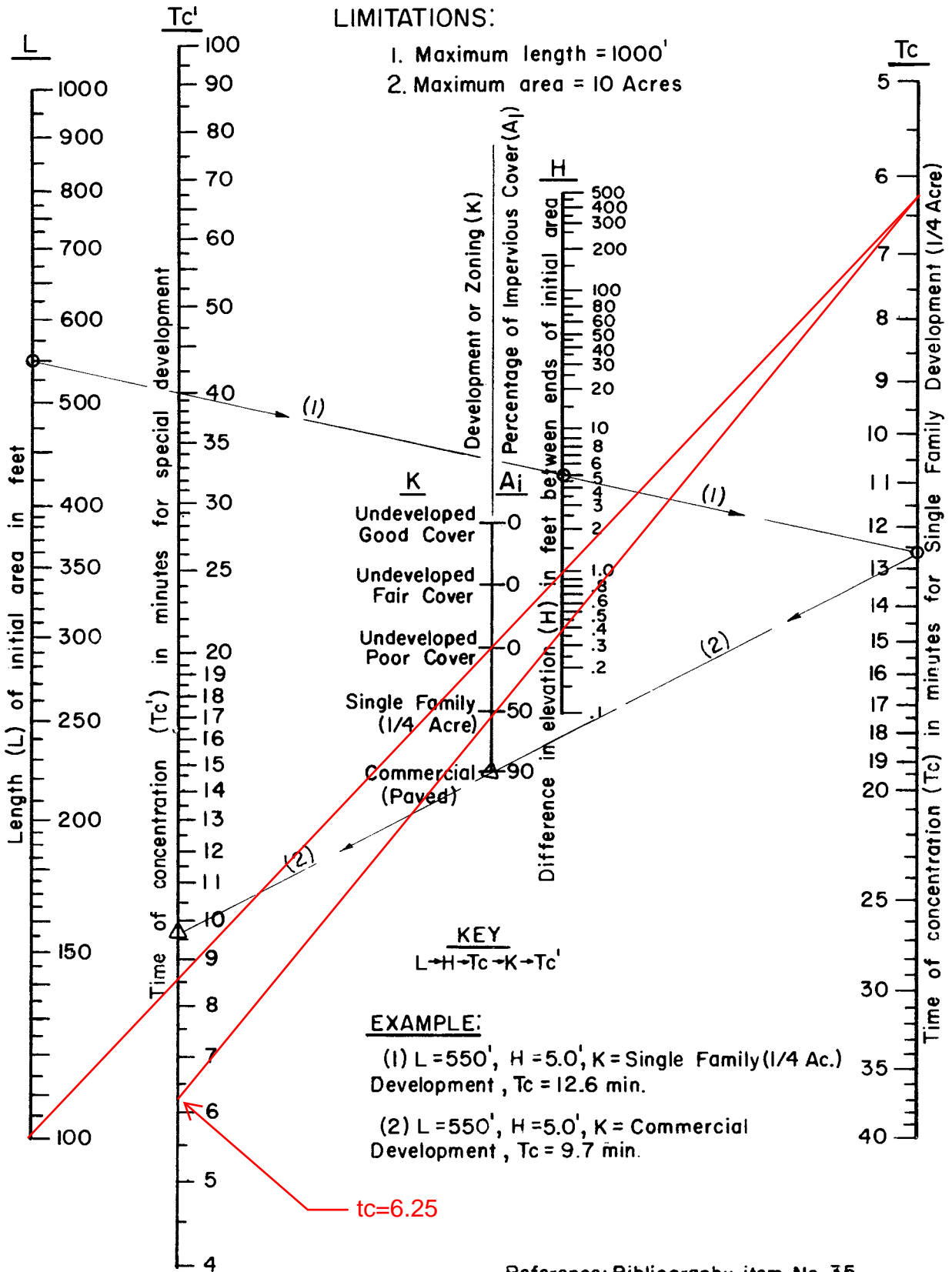
Kimley-Horn
3801 UNIVERSITY AVE. SUITE 300, RIVERSIDE, CA 92501
PHONE: (951) 543-9868 WWW.KIMLEY-HORN.COM

TENTATIVE TRACT MAP 39008
PROPOSED HYDROLOGY EXHIBIT
LA SIERRA AVE. & ALHAMBRA AVE.

PROJ. # 195261018
SHEET 1 OF SHEETS
DWG. NO. 195261018

REVISIONS	DATE	BY

K:\RIV_LDEV\195261018 - MLC RIVERSIDE REPORTS\DRAINAGE (LID + HH)\1 - CAD\PROPOSED DRAINAGE EXHIBIT.DWG 11/11/2024 10:44:54 PM



Reference: Bibliography item No. 35.

RCFC & WCD
HYDROLOGY MANUAL

**TIME OF CONCENTRATION
FOR INITIAL SUBAREA**

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 10/24/24 File: LSCP1100.out

+++++

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

Program License Serial Number 6658

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

English Units used in output format

LA SIERRA
100YR PROPOSED UH DMA C
KIMLEY-HORN
1HR

Drainage Area = 2.24(Ac.) = 0.004 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.24(Ac.) =
0.004 Sq. Mi.

USER Entry of lag time in hours
Lag time = 0.083 Hr.
Lag time = 4.98 Min.
25% of lag time = 1.25 Min.
40% of lag time = 1.99 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.24	0.46	1.02

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
2.24	1.24	2.78

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 0.457(In)
 Area Averaged 100-Year Rainfall = 1.240(In)

Point rain (area averaged) = 1.240(In)
 Areal adjustment factor = 100.00 %
 Adjusted average point rain = 1.240(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.240	75.00	0.520
Total Area Entered = 2.24(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec. %)	(In/Hr)	(Dec.)	(In/Hr)
75.0	88.0	0.153	0.520	0.081	1.000	0.081
Sum (F) =						0.081

Area averaged mean soil loss (F) (In/Hr) = 0.081
 Minimum soil loss rate ((In/Hr)) = 0.041
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.484

 Slope of intensity-duration curve for a 1 hour storm =0.5500

Unit Hydrograph
 FOOTHILL S-Curve

 Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	100.402	14.560
2	0.167	200.803	55.758
3	0.250	301.205	18.364
4	0.333	401.606	7.391
5	0.417	502.008	2.421
6	0.500	602.410	0.846
7	0.583	702.811	0.660
Sum = 100.000			Sum= 2.258

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

1+25	0.2162	0.02	Q				V
1+30	0.2163	0.01	Q				V

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 10/24/24 File: LSCP3100.out

+++++

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

Program License Serial Number 6658

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

English Units used in output format

LA SIERRA
100YR PROPOSED UH DMA C
KIMLEY-HORN
3HR

Drainage Area = 2.24(Ac.) = 0.004 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.24(Ac.) =
0.004 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.083 Hr.
Lag time = 4.98 Min.
25% of lag time = 1.25 Min.
40% of lag time = 1.99 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.24	0.79	1.77

100 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] Weighting[1*2]
 2.24 1.97 4.41

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 0.790(In)
 Area Averaged 100-Year Rainfall = 1.970(In)

Point rain (area averaged) = 1.970(In)
 Areal adjustment factor = 100.00 %
 Adjusted average point rain = 1.970(In)

Sub-Area Data:

Area(Ac.) Runoff Index Impervious %
 2.240 75.00 0.520
 Total Area Entered = 2.24(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec. %)	(In/Hr)	(Dec.)	(In/Hr)
75.0	88.0	0.153	0.520	0.081	1.000	0.081
Sum (F) =						0.081

Area averaged mean soil loss (F) (In/Hr) = 0.081
 Minimum soil loss rate ((In/Hr)) = 0.041
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.484

U n i t H y d r o g r a p h
 F O O T H I L L S - C u r v e

U n i t H y d r o g r a p h D a t a

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	100.402	14.560
2	0.167	200.803	55.758
3	0.250	301.205	18.364
4	0.333	401.606	7.391
5	0.417	502.008	2.421
6	0.500	602.410	0.846
7	0.583	702.811	0.660
Sum = 100.000			Sum= 2.258

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	1.30	0.307	0.081	(0.149)	0.226
2	0.17	1.30	0.307	0.081	(0.149)	0.226
3	0.25	1.10	0.260	0.081	(0.126)	0.179
4	0.33	1.50	0.355	0.081	(0.172)	0.273
5	0.42	1.50	0.355	0.081	(0.172)	0.273
6	0.50	1.80	0.426	0.081	(0.206)	0.344
7	0.58	1.50	0.355	0.081	(0.172)	0.273
8	0.67	1.80	0.426	0.081	(0.206)	0.344
9	0.75	1.80	0.426	0.081	(0.206)	0.344
10	0.83	1.50	0.355	0.081	(0.172)	0.273
11	0.92	1.60	0.378	0.081	(0.183)	0.297
12	1.00	1.80	0.426	0.081	(0.206)	0.344
13	1.08	2.20	0.520	0.081	(0.252)	0.439
14	1.17	2.20	0.520	0.081	(0.252)	0.439
15	1.25	2.20	0.520	0.081	(0.252)	0.439
16	1.33	2.00	0.473	0.081	(0.229)	0.392
17	1.42	2.60	0.615	0.081	(0.297)	0.533
18	1.50	2.70	0.638	0.081	(0.309)	0.557
19	1.58	2.40	0.567	0.081	(0.275)	0.486
20	1.67	2.70	0.638	0.081	(0.309)	0.557
21	1.75	3.30	0.780	0.081	(0.378)	0.699
22	1.83	3.10	0.733	0.081	(0.355)	0.652
23	1.92	2.90	0.686	0.081	(0.332)	0.604
24	2.00	3.00	0.709	0.081	(0.343)	0.628
25	2.08	3.10	0.733	0.081	(0.355)	0.652
26	2.17	4.20	0.993	0.081	(0.481)	0.912
27	2.25	5.00	1.182	0.081	(0.572)	1.101
28	2.33	3.50	0.827	0.081	(0.400)	0.746
29	2.42	6.80	1.608	0.081	(0.778)	1.526
30	2.50	7.30	1.726	0.081	(0.835)	1.644
31	2.58	8.20	1.938	0.081	(0.938)	1.857
32	2.67	5.90	1.395	0.081	(0.675)	1.313
33	2.75	2.00	0.473	0.081	(0.229)	0.392
34	2.83	1.80	0.426	0.081	(0.206)	0.344
35	2.92	1.80	0.426	0.081	(0.206)	0.344
36	3.00	0.60	0.142	(0.081)	0.069	0.073

(Loss Rate Not Used)

Sum = 100.0

Sum = 20.7

Flood volume = Effective rainfall 1.73(In)
times area 2.2(Ac.)/[(In)/(Ft.)] = 0.3(Ac. Ft)
Total soil loss = 0.24(In)
Total soil loss = 0.045(Ac. Ft)
Total rainfall = 1.97(In)
Flood volume = 14043.9 Cubic Feet
Total soil loss = 1974.4 Cubic Feet

Peak flow rate of this hydrograph = 3.783(CFS)

+++++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0005	0.07	Q					
0+10	0.0030	0.36	VQ					
0+15	0.0060	0.44	VQ					
0+20	0.0091	0.45	Q					
0+25	0.0129	0.56	VQ					
0+30	0.0172	0.62	Q					
0+35	0.0220	0.70	Q					
0+40	0.0266	0.67	QV					
0+45	0.0317	0.74	QV					
0+50	0.0368	0.74	Q V					
0+55	0.0414	0.67	Q V					
1+ 0	0.0461	0.69	Q V					
1+ 5	0.0515	0.78	Q V					
1+10	0.0578	0.92	Q V					
1+15	0.0644	0.96	Q V					
1+20	0.0710	0.97	Q V					
1+25	0.0776	0.96	Q V					
1+30	0.0854	1.13	Q V					
1+35	0.0936	1.19	Q V					
1+40	0.1015	1.15	Q V					
1+45	0.1103	1.27	Q V					
1+50	0.1203	1.45	Q V					
1+55	0.1302	1.45	Q V					
2+ 0	0.1399	1.40	Q V					
2+ 5	0.1497	1.42	Q V					
2+10	0.1603	1.54	Q V					
2+15	0.1736	1.94	Q V					
2+20	0.1886	2.17	Q V					
2+25	0.2031	2.11	Q V					
2+30	0.2240	3.03	Q V					
2+35	0.2483	3.53	Q V					
2+40	0.2743	3.78	Q V					
2+45	0.2946	2.94	Q V					
2+50	0.3055	1.59	Q V					
2+55	0.3130	1.08	Q V					
3+ 0	0.3185	0.80	Q V					
3+ 5	0.3210	0.37	Q V					
3+10	0.3219	0.13	Q V					
3+15	0.3222	0.04	Q V					
3+20	0.3224	0.02	Q V					
3+25	0.3224	0.01	Q V					
3+30	0.3224	0.00	Q V					

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 10/24/24 File: LSCP24100.out

+++++

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

Program License Serial Number 6658

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

English Units used in output format

LA SIERRA
100YR PROPOSED UH DMA C
KIMLEY-HORN
24HR

Drainage Area = 2.24(Ac.) = 0.004 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.24(Ac.) =
0.004 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.083 Hr.
Lag time = 4.98 Min.
25% of lag time = 1.25 Min.
40% of lag time = 1.99 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]
2.24	1.92	4.30

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
2.24	5.07	11.36

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 1.920(In)
 Area Averaged 100-Year Rainfall = 5.070(In)

Point rain (area averaged) = 5.070(In)
 Areal adjustment factor = 100.00 %
 Adjusted average point rain = 5.070(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.240	75.00	0.520
Total Area Entered = 2.24(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec. %)	(In/Hr)	(Dec.)	(In/Hr)
75.0	88.0	0.153	0.520	0.081	1.000	0.081
Sum (F) =						0.081

Area averaged mean soil loss (F) (In/Hr) = 0.081
 Minimum soil loss rate ((In/Hr)) = 0.041
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.484

Unit Hydrograph
 FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	100.402	14.560
2	0.167	200.803	55.758
3	0.250	301.205	18.364
4	0.333	401.606	7.391
5	0.417	502.008	2.421
6	0.500	602.410	0.846
7	0.583	702.811	0.660
Sum = 100.000			Sum= 2.258

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	0.041	(0.144)	0.020	0.021
2	0.17	0.07	0.041	(0.144)	0.020	0.021
3	0.25	0.07	0.041	(0.143)	0.020	0.021
4	0.33	0.10	0.061	(0.142)	0.029	0.031
5	0.42	0.10	0.061	(0.142)	0.029	0.031
6	0.50	0.10	0.061	(0.141)	0.029	0.031
7	0.58	0.10	0.061	(0.141)	0.029	0.031
8	0.67	0.10	0.061	(0.140)	0.029	0.031
9	0.75	0.10	0.061	(0.140)	0.029	0.031
10	0.83	0.13	0.081	(0.139)	0.039	0.042
11	0.92	0.13	0.081	(0.139)	0.039	0.042
12	1.00	0.13	0.081	(0.138)	0.039	0.042
13	1.08	0.10	0.061	(0.137)	0.029	0.031
14	1.17	0.10	0.061	(0.137)	0.029	0.031
15	1.25	0.10	0.061	(0.136)	0.029	0.031
16	1.33	0.10	0.061	(0.136)	0.029	0.031
17	1.42	0.10	0.061	(0.135)	0.029	0.031
18	1.50	0.10	0.061	(0.135)	0.029	0.031
19	1.58	0.10	0.061	(0.134)	0.029	0.031
20	1.67	0.10	0.061	(0.134)	0.029	0.031
21	1.75	0.10	0.061	(0.133)	0.029	0.031
22	1.83	0.13	0.081	(0.133)	0.039	0.042
23	1.92	0.13	0.081	(0.132)	0.039	0.042
24	2.00	0.13	0.081	(0.132)	0.039	0.042
25	2.08	0.13	0.081	(0.131)	0.039	0.042
26	2.17	0.13	0.081	(0.130)	0.039	0.042
27	2.25	0.13	0.081	(0.130)	0.039	0.042
28	2.33	0.13	0.081	(0.129)	0.039	0.042
29	2.42	0.13	0.081	(0.129)	0.039	0.042
30	2.50	0.13	0.081	(0.128)	0.039	0.042
31	2.58	0.17	0.101	(0.128)	0.049	0.052
32	2.67	0.17	0.101	(0.127)	0.049	0.052
33	2.75	0.17	0.101	(0.127)	0.049	0.052
34	2.83	0.17	0.101	(0.126)	0.049	0.052
35	2.92	0.17	0.101	(0.126)	0.049	0.052
36	3.00	0.17	0.101	(0.125)	0.049	0.052
37	3.08	0.17	0.101	(0.125)	0.049	0.052
38	3.17	0.17	0.101	(0.124)	0.049	0.052
39	3.25	0.17	0.101	(0.124)	0.049	0.052
40	3.33	0.17	0.101	(0.123)	0.049	0.052
41	3.42	0.17	0.101	(0.123)	0.049	0.052
42	3.50	0.17	0.101	(0.122)	0.049	0.052
43	3.58	0.17	0.101	(0.122)	0.049	0.052
44	3.67	0.17	0.101	(0.121)	0.049	0.052
45	3.75	0.17	0.101	(0.121)	0.049	0.052
46	3.83	0.20	0.122	(0.120)	0.059	0.063
47	3.92	0.20	0.122	(0.120)	0.059	0.063
48	4.00	0.20	0.122	(0.119)	0.059	0.063
49	4.08	0.20	0.122	(0.119)	0.059	0.063
50	4.17	0.20	0.122	(0.118)	0.059	0.063
51	4.25	0.20	0.122	(0.118)	0.059	0.063

52	4.33	0.23	0.142	(0.117)	0.069	0.073
53	4.42	0.23	0.142	(0.117)	0.069	0.073
54	4.50	0.23	0.142	(0.116)	0.069	0.073
55	4.58	0.23	0.142	(0.116)	0.069	0.073
56	4.67	0.23	0.142	(0.115)	0.069	0.073
57	4.75	0.23	0.142	(0.115)	0.069	0.073
58	4.83	0.27	0.162	(0.114)	0.079	0.084
59	4.92	0.27	0.162	(0.114)	0.079	0.084
60	5.00	0.27	0.162	(0.113)	0.079	0.084
61	5.08	0.20	0.122	(0.113)	0.059	0.063
62	5.17	0.20	0.122	(0.112)	0.059	0.063
63	5.25	0.20	0.122	(0.112)	0.059	0.063
64	5.33	0.23	0.142	(0.111)	0.069	0.073
65	5.42	0.23	0.142	(0.111)	0.069	0.073
66	5.50	0.23	0.142	(0.110)	0.069	0.073
67	5.58	0.27	0.162	(0.110)	0.079	0.084
68	5.67	0.27	0.162	(0.109)	0.079	0.084
69	5.75	0.27	0.162	(0.109)	0.079	0.084
70	5.83	0.27	0.162	(0.108)	0.079	0.084
71	5.92	0.27	0.162	(0.108)	0.079	0.084
72	6.00	0.27	0.162	(0.107)	0.079	0.084
73	6.08	0.30	0.183	(0.107)	0.088	0.094
74	6.17	0.30	0.183	(0.106)	0.088	0.094
75	6.25	0.30	0.183	(0.106)	0.088	0.094
76	6.33	0.30	0.183	(0.105)	0.088	0.094
77	6.42	0.30	0.183	(0.105)	0.088	0.094
78	6.50	0.30	0.183	(0.104)	0.088	0.094
79	6.58	0.33	0.203	(0.104)	0.098	0.105
80	6.67	0.33	0.203	(0.104)	0.098	0.105
81	6.75	0.33	0.203	(0.103)	0.098	0.105
82	6.83	0.33	0.203	(0.103)	0.098	0.105
83	6.92	0.33	0.203	(0.102)	0.098	0.105
84	7.00	0.33	0.203	(0.102)	0.098	0.105
85	7.08	0.33	0.203	(0.101)	0.098	0.105
86	7.17	0.33	0.203	(0.101)	0.098	0.105
87	7.25	0.33	0.203	(0.100)	0.098	0.105
88	7.33	0.37	0.223	0.100 (0.108)		0.123
89	7.42	0.37	0.223	0.099 (0.108)		0.124
90	7.50	0.37	0.223	0.099 (0.108)		0.124
91	7.58	0.40	0.243	0.098 (0.118)		0.145
92	7.67	0.40	0.243	0.098 (0.118)		0.145
93	7.75	0.40	0.243	0.098 (0.118)		0.146
94	7.83	0.43	0.264	0.097 (0.128)		0.167
95	7.92	0.43	0.264	0.097 (0.128)		0.167
96	8.00	0.43	0.264	0.096 (0.128)		0.167
97	8.08	0.50	0.304	0.096 (0.147)		0.208
98	8.17	0.50	0.304	0.095 (0.147)		0.209
99	8.25	0.50	0.304	0.095 (0.147)		0.209
100	8.33	0.50	0.304	0.094 (0.147)		0.210
101	8.42	0.50	0.304	0.094 (0.147)		0.210
102	8.50	0.50	0.304	0.094 (0.147)		0.211

103	8.58	0.53	0.324	0.093	(0.157)	0.231
104	8.67	0.53	0.324	0.093	(0.157)	0.232
105	8.75	0.53	0.324	0.092	(0.157)	0.232
106	8.83	0.57	0.345	0.092	(0.167)	0.253
107	8.92	0.57	0.345	0.091	(0.167)	0.253
108	9.00	0.57	0.345	0.091	(0.167)	0.254
109	9.08	0.63	0.385	0.090	(0.186)	0.295
110	9.17	0.63	0.385	0.090	(0.186)	0.295
111	9.25	0.63	0.385	0.090	(0.186)	0.296
112	9.33	0.67	0.406	0.089	(0.196)	0.316
113	9.42	0.67	0.406	0.089	(0.196)	0.317
114	9.50	0.67	0.406	0.088	(0.196)	0.317
115	9.58	0.70	0.426	0.088	(0.206)	0.338
116	9.67	0.70	0.426	0.088	(0.206)	0.338
117	9.75	0.70	0.426	0.087	(0.206)	0.339
118	9.83	0.73	0.446	0.087	(0.216)	0.359
119	9.92	0.73	0.446	0.086	(0.216)	0.360
120	10.00	0.73	0.446	0.086	(0.216)	0.360
121	10.08	0.50	0.304	0.085	(0.147)	0.219
122	10.17	0.50	0.304	0.085	(0.147)	0.219
123	10.25	0.50	0.304	0.085	(0.147)	0.220
124	10.33	0.50	0.304	0.084	(0.147)	0.220
125	10.42	0.50	0.304	0.084	(0.147)	0.220
126	10.50	0.50	0.304	0.083	(0.147)	0.221
127	10.58	0.67	0.406	0.083	(0.196)	0.323
128	10.67	0.67	0.406	0.083	(0.196)	0.323
129	10.75	0.67	0.406	0.082	(0.196)	0.323
130	10.83	0.67	0.406	0.082	(0.196)	0.324
131	10.92	0.67	0.406	0.081	(0.196)	0.324
132	11.00	0.67	0.406	0.081	(0.196)	0.325
133	11.08	0.63	0.385	0.081	(0.186)	0.305
134	11.17	0.63	0.385	0.080	(0.186)	0.305
135	11.25	0.63	0.385	0.080	(0.186)	0.306
136	11.33	0.63	0.385	0.079	(0.186)	0.306
137	11.42	0.63	0.385	0.079	(0.186)	0.306
138	11.50	0.63	0.385	0.079	(0.186)	0.307
139	11.58	0.57	0.345	0.078	(0.167)	0.267
140	11.67	0.57	0.345	0.078	(0.167)	0.267
141	11.75	0.57	0.345	0.077	(0.167)	0.267
142	11.83	0.60	0.365	0.077	(0.177)	0.288
143	11.92	0.60	0.365	0.077	(0.177)	0.288
144	12.00	0.60	0.365	0.076	(0.177)	0.289
145	12.08	0.83	0.507	0.076	(0.245)	0.431
146	12.17	0.83	0.507	0.076	(0.245)	0.431
147	12.25	0.83	0.507	0.075	(0.245)	0.432
148	12.33	0.87	0.527	0.075	(0.255)	0.453
149	12.42	0.87	0.527	0.074	(0.255)	0.453
150	12.50	0.87	0.527	0.074	(0.255)	0.453
151	12.58	0.93	0.568	0.074	(0.275)	0.494
152	12.67	0.93	0.568	0.073	(0.275)	0.495
153	12.75	0.93	0.568	0.073	(0.275)	0.495

154	12.83	0.97	0.588	0.073	(0.285)	0.516
155	12.92	0.97	0.588	0.072	(0.285)	0.516
156	13.00	0.97	0.588	0.072	(0.285)	0.516
157	13.08	1.13	0.690	0.071	(0.334)	0.618
158	13.17	1.13	0.690	0.071	(0.334)	0.618
159	13.25	1.13	0.690	0.071	(0.334)	0.619
160	13.33	1.13	0.690	0.070	(0.334)	0.619
161	13.42	1.13	0.690	0.070	(0.334)	0.620
162	13.50	1.13	0.690	0.070	(0.334)	0.620
163	13.58	0.77	0.466	0.069	(0.226)	0.397
164	13.67	0.77	0.466	0.069	(0.226)	0.398
165	13.75	0.77	0.466	0.069	(0.226)	0.398
166	13.83	0.77	0.466	0.068	(0.226)	0.398
167	13.92	0.77	0.466	0.068	(0.226)	0.399
168	14.00	0.77	0.466	0.068	(0.226)	0.399
169	14.08	0.90	0.548	0.067	(0.265)	0.480
170	14.17	0.90	0.548	0.067	(0.265)	0.481
171	14.25	0.90	0.548	0.066	(0.265)	0.481
172	14.33	0.87	0.527	0.066	(0.255)	0.461
173	14.42	0.87	0.527	0.066	(0.255)	0.461
174	14.50	0.87	0.527	0.065	(0.255)	0.462
175	14.58	0.87	0.527	0.065	(0.255)	0.462
176	14.67	0.87	0.527	0.065	(0.255)	0.462
177	14.75	0.87	0.527	0.064	(0.255)	0.463
178	14.83	0.83	0.507	0.064	(0.245)	0.443
179	14.92	0.83	0.507	0.064	(0.245)	0.443
180	15.00	0.83	0.507	0.063	(0.245)	0.444
181	15.08	0.80	0.487	0.063	(0.236)	0.424
182	15.17	0.80	0.487	0.063	(0.236)	0.424
183	15.25	0.80	0.487	0.063	(0.236)	0.424
184	15.33	0.77	0.466	0.062	(0.226)	0.404
185	15.42	0.77	0.466	0.062	(0.226)	0.405
186	15.50	0.77	0.466	0.062	(0.226)	0.405
187	15.58	0.63	0.385	0.061	(0.186)	0.324
188	15.67	0.63	0.385	0.061	(0.186)	0.324
189	15.75	0.63	0.385	0.061	(0.186)	0.325
190	15.83	0.63	0.385	0.060	(0.186)	0.325
191	15.92	0.63	0.385	0.060	(0.186)	0.325
192	16.00	0.63	0.385	0.060	(0.186)	0.326
193	16.08	0.13	0.081	(0.059)	0.039	0.042
194	16.17	0.13	0.081	(0.059)	0.039	0.042
195	16.25	0.13	0.081	(0.059)	0.039	0.042
196	16.33	0.13	0.081	(0.058)	0.039	0.042
197	16.42	0.13	0.081	(0.058)	0.039	0.042
198	16.50	0.13	0.081	(0.058)	0.039	0.042
199	16.58	0.10	0.061	(0.058)	0.029	0.031
200	16.67	0.10	0.061	(0.057)	0.029	0.031
201	16.75	0.10	0.061	(0.057)	0.029	0.031
202	16.83	0.10	0.061	(0.057)	0.029	0.031
203	16.92	0.10	0.061	(0.056)	0.029	0.031
204	17.00	0.10	0.061	(0.056)	0.029	0.031

205	17.08	0.17	0.101	(0.056)	0.049	0.052
206	17.17	0.17	0.101	(0.056)	0.049	0.052
207	17.25	0.17	0.101	(0.055)	0.049	0.052
208	17.33	0.17	0.101	(0.055)	0.049	0.052
209	17.42	0.17	0.101	(0.055)	0.049	0.052
210	17.50	0.17	0.101	(0.054)	0.049	0.052
211	17.58	0.17	0.101	(0.054)	0.049	0.052
212	17.67	0.17	0.101	(0.054)	0.049	0.052
213	17.75	0.17	0.101	(0.054)	0.049	0.052
214	17.83	0.13	0.081	(0.053)	0.039	0.042
215	17.92	0.13	0.081	(0.053)	0.039	0.042
216	18.00	0.13	0.081	(0.053)	0.039	0.042
217	18.08	0.13	0.081	(0.053)	0.039	0.042
218	18.17	0.13	0.081	(0.052)	0.039	0.042
219	18.25	0.13	0.081	(0.052)	0.039	0.042
220	18.33	0.13	0.081	(0.052)	0.039	0.042
221	18.42	0.13	0.081	(0.052)	0.039	0.042
222	18.50	0.13	0.081	(0.051)	0.039	0.042
223	18.58	0.10	0.061	(0.051)	0.029	0.031
224	18.67	0.10	0.061	(0.051)	0.029	0.031
225	18.75	0.10	0.061	(0.051)	0.029	0.031
226	18.83	0.07	0.041	(0.050)	0.020	0.021
227	18.92	0.07	0.041	(0.050)	0.020	0.021
228	19.00	0.07	0.041	(0.050)	0.020	0.021
229	19.08	0.10	0.061	(0.050)	0.029	0.031
230	19.17	0.10	0.061	(0.049)	0.029	0.031
231	19.25	0.10	0.061	(0.049)	0.029	0.031
232	19.33	0.13	0.081	(0.049)	0.039	0.042
233	19.42	0.13	0.081	(0.049)	0.039	0.042
234	19.50	0.13	0.081	(0.049)	0.039	0.042
235	19.58	0.10	0.061	(0.048)	0.029	0.031
236	19.67	0.10	0.061	(0.048)	0.029	0.031
237	19.75	0.10	0.061	(0.048)	0.029	0.031
238	19.83	0.07	0.041	(0.048)	0.020	0.021
239	19.92	0.07	0.041	(0.047)	0.020	0.021
240	20.00	0.07	0.041	(0.047)	0.020	0.021
241	20.08	0.10	0.061	(0.047)	0.029	0.031
242	20.17	0.10	0.061	(0.047)	0.029	0.031
243	20.25	0.10	0.061	(0.047)	0.029	0.031
244	20.33	0.10	0.061	(0.046)	0.029	0.031
245	20.42	0.10	0.061	(0.046)	0.029	0.031
246	20.50	0.10	0.061	(0.046)	0.029	0.031
247	20.58	0.10	0.061	(0.046)	0.029	0.031
248	20.67	0.10	0.061	(0.046)	0.029	0.031
249	20.75	0.10	0.061	(0.045)	0.029	0.031
250	20.83	0.07	0.041	(0.045)	0.020	0.021
251	20.92	0.07	0.041	(0.045)	0.020	0.021
252	21.00	0.07	0.041	(0.045)	0.020	0.021
253	21.08	0.10	0.061	(0.045)	0.029	0.031
254	21.17	0.10	0.061	(0.045)	0.029	0.031
255	21.25	0.10	0.061	(0.044)	0.029	0.031

256	21.33	0.07	0.041	(0.044)	0.020	0.021
257	21.42	0.07	0.041	(0.044)	0.020	0.021
258	21.50	0.07	0.041	(0.044)	0.020	0.021
259	21.58	0.10	0.061	(0.044)	0.029	0.031
260	21.67	0.10	0.061	(0.044)	0.029	0.031
261	21.75	0.10	0.061	(0.043)	0.029	0.031
262	21.83	0.07	0.041	(0.043)	0.020	0.021
263	21.92	0.07	0.041	(0.043)	0.020	0.021
264	22.00	0.07	0.041	(0.043)	0.020	0.021
265	22.08	0.10	0.061	(0.043)	0.029	0.031
266	22.17	0.10	0.061	(0.043)	0.029	0.031
267	22.25	0.10	0.061	(0.043)	0.029	0.031
268	22.33	0.07	0.041	(0.042)	0.020	0.021
269	22.42	0.07	0.041	(0.042)	0.020	0.021
270	22.50	0.07	0.041	(0.042)	0.020	0.021
271	22.58	0.07	0.041	(0.042)	0.020	0.021
272	22.67	0.07	0.041	(0.042)	0.020	0.021
273	22.75	0.07	0.041	(0.042)	0.020	0.021
274	22.83	0.07	0.041	(0.042)	0.020	0.021
275	22.92	0.07	0.041	(0.042)	0.020	0.021
276	23.00	0.07	0.041	(0.041)	0.020	0.021
277	23.08	0.07	0.041	(0.041)	0.020	0.021
278	23.17	0.07	0.041	(0.041)	0.020	0.021
279	23.25	0.07	0.041	(0.041)	0.020	0.021
280	23.33	0.07	0.041	(0.041)	0.020	0.021
281	23.42	0.07	0.041	(0.041)	0.020	0.021
282	23.50	0.07	0.041	(0.041)	0.020	0.021
283	23.58	0.07	0.041	(0.041)	0.020	0.021
284	23.67	0.07	0.041	(0.041)	0.020	0.021
285	23.75	0.07	0.041	(0.041)	0.020	0.021
286	23.83	0.07	0.041	(0.041)	0.020	0.021
287	23.92	0.07	0.041	(0.041)	0.020	0.021
288	24.00	0.07	0.041	(0.041)	0.020	0.021

(Loss Rate Not Used)

Sum = 100.0 Sum = 44.8

Flood volume = Effective rainfall 3.73(In)
times area 2.2(Ac.)/[(In)/(Ft.)] = 0.7(Ac. Ft)

Total soil loss = 1.34(In)

Total soil loss = 0.250(Ac. Ft)

Total rainfall = 5.07(In)

Flood volume = 30354.8 Cubic Feet

Total soil loss = 10870.2 Cubic Feet

Peak flow rate of this hydrograph = 1.398(CFS)

+++++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000		0.01	Q				
0+10	0.0003		0.03	Q				
0+15	0.0006		0.04	Q				
0+20	0.0009		0.05	Q				
0+25	0.0013		0.06	Q				
0+30	0.0018		0.07	Q				
0+35	0.0023		0.07	Q				
0+40	0.0028		0.07	Q				
0+45	0.0033		0.07	Q				
0+50	0.0038		0.07	Q				
0+55	0.0044		0.09	Q				
1+ 0	0.0050		0.09	Q				
1+ 5	0.0056		0.09	Q				
1+10	0.0062		0.08	Q				
1+15	0.0067		0.07	Q				
1+20	0.0072		0.07	Q				
1+25	0.0077		0.07	Q				
1+30	0.0081		0.07	Q				
1+35	0.0086		0.07	Q				
1+40	0.0091		0.07	Q				
1+45	0.0096		0.07	Q				
1+50	0.0101		0.07	Q				
1+55	0.0107		0.09	Q				
2+ 0	0.0114		0.09	Q				
2+ 5	0.0120		0.09	Q				
2+10	0.0126		0.09	Q				
2+15	0.0133		0.09	Q				
2+20	0.0140		0.09	Q				
2+25	0.0146		0.09	Q				
2+30	0.0153		0.09	Q				
2+35	0.0159		0.10	Q				
2+40	0.0167		0.11	Q				
2+45	0.0175		0.12	QV				
2+50	0.0183		0.12	QV				
2+55	0.0191		0.12	QV				
3+ 0	0.0199		0.12	QV				
3+ 5	0.0207		0.12	QV				
3+10	0.0215		0.12	QV				
3+15	0.0224		0.12	QV				
3+20	0.0232		0.12	QV				
3+25	0.0240		0.12	QV				
3+30	0.0248		0.12	QV				
3+35	0.0256		0.12	QV				
3+40	0.0264		0.12	QV				
3+45	0.0272		0.12	QV				
3+50	0.0281		0.12	QV				
3+55	0.0290		0.13	QV				
4+ 0	0.0300		0.14	QV				

4+ 5	0. 0309	0. 14	QV
4+10	0. 0319	0. 14	QV
4+15	0. 0329	0. 14	QV
4+20	0. 0339	0. 15	QV
4+25	0. 0350	0. 16	Q V
4+30	0. 0361	0. 16	Q V
4+35	0. 0372	0. 16	Q V
4+40	0. 0384	0. 17	Q V
4+45	0. 0395	0. 17	Q V
4+50	0. 0407	0. 17	Q V
4+55	0. 0419	0. 18	Q V
5+ 0	0. 0432	0. 19	Q V
5+ 5	0. 0445	0. 18	Q V
5+10	0. 0455	0. 16	Q V
5+15	0. 0465	0. 15	Q V
5+20	0. 0476	0. 15	Q V
5+25	0. 0487	0. 16	Q V
5+30	0. 0498	0. 16	Q V
5+35	0. 0509	0. 17	Q V
5+40	0. 0522	0. 18	Q V
5+45	0. 0535	0. 19	Q V
5+50	0. 0548	0. 19	Q V
5+55	0. 0561	0. 19	Q V
6+ 0	0. 0574	0. 19	Q V
6+ 5	0. 0587	0. 19	Q V
6+10	0. 0601	0. 21	Q V
6+15	0. 0616	0. 21	Q V
6+20	0. 0630	0. 21	Q V
6+25	0. 0645	0. 21	Q V
6+30	0. 0659	0. 21	Q V
6+35	0. 0674	0. 22	Q V
6+40	0. 0690	0. 23	Q V
6+45	0. 0706	0. 23	Q V
6+50	0. 0722	0. 24	Q V
6+55	0. 0739	0. 24	Q V
7+ 0	0. 0755	0. 24	Q V
7+ 5	0. 0771	0. 24	Q V
7+10	0. 0787	0. 24	Q V
7+15	0. 0804	0. 24	Q V
7+20	0. 0820	0. 24	Q V
7+25	0. 0839	0. 27	Q V
7+30	0. 0858	0. 27	Q V
7+35	0. 0877	0. 29	Q V
7+40	0. 0899	0. 31	Q V
7+45	0. 0921	0. 32	Q V
7+50	0. 0944	0. 33	Q V
7+55	0. 0969	0. 36	Q V
8+ 0	0. 0995	0. 37	Q V
8+ 5	0. 1021	0. 39	Q V
8+10	0. 1052	0. 44	Q V
8+15	0. 1084	0. 46	Q V

8+20	0. 1116	0. 47	Q	V				
8+25	0. 1148	0. 47	Q	V				
8+30	0. 1181	0. 47	Q	V				
8+35	0. 1214	0. 48	Q	V				
8+40	0. 1249	0. 51	Q	V				
8+45	0. 1285	0. 52	Q	V				
8+50	0. 1321	0. 53	Q	V				
8+55	0. 1360	0. 56	Q	V				
9+ 0	0. 1399	0. 57	Q	V				
9+ 5	0. 1439	0. 58	Q	V				
9+10	0. 1483	0. 64	Q	V				
9+15	0. 1528	0. 66	Q	V				
9+20	0. 1574	0. 67	Q	V				
9+25	0. 1622	0. 70	Q	V				
9+30	0. 1671	0. 71	Q	V				
9+35	0. 1721	0. 72	Q	V				
9+40	0. 1772	0. 75	Q	V				
9+45	0. 1825	0. 76	Q	V				
9+50	0. 1878	0. 77	Q	V				
9+55	0. 1933	0. 80	Q	V				
10+ 0	0. 1988	0. 81	Q	V				
10+ 5	0. 2041	0. 77	Q	V				
10+10	0. 2081	0. 59	Q	V				
10+15	0. 2118	0. 53	Q	V				
10+20	0. 2153	0. 51	Q	V				
10+25	0. 2188	0. 50	Q	V				
10+30	0. 2222	0. 50	Q	V				
10+35	0. 2259	0. 53	Q	V				
10+40	0. 2304	0. 66	Q	V				
10+45	0. 2353	0. 70	Q	V				
10+50	0. 2402	0. 72	Q	V				
10+55	0. 2452	0. 73	Q	V				
11+ 0	0. 2503	0. 73	Q	V				
11+ 5	0. 2553	0. 73	Q	V				
11+10	0. 2601	0. 70	Q	V				
11+15	0. 2649	0. 69	Q	V				
11+20	0. 2696	0. 69	Q	V				
11+25	0. 2744	0. 69	Q	V				
11+30	0. 2792	0. 69	Q	V				
11+35	0. 2838	0. 68	Q	V				
11+40	0. 2882	0. 63	Q	V				
11+45	0. 2924	0. 61	Q	V				
11+50	0. 2966	0. 61	Q	V				
11+55	0. 3010	0. 64	Q	V				
12+ 0	0. 3055	0. 65	Q	V				
12+ 5	0. 3103	0. 70	Q	V				
12+10	0. 3163	0. 88	Q	V				
12+15	0. 3228	0. 94	Q	V				
12+20	0. 3295	0. 97	Q	V				
12+25	0. 3364	1. 00	Q	V				
12+30	0. 3434	1. 02	Q	V				

12+35	0. 3505	1. 04	Q	V		
12+40	0. 3580	1. 09	Q	V		
12+45	0. 3656	1. 11	Q	V		
12+50	0. 3733	1. 12	Q	V		
12+55	0. 3812	1. 15	Q	V		
13+ 0	0. 3892	1. 16	Q	V		
13+ 5	0. 3975	1. 20	Q	V		
13+10	0. 4066	1. 33	Q	V		
13+15	0. 4160	1. 37	Q	V		
13+20	0. 4256	1. 39	Q	V		
13+25	0. 4352	1. 39	Q	V		
13+30	0. 4448	1. 40	Q	V		
13+35	0. 4540	1. 33	Q	V		
13+40	0. 4612	1. 05	Q	V		
13+45	0. 4677	0. 95	Q	V		
13+50	0. 4741	0. 92	Q	V		
13+55	0. 4803	0. 91	Q	V		
14+ 0	0. 4865	0. 90	Q	V		
14+ 5	0. 4929	0. 93	Q	V		
14+10	0. 5000	1. 03	Q	V		
14+15	0. 5074	1. 06	Q	V		
14+20	0. 5147	1. 07	Q	V		
14+25	0. 5220	1. 05	Q	V		
14+30	0. 5292	1. 05	Q	V		
14+35	0. 5364	1. 04	Q	V		
14+40	0. 5436	1. 04	Q	V		
14+45	0. 5508	1. 04	Q	V		
14+50	0. 5579	1. 04	Q	V		
14+55	0. 5649	1. 01	Q	V		
15+ 0	0. 5718	1. 01	Q	V		
15+ 5	0. 5787	1. 00	Q	V		
15+10	0. 5854	0. 97	Q	V		
15+15	0. 5920	0. 96	Q	V		
15+20	0. 5986	0. 95	Q	V		
15+25	0. 6050	0. 93	Q	V		
15+30	0. 6113	0. 92	Q	V		
15+35	0. 6174	0. 89	Q	V		
15+40	0. 6228	0. 79	Q	V		
15+45	0. 6280	0. 75	Q	V		
15+50	0. 6331	0. 74	Q	V		
15+55	0. 6382	0. 74	Q	V		
16+ 0	0. 6433	0. 74	Q	V		
16+ 5	0. 6477	0. 64	Q	V		
16+10	0. 6496	0. 28	Q	V		
16+15	0. 6508	0. 17	Q	V		
16+20	0. 6516	0. 12	Q	V		
16+25	0. 6523	0. 10	Q	V		
16+30	0. 6530	0. 10	Q	V		
16+35	0. 6536	0. 09	Q	V		
16+40	0. 6542	0. 08	Q	V		
16+45	0. 6547	0. 07	Q	V		

16+50	0. 6552	0. 07	Q				V
16+55	0. 6557	0. 07	Q				V
17+ 0	0. 6562	0. 07	Q				V
17+ 5	0. 6567	0. 08	Q				V
17+10	0. 6574	0. 10	Q				V
17+15	0. 6582	0. 11	Q				V
17+20	0. 6590	0. 12	Q				V
17+25	0. 6598	0. 12	Q				V
17+30	0. 6606	0. 12	Q				V
17+35	0. 6614	0. 12	Q				V
17+40	0. 6622	0. 12	Q				V
17+45	0. 6631	0. 12	Q				V
17+50	0. 6638	0. 11	Q				V
17+55	0. 6645	0. 10	Q				V
18+ 0	0. 6652	0. 10	Q				V
18+ 5	0. 6659	0. 10	Q				V
18+10	0. 6665	0. 09	Q				V
18+15	0. 6672	0. 09	Q				V
18+20	0. 6678	0. 09	Q				V
18+25	0. 6685	0. 09	Q				V
18+30	0. 6691	0. 09	Q				V
18+35	0. 6698	0. 09	Q				V
18+40	0. 6703	0. 08	Q				V
18+45	0. 6708	0. 07	Q				V
18+50	0. 6713	0. 07	Q				V
18+55	0. 6716	0. 05	Q				V
19+ 0	0. 6720	0. 05	Q				V
19+ 5	0. 6723	0. 05	Q				V
19+10	0. 6728	0. 06	Q				V
19+15	0. 6733	0. 07	Q				V
19+20	0. 6738	0. 07	Q				V
19+25	0. 6744	0. 09	Q				V
19+30	0. 6750	0. 09	Q				V
19+35	0. 6756	0. 09	Q				V
19+40	0. 6762	0. 08	Q				V
19+45	0. 6767	0. 07	Q				V
19+50	0. 6771	0. 07	Q				V
19+55	0. 6775	0. 05	Q				V
20+ 0	0. 6779	0. 05	Q				V
20+ 5	0. 6782	0. 05	Q				V
20+10	0. 6787	0. 06	Q				V
20+15	0. 6791	0. 07	Q				V
20+20	0. 6796	0. 07	Q				V
20+25	0. 6801	0. 07	Q				V
20+30	0. 6806	0. 07	Q				V
20+35	0. 6811	0. 07	Q				V
20+40	0. 6816	0. 07	Q				V
20+45	0. 6820	0. 07	Q				V
20+50	0. 6825	0. 07	Q				V
20+55	0. 6829	0. 05	Q				V
21+ 0	0. 6832	0. 05	Q				V

21+ 5	0. 6836	0. 05	Q				V
21+10	0. 6840	0. 06	Q				V
21+15	0. 6845	0. 07	Q				V
21+20	0. 6850	0. 07	Q				V
21+25	0. 6853	0. 05	Q				V
21+30	0. 6857	0. 05	Q				V
21+35	0. 6860	0. 05	Q				V
21+40	0. 6865	0. 06	Q				V
21+45	0. 6869	0. 07	Q				V
21+50	0. 6874	0. 07	Q				V
21+55	0. 6878	0. 05	Q				V
22+ 0	0. 6881	0. 05	Q				V
22+ 5	0. 6885	0. 05	Q				V
22+10	0. 6889	0. 06	Q				V
22+15	0. 6894	0. 07	Q				V
22+20	0. 6898	0. 07	Q				V
22+25	0. 6902	0. 05	Q				V
22+30	0. 6905	0. 05	Q				V
22+35	0. 6909	0. 05	Q				V
22+40	0. 6912	0. 05	Q				V
22+45	0. 6915	0. 05	Q				V
22+50	0. 6919	0. 05	Q				V
22+55	0. 6922	0. 05	Q				V
23+ 0	0. 6925	0. 05	Q				V
23+ 5	0. 6928	0. 05	Q				V
23+10	0. 6932	0. 05	Q				V
23+15	0. 6935	0. 05	Q				V
23+20	0. 6938	0. 05	Q				V
23+25	0. 6941	0. 05	Q				V
23+30	0. 6945	0. 05	Q				V
23+35	0. 6948	0. 05	Q				V
23+40	0. 6951	0. 05	Q				V
23+45	0. 6954	0. 05	Q				V
23+50	0. 6958	0. 05	Q				V
23+55	0. 6961	0. 05	Q				V
24+ 0	0. 6964	0. 05	Q				V
24+ 5	0. 6967	0. 04	Q				V
24+10	0. 6968	0. 01	Q				V
24+15	0. 6968	0. 01	Q				V
24+20	0. 6968	0. 00	Q				V
24+25	0. 6968	0. 00	Q				V
24+30	0. 6969	0. 00	Q				V

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 10/24/24 File: LSP1100.out

+++++

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

Program License Serial Number 6658

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

English Units used in output format

LA SIERRA
100YR PROPOSED UH DMA A
KIMLEY-HORN
1HR

Drainage Area = 8.54(Ac.) = 0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 8.54(Ac.) =
0.013 Sq. Mi.

USER Entry of lag time in hours
Lag time = 0.083 Hr.
Lag time = 4.98 Min.
25% of lag time = 1.25 Min.
40% of lag time = 1.99 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.54	0.46	3.90

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
8.54	1.24	10.59

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 0.457(In)
 Area Averaged 100-Year Rainfall = 1.240(In)

Point rain (area averaged) = 1.240(In)
 Areal adjustment factor = 99.99 %
 Adjusted average point rain = 1.240(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
8.540	75.00	0.520
Total Area Entered = 8.54(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec. %)	(In/Hr)	(Dec.)	(In/Hr)
75.0	88.0	0.153	0.520	0.081	1.000	0.081
Sum (F) =						0.081

Area averaged mean soil loss (F) (In/Hr) = 0.081
 Minimum soil loss rate ((In/Hr)) = 0.041
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.484

 Slope of intensity-duration curve for a 1 hour storm =0.5500

Unit Hydrograph
 FOOTHILL S-Curve

 Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	100.402	14.560
2	0.167	200.803	55.758
3	0.250	301.205	18.364
4	0.333	401.606	7.391
5	0.417	502.008	2.421
6	0.500	602.410	0.846
7	0.583	702.811	0.660
Sum = 100.000			Sum= 8.607

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

1+25	0.8244	0.09	Q				V
1+30	0.8245	0.03	Q				V

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 10/24/24 File: LSP3100.out

+++++

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

Program License Serial Number 6658

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

English Units used in output format

LA SIERRA
100YR PROPOSED UH DMA A
KIMLEY-HORN
3HR

Drainage Area = 8.54(Ac.) = 0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 8.54(Ac.) =
0.013 Sq. Mi.

USER Entry of lag time in hours
Lag time = 0.083 Hr.
Lag time = 4.98 Min.
25% of lag time = 1.25 Min.
40% of lag time = 1.99 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.54	0.79	6.75

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
8.54	1.97	16.82

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 0.790(In)
 Area Averaged 100-Year Rainfall = 1.970(In)

Point rain (area averaged) = 1.970(In)
 Areal adjustment factor = 100.00 %
 Adjusted average point rain = 1.970(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
8.540	75.00	0.520
Total Area Entered = 8.54(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec. %)	(In/Hr)	(Dec.)	(In/Hr)
75.0	88.0	0.153	0.520	0.081	1.000	0.081
Sum (F) =						0.081

Area averaged mean soil loss (F) (In/Hr) = 0.081
 Minimum soil loss rate ((In/Hr)) = 0.041
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.484

Unit Hydrograph
 FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	100.402	14.560
2	0.167	200.803	55.758
3	0.250	301.205	18.364
4	0.333	401.606	7.391
5	0.417	502.008	2.421
6	0.500	602.410	0.846
7	0.583	702.811	0.660
Sum = 100.000			Sum= 8.607

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	1.30	0.307	0.081	(0.149)	0.226
2	0.17	1.30	0.307	0.081	(0.149)	0.226
3	0.25	1.10	0.260	0.081	(0.126)	0.179
4	0.33	1.50	0.355	0.081	(0.172)	0.273
5	0.42	1.50	0.355	0.081	(0.172)	0.273
6	0.50	1.80	0.426	0.081	(0.206)	0.344
7	0.58	1.50	0.355	0.081	(0.172)	0.273
8	0.67	1.80	0.426	0.081	(0.206)	0.344
9	0.75	1.80	0.426	0.081	(0.206)	0.344
10	0.83	1.50	0.355	0.081	(0.172)	0.273
11	0.92	1.60	0.378	0.081	(0.183)	0.297
12	1.00	1.80	0.426	0.081	(0.206)	0.344
13	1.08	2.20	0.520	0.081	(0.252)	0.439
14	1.17	2.20	0.520	0.081	(0.252)	0.439
15	1.25	2.20	0.520	0.081	(0.252)	0.439
16	1.33	2.00	0.473	0.081	(0.229)	0.391
17	1.42	2.60	0.615	0.081	(0.297)	0.533
18	1.50	2.70	0.638	0.081	(0.309)	0.557
19	1.58	2.40	0.567	0.081	(0.275)	0.486
20	1.67	2.70	0.638	0.081	(0.309)	0.557
21	1.75	3.30	0.780	0.081	(0.378)	0.699
22	1.83	3.10	0.733	0.081	(0.355)	0.652
23	1.92	2.90	0.686	0.081	(0.332)	0.604
24	2.00	3.00	0.709	0.081	(0.343)	0.628
25	2.08	3.10	0.733	0.081	(0.355)	0.652
26	2.17	4.20	0.993	0.081	(0.481)	0.912
27	2.25	5.00	1.182	0.081	(0.572)	1.101
28	2.33	3.50	0.827	0.081	(0.400)	0.746
29	2.42	6.80	1.607	0.081	(0.778)	1.526
30	2.50	7.30	1.726	0.081	(0.835)	1.644
31	2.58	8.20	1.938	0.081	(0.938)	1.857
32	2.67	5.90	1.395	0.081	(0.675)	1.313
33	2.75	2.00	0.473	0.081	(0.229)	0.391
34	2.83	1.80	0.426	0.081	(0.206)	0.344
35	2.92	1.80	0.426	0.081	(0.206)	0.344
36	3.00	0.60	0.142	(0.081)	0.069	0.073

(Loss Rate Not Used)

Sum = 100.0

Sum = 20.7

Flood volume = Effective rainfall 1.73(In)
times area 8.5(Ac.)/[(In)/(Ft.)] = 1.2(Ac. Ft)
Total soil loss = 0.24(In)
Total soil loss = 0.173(Ac. Ft)
Total rainfall = 1.97(In)
Flood volume = 53540.8 Cubic Feet
Total soil loss = 7527.3 Cubic Feet

Peak flow rate of this hydrograph = 14.423(CFS)

+++++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0020	0.28	Q					
0+10	0.0114	1.37	V Q					
0+15	0.0229	1.67	V Q					
0+20	0.0346	1.70	V Q					
0+25	0.0492	2.13	V Q					
0+30	0.0654	2.35	V Q					
0+35	0.0838	2.67	V Q					
0+40	0.1013	2.54	V Q					
0+45	0.1208	2.82	V Q					
0+50	0.1402	2.82	VQ					
0+55	0.1577	2.55	Q					
1+ 0	0.1758	2.62	Q					
1+ 5	0.1962	2.96	QV					
1+10	0.2202	3.49	QV					
1+15	0.2455	3.67	Q					
1+20	0.2708	3.68	QV					
1+25	0.2960	3.65	Q V					
1+30	0.3256	4.30	Q V					
1+35	0.3568	4.52	Q V					
1+40	0.3870	4.39	Q V					
1+45	0.4203	4.84	Q V					
1+50	0.4585	5.54	Q V					
1+55	0.4965	5.52	Q V					
2+ 0	0.5333	5.35	Q V					
2+ 5	0.5706	5.42	Q V					
2+10	0.6110	5.87	Q V					
2+15	0.6620	7.40	Q					
2+20	0.7191	8.29	Q					
2+25	0.7744	8.03	Q					
2+30	0.8539	11.54	Q					
2+35	0.9465	13.44	Q					
2+40	1.0458	14.42	Q					
2+45	1.1231	11.22	Q					
2+50	1.1648	6.07	Q					
2+55	1.1933	4.13	Q					
3+ 0	1.2142	3.04	Q					
3+ 5	1.2239	1.40	Q					
3+10	1.2274	0.51	Q					
3+15	1.2285	0.17	Q					
3+20	1.2289	0.06	Q					
3+25	1.2291	0.02	Q					
3+30	1.2291	0.00	Q					

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 10/24/24 File: LSP24100.out

+++++

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

Program License Serial Number 6658

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

English Units used in output format

LA SIERRA
100YR PROPOSED UH DMA A
KIMLEY-HORN
24HR

Drainage Area = 8.54(Ac.) = 0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 8.54(Ac.) =
0.013 Sq. Mi.

USER Entry of lag time in hours
Lag time = 0.083 Hr.
Lag time = 4.98 Min.
25% of lag time = 1.25 Min.
40% of lag time = 1.99 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]
8.54	1.92	16.40

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
8.54	5.07	43.30

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 1.920(In)
 Area Averaged 100-Year Rainfall = 5.070(In)

Point rain (area averaged) = 5.070(In)
 Areal adjustment factor = 100.00 %
 Adjusted average point rain = 5.070(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
8.540	75.00	0.520
Total Area Entered = 8.54(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec. %)	(In/Hr)	(Dec.)	(In/Hr)
75.0	88.0	0.153	0.520	0.081	1.000	0.081
Sum (F) =						0.081

Area averaged mean soil loss (F) (In/Hr) = 0.081
 Minimum soil loss rate ((In/Hr)) = 0.041
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.484

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	100.402	14.560
2	0.167	200.803	55.758
3	0.250	301.205	18.364
4	0.333	401.606	7.391
5	0.417	502.008	2.421
6	0.500	602.410	0.846
7	0.583	702.811	0.660
Sum = 100.000			Sum= 8.607

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	0.041	(0.144)	0.020	0.021
2	0.17	0.07	0.041	(0.144)	0.020	0.021
3	0.25	0.07	0.041	(0.143)	0.020	0.021
4	0.33	0.10	0.061	(0.142)	0.029	0.031
5	0.42	0.10	0.061	(0.142)	0.029	0.031
6	0.50	0.10	0.061	(0.141)	0.029	0.031
7	0.58	0.10	0.061	(0.141)	0.029	0.031
8	0.67	0.10	0.061	(0.140)	0.029	0.031
9	0.75	0.10	0.061	(0.140)	0.029	0.031
10	0.83	0.13	0.081	(0.139)	0.039	0.042
11	0.92	0.13	0.081	(0.139)	0.039	0.042
12	1.00	0.13	0.081	(0.138)	0.039	0.042
13	1.08	0.10	0.061	(0.137)	0.029	0.031
14	1.17	0.10	0.061	(0.137)	0.029	0.031
15	1.25	0.10	0.061	(0.136)	0.029	0.031
16	1.33	0.10	0.061	(0.136)	0.029	0.031
17	1.42	0.10	0.061	(0.135)	0.029	0.031
18	1.50	0.10	0.061	(0.135)	0.029	0.031
19	1.58	0.10	0.061	(0.134)	0.029	0.031
20	1.67	0.10	0.061	(0.134)	0.029	0.031
21	1.75	0.10	0.061	(0.133)	0.029	0.031
22	1.83	0.13	0.081	(0.133)	0.039	0.042
23	1.92	0.13	0.081	(0.132)	0.039	0.042
24	2.00	0.13	0.081	(0.132)	0.039	0.042
25	2.08	0.13	0.081	(0.131)	0.039	0.042
26	2.17	0.13	0.081	(0.130)	0.039	0.042
27	2.25	0.13	0.081	(0.130)	0.039	0.042
28	2.33	0.13	0.081	(0.129)	0.039	0.042
29	2.42	0.13	0.081	(0.129)	0.039	0.042
30	2.50	0.13	0.081	(0.128)	0.039	0.042
31	2.58	0.17	0.101	(0.128)	0.049	0.052
32	2.67	0.17	0.101	(0.127)	0.049	0.052
33	2.75	0.17	0.101	(0.127)	0.049	0.052
34	2.83	0.17	0.101	(0.126)	0.049	0.052
35	2.92	0.17	0.101	(0.126)	0.049	0.052
36	3.00	0.17	0.101	(0.125)	0.049	0.052
37	3.08	0.17	0.101	(0.125)	0.049	0.052
38	3.17	0.17	0.101	(0.124)	0.049	0.052
39	3.25	0.17	0.101	(0.124)	0.049	0.052
40	3.33	0.17	0.101	(0.123)	0.049	0.052
41	3.42	0.17	0.101	(0.123)	0.049	0.052
42	3.50	0.17	0.101	(0.122)	0.049	0.052
43	3.58	0.17	0.101	(0.122)	0.049	0.052
44	3.67	0.17	0.101	(0.121)	0.049	0.052
45	3.75	0.17	0.101	(0.121)	0.049	0.052
46	3.83	0.20	0.122	(0.120)	0.059	0.063
47	3.92	0.20	0.122	(0.120)	0.059	0.063
48	4.00	0.20	0.122	(0.119)	0.059	0.063
49	4.08	0.20	0.122	(0.119)	0.059	0.063
50	4.17	0.20	0.122	(0.118)	0.059	0.063
51	4.25	0.20	0.122	(0.118)	0.059	0.063

52	4.33	0.23	0.142	(0.117)	0.069	0.073
53	4.42	0.23	0.142	(0.117)	0.069	0.073
54	4.50	0.23	0.142	(0.116)	0.069	0.073
55	4.58	0.23	0.142	(0.116)	0.069	0.073
56	4.67	0.23	0.142	(0.115)	0.069	0.073
57	4.75	0.23	0.142	(0.115)	0.069	0.073
58	4.83	0.27	0.162	(0.114)	0.079	0.084
59	4.92	0.27	0.162	(0.114)	0.079	0.084
60	5.00	0.27	0.162	(0.113)	0.079	0.084
61	5.08	0.20	0.122	(0.113)	0.059	0.063
62	5.17	0.20	0.122	(0.112)	0.059	0.063
63	5.25	0.20	0.122	(0.112)	0.059	0.063
64	5.33	0.23	0.142	(0.111)	0.069	0.073
65	5.42	0.23	0.142	(0.111)	0.069	0.073
66	5.50	0.23	0.142	(0.110)	0.069	0.073
67	5.58	0.27	0.162	(0.110)	0.079	0.084
68	5.67	0.27	0.162	(0.109)	0.079	0.084
69	5.75	0.27	0.162	(0.109)	0.079	0.084
70	5.83	0.27	0.162	(0.108)	0.079	0.084
71	5.92	0.27	0.162	(0.108)	0.079	0.084
72	6.00	0.27	0.162	(0.107)	0.079	0.084
73	6.08	0.30	0.183	(0.107)	0.088	0.094
74	6.17	0.30	0.183	(0.106)	0.088	0.094
75	6.25	0.30	0.183	(0.106)	0.088	0.094
76	6.33	0.30	0.183	(0.105)	0.088	0.094
77	6.42	0.30	0.183	(0.105)	0.088	0.094
78	6.50	0.30	0.183	(0.104)	0.088	0.094
79	6.58	0.33	0.203	(0.104)	0.098	0.105
80	6.67	0.33	0.203	(0.104)	0.098	0.105
81	6.75	0.33	0.203	(0.103)	0.098	0.105
82	6.83	0.33	0.203	(0.103)	0.098	0.105
83	6.92	0.33	0.203	(0.102)	0.098	0.105
84	7.00	0.33	0.203	(0.102)	0.098	0.105
85	7.08	0.33	0.203	(0.101)	0.098	0.105
86	7.17	0.33	0.203	(0.101)	0.098	0.105
87	7.25	0.33	0.203	(0.100)	0.098	0.105
88	7.33	0.37	0.223	0.100 (0.108)		0.123
89	7.42	0.37	0.223	0.099 (0.108)		0.124
90	7.50	0.37	0.223	0.099 (0.108)		0.124
91	7.58	0.40	0.243	0.098 (0.118)		0.145
92	7.67	0.40	0.243	0.098 (0.118)		0.145
93	7.75	0.40	0.243	0.098 (0.118)		0.146
94	7.83	0.43	0.264	0.097 (0.128)		0.167
95	7.92	0.43	0.264	0.097 (0.128)		0.167
96	8.00	0.43	0.264	0.096 (0.128)		0.167
97	8.08	0.50	0.304	0.096 (0.147)		0.208
98	8.17	0.50	0.304	0.095 (0.147)		0.209
99	8.25	0.50	0.304	0.095 (0.147)		0.209
100	8.33	0.50	0.304	0.094 (0.147)		0.210
101	8.42	0.50	0.304	0.094 (0.147)		0.210
102	8.50	0.50	0.304	0.094 (0.147)		0.211

103	8.58	0.53	0.324	0.093	(0.157)	0.231
104	8.67	0.53	0.324	0.093	(0.157)	0.232
105	8.75	0.53	0.324	0.092	(0.157)	0.232
106	8.83	0.57	0.345	0.092	(0.167)	0.253
107	8.92	0.57	0.345	0.091	(0.167)	0.253
108	9.00	0.57	0.345	0.091	(0.167)	0.254
109	9.08	0.63	0.385	0.090	(0.186)	0.295
110	9.17	0.63	0.385	0.090	(0.186)	0.295
111	9.25	0.63	0.385	0.090	(0.186)	0.296
112	9.33	0.67	0.406	0.089	(0.196)	0.316
113	9.42	0.67	0.406	0.089	(0.196)	0.317
114	9.50	0.67	0.406	0.088	(0.196)	0.317
115	9.58	0.70	0.426	0.088	(0.206)	0.338
116	9.67	0.70	0.426	0.088	(0.206)	0.338
117	9.75	0.70	0.426	0.087	(0.206)	0.339
118	9.83	0.73	0.446	0.087	(0.216)	0.359
119	9.92	0.73	0.446	0.086	(0.216)	0.360
120	10.00	0.73	0.446	0.086	(0.216)	0.360
121	10.08	0.50	0.304	0.085	(0.147)	0.219
122	10.17	0.50	0.304	0.085	(0.147)	0.219
123	10.25	0.50	0.304	0.085	(0.147)	0.220
124	10.33	0.50	0.304	0.084	(0.147)	0.220
125	10.42	0.50	0.304	0.084	(0.147)	0.220
126	10.50	0.50	0.304	0.083	(0.147)	0.221
127	10.58	0.67	0.406	0.083	(0.196)	0.323
128	10.67	0.67	0.406	0.083	(0.196)	0.323
129	10.75	0.67	0.406	0.082	(0.196)	0.323
130	10.83	0.67	0.406	0.082	(0.196)	0.324
131	10.92	0.67	0.406	0.081	(0.196)	0.324
132	11.00	0.67	0.406	0.081	(0.196)	0.325
133	11.08	0.63	0.385	0.081	(0.186)	0.305
134	11.17	0.63	0.385	0.080	(0.186)	0.305
135	11.25	0.63	0.385	0.080	(0.186)	0.306
136	11.33	0.63	0.385	0.079	(0.186)	0.306
137	11.42	0.63	0.385	0.079	(0.186)	0.306
138	11.50	0.63	0.385	0.079	(0.186)	0.307
139	11.58	0.57	0.345	0.078	(0.167)	0.267
140	11.67	0.57	0.345	0.078	(0.167)	0.267
141	11.75	0.57	0.345	0.077	(0.167)	0.267
142	11.83	0.60	0.365	0.077	(0.177)	0.288
143	11.92	0.60	0.365	0.077	(0.177)	0.288
144	12.00	0.60	0.365	0.076	(0.177)	0.289
145	12.08	0.83	0.507	0.076	(0.245)	0.431
146	12.17	0.83	0.507	0.076	(0.245)	0.431
147	12.25	0.83	0.507	0.075	(0.245)	0.432
148	12.33	0.87	0.527	0.075	(0.255)	0.453
149	12.42	0.87	0.527	0.074	(0.255)	0.453
150	12.50	0.87	0.527	0.074	(0.255)	0.453
151	12.58	0.93	0.568	0.074	(0.275)	0.494
152	12.67	0.93	0.568	0.073	(0.275)	0.495
153	12.75	0.93	0.568	0.073	(0.275)	0.495

154	12.83	0.97	0.588	0.073	(0.285)	0.516
155	12.92	0.97	0.588	0.072	(0.285)	0.516
156	13.00	0.97	0.588	0.072	(0.285)	0.516
157	13.08	1.13	0.690	0.071	(0.334)	0.618
158	13.17	1.13	0.690	0.071	(0.334)	0.618
159	13.25	1.13	0.690	0.071	(0.334)	0.619
160	13.33	1.13	0.690	0.070	(0.334)	0.619
161	13.42	1.13	0.690	0.070	(0.334)	0.620
162	13.50	1.13	0.690	0.070	(0.334)	0.620
163	13.58	0.77	0.466	0.069	(0.226)	0.397
164	13.67	0.77	0.466	0.069	(0.226)	0.398
165	13.75	0.77	0.466	0.069	(0.226)	0.398
166	13.83	0.77	0.466	0.068	(0.226)	0.398
167	13.92	0.77	0.466	0.068	(0.226)	0.399
168	14.00	0.77	0.466	0.068	(0.226)	0.399
169	14.08	0.90	0.548	0.067	(0.265)	0.480
170	14.17	0.90	0.548	0.067	(0.265)	0.481
171	14.25	0.90	0.548	0.066	(0.265)	0.481
172	14.33	0.87	0.527	0.066	(0.255)	0.461
173	14.42	0.87	0.527	0.066	(0.255)	0.461
174	14.50	0.87	0.527	0.065	(0.255)	0.462
175	14.58	0.87	0.527	0.065	(0.255)	0.462
176	14.67	0.87	0.527	0.065	(0.255)	0.462
177	14.75	0.87	0.527	0.064	(0.255)	0.463
178	14.83	0.83	0.507	0.064	(0.245)	0.443
179	14.92	0.83	0.507	0.064	(0.245)	0.443
180	15.00	0.83	0.507	0.063	(0.245)	0.444
181	15.08	0.80	0.487	0.063	(0.236)	0.424
182	15.17	0.80	0.487	0.063	(0.236)	0.424
183	15.25	0.80	0.487	0.063	(0.236)	0.424
184	15.33	0.77	0.466	0.062	(0.226)	0.404
185	15.42	0.77	0.466	0.062	(0.226)	0.405
186	15.50	0.77	0.466	0.062	(0.226)	0.405
187	15.58	0.63	0.385	0.061	(0.186)	0.324
188	15.67	0.63	0.385	0.061	(0.186)	0.324
189	15.75	0.63	0.385	0.061	(0.186)	0.325
190	15.83	0.63	0.385	0.060	(0.186)	0.325
191	15.92	0.63	0.385	0.060	(0.186)	0.325
192	16.00	0.63	0.385	0.060	(0.186)	0.326
193	16.08	0.13	0.081	(0.059)	0.039	0.042
194	16.17	0.13	0.081	(0.059)	0.039	0.042
195	16.25	0.13	0.081	(0.059)	0.039	0.042
196	16.33	0.13	0.081	(0.058)	0.039	0.042
197	16.42	0.13	0.081	(0.058)	0.039	0.042
198	16.50	0.13	0.081	(0.058)	0.039	0.042
199	16.58	0.10	0.061	(0.058)	0.029	0.031
200	16.67	0.10	0.061	(0.057)	0.029	0.031
201	16.75	0.10	0.061	(0.057)	0.029	0.031
202	16.83	0.10	0.061	(0.057)	0.029	0.031
203	16.92	0.10	0.061	(0.056)	0.029	0.031
204	17.00	0.10	0.061	(0.056)	0.029	0.031

205	17.08	0.17	0.101	(0.056)	0.049	0.052
206	17.17	0.17	0.101	(0.056)	0.049	0.052
207	17.25	0.17	0.101	(0.055)	0.049	0.052
208	17.33	0.17	0.101	(0.055)	0.049	0.052
209	17.42	0.17	0.101	(0.055)	0.049	0.052
210	17.50	0.17	0.101	(0.054)	0.049	0.052
211	17.58	0.17	0.101	(0.054)	0.049	0.052
212	17.67	0.17	0.101	(0.054)	0.049	0.052
213	17.75	0.17	0.101	(0.054)	0.049	0.052
214	17.83	0.13	0.081	(0.053)	0.039	0.042
215	17.92	0.13	0.081	(0.053)	0.039	0.042
216	18.00	0.13	0.081	(0.053)	0.039	0.042
217	18.08	0.13	0.081	(0.053)	0.039	0.042
218	18.17	0.13	0.081	(0.052)	0.039	0.042
219	18.25	0.13	0.081	(0.052)	0.039	0.042
220	18.33	0.13	0.081	(0.052)	0.039	0.042
221	18.42	0.13	0.081	(0.052)	0.039	0.042
222	18.50	0.13	0.081	(0.051)	0.039	0.042
223	18.58	0.10	0.061	(0.051)	0.029	0.031
224	18.67	0.10	0.061	(0.051)	0.029	0.031
225	18.75	0.10	0.061	(0.051)	0.029	0.031
226	18.83	0.07	0.041	(0.050)	0.020	0.021
227	18.92	0.07	0.041	(0.050)	0.020	0.021
228	19.00	0.07	0.041	(0.050)	0.020	0.021
229	19.08	0.10	0.061	(0.050)	0.029	0.031
230	19.17	0.10	0.061	(0.049)	0.029	0.031
231	19.25	0.10	0.061	(0.049)	0.029	0.031
232	19.33	0.13	0.081	(0.049)	0.039	0.042
233	19.42	0.13	0.081	(0.049)	0.039	0.042
234	19.50	0.13	0.081	(0.049)	0.039	0.042
235	19.58	0.10	0.061	(0.048)	0.029	0.031
236	19.67	0.10	0.061	(0.048)	0.029	0.031
237	19.75	0.10	0.061	(0.048)	0.029	0.031
238	19.83	0.07	0.041	(0.048)	0.020	0.021
239	19.92	0.07	0.041	(0.047)	0.020	0.021
240	20.00	0.07	0.041	(0.047)	0.020	0.021
241	20.08	0.10	0.061	(0.047)	0.029	0.031
242	20.17	0.10	0.061	(0.047)	0.029	0.031
243	20.25	0.10	0.061	(0.047)	0.029	0.031
244	20.33	0.10	0.061	(0.046)	0.029	0.031
245	20.42	0.10	0.061	(0.046)	0.029	0.031
246	20.50	0.10	0.061	(0.046)	0.029	0.031
247	20.58	0.10	0.061	(0.046)	0.029	0.031
248	20.67	0.10	0.061	(0.046)	0.029	0.031
249	20.75	0.10	0.061	(0.045)	0.029	0.031
250	20.83	0.07	0.041	(0.045)	0.020	0.021
251	20.92	0.07	0.041	(0.045)	0.020	0.021
252	21.00	0.07	0.041	(0.045)	0.020	0.021
253	21.08	0.10	0.061	(0.045)	0.029	0.031
254	21.17	0.10	0.061	(0.045)	0.029	0.031
255	21.25	0.10	0.061	(0.044)	0.029	0.031

256	21.33	0.07	0.041	(0.044)	0.020	0.021
257	21.42	0.07	0.041	(0.044)	0.020	0.021
258	21.50	0.07	0.041	(0.044)	0.020	0.021
259	21.58	0.10	0.061	(0.044)	0.029	0.031
260	21.67	0.10	0.061	(0.044)	0.029	0.031
261	21.75	0.10	0.061	(0.043)	0.029	0.031
262	21.83	0.07	0.041	(0.043)	0.020	0.021
263	21.92	0.07	0.041	(0.043)	0.020	0.021
264	22.00	0.07	0.041	(0.043)	0.020	0.021
265	22.08	0.10	0.061	(0.043)	0.029	0.031
266	22.17	0.10	0.061	(0.043)	0.029	0.031
267	22.25	0.10	0.061	(0.043)	0.029	0.031
268	22.33	0.07	0.041	(0.042)	0.020	0.021
269	22.42	0.07	0.041	(0.042)	0.020	0.021
270	22.50	0.07	0.041	(0.042)	0.020	0.021
271	22.58	0.07	0.041	(0.042)	0.020	0.021
272	22.67	0.07	0.041	(0.042)	0.020	0.021
273	22.75	0.07	0.041	(0.042)	0.020	0.021
274	22.83	0.07	0.041	(0.042)	0.020	0.021
275	22.92	0.07	0.041	(0.042)	0.020	0.021
276	23.00	0.07	0.041	(0.041)	0.020	0.021
277	23.08	0.07	0.041	(0.041)	0.020	0.021
278	23.17	0.07	0.041	(0.041)	0.020	0.021
279	23.25	0.07	0.041	(0.041)	0.020	0.021
280	23.33	0.07	0.041	(0.041)	0.020	0.021
281	23.42	0.07	0.041	(0.041)	0.020	0.021
282	23.50	0.07	0.041	(0.041)	0.020	0.021
283	23.58	0.07	0.041	(0.041)	0.020	0.021
284	23.67	0.07	0.041	(0.041)	0.020	0.021
285	23.75	0.07	0.041	(0.041)	0.020	0.021
286	23.83	0.07	0.041	(0.041)	0.020	0.021
287	23.92	0.07	0.041	(0.041)	0.020	0.021
288	24.00	0.07	0.041	(0.041)	0.020	0.021

(Loss Rate Not Used)

Sum = 100.0 Sum = 44.8

Flood volume = Effective rainfall 3.73(In)
times area 8.5(Ac.)/[(In)/(Ft.)] = 2.7(Ac. Ft)

Total soil loss = 1.34(In)

Total soil loss = 0.951(Ac. Ft)

Total rainfall = 5.07(In)

Flood volume = 115726.0 Cubic Feet

Total soil loss = 41442.4 Cubic Feet

Peak flow rate of this hydrograph = 5.328(CFS)

+++++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0002		0.03	Q				
0+10	0.0011		0.13	Q				
0+15	0.0022		0.16	Q				
0+20	0.0034		0.19	Q				
0+25	0.0051		0.24	Q				
0+30	0.0069		0.26	VQ				
0+35	0.0087		0.27	VQ				
0+40	0.0106		0.27	VQ				
0+45	0.0124		0.27	VQ				
0+50	0.0144		0.28	VQ				
0+55	0.0167		0.33	VQ				
1+ 0	0.0191		0.35	VQ				
1+ 5	0.0215		0.34	VQ				
1+10	0.0235		0.30	VQ				
1+15	0.0254		0.28	VQ				
1+20	0.0273		0.27	VQ				
1+25	0.0292		0.27	VQ				
1+30	0.0310		0.27	VQ				
1+35	0.0329		0.27	VQ				
1+40	0.0348		0.27	VQ				
1+45	0.0366		0.27	VQ				
1+50	0.0386		0.28	VQ				
1+55	0.0409		0.33	VQ				
2+ 0	0.0433		0.35	VQ				
2+ 5	0.0458		0.36	VQ				
2+10	0.0482		0.36	VQ				
2+15	0.0507		0.36	VQ				
2+20	0.0532		0.36	VQ				
2+25	0.0557		0.36	VQ				
2+30	0.0581		0.36	VQ				
2+35	0.0607		0.37	VQ				
2+40	0.0636		0.42	VQ				
2+45	0.0667		0.44	Q				
2+50	0.0698		0.45	Q				
2+55	0.0728		0.45	Q				
3+ 0	0.0759		0.45	Q				
3+ 5	0.0790		0.45	Q				
3+10	0.0821		0.45	Q				
3+15	0.0853		0.45	Q				
3+20	0.0884		0.45	Q				
3+25	0.0915		0.45	Q				
3+30	0.0946		0.45	Q				
3+35	0.0977		0.45	Q				
3+40	0.1008		0.45	Q				
3+45	0.1039		0.45	Q				
3+50	0.1071		0.46	Q				
3+55	0.1106		0.51	VQ				
4+ 0	0.1143		0.53	VQ				

4+ 5	0. 1180	0. 54	VQ				
4+10	0. 1217	0. 54	VQ				
4+15	0. 1254	0. 54	VQ				
4+20	0. 1292	0. 55	VQ				
4+25	0. 1334	0. 60	Q				
4+30	0. 1376	0. 62	Q				
4+35	0. 1420	0. 63	Q				
4+40	0. 1463	0. 63	Q				
4+45	0. 1506	0. 63	Q				
4+50	0. 1551	0. 64	Q				
4+55	0. 1598	0. 69	Q				
5+ 0	0. 1647	0. 71	Q				
5+ 5	0. 1695	0. 69	Q				
5+10	0. 1736	0. 59	Q				
5+15	0. 1774	0. 56	Q				
5+20	0. 1813	0. 56	Q				
5+25	0. 1855	0. 61	Q				
5+30	0. 1898	0. 62	Q				
5+35	0. 1942	0. 64	Q				
5+40	0. 1989	0. 69	Q				
5+45	0. 2038	0. 71	QV				
5+50	0. 2088	0. 72	QV				
5+55	0. 2137	0. 72	QV				
6+ 0	0. 2187	0. 72	QV				
6+ 5	0. 2238	0. 73	QV				
6+10	0. 2292	0. 78	Q				
6+15	0. 2347	0. 80	Q				
6+20	0. 2402	0. 81	Q				
6+25	0. 2458	0. 81	Q				
6+30	0. 2514	0. 81	Q				
6+35	0. 2571	0. 82	Q				
6+40	0. 2631	0. 87	Q				
6+45	0. 2692	0. 89	QV				
6+50	0. 2754	0. 90	QV				
6+55	0. 2816	0. 90	QV				
7+ 0	0. 2878	0. 90	QV				
7+ 5	0. 2940	0. 90	QV				
7+10	0. 3002	0. 90	QV				
7+15	0. 3064	0. 90	QV				
7+20	0. 3128	0. 92	QV				
7+25	0. 3198	1. 01	Q				
7+30	0. 3270	1. 05	Q				
7+35	0. 3345	1. 09	QV				
7+40	0. 3427	1. 19	QV				
7+45	0. 3511	1. 23	QV				
7+50	0. 3599	1. 27	Q				
7+55	0. 3694	1. 38	Q				
8+ 0	0. 3792	1. 42	Q				
8+ 5	0. 3894	1. 48	Q				
8+10	0. 4010	1. 69	Q				
8+15	0. 4131	1. 76	VQ				

8+20	0. 4254	1. 79	VQ			
8+25	0. 4378	1. 80	VQ			
8+30	0. 4502	1. 81	VQ			
8+35	0. 4629	1. 84	VQ			
8+40	0. 4763	1. 94	Q			
8+45	0. 4899	1. 98	Q			
8+50	0. 5038	2. 02	VQ			
8+55	0. 5184	2. 12	VQ			
9+ 0	0. 5333	2. 16	Q			
9+ 5	0. 5486	2. 23	Q			
9+10	0. 5653	2. 43	VQ			
9+15	0. 5826	2. 50	V Q			
9+20	0. 6002	2. 56	VQ			
9+25	0. 6185	2. 67	VQ			
9+30	0. 6372	2. 70	VQ			
9+35	0. 6561	2. 75	VQ			
9+40	0. 6758	2. 85	VQ			
9+45	0. 6957	2. 89	VQ			
9+50	0. 7159	2. 93	VQ			
9+55	0. 7368	3. 04	VQ			
10+ 0	0. 7580	3. 08	VQ			
10+ 5	0. 7781	2. 92	Q			
10+10	0. 7935	2. 24	Q V			
10+15	0. 8075	2. 02	Q V			
10+20	0. 8208	1. 94	Q V			
10+25	0. 8340	1. 91	Q V			
10+30	0. 8471	1. 90	Q V			
10+35	0. 8611	2. 03	Q V			
10+40	0. 8784	2. 52	Q V			
10+45	0. 8969	2. 68	Q V			
10+50	0. 9158	2. 75	Q V			
10+55	0. 9349	2. 77	Q V			
11+ 0	0. 9541	2. 79	Q V			
11+ 5	0. 9732	2. 77	Q V			
11+10	0. 9916	2. 68	Q V			
11+15	1. 0098	2. 65	Q V			
11+20	1. 0280	2. 64	Q V			
11+25	1. 0461	2. 64	Q V			
11+30	1. 0643	2. 64	Q V			
11+35	1. 0821	2. 59	Q V			
11+40	1. 0987	2. 40	Q V			
11+45	1. 1148	2. 34	Q V			
11+50	1. 1309	2. 34	Q V			
11+55	1. 1476	2. 43	Q V			
12+ 0	1. 1646	2. 46	Q V			
12+ 5	1. 1829	2. 66	Q V			
12+10	1. 2059	3. 35	Q V			
12+15	1. 2306	3. 58	Q V			
12+20	1. 2560	3. 70	Q V			
12+25	1. 2824	3. 83	Q V			
12+30	1. 3090	3. 87	Q V			

12+35	1. 3362	3. 95			Q	V		
12+40	1. 3648	4. 15			Q	V		
12+45	1. 3938	4. 22			Q	V		
12+50	1. 4232	4. 27			Q	V		
12+55	1. 4534	4. 38			Q	V		
13+ 0	1. 4839	4. 42			Q	V		
13+ 5	1. 5153	4. 57			Q	V		
13+10	1. 5501	5. 06			Q	V		
13+15	1. 5861	5. 22			Q	V		
13+20	1. 6226	5. 29			Q	V		
13+25	1. 6592	5. 32			Q	V		
13+30	1. 6959	5. 33			Q	V		
13+35	1. 7307	5. 06			Q	V		
13+40	1. 7582	3. 99			Q	V		
13+45	1. 7833	3. 64			Q	V		
13+50	1. 8074	3. 50			Q	V		
13+55	1. 8312	3. 46			Q	V		
14+ 0	1. 8549	3. 44			Q	V		
14+ 5	1. 8792	3. 54			Q	V		
14+10	1. 9063	3. 93			Q	V		
14+15	1. 9343	4. 06			Q	V		
14+20	1. 9624	4. 09			Q	V		
14+25	1. 9900	4. 01			Q	V		
14+30	2. 0175	3. 99			Q	V		
14+35	2. 0449	3. 98			Q	V		
14+40	2. 0724	3. 98			Q	V		
14+45	2. 0998	3. 98			Q	V		
14+50	2. 1270	3. 96			Q	V		
14+55	2. 1537	3. 86			Q	V		
15+ 0	2. 1801	3. 84			Q	V		
15+ 5	2. 2062	3. 80			Q	V		
15+10	2. 2317	3. 70			Q	V		
15+15	2. 2570	3. 67			Q	V		
15+20	2. 2820	3. 63			Q	V		
15+25	2. 3064	3. 53			Q	V		
15+30	2. 3305	3. 50			Q	V		
15+35	2. 3539	3. 39			Q	V		
15+40	2. 3745	3. 00		Q	V			
15+45	2. 3943	2. 87		Q	V			
15+50	2. 4137	2. 82		Q	V			
15+55	2. 4331	2. 81		Q	V			
16+ 0	2. 4524	2. 81		Q	V			
16+ 5	2. 4692	2. 45		Q	V			
16+10	2. 4767	1. 09	Q		V			
16+15	2. 4811	0. 64	Q		V			
16+20	2. 4842	0. 46	Q		V			
16+25	2. 4870	0. 40	Q		V			
16+30	2. 4896	0. 38	Q		V			
16+35	2. 4920	0. 35	Q		V			
16+40	2. 4940	0. 30	Q		V			
16+45	2. 4959	0. 28	Q		V			

16+50	2. 4978	0. 27	Q				V
16+55	2. 4997	0. 27	Q				V
17+ 0	2. 5016	0. 27	Q				V
17+ 5	2. 5036	0. 30	Q				V
17+10	2. 5063	0. 40	Q				V
17+15	2. 5093	0. 43	Q				V
17+20	2. 5124	0. 44	Q				V
17+25	2. 5154	0. 45	Q				V
17+30	2. 5185	0. 45	Q				V
17+35	2. 5216	0. 45	Q				V
17+40	2. 5247	0. 45	Q				V
17+45	2. 5279	0. 45	Q				V
17+50	2. 5309	0. 44	Q				V
17+55	2. 5335	0. 39	Q				V
18+ 0	2. 5361	0. 37	Q				V
18+ 5	2. 5386	0. 36	Q				V
18+10	2. 5411	0. 36	Q				V
18+15	2. 5436	0. 36	Q				V
18+20	2. 5461	0. 36	Q				V
18+25	2. 5485	0. 36	Q				V
18+30	2. 5510	0. 36	Q				V
18+35	2. 5534	0. 35	Q				V
18+40	2. 5555	0. 30	Q				V
18+45	2. 5574	0. 28	Q				V
18+50	2. 5592	0. 26	Q				V
18+55	2. 5606	0. 21	Q				V
19+ 0	2. 5619	0. 19	Q				V
19+ 5	2. 5633	0. 20	Q				V
19+10	2. 5650	0. 24	Q				V
19+15	2. 5668	0. 26	Q				V
19+20	2. 5687	0. 28	Q				V
19+25	2. 5710	0. 33	Q				V
19+30	2. 5734	0. 35	Q				V
19+35	2. 5758	0. 34	Q				V
19+40	2. 5778	0. 30	Q				V
19+45	2. 5797	0. 28	Q				V
19+50	2. 5815	0. 26	Q				V
19+55	2. 5830	0. 21	Q				V
20+ 0	2. 5843	0. 19	Q				V
20+ 5	2. 5856	0. 20	Q				V
20+10	2. 5873	0. 24	Q				V
20+15	2. 5891	0. 26	Q				V
20+20	2. 5909	0. 27	Q				V
20+25	2. 5928	0. 27	Q				V
20+30	2. 5947	0. 27	Q				V
20+35	2. 5965	0. 27	Q				V
20+40	2. 5984	0. 27	Q				V
20+45	2. 6002	0. 27	Q				V
20+50	2. 6020	0. 26	Q				V
20+55	2. 6034	0. 21	Q				V
21+ 0	2. 6048	0. 19	Q				V

21+ 5	2. 6061	0. 20	Q				V
21+10	2. 6078	0. 24	Q				V
21+15	2. 6096	0. 26	Q				V
21+20	2. 6113	0. 25	Q				V
21+25	2. 6128	0. 21	Q				V
21+30	2. 6141	0. 19	Q				V
21+35	2. 6154	0. 20	Q				V
21+40	2. 6171	0. 24	Q				V
21+45	2. 6189	0. 26	Q				V
21+50	2. 6206	0. 25	Q				V
21+55	2. 6221	0. 21	Q				V
22+ 0	2. 6234	0. 19	Q				V
22+ 5	2. 6247	0. 20	Q				V
22+10	2. 6264	0. 24	Q				V
22+15	2. 6282	0. 26	Q				V
22+20	2. 6300	0. 25	Q				V
22+25	2. 6314	0. 21	Q				V
22+30	2. 6327	0. 19	Q				V
22+35	2. 6339	0. 18	Q				V
22+40	2. 6352	0. 18	Q				V
22+45	2. 6364	0. 18	Q				V
22+50	2. 6377	0. 18	Q				V
22+55	2. 6389	0. 18	Q				V
23+ 0	2. 6402	0. 18	Q				V
23+ 5	2. 6414	0. 18	Q				V
23+10	2. 6426	0. 18	Q				V
23+15	2. 6439	0. 18	Q				V
23+20	2. 6451	0. 18	Q				V
23+25	2. 6464	0. 18	Q				V
23+30	2. 6476	0. 18	Q				V
23+35	2. 6489	0. 18	Q				V
23+40	2. 6501	0. 18	Q				V
23+45	2. 6513	0. 18	Q				V
23+50	2. 6526	0. 18	Q				V
23+55	2. 6538	0. 18	Q				V
24+ 0	2. 6551	0. 18	Q				V
24+ 5	2. 6561	0. 15	Q				V
24+10	2. 6565	0. 05	Q				V
24+15	2. 6566	0. 02	Q				V
24+20	2. 6567	0. 01	Q				V
24+25	2. 6567	0. 00	Q				V
24+30	2. 6567	0. 00	Q				V

Appendix C: Detention Calculations

La Sierra 100-Yr Analysis

Project Summary

Title	MLC La Sierra Basin Routing
Engineer	
Company	Kimley-Horn and Associates, Inc.
Date	11/12/2024

Notes	1. Inflow hydrographs calculated based on Synthetic Unit Hydrograph Method from Riverside County Flood Control and Water Conservation District Hydrology Manual (April 1978) using Civild software.
-------	---

Table of Contents

	Master Network Summary	2
A		
	Read Hydrograph	3
	Read Hydrograph	3
	Read Hydrograph	3
C		
	Read Hydrograph	3
	Read Hydrograph	3
	Read Hydrograph	3
BMP A (OUT)		
	Time vs. Elevation	11
	Time vs. Elevation	11
	Time vs. Elevation	11
BMP C (OUT)		
	Time vs. Elevation	11
	Time vs. Elevation	11
	Time vs. Elevation	11
BMP A		
	Time vs. Volume	29
	Time vs. Volume	29
	Time vs. Volume	29
BMP C		
	Time vs. Volume	29
	Time vs. Volume	29
	Time vs. Volume	29
Outlet A		
	Outlet Input Data	47
	Outlet Input Data	47
	Outlet Input Data	47
Outlet C		
	Outlet Input Data	47
	Outlet Input Data	47
	Outlet Input Data	47
BMP A		

Table of Contents

	Elevation-Volume-Flow Table (Pond)	59
	Elevation-Volume-Flow Table (Pond)	59
	Elevation-Volume-Flow Table (Pond)	59
BMP A (IN)		
	Level Pool Pond Routing Summary	62
	Level Pool Pond Routing Summary	62
	Level Pool Pond Routing Summary	62
	Pond Inflow Summary	65
	Pond Inflow Summary	65
	Pond Inflow Summary	65
BMP C		
	Elevation-Volume-Flow Table (Pond)	59
	Elevation-Volume-Flow Table (Pond)	59
	Elevation-Volume-Flow Table (Pond)	59
BMP C (IN)		
	Level Pool Pond Routing Summary	62
	Level Pool Pond Routing Summary	62
	Level Pool Pond Routing Summary	62
	Pond Inflow Summary	65
	Pond Inflow Summary	65
	Pond Inflow Summary	65

La Sierra 100-Yr Analysis

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
C	100-yr 1-hr	0	9,393.000	55.000	7.21000
C	100-yr 3-hr	0	14,042.000	160.000	3.78000
C	100-yr 24-hr	0	30,358.000	810.000	1.40000
A	100-yr 1-hr	0	35,841.000	55.000	27.50000
A	100-yr 3-hr	0	53,496.000	160.000	14.42000
A	100-yr 24-hr	0	115,720.000	810.000	5.33000

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
O-C	100-yr 1-hr	0	9,411.000	60.000	3.44826
O-C	100-yr 3-hr	0	14,052.000	170.000	2.24309
O-C	100-yr 24-hr	0	30,360.000	815.000	1.20614
O-A	100-yr 1-hr	0	32,768.000	60.000	20.07597
O-A	100-yr 3-hr	0	50,393.000	165.000	12.18747
O-A	100-yr 24-hr	0	112,580.000	815.000	4.66340

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft ³)
BMP C (IN)	100-yr 1-hr	0	9,411.000	55.000	7.21000	(N/A)	(N/A)
BMP C (OUT)	100-yr 1-hr	0	9,411.000	60.000	3.44826	3.697	5,075.000
BMP C (IN)	100-yr 3-hr	0	14,052.000	160.000	3.78000	(N/A)	(N/A)
BMP C (OUT)	100-yr 3-hr	0	14,052.000	170.000	2.24309	3.579	4,758.000
BMP C (IN)	100-yr 24-hr	0	30,360.000	810.000	1.40000	(N/A)	(N/A)
BMP C (OUT)	100-yr 24-hr	0	30,360.000	815.000	1.20614	2.538	1,968.000
BMP A (IN)	100-yr 1-hr	0	35,913.000	55.000	27.50000	(N/A)	(N/A)
BMP A (OUT)	100-yr 1-hr	0	32,768.000	60.000	20.07597	5.448	17,045.000
BMP A (IN)	100-yr 3-hr	0	53,538.000	160.000	14.42000	(N/A)	(N/A)
BMP A (OUT)	100-yr 3-hr	0	50,393.000	165.000	12.18747	4.741	15,134.000
BMP A (IN)	100-yr 24-hr	0	115,725.000	810.000	5.33000	(N/A)	(N/A)
BMP A (OUT)	100-yr 24-hr	0	112,580.000	815.000	4.66340	3.361	10,649.000

La Sierra 100-Yr Analysis

Subsection: Read Hydrograph
Label: A

Scenario: 100-yr 1-hr

Peak Discharge	27.50000 ft ³ /s
Time to Peak	55.000 min
Hydrograph Volume	35,841.000 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
5.000	0.51000	2.65000	3.98000	4.67000	5.25000
30.000	5.89000	6.89000	7.98000	10.62000	18.09000
55.000	27.50000	14.26000	7.37000	2.57000	0.96000
80.000	0.43000	0.09000	0.03000	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Read Hydrograph
Label: A

Scenario: 100-yr 24-hr

Peak Discharge	5.33000 ft ³ /s
Time to Peak	810.000 min
Hydrograph Volume	115,720.500 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
5.000	0.03000	0.13000	0.16000	0.19000	0.24000
30.000	0.26000	0.27000	0.27000	0.27000	0.28000
55.000	0.33000	0.35000	0.34000	0.30000	0.28000
80.000	0.27000	0.27000	0.27000	0.27000	0.27000
105.000	0.27000	0.28000	0.33000	0.35000	0.36000
130.000	0.36000	0.36000	0.36000	0.36000	0.36000
155.000	0.37000	0.42000	0.44000	0.45000	0.45000
180.000	0.45000	0.45000	0.45000	0.45000	0.45000
205.000	0.45000	0.45000	0.45000	0.45000	0.45000
230.000	0.46000	0.51000	0.53000	0.54000	0.54000
255.000	0.54000	0.55000	0.60000	0.62000	0.63000
280.000	0.63000	0.63000	0.64000	0.69000	0.71000
305.000	0.69000	0.59000	0.56000	0.56000	0.61000
330.000	0.62000	0.64000	0.69000	0.71000	0.72000
355.000	0.72000	0.72000	0.73000	0.78000	0.80000
380.000	0.81000	0.81000	0.81000	0.82000	0.87000
405.000	0.89000	0.90000	0.90000	0.90000	0.90000
430.000	0.90000	0.90000	0.92000	1.01000	1.05000
455.000	1.09000	1.19000	1.23000	1.27000	1.38000
480.000	1.42000	1.48000	1.69000	1.76000	1.79000
505.000	1.80000	1.81000	1.84000	1.94000	1.98000
530.000	2.02000	2.12000	2.16000	2.23000	2.43000
555.000	2.50000	2.56000	2.67000	2.70000	2.75000
580.000	2.85000	2.89000	2.93000	3.04000	3.08000
605.000	2.92000	2.24000	2.02000	1.94000	1.91000
630.000	1.90000	2.03000	2.52000	2.68000	2.75000
655.000	2.77000	2.79000	2.77000	2.68000	2.65000
680.000	2.64000	2.64000	2.64000	2.59000	2.40000
705.000	2.34000	2.34000	2.43000	2.46000	2.66000
730.000	3.35000	3.58000	3.70000	3.83000	3.87000
755.000	3.95000	4.15000	4.22000	4.27000	4.38000
780.000	4.42000	4.57000	5.06000	5.22000	5.29000
805.000	5.32000	5.33000	5.06000	3.99000	3.64000
830.000	3.50000	3.46000	3.44000	3.54000	3.93000
855.000	4.06000	4.09000	4.01000	3.99000	3.98000
880.000	3.98000	3.98000	3.96000	3.86000	3.84000
905.000	3.80000	3.70000	3.67000	3.63000	3.53000

La Sierra 100-Yr Analysis

Subsection: Read Hydrograph
Label: A

Scenario: 100-yr 24-hr

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
930.000	3.50000	3.39000	3.00000	2.87000	2.82000
955.000	2.81000	2.81000	2.45000	1.09000	0.64000
980.000	0.46000	0.40000	0.38000	0.35000	0.30000
1,005.000	0.28000	0.27000	0.27000	0.27000	0.30000
1,030.000	0.40000	0.43000	0.44000	0.45000	0.45000
1,055.000	0.45000	0.45000	0.45000	0.44000	0.39000
1,080.000	0.37000	0.36000	0.36000	0.36000	0.36000
1,105.000	0.36000	0.36000	0.35000	0.30000	0.28000
1,130.000	0.26000	0.21000	0.19000	0.20000	0.24000
1,155.000	0.26000	0.28000	0.33000	0.35000	0.34000
1,180.000	0.30000	0.28000	0.26000	0.21000	0.19000
1,205.000	0.20000	0.24000	0.26000	0.27000	0.27000
1,230.000	0.27000	0.27000	0.27000	0.27000	0.26000
1,255.000	0.21000	0.19000	0.20000	0.24000	0.26000
1,280.000	0.25000	0.21000	0.19000	0.20000	0.24000
1,305.000	0.26000	0.25000	0.21000	0.19000	0.20000
1,330.000	0.24000	0.26000	0.25000	0.21000	0.19000
1,355.000	0.18000	0.18000	0.18000	0.18000	0.18000
1,380.000	0.18000	0.18000	0.18000	0.18000	0.18000
1,405.000	0.18000	0.18000	0.18000	0.18000	0.18000
1,430.000	0.18000	0.18000	0.18000	0.15000	0.05000
1,455.000	0.02000	0.01000	0.00000	0.00000	(N/A)

La Sierra 100-Yr Analysis

Subsection: Read Hydrograph
Label: A

Scenario: 100-yr 3-hr

Peak Discharge	14.42000 ft ³ /s
Time to Peak	160.000 min
Hydrograph Volume	53,496.000 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
5.000	0.28000	1.37000	1.67000	1.70000	2.13000
30.000	2.35000	2.67000	2.54000	2.82000	2.82000
55.000	2.55000	2.62000	2.96000	3.49000	3.67000
80.000	3.68000	3.65000	4.30000	4.52000	4.39000
105.000	4.84000	5.54000	5.52000	5.35000	5.42000
130.000	5.87000	7.40000	8.29000	8.03000	11.54000
155.000	13.44000	14.42000	11.22000	6.07000	4.13000
180.000	3.04000	1.40000	0.51000	0.17000	0.06000
205.000	0.02000	0.00000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Read Hydrograph
Label: C

Scenario: 100-yr 1-hr

Peak Discharge	7.21000 ft ³ /s
Time to Peak	55.000 min
Hydrograph Volume	9,393.000 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
5.000	0.13000	0.69000	1.04000	1.22000	1.38000
30.000	1.54000	1.81000	2.09000	2.79000	4.75000
55.000	7.21000	3.74000	1.93000	0.67000	0.25000
80.000	0.11000	0.02000	0.01000	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Read Hydrograph
Label: C

Scenario: 100-yr 24-hr

Peak Discharge	1.40000 ft ³ /s
Time to Peak	810.000 min
Hydrograph Volume	30,358.500 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
5.000	0.01000	0.03000	0.04000	0.05000	0.06000
30.000	0.07000	0.07000	0.07000	0.07000	0.07000
55.000	0.09000	0.09000	0.09000	0.08000	0.07000
80.000	0.07000	0.07000	0.07000	0.07000	0.07000
105.000	0.07000	0.07000	0.09000	0.09000	0.09000
130.000	0.09000	0.09000	0.09000	0.09000	0.09000
155.000	0.10000	0.11000	0.12000	0.12000	0.12000
180.000	0.12000	0.12000	0.12000	0.12000	0.12000
205.000	0.12000	0.12000	0.12000	0.12000	0.12000
230.000	0.12000	0.13000	0.14000	0.14000	0.14000
255.000	0.14000	0.15000	0.16000	0.16000	0.16000
280.000	0.17000	0.17000	0.17000	0.18000	0.19000
305.000	0.18000	0.16000	0.15000	0.15000	0.16000
330.000	0.16000	0.17000	0.18000	0.19000	0.19000
355.000	0.19000	0.19000	0.19000	0.21000	0.21000
380.000	0.21000	0.21000	0.21000	0.22000	0.23000
405.000	0.23000	0.24000	0.24000	0.24000	0.24000
430.000	0.24000	0.24000	0.24000	0.27000	0.27000
455.000	0.29000	0.31000	0.32000	0.33000	0.36000
480.000	0.37000	0.39000	0.44000	0.46000	0.47000
505.000	0.47000	0.47000	0.48000	0.51000	0.52000
530.000	0.53000	0.56000	0.57000	0.58000	0.64000
555.000	0.66000	0.67000	0.70000	0.71000	0.72000
580.000	0.75000	0.76000	0.77000	0.80000	0.81000
605.000	0.77000	0.59000	0.53000	0.51000	0.50000
630.000	0.50000	0.53000	0.66000	0.70000	0.72000
655.000	0.73000	0.73000	0.73000	0.70000	0.69000
680.000	0.69000	0.69000	0.69000	0.68000	0.63000
705.000	0.61000	0.61000	0.64000	0.65000	0.70000
730.000	0.88000	0.94000	0.97000	1.00000	1.02000
755.000	1.04000	1.09000	1.11000	1.12000	1.15000
780.000	1.16000	1.20000	1.33000	1.37000	1.39000
805.000	1.39000	1.40000	1.33000	1.05000	0.95000
830.000	0.92000	0.91000	0.90000	0.93000	1.03000
855.000	1.06000	1.07000	1.05000	1.05000	1.04000
880.000	1.04000	1.04000	1.04000	1.01000	1.01000
905.000	1.00000	0.97000	0.96000	0.95000	0.93000

La Sierra 100-Yr Analysis

Subsection: Read Hydrograph
Label: C

Scenario: 100-yr 24-hr

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
930.000	0.92000	0.89000	0.79000	0.75000	0.74000
955.000	0.74000	0.74000	0.64000	0.28000	0.17000
980.000	0.12000	0.10000	0.10000	0.09000	0.08000
1,005.000	0.07000	0.07000	0.07000	0.07000	0.08000
1,030.000	0.10000	0.11000	0.12000	0.12000	0.12000
1,055.000	0.12000	0.12000	0.12000	0.11000	0.10000
1,080.000	0.10000	0.10000	0.09000	0.09000	0.09000
1,105.000	0.09000	0.09000	0.09000	0.08000	0.07000
1,130.000	0.07000	0.05000	0.05000	0.05000	0.06000
1,155.000	0.07000	0.07000	0.09000	0.09000	0.09000
1,180.000	0.08000	0.07000	0.07000	0.05000	0.05000
1,205.000	0.05000	0.06000	0.07000	0.07000	0.07000
1,230.000	0.07000	0.07000	0.07000	0.07000	0.07000
1,255.000	0.05000	0.05000	0.05000	0.06000	0.07000
1,280.000	0.07000	0.05000	0.05000	0.05000	0.06000
1,305.000	0.07000	0.07000	0.05000	0.05000	0.05000
1,330.000	0.06000	0.07000	0.07000	0.05000	0.05000
1,355.000	0.05000	0.05000	0.05000	0.05000	0.05000
1,380.000	0.05000	0.05000	0.05000	0.05000	0.05000
1,405.000	0.05000	0.05000	0.05000	0.05000	0.05000
1,430.000	0.05000	0.05000	0.05000	0.04000	0.01000
1,455.000	0.01000	0.00000	0.00000	0.00000	(N/A)

La Sierra 100-Yr Analysis

Subsection: Read Hydrograph
Label: C

Scenario: 100-yr 3-hr

Peak Discharge	3.78000 ft ³ /s
Time to Peak	160.000 min
Hydrograph Volume	14,041.500 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
5.000	0.07000	0.36000	0.44000	0.45000	0.56000
30.000	0.62000	0.70000	0.67000	0.74000	0.74000
55.000	0.67000	0.69000	0.78000	0.92000	0.96000
80.000	0.97000	0.96000	1.13000	1.19000	1.15000
105.000	1.27000	1.45000	1.45000	1.40000	1.42000
130.000	1.54000	1.94000	2.17000	2.11000	3.03000
155.000	3.53000	3.78000	2.94000	1.59000	1.08000
180.000	0.80000	0.37000	0.13000	0.04000	0.02000
205.000	0.01000	0.00000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP A (OUT)

Scenario: 100-yr 1-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	0.000	1.008	1.058	1.162	1.298
25.000	1.628	2.000	2.357	2.715	3.163
50.000	3.924	5.079	5.448	4.818	4.223
75.000	3.714	3.349	2.999	2.691	2.432
100.000	2.232	2.082	1.969	1.880	1.807
125.000	1.746	1.697	1.655	1.621	1.593
150.000	1.570	1.551	1.535	1.522	1.511
175.000	1.502	1.495	1.487	1.480	1.474
200.000	1.467	1.461	1.455	1.450	1.445
225.000	1.439	1.435	1.430	1.426	1.421
250.000	1.417	1.413	1.410	1.406	1.403
275.000	1.400	1.396	1.394	1.391	1.388
300.000	1.385	1.383	1.381	1.378	1.376
325.000	1.374	1.372	1.370	1.369	1.367
350.000	1.365	1.364	1.362	1.361	1.359
375.000	1.358	1.357	1.356	1.355	1.353
400.000	1.352	1.351	1.350	1.350	1.349
425.000	1.348	1.347	1.346	1.346	1.345
450.000	1.344	1.344	1.343	1.342	1.342
475.000	1.341	1.341	1.340	1.340	1.339
500.000	1.339	1.339	1.338	1.338	1.338
525.000	1.337	1.337	1.337	1.336	1.336
550.000	1.336	1.335	1.335	1.335	1.335
575.000	1.335	1.334	1.334	1.334	1.334
600.000	1.334	1.333	1.333	1.333	1.333
625.000	1.333	1.333	1.333	1.333	1.332
650.000	1.332	1.332	1.332	1.332	1.332
675.000	1.332	1.332	1.332	1.332	1.332
700.000	1.331	1.331	1.331	1.331	1.331
725.000	1.331	1.331	1.331	1.331	1.331
750.000	1.331	1.331	1.331	1.331	1.331
775.000	1.331	1.331	1.331	1.331	1.331
800.000	1.331	1.331	1.331	1.331	1.330
825.000	1.330	1.330	1.330	1.330	1.330
850.000	1.330	1.330	1.330	1.330	1.330
875.000	1.330	1.330	1.330	1.330	1.330
900.000	1.330	1.330	1.330	1.330	1.330
925.000	1.330	1.330	1.330	1.330	1.330
950.000	1.330	1.330	1.330	1.330	1.330
975.000	1.330	1.330	1.330	1.330	1.330
1,000.000	1.330	1.330	1.330	1.330	1.330

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP A (OUT)

Scenario: 100-yr 1-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,025.000	1.330	1.330	1.330	1.330	1.330
1,050.000	1.330	1.330	1.330	1.330	1.330
1,075.000	1.330	1.330	1.330	1.330	1.330
1,100.000	1.330	1.330	1.330	1.330	1.330
1,125.000	1.330	1.330	1.330	1.330	1.330
1,150.000	1.330	1.330	1.330	1.330	1.330
1,175.000	1.330	1.330	1.330	1.330	1.330
1,200.000	1.330	1.330	1.330	1.330	1.330
1,225.000	1.330	1.330	1.330	1.330	1.330
1,250.000	1.330	1.330	1.330	1.330	1.330
1,275.000	1.330	1.330	1.330	1.330	1.330
1,300.000	1.330	1.330	1.330	1.330	1.330
1,325.000	1.330	1.330	1.330	1.330	1.330
1,350.000	1.330	1.330	1.330	1.330	1.330
1,375.000	1.330	1.330	1.330	1.330	1.330
1,400.000	1.330	1.330	1.330	1.330	1.330
1,425.000	1.330	1.330	1.330	1.330	1.330
1,450.000	1.330	1.330	1.330	1.330	1.330
1,475.000	1.330	1.330	1.330	1.330	1.330
1,500.000	1.330	1.330	1.330	1.330	1.330
1,525.000	1.330	1.330	1.330	1.330	1.330
1,550.000	1.330	1.330	1.330	1.330	1.330
1,575.000	1.330	1.330	1.330	1.330	1.330
1,600.000	1.330	1.330	1.330	1.330	1.330
1,625.000	1.330	1.330	1.330	1.330	1.330
1,650.000	1.330	1.330	1.330	1.330	1.330
1,675.000	1.330	1.330	1.330	1.330	1.330
1,700.000	1.330	1.330	1.330	1.330	1.330
1,725.000	1.330	1.330	1.330	1.330	1.330
1,750.000	1.330	1.330	1.330	1.330	1.330
1,775.000	1.330	1.330	1.330	1.330	1.330
1,800.000	1.330	1.330	1.330	1.330	1.330
1,825.000	1.330	1.330	1.330	1.330	1.330
1,850.000	1.330	1.330	1.330	1.330	1.330
1,875.000	1.330	1.330	1.330	1.330	1.330
1,900.000	1.330	1.330	1.330	1.330	1.330
1,925.000	1.330	1.330	1.330	1.330	1.330
1,950.000	1.330	1.330	1.330	1.330	1.330
1,975.000	1.330	1.330	1.330	1.330	1.330
2,000.000	1.330	1.330	1.330	1.330	1.330
2,025.000	1.330	1.330	1.330	1.330	1.330

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP A (OUT)

Scenario: 100-yr 1-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min
 Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,050.000	1.330	1.330	1.330	1.330	1.330
2,075.000	1.330	1.330	1.330	1.330	1.330
2,100.000	1.330	1.330	1.330	1.330	1.330
2,125.000	1.330	1.330	1.330	1.330	1.330
2,150.000	1.330	1.330	1.330	1.330	1.330
2,175.000	1.330	1.330	1.330	1.330	1.330
2,200.000	1.330	1.330	1.330	1.330	1.330
2,225.000	1.330	1.330	1.330	1.330	1.330
2,250.000	1.330	1.330	1.330	1.330	1.330
2,275.000	1.330	1.330	1.330	1.330	1.330
2,300.000	1.330	1.330	1.330	1.330	1.330
2,325.000	1.330	1.330	1.330	1.330	1.330
2,350.000	1.330	1.330	1.330	1.330	1.330
2,375.000	1.330	1.330	1.330	1.330	1.330
2,400.000	1.330	1.330	1.330	1.330	1.330
2,425.000	1.330	1.330	1.330	1.330	1.330
2,450.000	1.330	1.330	1.330	1.330	1.330
2,475.000	1.330	1.330	1.330	1.330	1.330
2,500.000	1.330	1.330	1.330	1.330	1.330
2,525.000	1.330	1.330	1.330	1.330	1.330
2,550.000	1.330	1.330	1.330	1.330	1.330
2,575.000	1.330	1.330	1.330	1.330	1.330
2,600.000	1.330	1.330	1.330	1.330	1.330
2,625.000	1.330	1.330	1.330	1.330	1.330
2,650.000	1.330	1.330	1.330	1.330	1.330
2,675.000	1.330	1.330	1.330	1.330	1.330
2,700.000	1.330	1.330	1.330	1.330	1.330
2,725.000	1.330	1.330	1.330	1.330	1.330
2,750.000	1.330	1.330	1.330	1.330	1.330
2,775.000	1.330	1.330	1.330	1.330	1.330
2,800.000	1.330	1.330	1.330	1.330	1.330
2,825.000	1.330	1.330	1.330	1.330	1.330
2,850.000	1.330	1.330	1.330	1.330	1.330
2,875.000	1.330	1.330	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP A (OUT)

Scenario: 100-yr 24-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	0.000	1.000	1.003	1.008	1.013
25.000	1.020	1.028	1.036	1.045	1.053
50.000	1.062	1.071	1.082	1.093	1.103
75.000	1.112	1.121	1.129	1.138	1.146
100.000	1.155	1.163	1.172	1.181	1.192
125.000	1.203	1.215	1.226	1.237	1.249
150.000	1.260	1.272	1.284	1.297	1.311
175.000	1.326	1.354	1.388	1.421	1.452
200.000	1.482	1.509	1.533	1.553	1.569
225.000	1.582	1.594	1.606	1.618	1.629
250.000	1.638	1.646	1.653	1.661	1.670
275.000	1.678	1.686	1.692	1.697	1.704
300.000	1.712	1.718	1.719	1.716	1.712
325.000	1.710	1.711	1.712	1.716	1.722
350.000	1.728	1.733	1.738	1.741	1.747
375.000	1.754	1.761	1.767	1.772	1.776
400.000	1.782	1.789	1.796	1.803	1.808
425.000	1.812	1.816	1.819	1.822	1.828
450.000	1.838	1.850	1.864	1.881	1.897
475.000	1.917	1.938	1.959	1.987	2.019
500.000	2.047	2.070	2.087	2.102	2.117
525.000	2.134	2.149	2.165	2.182	2.199
550.000	2.221	2.247	2.271	2.295	2.318
575.000	2.338	2.358	2.378	2.396	2.414
600.000	2.433	2.444	2.422	2.374	2.327
625.000	2.288	2.258	2.239	2.247	2.276
650.000	2.306	2.331	2.352	2.367	2.374
675.000	2.376	2.375	2.375	2.374	2.372
700.000	2.362	2.346	2.332	2.324	2.323
725.000	2.330	2.366	2.426	2.483	2.537
750.000	2.589	2.638	2.690	2.744	2.795
775.000	2.844	2.891	2.939	3.004	3.087
800.000	3.169	3.245	3.312	3.361	3.350
825.000	3.283	3.206	3.131	3.064	3.008
850.000	2.979	2.975	2.978	2.978	2.975
875.000	2.971	2.967	2.964	2.960	2.953
900.000	2.942	2.930	2.915	2.897	2.879
925.000	2.859	2.836	2.812	2.772	2.719
950.000	2.667	2.620	2.580	2.533	2.433
975.000	2.293	2.166	2.063	1.982	1.918
1,000.000	1.861	1.812	1.771	1.736	1.707

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP A (OUT)

Scenario: 100-yr 24-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,025.000	1.685	1.671	1.664	1.660	1.657
1,050.000	1.655	1.654	1.652	1.651	1.650
1,075.000	1.647	1.642	1.636	1.632	1.628
1,100.000	1.624	1.622	1.620	1.617	1.613
1,125.000	1.608	1.601	1.594	1.585	1.577
1,150.000	1.573	1.571	1.571	1.574	1.578
1,175.000	1.583	1.584	1.584	1.582	1.577
1,200.000	1.571	1.566	1.563	1.563	1.564
1,225.000	1.566	1.567	1.568	1.568	1.569
1,250.000	1.569	1.567	1.563	1.559	1.558
1,275.000	1.559	1.560	1.559	1.556	1.553
1,300.000	1.553	1.555	1.557	1.556	1.554
1,325.000	1.552	1.552	1.554	1.556	1.556
1,350.000	1.553	1.550	1.548	1.545	1.544
1,375.000	1.542	1.541	1.540	1.539	1.538
1,400.000	1.537	1.537	1.536	1.536	1.536
1,425.000	1.536	1.535	1.535	1.535	1.534
1,450.000	1.528	1.519	1.510	1.501	1.494
1,475.000	1.487	1.480	1.473	1.467	1.461
1,500.000	1.455	1.449	1.444	1.439	1.434
1,525.000	1.429	1.425	1.421	1.417	1.413
1,550.000	1.409	1.406	1.402	1.399	1.396
1,575.000	1.393	1.390	1.388	1.385	1.383
1,600.000	1.380	1.378	1.376	1.374	1.372
1,625.000	1.370	1.368	1.367	1.365	1.364
1,650.000	1.362	1.361	1.359	1.358	1.357
1,675.000	1.356	1.354	1.353	1.352	1.351
1,700.000	1.350	1.349	1.349	1.348	1.347
1,725.000	1.346	1.346	1.345	1.344	1.344
1,750.000	1.343	1.342	1.342	1.341	1.341
1,775.000	1.340	1.340	1.339	1.339	1.339
1,800.000	1.338	1.338	1.338	1.337	1.337
1,825.000	1.337	1.336	1.336	1.336	1.335
1,850.000	1.335	1.335	1.335	1.335	1.334
1,875.000	1.334	1.334	1.334	1.334	1.333
1,900.000	1.333	1.333	1.333	1.333	1.333
1,925.000	1.333	1.333	1.332	1.332	1.332
1,950.000	1.332	1.332	1.332	1.332	1.332
1,975.000	1.332	1.332	1.332	1.331	1.331
2,000.000	1.331	1.331	1.331	1.331	1.331
2,025.000	1.331	1.331	1.331	1.331	1.331

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP A (OUT)

Scenario: 100-yr 24-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,050.000	1.331	1.331	1.331	1.331	1.331
2,075.000	1.331	1.331	1.331	1.331	1.331
2,100.000	1.331	1.331	1.330	1.330	1.330
2,125.000	1.330	1.330	1.330	1.330	1.330
2,150.000	1.330	1.330	1.330	1.330	1.330
2,175.000	1.330	1.330	1.330	1.330	1.330
2,200.000	1.330	1.330	1.330	1.330	1.330
2,225.000	1.330	1.330	1.330	1.330	1.330
2,250.000	1.330	1.330	1.330	1.330	1.330
2,275.000	1.330	1.330	1.330	1.330	1.330
2,300.000	1.330	1.330	1.330	1.330	1.330
2,325.000	1.330	1.330	1.330	1.330	1.330
2,350.000	1.330	1.330	1.330	1.330	1.330
2,375.000	1.330	1.330	1.330	1.330	1.330
2,400.000	1.330	1.330	1.330	1.330	1.330
2,425.000	1.330	1.330	1.330	1.330	1.330
2,450.000	1.330	1.330	1.330	1.330	1.330
2,475.000	1.330	1.330	1.330	1.330	1.330
2,500.000	1.330	1.330	1.330	1.330	1.330
2,525.000	1.330	1.330	1.330	1.330	1.330
2,550.000	1.330	1.330	1.330	1.330	1.330
2,575.000	1.330	1.330	1.330	1.330	1.330
2,600.000	1.330	1.330	1.330	1.330	1.330
2,625.000	1.330	1.330	1.330	1.330	1.330
2,650.000	1.330	1.330	1.330	1.330	1.330
2,675.000	1.330	1.330	1.330	1.330	1.330
2,700.000	1.330	1.330	1.330	1.330	1.330
2,725.000	1.330	1.330	1.330	1.330	1.330
2,750.000	1.330	1.330	1.330	1.330	1.330
2,775.000	1.330	1.330	1.330	1.330	1.330
2,800.000	1.330	1.330	1.330	1.330	1.330
2,825.000	1.330	1.330	1.330	1.330	1.330
2,850.000	1.330	1.330	1.330	1.330	1.330
2,875.000	1.330	1.330	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP A (OUT)

Scenario: 100-yr 3-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	0.000	1.004	1.030	1.078	1.131
25.000	1.192	1.262	1.357	1.555	1.731
50.000	1.887	2.006	2.095	2.175	2.266
75.000	2.359	2.435	2.492	2.560	2.652
100.000	2.732	2.813	2.925	3.049	3.150
125.000	3.234	3.329	3.490	3.735	3.925
150.000	4.111	4.386	4.660	4.741	4.458
175.000	4.038	3.749	3.501	3.187	2.870
200.000	2.587	2.353	2.173	2.038	1.935
225.000	1.852	1.784	1.728	1.681	1.643
250.000	1.611	1.585	1.563	1.545	1.530
275.000	1.518	1.508	1.499	1.492	1.485
300.000	1.478	1.471	1.465	1.459	1.453
325.000	1.448	1.443	1.438	1.433	1.428
350.000	1.424	1.420	1.416	1.412	1.408
375.000	1.405	1.402	1.398	1.395	1.393
400.000	1.390	1.387	1.385	1.382	1.380
425.000	1.378	1.376	1.374	1.372	1.370
450.000	1.368	1.366	1.365	1.363	1.362
475.000	1.360	1.359	1.358	1.356	1.355
500.000	1.354	1.353	1.352	1.351	1.350
525.000	1.349	1.348	1.348	1.347	1.346
550.000	1.345	1.345	1.344	1.343	1.343
575.000	1.342	1.342	1.341	1.341	1.340
600.000	1.340	1.339	1.339	1.339	1.338
625.000	1.338	1.337	1.337	1.337	1.336
650.000	1.336	1.336	1.336	1.335	1.335
675.000	1.335	1.335	1.335	1.334	1.334
700.000	1.334	1.334	1.334	1.333	1.333
725.000	1.333	1.333	1.333	1.333	1.333
750.000	1.333	1.332	1.332	1.332	1.332
775.000	1.332	1.332	1.332	1.332	1.332
800.000	1.332	1.332	1.331	1.331	1.331
825.000	1.331	1.331	1.331	1.331	1.331
850.000	1.331	1.331	1.331	1.331	1.331
875.000	1.331	1.331	1.331	1.331	1.331
900.000	1.331	1.331	1.331	1.331	1.331
925.000	1.331	1.330	1.330	1.330	1.330
950.000	1.330	1.330	1.330	1.330	1.330
975.000	1.330	1.330	1.330	1.330	1.330
1,000.000	1.330	1.330	1.330	1.330	1.330

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP A (OUT)

Scenario: 100-yr 3-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,025.000	1.330	1.330	1.330	1.330	1.330
1,050.000	1.330	1.330	1.330	1.330	1.330
1,075.000	1.330	1.330	1.330	1.330	1.330
1,100.000	1.330	1.330	1.330	1.330	1.330
1,125.000	1.330	1.330	1.330	1.330	1.330
1,150.000	1.330	1.330	1.330	1.330	1.330
1,175.000	1.330	1.330	1.330	1.330	1.330
1,200.000	1.330	1.330	1.330	1.330	1.330
1,225.000	1.330	1.330	1.330	1.330	1.330
1,250.000	1.330	1.330	1.330	1.330	1.330
1,275.000	1.330	1.330	1.330	1.330	1.330
1,300.000	1.330	1.330	1.330	1.330	1.330
1,325.000	1.330	1.330	1.330	1.330	1.330
1,350.000	1.330	1.330	1.330	1.330	1.330
1,375.000	1.330	1.330	1.330	1.330	1.330
1,400.000	1.330	1.330	1.330	1.330	1.330
1,425.000	1.330	1.330	1.330	1.330	1.330
1,450.000	1.330	1.330	1.330	1.330	1.330
1,475.000	1.330	1.330	1.330	1.330	1.330
1,500.000	1.330	1.330	1.330	1.330	1.330
1,525.000	1.330	1.330	1.330	1.330	1.330
1,550.000	1.330	1.330	1.330	1.330	1.330
1,575.000	1.330	1.330	1.330	1.330	1.330
1,600.000	1.330	1.330	1.330	1.330	1.330
1,625.000	1.330	1.330	1.330	1.330	1.330
1,650.000	1.330	1.330	1.330	1.330	1.330
1,675.000	1.330	1.330	1.330	1.330	1.330
1,700.000	1.330	1.330	1.330	1.330	1.330
1,725.000	1.330	1.330	1.330	1.330	1.330
1,750.000	1.330	1.330	1.330	1.330	1.330
1,775.000	1.330	1.330	1.330	1.330	1.330
1,800.000	1.330	1.330	1.330	1.330	1.330
1,825.000	1.330	1.330	1.330	1.330	1.330
1,850.000	1.330	1.330	1.330	1.330	1.330
1,875.000	1.330	1.330	1.330	1.330	1.330
1,900.000	1.330	1.330	1.330	1.330	1.330
1,925.000	1.330	1.330	1.330	1.330	1.330
1,950.000	1.330	1.330	1.330	1.330	1.330
1,975.000	1.330	1.330	1.330	1.330	1.330
2,000.000	1.330	1.330	1.330	1.330	1.330
2,025.000	1.330	1.330	1.330	1.330	1.330

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP A (OUT)

Scenario: 100-yr 3-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min
 Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,050.000	1.330	1.330	1.330	1.330	1.330
2,075.000	1.330	1.330	1.330	1.330	1.330
2,100.000	1.330	1.330	1.330	1.330	1.330
2,125.000	1.330	1.330	1.330	1.330	1.330
2,150.000	1.330	1.330	1.330	1.330	1.330
2,175.000	1.330	1.330	1.330	1.330	1.330
2,200.000	1.330	1.330	1.330	1.330	1.330
2,225.000	1.330	1.330	1.330	1.330	1.330
2,250.000	1.330	1.330	1.330	1.330	1.330
2,275.000	1.330	1.330	1.330	1.330	1.330
2,300.000	1.330	1.330	1.330	1.330	1.330
2,325.000	1.330	1.330	1.330	1.330	1.330
2,350.000	1.330	1.330	1.330	1.330	1.330
2,375.000	1.330	1.330	1.330	1.330	1.330
2,400.000	1.330	1.330	1.330	1.330	1.330
2,425.000	1.330	1.330	1.330	1.330	1.330
2,450.000	1.330	1.330	1.330	1.330	1.330
2,475.000	1.330	1.330	1.330	1.330	1.330
2,500.000	1.330	1.330	1.330	1.330	1.330
2,525.000	1.330	1.330	1.330	1.330	1.330
2,550.000	1.330	1.330	1.330	1.330	1.330
2,575.000	1.330	1.330	1.330	1.330	1.330
2,600.000	1.330	1.330	1.330	1.330	1.330
2,625.000	1.330	1.330	1.330	1.330	1.330
2,650.000	1.330	1.330	1.330	1.330	1.330
2,675.000	1.330	1.330	1.330	1.330	1.330
2,700.000	1.330	1.330	1.330	1.330	1.330
2,725.000	1.330	1.330	1.330	1.330	1.330
2,750.000	1.330	1.330	1.330	1.330	1.330
2,775.000	1.330	1.330	1.330	1.330	1.330
2,800.000	1.330	1.330	1.330	1.330	1.330
2,825.000	1.330	1.330	1.330	1.330	1.330
2,850.000	1.330	1.330	1.330	1.330	1.330
2,875.000	1.330	1.330	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation

Scenario: 100-yr 1-hr

Label: BMP C (OUT)

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	0.000	0.016	0.116	0.309	0.529
25.000	0.755	0.989	1.470	2.017	2.550
50.000	2.835	3.356	3.697	3.653	3.532
75.000	3.406	3.269	3.124	2.975	2.829
100.000	2.686	2.548	2.095	1.538	1.084
125.000	0.854	0.695	0.559	0.445	0.353
150.000	0.280	0.222	0.176	0.139	0.110
175.000	0.088	0.069	0.055	0.044	0.035
200.000	0.027	0.022	0.017	0.014	0.011
225.000	0.009	0.007	0.005	0.004	0.003
250.000	0.003	0.002	0.002	0.001	0.001
275.000	0.001	0.001	0.001	0.000	0.000
300.000	0.000	0.000	0.000	0.000	0.000
325.000	0.000	0.000	0.000	0.000	0.000
350.000	0.000	0.000	0.000	0.000	0.000
375.000	0.000	0.000	0.000	0.000	0.000
400.000	0.000	0.000	0.000	0.000	0.000
425.000	0.000	0.000	0.000	0.000	0.000
450.000	0.000	0.000	0.000	0.000	0.000
475.000	0.000	0.000	0.000	0.000	0.000
500.000	0.000	0.000	0.000	0.000	0.000
525.000	0.000	0.000	0.000	0.000	0.000
550.000	0.000	0.000	0.000	0.000	0.000
575.000	0.000	0.000	0.000	0.000	0.000
600.000	0.000	0.000	0.000	0.000	0.000
625.000	0.000	0.000	0.000	0.000	0.000
650.000	0.000	0.000	0.000	0.000	0.000
675.000	0.000	0.000	0.000	0.000	0.000
700.000	0.000	0.000	0.000	0.000	0.000
725.000	0.000	0.000	0.000	0.000	0.000
750.000	0.000	0.000	0.000	0.000	0.000
775.000	0.000	0.000	0.000	0.000	0.000
800.000	0.000	0.000	0.000	0.000	0.000
825.000	0.000	0.000	0.000	0.000	0.000
850.000	0.000	0.000	0.000	0.000	0.000
875.000	0.000	0.000	0.000	0.000	0.000
900.000	0.000	0.000	0.000	0.000	0.000
925.000	0.000	0.000	0.000	0.000	0.000
950.000	0.000	0.000	0.000	0.000	0.000
975.000	0.000	0.000	0.000	0.000	0.000
1,000.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP C (OUT)

Scenario: 100-yr 1-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,025.000	0.000	0.000	0.000	0.000	0.000
1,050.000	0.000	0.000	0.000	0.000	0.000
1,075.000	0.000	0.000	0.000	0.000	0.000
1,100.000	0.000	0.000	0.000	0.000	0.000
1,125.000	0.000	0.000	0.000	0.000	0.000
1,150.000	0.000	0.000	0.000	0.000	0.000
1,175.000	0.000	0.000	0.000	0.000	0.000
1,200.000	0.000	0.000	0.000	0.000	0.000
1,225.000	0.000	0.000	0.000	0.000	0.000
1,250.000	0.000	0.000	0.000	0.000	0.000
1,275.000	0.000	0.000	0.000	0.000	0.000
1,300.000	0.000	0.000	0.000	0.000	0.000
1,325.000	0.000	0.000	0.000	0.000	0.000
1,350.000	0.000	0.000	0.000	0.000	0.000
1,375.000	0.000	0.000	0.000	0.000	0.000
1,400.000	0.000	0.000	0.000	0.000	0.000
1,425.000	0.000	0.000	0.000	0.000	0.000
1,450.000	0.000	0.000	0.000	0.000	0.000
1,475.000	0.000	0.000	0.000	0.000	0.000
1,500.000	0.000	0.000	0.000	0.000	0.000
1,525.000	0.000	0.000	0.000	0.000	0.000
1,550.000	0.000	0.000	0.000	0.000	0.000
1,575.000	0.000	0.000	0.000	0.000	0.000
1,600.000	0.000	0.000	0.000	0.000	0.000
1,625.000	0.000	0.000	0.000	0.000	0.000
1,650.000	0.000	0.000	0.000	0.000	0.000
1,675.000	0.000	0.000	0.000	0.000	0.000
1,700.000	0.000	0.000	0.000	0.000	0.000
1,725.000	0.000	0.000	0.000	0.000	0.000
1,750.000	0.000	0.000	0.000	0.000	0.000
1,775.000	0.000	0.000	0.000	0.000	0.000
1,800.000	0.000	0.000	0.000	0.000	0.000
1,825.000	0.000	0.000	0.000	0.000	0.000
1,850.000	0.000	0.000	0.000	0.000	0.000
1,875.000	0.000	0.000	0.000	0.000	0.000
1,900.000	0.000	0.000	0.000	0.000	0.000
1,925.000	0.000	0.000	0.000	0.000	0.000
1,950.000	0.000	0.000	0.000	0.000	0.000
1,975.000	0.000	0.000	0.000	0.000	0.000
2,000.000	0.000	0.000	0.000	0.000	0.000
2,025.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP C (OUT)

Scenario: 100-yr 1-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,050.000	0.000	0.000	0.000	0.000	0.000
2,075.000	0.000	0.000	0.000	0.000	0.000
2,100.000	0.000	0.000	0.000	0.000	0.000
2,125.000	0.000	0.000	0.000	0.000	0.000
2,150.000	0.000	0.000	0.000	0.000	0.000
2,175.000	0.000	0.000	0.000	0.000	0.000
2,200.000	0.000	0.000	0.000	0.000	0.000
2,225.000	0.000	0.000	0.000	0.000	0.000
2,250.000	0.000	0.000	0.000	0.000	0.000
2,275.000	0.000	0.000	0.000	0.000	0.000
2,300.000	0.000	0.000	0.000	0.000	0.000
2,325.000	0.000	0.000	0.000	0.000	0.000
2,350.000	0.000	0.000	0.000	0.000	0.000
2,375.000	0.000	0.000	0.000	0.000	0.000
2,400.000	0.000	0.000	0.000	0.000	0.000
2,425.000	0.000	0.000	0.000	0.000	0.000
2,450.000	0.000	0.000	0.000	0.000	0.000
2,475.000	0.000	0.000	0.000	0.000	0.000
2,500.000	0.000	0.000	0.000	0.000	0.000
2,525.000	0.000	0.000	0.000	0.000	0.000
2,550.000	0.000	0.000	0.000	0.000	0.000
2,575.000	0.000	0.000	0.000	0.000	0.000
2,600.000	0.000	0.000	0.000	0.000	0.000
2,625.000	0.000	0.000	0.000	0.000	0.000
2,650.000	0.000	0.000	0.000	0.000	0.000
2,675.000	0.000	0.000	0.000	0.000	0.000
2,700.000	0.000	0.000	0.000	0.000	0.000
2,725.000	0.000	0.000	0.000	0.000	0.000
2,750.000	0.000	0.000	0.000	0.000	0.000
2,775.000	0.000	0.000	0.000	0.000	0.000
2,800.000	0.000	0.000	0.000	0.000	0.000
2,825.000	0.000	0.000	0.000	0.000	0.000
2,850.000	0.000	0.000	0.000	0.000	0.000
2,875.000	0.000	0.000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP C (OUT)

Scenario: 100-yr 24-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	0.000	0.001	0.006	0.014	0.022
25.000	0.031	0.041	0.050	0.057	0.063
50.000	0.067	0.074	0.081	0.087	0.090
75.000	0.090	0.089	0.088	0.087	0.087
100.000	0.086	0.086	0.086	0.088	0.092
125.000	0.096	0.099	0.101	0.102	0.104
150.000	0.105	0.107	0.111	0.117	0.123
175.000	0.127	0.131	0.134	0.136	0.138
200.000	0.140	0.141	0.142	0.142	0.143
225.000	0.143	0.144	0.145	0.149	0.153
250.000	0.157	0.159	0.163	0.168	0.173
275.000	0.177	0.182	0.187	0.191	0.195
300.000	0.201	0.206	0.206	0.202	0.198
325.000	0.196	0.195	0.196	0.199	0.204
350.000	0.210	0.214	0.217	0.220	0.224
375.000	0.231	0.235	0.239	0.242	0.246
400.000	0.251	0.257	0.263	0.268	0.273
425.000	0.277	0.279	0.282	0.284	0.289
450.000	0.297	0.305	0.317	0.331	0.344
475.000	0.359	0.376	0.393	0.416	0.443
500.000	0.467	0.488	0.505	0.520	0.539
525.000	0.559	0.580	0.602	0.626	0.650
550.000	0.679	0.714	0.748	0.782	0.816
575.000	0.847	0.880	0.912	0.943	0.974
600.000	1.011	1.055	1.036	0.979	0.936
625.000	0.896	0.860	0.834	0.832	0.852
650.000	0.877	0.902	0.925	0.945	0.957
675.000	0.963	0.967	0.970	0.972	0.973
700.000	0.966	0.951	0.936	0.927	0.924
725.000	0.929	0.964	1.047	1.166	1.277
750.000	1.379	1.470	1.562	1.657	1.744
775.000	1.827	1.906	1.985	2.095	2.234
800.000	2.367	2.487	2.520	2.538	2.536
825.000	2.513	2.424	2.289	2.168	2.070
850.000	2.020	2.011	2.014	2.014	2.008
875.000	2.001	1.992	1.985	1.979	1.966
900.000	1.948	1.930	1.905	1.873	1.842
925.000	1.808	1.773	1.732	1.666	1.574
950.000	1.485	1.410	1.351	1.278	1.104
975.000	0.921	0.789	0.668	0.562	0.472
1,000.000	0.395	0.332	0.281	0.240	0.208

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP C (OUT)

Scenario: 100-yr 24-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,025.000	0.184	0.168	0.160	0.155	0.153
1,050.000	0.152	0.150	0.149	0.148	0.146
1,075.000	0.142	0.138	0.134	0.130	0.126
1,100.000	0.122	0.120	0.117	0.116	0.113
1,125.000	0.108	0.103	0.097	0.089	0.083
1,150.000	0.080	0.080	0.081	0.084	0.089
1,175.000	0.093	0.095	0.094	0.092	0.088
1,200.000	0.082	0.078	0.076	0.076	0.078
1,225.000	0.079	0.080	0.081	0.082	0.083
1,250.000	0.083	0.081	0.077	0.073	0.072
1,275.000	0.073	0.076	0.075	0.072	0.070
1,300.000	0.069	0.071	0.074	0.074	0.071
1,325.000	0.069	0.068	0.070	0.073	0.073
1,350.000	0.071	0.068	0.067	0.066	0.064
1,375.000	0.064	0.063	0.062	0.062	0.062
1,400.000	0.061	0.061	0.061	0.061	0.061
1,425.000	0.061	0.061	0.061	0.061	0.059
1,450.000	0.053	0.045	0.037	0.029	0.023
1,475.000	0.018	0.015	0.012	0.009	0.007
1,500.000	0.006	0.005	0.004	0.003	0.002
1,525.000	0.002	0.001	0.001	0.001	0.001
1,550.000	0.001	0.000	0.000	0.000	0.000
1,575.000	0.000	0.000	0.000	0.000	0.000
1,600.000	0.000	0.000	0.000	0.000	0.000
1,625.000	0.000	0.000	0.000	0.000	0.000
1,650.000	0.000	0.000	0.000	0.000	0.000
1,675.000	0.000	0.000	0.000	0.000	0.000
1,700.000	0.000	0.000	0.000	0.000	0.000
1,725.000	0.000	0.000	0.000	0.000	0.000
1,750.000	0.000	0.000	0.000	0.000	0.000
1,775.000	0.000	0.000	0.000	0.000	0.000
1,800.000	0.000	0.000	0.000	0.000	0.000
1,825.000	0.000	0.000	0.000	0.000	0.000
1,850.000	0.000	0.000	0.000	0.000	0.000
1,875.000	0.000	0.000	0.000	0.000	0.000
1,900.000	0.000	0.000	0.000	0.000	0.000
1,925.000	0.000	0.000	0.000	0.000	0.000
1,950.000	0.000	0.000	0.000	0.000	0.000
1,975.000	0.000	0.000	0.000	0.000	0.000
2,000.000	0.000	0.000	0.000	0.000	0.000
2,025.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP C (OUT)

Scenario: 100-yr 24-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,050.000	0.000	0.000	0.000	0.000	0.000
2,075.000	0.000	0.000	0.000	0.000	0.000
2,100.000	0.000	0.000	0.000	0.000	0.000
2,125.000	0.000	0.000	0.000	0.000	0.000
2,150.000	0.000	0.000	0.000	0.000	0.000
2,175.000	0.000	0.000	0.000	0.000	0.000
2,200.000	0.000	0.000	0.000	0.000	0.000
2,225.000	0.000	0.000	0.000	0.000	0.000
2,250.000	0.000	0.000	0.000	0.000	0.000
2,275.000	0.000	0.000	0.000	0.000	0.000
2,300.000	0.000	0.000	0.000	0.000	0.000
2,325.000	0.000	0.000	0.000	0.000	0.000
2,350.000	0.000	0.000	0.000	0.000	0.000
2,375.000	0.000	0.000	0.000	0.000	0.000
2,400.000	0.000	0.000	0.000	0.000	0.000
2,425.000	0.000	0.000	0.000	0.000	0.000
2,450.000	0.000	0.000	0.000	0.000	0.000
2,475.000	0.000	0.000	0.000	0.000	0.000
2,500.000	0.000	0.000	0.000	0.000	0.000
2,525.000	0.000	0.000	0.000	0.000	0.000
2,550.000	0.000	0.000	0.000	0.000	0.000
2,575.000	0.000	0.000	0.000	0.000	0.000
2,600.000	0.000	0.000	0.000	0.000	0.000
2,625.000	0.000	0.000	0.000	0.000	0.000
2,650.000	0.000	0.000	0.000	0.000	0.000
2,675.000	0.000	0.000	0.000	0.000	0.000
2,700.000	0.000	0.000	0.000	0.000	0.000
2,725.000	0.000	0.000	0.000	0.000	0.000
2,750.000	0.000	0.000	0.000	0.000	0.000
2,775.000	0.000	0.000	0.000	0.000	0.000
2,800.000	0.000	0.000	0.000	0.000	0.000
2,825.000	0.000	0.000	0.000	0.000	0.000
2,850.000	0.000	0.000	0.000	0.000	0.000
2,875.000	0.000	0.000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP C (OUT)

Scenario: 100-yr 3-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	0.000	0.009	0.061	0.149	0.229
25.000	0.309	0.393	0.477	0.551	0.619
50.000	0.687	0.735	0.769	0.813	0.880
75.000	0.961	1.069	1.189	1.326	1.493
100.000	1.635	1.774	1.967	2.177	2.342
125.000	2.476	2.527	2.587	2.680	2.780
150.000	2.925	3.144	3.399	3.573	3.579
175.000	3.514	3.451	3.358	3.231	3.088
200.000	2.943	2.799	2.658	2.520	1.971
225.000	1.435	1.000	0.819	0.665	0.534
250.000	0.424	0.336	0.267	0.211	0.167
275.000	0.133	0.105	0.083	0.066	0.052
300.000	0.042	0.033	0.026	0.021	0.016
325.000	0.013	0.010	0.008	0.006	0.005
350.000	0.004	0.003	0.003	0.002	0.002
375.000	0.001	0.001	0.001	0.001	0.001
400.000	0.000	0.000	0.000	0.000	0.000
425.000	0.000	0.000	0.000	0.000	0.000
450.000	0.000	0.000	0.000	0.000	0.000
475.000	0.000	0.000	0.000	0.000	0.000
500.000	0.000	0.000	0.000	0.000	0.000
525.000	0.000	0.000	0.000	0.000	0.000
550.000	0.000	0.000	0.000	0.000	0.000
575.000	0.000	0.000	0.000	0.000	0.000
600.000	0.000	0.000	0.000	0.000	0.000
625.000	0.000	0.000	0.000	0.000	0.000
650.000	0.000	0.000	0.000	0.000	0.000
675.000	0.000	0.000	0.000	0.000	0.000
700.000	0.000	0.000	0.000	0.000	0.000
725.000	0.000	0.000	0.000	0.000	0.000
750.000	0.000	0.000	0.000	0.000	0.000
775.000	0.000	0.000	0.000	0.000	0.000
800.000	0.000	0.000	0.000	0.000	0.000
825.000	0.000	0.000	0.000	0.000	0.000
850.000	0.000	0.000	0.000	0.000	0.000
875.000	0.000	0.000	0.000	0.000	0.000
900.000	0.000	0.000	0.000	0.000	0.000
925.000	0.000	0.000	0.000	0.000	0.000
950.000	0.000	0.000	0.000	0.000	0.000
975.000	0.000	0.000	0.000	0.000	0.000
1,000.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP C (OUT)

Scenario: 100-yr 3-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,025.000	0.000	0.000	0.000	0.000	0.000
1,050.000	0.000	0.000	0.000	0.000	0.000
1,075.000	0.000	0.000	0.000	0.000	0.000
1,100.000	0.000	0.000	0.000	0.000	0.000
1,125.000	0.000	0.000	0.000	0.000	0.000
1,150.000	0.000	0.000	0.000	0.000	0.000
1,175.000	0.000	0.000	0.000	0.000	0.000
1,200.000	0.000	0.000	0.000	0.000	0.000
1,225.000	0.000	0.000	0.000	0.000	0.000
1,250.000	0.000	0.000	0.000	0.000	0.000
1,275.000	0.000	0.000	0.000	0.000	0.000
1,300.000	0.000	0.000	0.000	0.000	0.000
1,325.000	0.000	0.000	0.000	0.000	0.000
1,350.000	0.000	0.000	0.000	0.000	0.000
1,375.000	0.000	0.000	0.000	0.000	0.000
1,400.000	0.000	0.000	0.000	0.000	0.000
1,425.000	0.000	0.000	0.000	0.000	0.000
1,450.000	0.000	0.000	0.000	0.000	0.000
1,475.000	0.000	0.000	0.000	0.000	0.000
1,500.000	0.000	0.000	0.000	0.000	0.000
1,525.000	0.000	0.000	0.000	0.000	0.000
1,550.000	0.000	0.000	0.000	0.000	0.000
1,575.000	0.000	0.000	0.000	0.000	0.000
1,600.000	0.000	0.000	0.000	0.000	0.000
1,625.000	0.000	0.000	0.000	0.000	0.000
1,650.000	0.000	0.000	0.000	0.000	0.000
1,675.000	0.000	0.000	0.000	0.000	0.000
1,700.000	0.000	0.000	0.000	0.000	0.000
1,725.000	0.000	0.000	0.000	0.000	0.000
1,750.000	0.000	0.000	0.000	0.000	0.000
1,775.000	0.000	0.000	0.000	0.000	0.000
1,800.000	0.000	0.000	0.000	0.000	0.000
1,825.000	0.000	0.000	0.000	0.000	0.000
1,850.000	0.000	0.000	0.000	0.000	0.000
1,875.000	0.000	0.000	0.000	0.000	0.000
1,900.000	0.000	0.000	0.000	0.000	0.000
1,925.000	0.000	0.000	0.000	0.000	0.000
1,950.000	0.000	0.000	0.000	0.000	0.000
1,975.000	0.000	0.000	0.000	0.000	0.000
2,000.000	0.000	0.000	0.000	0.000	0.000
2,025.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Elevation
 Label: BMP C (OUT)

Scenario: 100-yr 3-hr

Time vs. Elevation (ft)

Output Time increment = 5.000 min
 Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,050.000	0.000	0.000	0.000	0.000	0.000
2,075.000	0.000	0.000	0.000	0.000	0.000
2,100.000	0.000	0.000	0.000	0.000	0.000
2,125.000	0.000	0.000	0.000	0.000	0.000
2,150.000	0.000	0.000	0.000	0.000	0.000
2,175.000	0.000	0.000	0.000	0.000	0.000
2,200.000	0.000	0.000	0.000	0.000	0.000
2,225.000	0.000	0.000	0.000	0.000	0.000
2,250.000	0.000	0.000	0.000	0.000	0.000
2,275.000	0.000	0.000	0.000	0.000	0.000
2,300.000	0.000	0.000	0.000	0.000	0.000
2,325.000	0.000	0.000	0.000	0.000	0.000
2,350.000	0.000	0.000	0.000	0.000	0.000
2,375.000	0.000	0.000	0.000	0.000	0.000
2,400.000	0.000	0.000	0.000	0.000	0.000
2,425.000	0.000	0.000	0.000	0.000	0.000
2,450.000	0.000	0.000	0.000	0.000	0.000
2,475.000	0.000	0.000	0.000	0.000	0.000
2,500.000	0.000	0.000	0.000	0.000	0.000
2,525.000	0.000	0.000	0.000	0.000	0.000
2,550.000	0.000	0.000	0.000	0.000	0.000
2,575.000	0.000	0.000	0.000	0.000	0.000
2,600.000	0.000	0.000	0.000	0.000	0.000
2,625.000	0.000	0.000	0.000	0.000	0.000
2,650.000	0.000	0.000	0.000	0.000	0.000
2,675.000	0.000	0.000	0.000	0.000	0.000
2,700.000	0.000	0.000	0.000	0.000	0.000
2,725.000	0.000	0.000	0.000	0.000	0.000
2,750.000	0.000	0.000	0.000	0.000	0.000
2,775.000	0.000	0.000	0.000	0.000	0.000
2,800.000	0.000	0.000	0.000	0.000	0.000
2,825.000	0.000	0.000	0.000	0.000	0.000
2,850.000	0.000	0.000	0.000	0.000	0.000
2,875.000	0.000	0.000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume

Scenario: 100-yr 1-hr

Label: BMP A

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
0.000	0.000	0.000	0.000	0.000	1,898.000
25.000	4,272.000	5,684.000	7,027.000	8,334.000	9,939.000
50.000	12,555.000	16,107.000	17,045.000	15,369.000	13,533.000
75.000	11,856.000	10,612.000	9,367.000	8,243.000	7,289.000
100.000	6,551.000	6,004.000	5,561.000	5,230.000	4,963.000
125.000	4,724.000	4,527.000	4,370.000	4,249.000	4,150.000
150.000	4,064.000	3,987.000	3,924.000	3,872.000	3,829.000
175.000	3,794.000	3,763.000	3,733.000	3,706.000	3,679.000
200.000	3,654.000	3,629.000	3,606.000	3,584.000	3,563.000
225.000	3,542.000	3,523.000	3,505.000	3,487.000	3,470.000
250.000	3,455.000	3,441.000	3,428.000	3,416.000	3,404.000
275.000	3,392.000	3,381.000	3,371.000	3,361.000	3,351.000
300.000	3,342.000	3,333.000	3,325.000	3,317.000	3,309.000
325.000	3,302.000	3,295.000	3,288.000	3,282.000	3,276.000
350.000	3,270.000	3,265.000	3,259.000	3,254.000	3,249.000
375.000	3,245.000	3,240.000	3,236.000	3,232.000	3,228.000
400.000	3,224.000	3,221.000	3,218.000	3,214.000	3,211.000
425.000	3,208.000	3,206.000	3,203.000	3,200.000	3,198.000
450.000	3,195.000	3,193.000	3,191.000	3,189.000	3,187.000
475.000	3,185.000	3,183.000	3,182.000	3,180.000	3,178.000
500.000	3,177.000	3,176.000	3,174.000	3,173.000	3,172.000
525.000	3,170.000	3,169.000	3,168.000	3,167.000	3,166.000
550.000	3,165.000	3,164.000	3,163.000	3,163.000	3,162.000
575.000	3,161.000	3,160.000	3,160.000	3,159.000	3,158.000
600.000	3,158.000	3,157.000	3,157.000	3,156.000	3,156.000
625.000	3,155.000	3,155.000	3,154.000	3,154.000	3,153.000
650.000	3,153.000	3,153.000	3,152.000	3,152.000	3,152.000
675.000	3,151.000	3,151.000	3,151.000	3,151.000	3,150.000
700.000	3,150.000	3,150.000	3,150.000	3,149.000	3,149.000
725.000	3,149.000	3,149.000	3,149.000	3,148.000	3,148.000
750.000	3,148.000	3,148.000	3,148.000	3,148.000	3,148.000
775.000	3,147.000	3,147.000	3,147.000	3,147.000	3,147.000
800.000	3,147.000	3,147.000	3,147.000	3,147.000	3,147.000
825.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000
850.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000
875.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000
900.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000
925.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
950.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
975.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,000.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP A

Scenario: 100-yr 1-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
1,025.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,050.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,075.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,100.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,125.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,150.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,175.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,200.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,225.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,250.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,275.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,300.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,325.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,350.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,375.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,400.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,425.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,450.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,475.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,500.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,525.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,550.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,575.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,600.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,625.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,650.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,675.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,700.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,725.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,750.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,775.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,800.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,825.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,850.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,875.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,900.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,925.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,950.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,975.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,000.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,025.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
Label: BMP A

Scenario: 100-yr 1-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
2,050.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,075.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,100.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,125.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,150.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,175.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,200.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,225.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,250.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,275.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,300.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,325.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,350.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,375.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,400.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,425.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,450.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,475.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,500.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,525.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,550.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,575.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,600.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,625.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,650.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,675.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,700.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,725.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,750.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,775.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,800.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,825.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,850.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,875.000	3,145.000	3,145.000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
Label: BMP A

Scenario: 100-yr 24-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
0.000	0.000	0.000	0.000	0.000	0.000
25.000	0.000	0.000	0.000	0.000	0.000
50.000	0.000	0.000	0.000	0.000	0.000
75.000	0.000	0.000	0.000	0.000	0.000
100.000	0.000	0.000	0.000	0.000	0.000
125.000	0.000	0.000	0.000	0.000	0.000
150.000	394.000	846.000	1,335.000	1,867.000	2,418.000
175.000	2,974.000	3,231.000	3,352.000	3,468.000	3,592.000
200.000	3,711.000	3,821.000	3,916.000	3,995.000	4,060.000
225.000	4,112.000	4,152.000	4,194.000	4,236.000	4,276.000
250.000	4,309.000	4,337.000	4,361.000	4,389.000	4,421.000
275.000	4,454.000	4,483.000	4,508.000	4,529.000	4,555.000
300.000	4,587.000	4,613.000	4,618.000	4,603.000	4,586.000
325.000	4,579.000	4,583.000	4,590.000	4,605.000	4,628.000
350.000	4,651.000	4,672.000	4,689.000	4,705.000	4,726.000
375.000	4,754.000	4,781.000	4,804.000	4,824.000	4,842.000
400.000	4,865.000	4,894.000	4,922.000	4,947.000	4,967.000
425.000	4,984.000	4,998.000	5,010.000	5,022.000	5,048.000
450.000	5,084.000	5,123.000	5,174.000	5,233.000	5,292.000
475.000	5,359.000	5,442.000	5,525.000	5,632.000	5,758.000
500.000	5,869.000	5,958.000	6,024.000	6,075.000	6,128.000
525.000	6,186.000	6,238.000	6,295.000	6,360.000	6,424.000
550.000	6,510.000	6,611.000	6,704.000	6,797.000	6,885.000
575.000	6,959.000	7,029.000	7,097.000	7,158.000	7,222.000
600.000	7,294.000	7,333.000	7,248.000	7,083.000	6,921.000
625.000	6,771.000	6,654.000	6,582.000	6,613.000	6,724.000
650.000	6,839.000	6,937.000	7,007.000	7,060.000	7,085.000
675.000	7,090.000	7,089.000	7,087.000	7,086.000	7,078.000
700.000	7,044.000	6,988.000	6,939.000	6,911.000	6,905.000
725.000	6,932.000	7,058.000	7,266.000	7,485.000	7,693.000
750.000	7,888.000	8,053.000	8,238.000	8,444.000	8,636.000
775.000	8,816.000	8,974.000	9,140.000	9,382.000	9,690.000
800.000	9,960.000	10,237.000	10,485.000	10,649.000	10,613.000
825.000	10,379.000	10,095.000	9,835.000	9,606.000	9,398.000
850.000	9,292.000	9,277.000	9,287.000	9,288.000	9,275.000
875.000	9,260.000	9,245.000	9,233.000	9,220.000	9,191.000
900.000	9,150.000	9,107.000	9,052.000	8,992.000	8,933.000
925.000	8,864.000	8,790.000	8,701.000	8,551.000	8,348.000
950.000	8,151.000	7,993.000	7,858.000	7,676.000	7,291.000
975.000	6,789.000	6,297.000	5,931.000	5,615.000	5,362.000
1,000.000	5,165.000	4,985.000	4,821.000	4,683.000	4,570.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP A

Scenario: 100-yr 24-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
1,025.000	4,480.000	4,425.000	4,401.000	4,386.000	4,376.000
1,050.000	4,369.000	4,364.000	4,359.000	4,355.000	4,351.000
1,075.000	4,340.000	4,321.000	4,302.000	4,286.000	4,272.000
1,100.000	4,260.000	4,251.000	4,243.000	4,235.000	4,221.000
1,125.000	4,200.000	4,178.000	4,151.000	4,120.000	4,092.000
1,150.000	4,074.000	4,067.000	4,068.000	4,078.000	4,097.000
1,175.000	4,113.000	4,119.000	4,116.000	4,109.000	4,092.000
1,200.000	4,069.000	4,047.000	4,037.000	4,037.000	4,041.000
1,225.000	4,046.000	4,051.000	4,054.000	4,057.000	4,059.000
1,250.000	4,060.000	4,051.000	4,035.000	4,019.000	4,014.000
1,275.000	4,018.000	4,023.000	4,020.000	4,008.000	3,998.000
1,300.000	3,996.000	4,003.000	4,010.000	4,009.000	4,000.000
1,325.000	3,991.000	3,990.000	3,998.000	4,007.000	4,006.000
1,350.000	3,997.000	3,986.000	3,974.000	3,965.000	3,958.000
1,375.000	3,951.000	3,946.000	3,942.000	3,939.000	3,936.000
1,400.000	3,933.000	3,931.000	3,930.000	3,928.000	3,927.000
1,425.000	3,926.000	3,925.000	3,925.000	3,924.000	3,920.000
1,450.000	3,897.000	3,860.000	3,823.000	3,790.000	3,759.000
1,475.000	3,730.000	3,703.000	3,676.000	3,651.000	3,627.000
1,500.000	3,604.000	3,582.000	3,561.000	3,540.000	3,521.000
1,525.000	3,503.000	3,485.000	3,468.000	3,454.000	3,440.000
1,550.000	3,427.000	3,414.000	3,402.000	3,391.000	3,380.000
1,575.000	3,370.000	3,360.000	3,350.000	3,341.000	3,332.000
1,600.000	3,324.000	3,316.000	3,309.000	3,301.000	3,294.000
1,625.000	3,288.000	3,281.000	3,275.000	3,270.000	3,264.000
1,650.000	3,259.000	3,254.000	3,249.000	3,244.000	3,240.000
1,675.000	3,236.000	3,232.000	3,228.000	3,224.000	3,221.000
1,700.000	3,217.000	3,214.000	3,211.000	3,208.000	3,205.000
1,725.000	3,203.000	3,200.000	3,198.000	3,195.000	3,193.000
1,750.000	3,191.000	3,189.000	3,187.000	3,185.000	3,183.000
1,775.000	3,182.000	3,180.000	3,178.000	3,177.000	3,175.000
1,800.000	3,174.000	3,173.000	3,172.000	3,170.000	3,169.000
1,825.000	3,168.000	3,167.000	3,166.000	3,165.000	3,164.000
1,850.000	3,163.000	3,163.000	3,162.000	3,161.000	3,160.000
1,875.000	3,160.000	3,159.000	3,158.000	3,158.000	3,157.000
1,900.000	3,157.000	3,156.000	3,156.000	3,155.000	3,155.000
1,925.000	3,154.000	3,154.000	3,153.000	3,153.000	3,153.000
1,950.000	3,152.000	3,152.000	3,152.000	3,151.000	3,151.000
1,975.000	3,151.000	3,151.000	3,150.000	3,150.000	3,150.000
2,000.000	3,150.000	3,149.000	3,149.000	3,149.000	3,149.000
2,025.000	3,149.000	3,148.000	3,148.000	3,148.000	3,148.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP A

Scenario: 100-yr 24-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
2,050.000	3,148.000	3,148.000	3,148.000	3,147.000	3,147.000
2,075.000	3,147.000	3,147.000	3,147.000	3,147.000	3,147.000
2,100.000	3,147.000	3,147.000	3,147.000	3,146.000	3,146.000
2,125.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000
2,150.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000
2,175.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000
2,200.000	3,146.000	3,146.000	3,146.000	3,145.000	3,145.000
2,225.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,250.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,275.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,300.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,325.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,350.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,375.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,400.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,425.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,450.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,475.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,500.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,525.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,550.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,575.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,600.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,625.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,650.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,675.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,700.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,725.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,750.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,775.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,800.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,825.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,850.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,875.000	3,145.000	3,145.000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP A

Scenario: 100-yr 3-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min
 Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
0.000	0.000	0.000	0.000	0.000	0.000
25.000	0.000	475.000	3,243.000	4,003.000	4,665.000
50.000	5,256.000	5,709.000	6,050.000	6,331.000	6,685.000
75.000	7,033.000	7,302.000	7,519.000	7,782.000	8,100.000
100.000	8,399.000	8,704.000	9,089.000	9,550.000	9,897.000
125.000	10,199.000	10,545.000	11,093.000	11,929.000	12,558.000
150.000	13,181.000	14,052.000	14,886.000	15,134.000	14,272.000
175.000	12,943.000	11,978.000	11,132.000	10,026.000	8,903.000
200.000	7,881.000	7,013.000	6,324.000	5,834.000	5,430.000
225.000	5,133.000	4,873.000	4,650.000	4,465.000	4,324.000
250.000	4,212.000	4,119.000	4,035.000	3,963.000	3,905.000
275.000	3,856.000	3,816.000	3,782.000	3,752.000	3,724.000
300.000	3,696.000	3,670.000	3,645.000	3,621.000	3,598.000
325.000	3,577.000	3,556.000	3,536.000	3,517.000	3,498.000
350.000	3,481.000	3,464.000	3,450.000	3,437.000	3,424.000
375.000	3,411.000	3,400.000	3,388.000	3,378.000	3,367.000
400.000	3,357.000	3,348.000	3,339.000	3,330.000	3,322.000
425.000	3,314.000	3,307.000	3,300.000	3,293.000	3,286.000
450.000	3,280.000	3,274.000	3,268.000	3,263.000	3,258.000
475.000	3,253.000	3,248.000	3,243.000	3,239.000	3,235.000
500.000	3,231.000	3,227.000	3,223.000	3,220.000	3,216.000
525.000	3,213.000	3,210.000	3,207.000	3,205.000	3,202.000
550.000	3,199.000	3,197.000	3,195.000	3,192.000	3,190.000
575.000	3,188.000	3,186.000	3,185.000	3,183.000	3,181.000
600.000	3,180.000	3,178.000	3,176.000	3,175.000	3,174.000
625.000	3,172.000	3,171.000	3,170.000	3,169.000	3,168.000
650.000	3,167.000	3,166.000	3,165.000	3,164.000	3,163.000
675.000	3,162.000	3,162.000	3,161.000	3,160.000	3,159.000
700.000	3,159.000	3,158.000	3,158.000	3,157.000	3,156.000
725.000	3,156.000	3,155.000	3,155.000	3,155.000	3,154.000
750.000	3,154.000	3,153.000	3,153.000	3,153.000	3,152.000
775.000	3,152.000	3,152.000	3,151.000	3,151.000	3,151.000
800.000	3,150.000	3,150.000	3,150.000	3,150.000	3,150.000
825.000	3,149.000	3,149.000	3,149.000	3,149.000	3,149.000
850.000	3,148.000	3,148.000	3,148.000	3,148.000	3,148.000
875.000	3,148.000	3,148.000	3,147.000	3,147.000	3,147.000
900.000	3,147.000	3,147.000	3,147.000	3,147.000	3,147.000
925.000	3,147.000	3,147.000	3,146.000	3,146.000	3,146.000
950.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000
975.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000
1,000.000	3,146.000	3,146.000	3,146.000	3,146.000	3,146.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP A

Scenario: 100-yr 3-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
1,025.000	3,146.000	3,146.000	3,145.000	3,145.000	3,145.000
1,050.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,075.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,100.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,125.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,150.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,175.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,200.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,225.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,250.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,275.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,300.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,325.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,350.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,375.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,400.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,425.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,450.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,475.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,500.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,525.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,550.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,575.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,600.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,625.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,650.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,675.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,700.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,725.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,750.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,775.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,800.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,825.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,850.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,875.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,900.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,925.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,950.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
1,975.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,000.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,025.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP A

Scenario: 100-yr 3-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
2,050.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,075.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,100.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,125.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,150.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,175.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,200.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,225.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,250.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,275.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,300.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,325.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,350.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,375.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,400.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,425.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,450.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,475.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,500.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,525.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,550.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,575.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,600.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,625.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,650.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,675.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,700.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,725.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,750.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,775.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,800.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,825.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,850.000	3,145.000	3,145.000	3,145.000	3,145.000	3,145.000
2,875.000	3,145.000	3,145.000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP C

Scenario: 100-yr 1-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
0.000	0.000	17.000	124.000	331.000	567.000
25.000	809.000	1,060.000	1,326.000	1,619.000	2,000.000
50.000	2,764.000	4,160.000	5,075.000	4,958.000	4,633.000
75.000	4,294.000	3,928.000	3,538.000	3,140.000	2,747.000
100.000	2,366.000	1,994.000	1,662.000	1,363.000	1,119.000
125.000	916.000	745.000	599.000	477.000	378.000
150.000	300.000	238.000	188.000	149.000	118.000
175.000	94.000	74.000	59.000	47.000	37.000
200.000	29.000	23.000	18.000	15.000	12.000
225.000	9.000	7.000	6.000	5.000	4.000
250.000	3.000	2.000	2.000	1.000	1.000
275.000	1.000	1.000	1.000	0.000	0.000
300.000	0.000	0.000	0.000	0.000	0.000
325.000	0.000	0.000	0.000	0.000	0.000
350.000	0.000	0.000	0.000	0.000	0.000
375.000	0.000	0.000	0.000	0.000	0.000
400.000	0.000	0.000	0.000	0.000	0.000
425.000	0.000	0.000	0.000	0.000	0.000
450.000	0.000	0.000	0.000	0.000	0.000
475.000	0.000	0.000	0.000	0.000	0.000
500.000	0.000	0.000	0.000	0.000	0.000
525.000	0.000	0.000	0.000	0.000	0.000
550.000	0.000	0.000	0.000	0.000	0.000
575.000	0.000	0.000	0.000	0.000	0.000
600.000	0.000	0.000	0.000	0.000	0.000
625.000	0.000	0.000	0.000	0.000	0.000
650.000	0.000	0.000	0.000	0.000	0.000
675.000	0.000	0.000	0.000	0.000	0.000
700.000	0.000	0.000	0.000	0.000	0.000
725.000	0.000	0.000	0.000	0.000	0.000
750.000	0.000	0.000	0.000	0.000	0.000
775.000	0.000	0.000	0.000	0.000	0.000
800.000	0.000	0.000	0.000	0.000	0.000
825.000	0.000	0.000	0.000	0.000	0.000
850.000	0.000	0.000	0.000	0.000	0.000
875.000	0.000	0.000	0.000	0.000	0.000
900.000	0.000	0.000	0.000	0.000	0.000
925.000	0.000	0.000	0.000	0.000	0.000
950.000	0.000	0.000	0.000	0.000	0.000
975.000	0.000	0.000	0.000	0.000	0.000
1,000.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
Label: BMP C

Scenario: 100-yr 1-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
1,025.000	0.000	0.000	0.000	0.000	0.000
1,050.000	0.000	0.000	0.000	0.000	0.000
1,075.000	0.000	0.000	0.000	0.000	0.000
1,100.000	0.000	0.000	0.000	0.000	0.000
1,125.000	0.000	0.000	0.000	0.000	0.000
1,150.000	0.000	0.000	0.000	0.000	0.000
1,175.000	0.000	0.000	0.000	0.000	0.000
1,200.000	0.000	0.000	0.000	0.000	0.000
1,225.000	0.000	0.000	0.000	0.000	0.000
1,250.000	0.000	0.000	0.000	0.000	0.000
1,275.000	0.000	0.000	0.000	0.000	0.000
1,300.000	0.000	0.000	0.000	0.000	0.000
1,325.000	0.000	0.000	0.000	0.000	0.000
1,350.000	0.000	0.000	0.000	0.000	0.000
1,375.000	0.000	0.000	0.000	0.000	0.000
1,400.000	0.000	0.000	0.000	0.000	0.000
1,425.000	0.000	0.000	0.000	0.000	0.000
1,450.000	0.000	0.000	0.000	0.000	0.000
1,475.000	0.000	0.000	0.000	0.000	0.000
1,500.000	0.000	0.000	0.000	0.000	0.000
1,525.000	0.000	0.000	0.000	0.000	0.000
1,550.000	0.000	0.000	0.000	0.000	0.000
1,575.000	0.000	0.000	0.000	0.000	0.000
1,600.000	0.000	0.000	0.000	0.000	0.000
1,625.000	0.000	0.000	0.000	0.000	0.000
1,650.000	0.000	0.000	0.000	0.000	0.000
1,675.000	0.000	0.000	0.000	0.000	0.000
1,700.000	0.000	0.000	0.000	0.000	0.000
1,725.000	0.000	0.000	0.000	0.000	0.000
1,750.000	0.000	0.000	0.000	0.000	0.000
1,775.000	0.000	0.000	0.000	0.000	0.000
1,800.000	0.000	0.000	0.000	0.000	0.000
1,825.000	0.000	0.000	0.000	0.000	0.000
1,850.000	0.000	0.000	0.000	0.000	0.000
1,875.000	0.000	0.000	0.000	0.000	0.000
1,900.000	0.000	0.000	0.000	0.000	0.000
1,925.000	0.000	0.000	0.000	0.000	0.000
1,950.000	0.000	0.000	0.000	0.000	0.000
1,975.000	0.000	0.000	0.000	0.000	0.000
2,000.000	0.000	0.000	0.000	0.000	0.000
2,025.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP C

Scenario: 100-yr 1-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
2,050.000	0.000	0.000	0.000	0.000	0.000
2,075.000	0.000	0.000	0.000	0.000	0.000
2,100.000	0.000	0.000	0.000	0.000	0.000
2,125.000	0.000	0.000	0.000	0.000	0.000
2,150.000	0.000	0.000	0.000	0.000	0.000
2,175.000	0.000	0.000	0.000	0.000	0.000
2,200.000	0.000	0.000	0.000	0.000	0.000
2,225.000	0.000	0.000	0.000	0.000	0.000
2,250.000	0.000	0.000	0.000	0.000	0.000
2,275.000	0.000	0.000	0.000	0.000	0.000
2,300.000	0.000	0.000	0.000	0.000	0.000
2,325.000	0.000	0.000	0.000	0.000	0.000
2,350.000	0.000	0.000	0.000	0.000	0.000
2,375.000	0.000	0.000	0.000	0.000	0.000
2,400.000	0.000	0.000	0.000	0.000	0.000
2,425.000	0.000	0.000	0.000	0.000	0.000
2,450.000	0.000	0.000	0.000	0.000	0.000
2,475.000	0.000	0.000	0.000	0.000	0.000
2,500.000	0.000	0.000	0.000	0.000	0.000
2,525.000	0.000	0.000	0.000	0.000	0.000
2,550.000	0.000	0.000	0.000	0.000	0.000
2,575.000	0.000	0.000	0.000	0.000	0.000
2,600.000	0.000	0.000	0.000	0.000	0.000
2,625.000	0.000	0.000	0.000	0.000	0.000
2,650.000	0.000	0.000	0.000	0.000	0.000
2,675.000	0.000	0.000	0.000	0.000	0.000
2,700.000	0.000	0.000	0.000	0.000	0.000
2,725.000	0.000	0.000	0.000	0.000	0.000
2,750.000	0.000	0.000	0.000	0.000	0.000
2,775.000	0.000	0.000	0.000	0.000	0.000
2,800.000	0.000	0.000	0.000	0.000	0.000
2,825.000	0.000	0.000	0.000	0.000	0.000
2,850.000	0.000	0.000	0.000	0.000	0.000
2,875.000	0.000	0.000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
Label: BMP C

Scenario: 100-yr 24-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
0.000	0.000	1.000	6.000	15.000	24.000
25.000	34.000	44.000	54.000	61.000	68.000
50.000	72.000	79.000	87.000	93.000	97.000
75.000	97.000	95.000	94.000	94.000	93.000
100.000	93.000	92.000	92.000	94.000	99.000
125.000	103.000	106.000	108.000	110.000	111.000
150.000	112.000	115.000	119.000	125.000	132.000
175.000	137.000	141.000	144.000	146.000	148.000
200.000	150.000	151.000	152.000	153.000	153.000
225.000	154.000	154.000	156.000	160.000	164.000
250.000	168.000	171.000	174.000	180.000	186.000
275.000	190.000	195.000	200.000	205.000	209.000
300.000	216.000	221.000	221.000	217.000	212.000
325.000	210.000	209.000	210.000	214.000	219.000
350.000	225.000	229.000	233.000	236.000	241.000
375.000	247.000	252.000	257.000	260.000	264.000
400.000	270.000	276.000	282.000	288.000	293.000
425.000	297.000	300.000	302.000	304.000	309.000
450.000	318.000	327.000	340.000	354.000	368.000
475.000	385.000	403.000	422.000	446.000	474.000
500.000	501.000	524.000	542.000	558.000	577.000
525.000	600.000	621.000	645.000	671.000	696.000
550.000	727.000	765.000	801.000	838.000	874.000
575.000	908.000	943.000	978.000	1,011.000	1,044.000
600.000	1,081.000	1,104.000	1,094.000	1,050.000	1,004.000
625.000	960.000	922.000	894.000	891.000	913.000
650.000	940.000	967.000	992.000	1,013.000	1,026.000
675.000	1,033.000	1,036.000	1,040.000	1,042.000	1,043.000
700.000	1,036.000	1,020.000	1,003.000	993.000	990.000
725.000	996.000	1,033.000	1,100.000	1,164.000	1,223.000
750.000	1,277.000	1,326.000	1,376.000	1,427.000	1,473.000
775.000	1,518.000	1,560.000	1,602.000	1,662.000	1,736.000
800.000	1,807.000	1,872.000	1,919.000	1,968.000	1,963.000
825.000	1,902.000	1,838.000	1,765.000	1,701.000	1,648.000
850.000	1,621.000	1,617.000	1,618.000	1,618.000	1,615.000
875.000	1,611.000	1,606.000	1,602.000	1,599.000	1,592.000
900.000	1,582.000	1,573.000	1,559.000	1,543.000	1,526.000
925.000	1,508.000	1,489.000	1,467.000	1,431.000	1,382.000
950.000	1,334.000	1,294.000	1,262.000	1,223.000	1,130.000
975.000	987.000	846.000	716.000	603.000	505.000
1,000.000	424.000	356.000	301.000	257.000	223.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP C

Scenario: 100-yr 24-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
1,025.000	197.000	180.000	171.000	167.000	164.000
1,050.000	162.000	161.000	160.000	159.000	157.000
1,075.000	153.000	148.000	144.000	140.000	135.000
1,100.000	131.000	128.000	126.000	124.000	121.000
1,125.000	116.000	111.000	104.000	96.000	89.000
1,150.000	86.000	85.000	87.000	90.000	96.000
1,175.000	100.000	102.000	101.000	99.000	95.000
1,200.000	88.000	84.000	81.000	82.000	84.000
1,225.000	85.000	86.000	87.000	88.000	89.000
1,250.000	89.000	87.000	82.000	79.000	77.000
1,275.000	79.000	81.000	80.000	77.000	75.000
1,300.000	74.000	76.000	79.000	79.000	76.000
1,325.000	74.000	73.000	75.000	79.000	78.000
1,350.000	76.000	73.000	72.000	70.000	69.000
1,375.000	68.000	68.000	67.000	67.000	66.000
1,400.000	66.000	66.000	66.000	65.000	65.000
1,425.000	65.000	65.000	65.000	65.000	64.000
1,450.000	57.000	48.000	39.000	31.000	25.000
1,475.000	20.000	16.000	12.000	10.000	8.000
1,500.000	6.000	5.000	4.000	3.000	2.000
1,525.000	2.000	2.000	1.000	1.000	1.000
1,550.000	1.000	0.000	0.000	0.000	0.000
1,575.000	0.000	0.000	0.000	0.000	0.000
1,600.000	0.000	0.000	0.000	0.000	0.000
1,625.000	0.000	0.000	0.000	0.000	0.000
1,650.000	0.000	0.000	0.000	0.000	0.000
1,675.000	0.000	0.000	0.000	0.000	0.000
1,700.000	0.000	0.000	0.000	0.000	0.000
1,725.000	0.000	0.000	0.000	0.000	0.000
1,750.000	0.000	0.000	0.000	0.000	0.000
1,775.000	0.000	0.000	0.000	0.000	0.000
1,800.000	0.000	0.000	0.000	0.000	0.000
1,825.000	0.000	0.000	0.000	0.000	0.000
1,850.000	0.000	0.000	0.000	0.000	0.000
1,875.000	0.000	0.000	0.000	0.000	0.000
1,900.000	0.000	0.000	0.000	0.000	0.000
1,925.000	0.000	0.000	0.000	0.000	0.000
1,950.000	0.000	0.000	0.000	0.000	0.000
1,975.000	0.000	0.000	0.000	0.000	0.000
2,000.000	0.000	0.000	0.000	0.000	0.000
2,025.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP C

Scenario: 100-yr 24-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
2,050.000	0.000	0.000	0.000	0.000	0.000
2,075.000	0.000	0.000	0.000	0.000	0.000
2,100.000	0.000	0.000	0.000	0.000	0.000
2,125.000	0.000	0.000	0.000	0.000	0.000
2,150.000	0.000	0.000	0.000	0.000	0.000
2,175.000	0.000	0.000	0.000	0.000	0.000
2,200.000	0.000	0.000	0.000	0.000	0.000
2,225.000	0.000	0.000	0.000	0.000	0.000
2,250.000	0.000	0.000	0.000	0.000	0.000
2,275.000	0.000	0.000	0.000	0.000	0.000
2,300.000	0.000	0.000	0.000	0.000	0.000
2,325.000	0.000	0.000	0.000	0.000	0.000
2,350.000	0.000	0.000	0.000	0.000	0.000
2,375.000	0.000	0.000	0.000	0.000	0.000
2,400.000	0.000	0.000	0.000	0.000	0.000
2,425.000	0.000	0.000	0.000	0.000	0.000
2,450.000	0.000	0.000	0.000	0.000	0.000
2,475.000	0.000	0.000	0.000	0.000	0.000
2,500.000	0.000	0.000	0.000	0.000	0.000
2,525.000	0.000	0.000	0.000	0.000	0.000
2,550.000	0.000	0.000	0.000	0.000	0.000
2,575.000	0.000	0.000	0.000	0.000	0.000
2,600.000	0.000	0.000	0.000	0.000	0.000
2,625.000	0.000	0.000	0.000	0.000	0.000
2,650.000	0.000	0.000	0.000	0.000	0.000
2,675.000	0.000	0.000	0.000	0.000	0.000
2,700.000	0.000	0.000	0.000	0.000	0.000
2,725.000	0.000	0.000	0.000	0.000	0.000
2,750.000	0.000	0.000	0.000	0.000	0.000
2,775.000	0.000	0.000	0.000	0.000	0.000
2,800.000	0.000	0.000	0.000	0.000	0.000
2,825.000	0.000	0.000	0.000	0.000	0.000
2,850.000	0.000	0.000	0.000	0.000	0.000
2,875.000	0.000	0.000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP C

Scenario: 100-yr 3-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min
 Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
0.000	0.000	9.000	65.000	159.000	246.000
25.000	331.000	421.000	511.000	591.000	664.000
50.000	736.000	788.000	825.000	872.000	944.000
75.000	1,030.000	1,112.000	1,176.000	1,249.000	1,339.000
100.000	1,415.000	1,489.000	1,593.000	1,705.000	1,794.000
125.000	1,866.000	1,939.000	2,099.000	2,349.000	2,617.000
150.000	3,006.000	3,593.000	4,275.000	4,743.000	4,758.000
175.000	4,585.000	4,416.000	4,167.000	3,825.000	3,443.000
200.000	3,053.000	2,668.000	2,289.000	1,920.000	1,595.000
225.000	1,308.000	1,072.000	878.000	713.000	572.000
250.000	455.000	360.000	286.000	227.000	180.000
275.000	142.000	113.000	89.000	71.000	56.000
300.000	45.000	35.000	28.000	22.000	18.000
325.000	14.000	11.000	9.000	7.000	6.000
350.000	4.000	3.000	3.000	2.000	2.000
375.000	1.000	1.000	1.000	1.000	1.000
400.000	0.000	0.000	0.000	0.000	0.000
425.000	0.000	0.000	0.000	0.000	0.000
450.000	0.000	0.000	0.000	0.000	0.000
475.000	0.000	0.000	0.000	0.000	0.000
500.000	0.000	0.000	0.000	0.000	0.000
525.000	0.000	0.000	0.000	0.000	0.000
550.000	0.000	0.000	0.000	0.000	0.000
575.000	0.000	0.000	0.000	0.000	0.000
600.000	0.000	0.000	0.000	0.000	0.000
625.000	0.000	0.000	0.000	0.000	0.000
650.000	0.000	0.000	0.000	0.000	0.000
675.000	0.000	0.000	0.000	0.000	0.000
700.000	0.000	0.000	0.000	0.000	0.000
725.000	0.000	0.000	0.000	0.000	0.000
750.000	0.000	0.000	0.000	0.000	0.000
775.000	0.000	0.000	0.000	0.000	0.000
800.000	0.000	0.000	0.000	0.000	0.000
825.000	0.000	0.000	0.000	0.000	0.000
850.000	0.000	0.000	0.000	0.000	0.000
875.000	0.000	0.000	0.000	0.000	0.000
900.000	0.000	0.000	0.000	0.000	0.000
925.000	0.000	0.000	0.000	0.000	0.000
950.000	0.000	0.000	0.000	0.000	0.000
975.000	0.000	0.000	0.000	0.000	0.000
1,000.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP C

Scenario: 100-yr 3-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
1,025.000	0.000	0.000	0.000	0.000	0.000
1,050.000	0.000	0.000	0.000	0.000	0.000
1,075.000	0.000	0.000	0.000	0.000	0.000
1,100.000	0.000	0.000	0.000	0.000	0.000
1,125.000	0.000	0.000	0.000	0.000	0.000
1,150.000	0.000	0.000	0.000	0.000	0.000
1,175.000	0.000	0.000	0.000	0.000	0.000
1,200.000	0.000	0.000	0.000	0.000	0.000
1,225.000	0.000	0.000	0.000	0.000	0.000
1,250.000	0.000	0.000	0.000	0.000	0.000
1,275.000	0.000	0.000	0.000	0.000	0.000
1,300.000	0.000	0.000	0.000	0.000	0.000
1,325.000	0.000	0.000	0.000	0.000	0.000
1,350.000	0.000	0.000	0.000	0.000	0.000
1,375.000	0.000	0.000	0.000	0.000	0.000
1,400.000	0.000	0.000	0.000	0.000	0.000
1,425.000	0.000	0.000	0.000	0.000	0.000
1,450.000	0.000	0.000	0.000	0.000	0.000
1,475.000	0.000	0.000	0.000	0.000	0.000
1,500.000	0.000	0.000	0.000	0.000	0.000
1,525.000	0.000	0.000	0.000	0.000	0.000
1,550.000	0.000	0.000	0.000	0.000	0.000
1,575.000	0.000	0.000	0.000	0.000	0.000
1,600.000	0.000	0.000	0.000	0.000	0.000
1,625.000	0.000	0.000	0.000	0.000	0.000
1,650.000	0.000	0.000	0.000	0.000	0.000
1,675.000	0.000	0.000	0.000	0.000	0.000
1,700.000	0.000	0.000	0.000	0.000	0.000
1,725.000	0.000	0.000	0.000	0.000	0.000
1,750.000	0.000	0.000	0.000	0.000	0.000
1,775.000	0.000	0.000	0.000	0.000	0.000
1,800.000	0.000	0.000	0.000	0.000	0.000
1,825.000	0.000	0.000	0.000	0.000	0.000
1,850.000	0.000	0.000	0.000	0.000	0.000
1,875.000	0.000	0.000	0.000	0.000	0.000
1,900.000	0.000	0.000	0.000	0.000	0.000
1,925.000	0.000	0.000	0.000	0.000	0.000
1,950.000	0.000	0.000	0.000	0.000	0.000
1,975.000	0.000	0.000	0.000	0.000	0.000
2,000.000	0.000	0.000	0.000	0.000	0.000
2,025.000	0.000	0.000	0.000	0.000	0.000

La Sierra 100-Yr Analysis

Subsection: Time vs. Volume
 Label: BMP C

Scenario: 100-yr 3-hr

Time vs. Volume (ft³)

Output Time increment = 5.000 min

Time on left represents time for first value in each row.

Time (min)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)	Volume (ft ³)
2,050.000	0.000	0.000	0.000	0.000	0.000
2,075.000	0.000	0.000	0.000	0.000	0.000
2,100.000	0.000	0.000	0.000	0.000	0.000
2,125.000	0.000	0.000	0.000	0.000	0.000
2,150.000	0.000	0.000	0.000	0.000	0.000
2,175.000	0.000	0.000	0.000	0.000	0.000
2,200.000	0.000	0.000	0.000	0.000	0.000
2,225.000	0.000	0.000	0.000	0.000	0.000
2,250.000	0.000	0.000	0.000	0.000	0.000
2,275.000	0.000	0.000	0.000	0.000	0.000
2,300.000	0.000	0.000	0.000	0.000	0.000
2,325.000	0.000	0.000	0.000	0.000	0.000
2,350.000	0.000	0.000	0.000	0.000	0.000
2,375.000	0.000	0.000	0.000	0.000	0.000
2,400.000	0.000	0.000	0.000	0.000	0.000
2,425.000	0.000	0.000	0.000	0.000	0.000
2,450.000	0.000	0.000	0.000	0.000	0.000
2,475.000	0.000	0.000	0.000	0.000	0.000
2,500.000	0.000	0.000	0.000	0.000	0.000
2,525.000	0.000	0.000	0.000	0.000	0.000
2,550.000	0.000	0.000	0.000	0.000	0.000
2,575.000	0.000	0.000	0.000	0.000	0.000
2,600.000	0.000	0.000	0.000	0.000	0.000
2,625.000	0.000	0.000	0.000	0.000	0.000
2,650.000	0.000	0.000	0.000	0.000	0.000
2,675.000	0.000	0.000	0.000	0.000	0.000
2,700.000	0.000	0.000	0.000	0.000	0.000
2,725.000	0.000	0.000	0.000	0.000	0.000
2,750.000	0.000	0.000	0.000	0.000	0.000
2,775.000	0.000	0.000	0.000	0.000	0.000
2,800.000	0.000	0.000	0.000	0.000	0.000
2,825.000	0.000	0.000	0.000	0.000	0.000
2,850.000	0.000	0.000	0.000	0.000	0.000
2,875.000	0.000	0.000	(N/A)	(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 1-hr

Label: Outlet A

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.000 ft
Increment (Headwater)	0.500 ft
Maximum (Headwater)	7.250 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - A MWS Outlet	Forward	TW	1.330	7.250
Orifice-Area	Orifice - A WQ Overflow	Forward	TW	3.830	7.250
Rectangular Weir	Weir - A 100yr 3hr Stage	Forward	TW	4.760	7.250
Tailwater Settings	Tailwater			(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 1-hr

Label: Outlet A

Structure ID: Orifice - A MWS Outlet	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	1.330 ft
Orifice Diameter	12.00 in
Orifice Coefficient	0.600
Structure ID: Orifice - A WQ Overflow	
Structure Type: Orifice-Area	
Number of Openings	1
Elevation	3.830 ft
Orifice Area	1.3 ft ²
Top Elevation	3.580 ft
Datum Elevation	3.250 ft
Orifice Coefficient	0.600
Structure ID: Weir - A 100yr 3hr Stage	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	4.760 ft
Weir Length	3.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.010 ft
Tailwater Tolerance (Maximum)	0.500 ft
Headwater Tolerance (Minimum)	0.010 ft
Headwater Tolerance (Maximum)	0.500 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 24-hr

Label: Outlet A

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.000 ft
Increment (Headwater)	0.500 ft
Maximum (Headwater)	7.250 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - A MWS Outlet	Forward	TW	1.330	7.000
Orifice-Area	Orifice - A WQ Overflow	Forward	TW	3.830	7.000
Rectangular Weir	Weir - A 100yr 3hr Stage	Forward	TW	4.760	7.000
Tailwater Settings	Tailwater			(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 24-hr

Label: Outlet A

Structure ID: Orifice - A MWS Outlet	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	1.330 ft
Orifice Diameter	12.00 in
Orifice Coefficient	0.600
Structure ID: Orifice - A WQ Overflow	
Structure Type: Orifice-Area	
Number of Openings	1
Elevation	3.830 ft
Orifice Area	1.3 ft ²
Top Elevation	3.580 ft
Datum Elevation	3.250 ft
Orifice Coefficient	0.600
Structure ID: Weir - A 100yr 3hr Stage	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	4.760 ft
Weir Length	3.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.010 ft
Tailwater Tolerance (Maximum)	0.500 ft
Headwater Tolerance (Minimum)	0.010 ft
Headwater Tolerance (Maximum)	0.500 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 3-hr

Label: Outlet A

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.000 ft
Increment (Headwater)	0.500 ft
Maximum (Headwater)	7.250 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - A MWS Outlet	Forward	TW	1.330	7.000
Orifice-Area	Orifice - A WQ Overflow	Forward	TW	3.830	7.000
Rectangular Weir	Weir - A 100yr 3hr Stage	Forward	TW	4.760	7.000
Tailwater Settings	Tailwater			(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 3-hr

Label: Outlet A

Structure ID: Orifice - A MWS Outlet	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	1.330 ft
Orifice Diameter	12.00 in
Orifice Coefficient	0.600
Structure ID: Orifice - A WQ Overflow	
Structure Type: Orifice-Area	
Number of Openings	1
Elevation	3.830 ft
Orifice Area	1.3 ft ²
Top Elevation	3.580 ft
Datum Elevation	3.250 ft
Orifice Coefficient	0.600
Structure ID: Weir - A 100yr 3hr Stage	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	4.760 ft
Weir Length	3.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.010 ft
Tailwater Tolerance (Maximum)	0.500 ft
Headwater Tolerance (Minimum)	0.010 ft
Headwater Tolerance (Maximum)	0.500 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 1-hr

Label: Outlet C

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.000 ft
Increment (Headwater)	0.500 ft
Maximum (Headwater)	4.500 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Stand Pipe	Riser - C WQ Overflow	Forward	TW	3.500	4.500
Orifice-Circular	Orifice - C Underdrain	Forward	TW	0.000	4.500
Tailwater Settings	Tailwater			(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 1-hr

Label: Outlet C

Structure ID: Orifice - C Underdrain	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	0.000 ft
Orifice Diameter	5.50 in
Orifice Coefficient	0.600

Structure ID: Riser - C WQ Overflow	
Structure Type: Stand Pipe	
Number of Openings	1
Elevation	3.500 ft
Diameter	18.00 in
Orifice Area	1.8 ft ²
Orifice Coefficient	0.600
Weir Length	4.71 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.010 ft
Tailwater Tolerance (Maximum)	0.500 ft
Headwater Tolerance (Minimum)	0.010 ft
Headwater Tolerance (Maximum)	0.500 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 24-hr

Label: Outlet C

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.000 ft
Increment (Headwater)	0.500 ft
Maximum (Headwater)	4.500 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Stand Pipe	Riser - C WQ Overflow	Forward	TW	3.500	4.500
Orifice-Circular	Orifice - C Underdrain	Forward	TW	0.000	4.500
Tailwater Settings	Tailwater			(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 24-hr

Label: Outlet C

Structure ID: Orifice - C Underdrain Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	0.000 ft
Orifice Diameter	5.50 in
Orifice Coefficient	0.600
Structure ID: Riser - C WQ Overflow Structure Type: Stand Pipe	
Number of Openings	1
Elevation	3.500 ft
Diameter	18.00 in
Orifice Area	1.8 ft ²
Orifice Coefficient	0.600
Weir Length	4.71 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True
Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.010 ft
Tailwater Tolerance (Maximum)	0.500 ft
Headwater Tolerance (Minimum)	0.010 ft
Headwater Tolerance (Maximum)	0.500 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 3-hr

Label: Outlet C

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.000 ft
Increment (Headwater)	0.500 ft
Maximum (Headwater)	4.500 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Stand Pipe	Riser - C WQ Overflow	Forward	TW	3.500	4.500
Orifice-Circular	Orifice - C Underdrain	Forward	TW	0.000	4.500
Tailwater Settings	Tailwater			(N/A)	(N/A)

La Sierra 100-Yr Analysis

Subsection: Outlet Input Data

Scenario: 100-yr 3-hr

Label: Outlet C

Structure ID: Orifice - C Underdrain
Structure Type: Orifice-Circular

Number of Openings	1
Elevation	0.000 ft
Orifice Diameter	5.50 in
Orifice Coefficient	0.600

Structure ID: Riser - C WQ Overflow
Structure Type: Stand Pipe

Number of Openings	1
Elevation	3.500 ft
Diameter	18.00 in
Orifice Area	1.8 ft ²
Orifice Coefficient	0.600
Weir Length	4.71 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall
----------------	--------------

Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.010 ft
Tailwater Tolerance (Maximum)	0.500 ft
Headwater Tolerance (Minimum)	0.010 ft
Headwater Tolerance (Maximum)	0.500 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

La Sierra 100-Yr Analysis

Subsection: Elevation-Volume-Flow Table (Pond)

Scenario: 100-yr 1-hr

Label: BMP A

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.000 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00000 ft ³ /s
Flow (Initial Infiltration)	0.00000 ft ³ /s
Flow (Initial, Total)	0.00000 ft ³ /s
Time Increment	5.000 min

Elevation (ft)	Outflow (ft ³ /s)	Storage (ft ³)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
0.000	0.00000	0.000	0	0.00000	0.00000	0.00000
0.500	0.00000	0.000	0	0.00000	0.00000	0.00000
1.000	0.00000	0.000	0	0.00000	0.00000	0.00000
1.330	0.00000	3,144.800	0	0.00000	0.00000	20.96533
1.500	0.09658	3,784.340	0	0.00000	0.09658	25.32552
2.000	1.30516	5,685.050	0	0.00000	1.30516	39.20549
2.500	3.09418	7,550.240	0	0.00000	3.09418	53.42912
3.000	4.08885	9,368.970	0	0.00000	4.08885	66.54865
3.500	4.88503	11,128.880	0	0.00000	4.88503	79.07756
3.830	5.34594	12,262.010	0	0.00000	5.34594	87.09267
4.000	8.04908	12,814.700	0	0.00000	8.04908	93.48042
4.500	11.10136	14,407.810	0	0.00000	11.10136	107.15342
4.760	12.27247	15,191.708	0	0.00000	12.27247	113.55052
5.000	14.29615	15,879.660	0	0.00000	14.29615	120.16055
5.500	20.74563	17,173.660	0	0.00000	20.74563	135.23670
6.000	29.00908	18,184.950	0	0.00000	29.00908	150.24208
6.500	38.65662	19,113.750	0	0.00000	38.65662	166.08162
7.000	49.47959	20,042.550	0	0.00000	49.47959	183.09659

La Sierra 100-Yr Analysis

Subsection: Elevation-Volume-Flow Table (Pond)

Scenario: 100-yr 24-hr

Label: BMP A

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.000 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00000 ft ³ /s
Flow (Initial Infiltration)	0.00000 ft ³ /s
Flow (Initial, Total)	0.00000 ft ³ /s
Time Increment	5.000 min

Elevation (ft)	Outflow (ft ³ /s)	Storage (ft ³)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
0.000	0.00000	0.000	0	0.00000	0.00000	0.00000
0.500	0.00000	0.000	0	0.00000	0.00000	0.00000
1.000	0.00000	0.000	0	0.00000	0.00000	0.00000
1.330	0.00000	3,144.800	0	0.00000	0.00000	20.96533
1.500	0.09658	3,784.340	0	0.00000	0.09658	25.32552
2.000	1.30516	5,685.050	0	0.00000	1.30516	39.20549
2.500	3.09418	7,550.240	0	0.00000	3.09418	53.42912
3.000	4.08885	9,368.970	0	0.00000	4.08885	66.54865
3.500	4.88503	11,128.880	0	0.00000	4.88503	79.07756
3.830	5.34594	12,262.010	0	0.00000	5.34594	87.09267
4.000	8.04908	12,814.700	0	0.00000	8.04908	93.48042
4.500	11.10136	14,407.810	0	0.00000	11.10136	107.15342
4.760	12.27247	15,191.708	0	0.00000	12.27247	113.55052
5.000	14.29615	15,879.660	0	0.00000	14.29615	120.16055
5.500	20.74563	17,173.660	0	0.00000	20.74563	135.23670
6.000	29.00908	18,184.950	0	0.00000	29.00908	150.24208
6.500	38.65662	19,113.750	0	0.00000	38.65662	166.08162
7.000	49.47959	20,042.550	0	0.00000	49.47959	183.09659

La Sierra 100-Yr Analysis

Subsection: Elevation-Volume-Flow Table (Pond)

Scenario: 100-yr 3-hr

Label: BMP A

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.000 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00000 ft ³ /s
Flow (Initial Infiltration)	0.00000 ft ³ /s
Flow (Initial, Total)	0.00000 ft ³ /s
Time Increment	5.000 min

Elevation (ft)	Outflow (ft ³ /s)	Storage (ft ³)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
0.000	0.00000	0.000	0	0.00000	0.00000	0.00000
0.500	0.00000	0.000	0	0.00000	0.00000	0.00000
1.000	0.00000	0.000	0	0.00000	0.00000	0.00000
1.330	0.00000	3,144.800	0	0.00000	0.00000	20.96533
1.500	0.09658	3,784.340	0	0.00000	0.09658	25.32552
2.000	1.30516	5,685.050	0	0.00000	1.30516	39.20549
2.500	3.09418	7,550.240	0	0.00000	3.09418	53.42912
3.000	4.08885	9,368.970	0	0.00000	4.08885	66.54865
3.500	4.88503	11,128.880	0	0.00000	4.88503	79.07756
3.830	5.34594	12,262.010	0	0.00000	5.34594	87.09267
4.000	8.04908	12,814.700	0	0.00000	8.04908	93.48042
4.500	11.10136	14,407.810	0	0.00000	11.10136	107.15342
4.760	12.27247	15,191.708	0	0.00000	12.27247	113.55052
5.000	14.29615	15,879.660	0	0.00000	14.29615	120.16055
5.500	20.74563	17,173.660	0	0.00000	20.74563	135.23670
6.000	29.00908	18,184.950	0	0.00000	29.00908	150.24208
6.500	38.65662	19,113.750	0	0.00000	38.65662	166.08162
7.000	49.47959	20,042.550	0	0.00000	49.47959	183.09659

La Sierra 100-Yr Analysis

Subsection: Level Pool Pond Routing Summary
 Label: BMP A (IN)

Scenario: 100-yr 1-hr

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	0.000 ft		
Volume (Initial)	0.000 ft ³		
Flow (Initial Outlet)	0.00000 ft ³ /s		
Flow (Initial Infiltration)	0.00000 ft ³ /s		
Flow (Initial, Total)	0.00000 ft ³ /s		
Time Increment	5.000 min		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	27.50000 ft ³ /s	Time to Peak (Flow, In)	55.000 min
Flow (Peak Outlet)	20.07597 ft ³ /s	Time to Peak (Flow, Outlet)	60.000 min
Peak Conditions			
Elevation (Water Surface, Peak)	5.448 ft		
Volume (Peak)	17,045.266 ft ³		
Mass Balance (ft ³)			
Volume (Initial)	0.000 ft ³		
Volume (Total Inflow)	35,913.000 ft ³		
Volume (Total Infiltration)	0.000 ft ³		
Volume (Total Outlet Outflow)	32,768.000 ft ³		
Volume (Retained)	3,145.000 ft ³		
Volume (Unrouted)	0.000 ft ³		
Error (Mass Balance)	0.0 %		

La Sierra 100-Yr Analysis

Subsection: Level Pool Pond Routing Summary
 Label: BMP A (IN)

Scenario: 100-yr 24-hr

Infiltration			
Infiltration Method (Computed)	No Infiltration		

Initial Conditions			
Elevation (Water Surface, Initial)	0.000 ft		
Volume (Initial)	0.000 ft ³		
Flow (Initial Outlet)	0.00000 ft ³ /s		
Flow (Initial Infiltration)	0.00000 ft ³ /s		
Flow (Initial, Total)	0.00000 ft ³ /s		
Time Increment	5.000 min		

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	5.33000 ft ³ /s	Time to Peak (Flow, In)	810.000 min
Flow (Peak Outlet)	4.66340 ft ³ /s	Time to Peak (Flow, Outlet)	815.000 min

Elevation (Water Surface, Peak)	3.361 ft		
Volume (Peak)	10,649.148 ft ³		

Mass Balance (ft ³)			
Volume (Initial)	0.000 ft ³		
Volume (Total Inflow)	115,725.000 ft ³		
Volume (Total Infiltration)	0.000 ft ³		
Volume (Total Outlet Outflow)	112,580.000 ft ³		
Volume (Retained)	3,145.000 ft ³		
Volume (Unrouted)	0.000 ft ³		
Error (Mass Balance)	0.0 %		

La Sierra 100-Yr Analysis

Subsection: Level Pool Pond Routing Summary
 Label: BMP A (IN)

Scenario: 100-yr 3-hr

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	0.000 ft		
Volume (Initial)	0.000 ft ³		
Flow (Initial Outlet)	0.00000 ft ³ /s		
Flow (Initial Infiltration)	0.00000 ft ³ /s		
Flow (Initial, Total)	0.00000 ft ³ /s		
Time Increment	5.000 min		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	14.42000 ft ³ /s	Time to Peak (Flow, In)	160.000 min
Flow (Peak Outlet)	12.18747 ft ³ /s	Time to Peak (Flow, Outlet)	165.000 min
Peak Conditions			
Elevation (Water Surface, Peak)	4.741 ft		
Volume (Peak)	15,133.801 ft ³		
Mass Balance (ft ³)			
Volume (Initial)	0.000 ft ³		
Volume (Total Inflow)	53,538.000 ft ³		
Volume (Total Infiltration)	0.000 ft ³		
Volume (Total Outlet Outflow)	50,393.000 ft ³		
Volume (Retained)	3,145.000 ft ³		
Volume (Unrouted)	0.000 ft ³		
Error (Mass Balance)	0.0 %		

La Sierra 100-Yr Analysis

Subsection: Pond Inflow Summary

Scenario: 100-yr 1-hr

Label: BMP A (IN)

Summary for Hydrograph Addition at 'BMP A'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	A

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	A	35,841.000	55.000	27.50000
Flow (In)	BMP A	35,913.000	55.000	27.50000

La Sierra 100-Yr Analysis

Subsection: Pond Inflow Summary

Scenario: 100-yr 24-hr

Label: BMP A (IN)

Summary for Hydrograph Addition at 'BMP A'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	A

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	A	115,720.500	810.000	5.33000
Flow (In)	BMP A	115,725.000	810.000	5.33000

La Sierra 100-Yr Analysis

Subsection: Pond Inflow Summary

Scenario: 100-yr 3-hr

Label: BMP A (IN)

Summary for Hydrograph Addition at 'BMP A'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	A

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	A	53,496.000	160.000	14.42000
Flow (In)	BMP A	53,538.000	160.000	14.42000

La Sierra 100-Yr Analysis

Subsection: Elevation-Volume-Flow Table (Pond)

Scenario: 100-yr 1-hr

Label: BMP C

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.000 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00000 ft ³ /s
Flow (Initial Infiltration)	0.00000 ft ³ /s
Flow (Initial, Total)	0.00000 ft ³ /s
Time Increment	5.000 min

Elevation (ft)	Outflow (ft ³ /s)	Storage (ft ³)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
0.000	0.00000	0.000	1,072	0.00000	0.00000	0.00000
0.500	0.41326	536.000	1,072	0.00000	0.41326	3.98659
1.000	0.69719	1,072.000	1,072	0.00000	0.69719	7.84386
1.500	0.89519	1,342.527	536	0.00000	0.89519	9.84537
2.000	1.05672	1,610.527	536	0.00000	1.05672	11.79357
2.500	1.19664	1,878.527	536	0.00000	1.19664	13.72015
3.000	1.32183	3,206.442	2,680	0.00000	1.32183	22.69811
3.500	1.43615	4,546.442	2,680	0.00000	1.43615	31.74577
4.000	6.54026	5,886.442	2,680	0.00000	6.54026	45.78321
4.500	10.14640	7,226.442	2,680	0.00000	10.14640	58.32268

La Sierra 100-Yr Analysis

Subsection: Elevation-Volume-Flow Table (Pond)

Scenario: 100-yr 24-hr

Label: BMP C

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.000 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00000 ft ³ /s
Flow (Initial Infiltration)	0.00000 ft ³ /s
Flow (Initial, Total)	0.00000 ft ³ /s
Time Increment	5.000 min

Elevation (ft)	Outflow (ft ³ /s)	Storage (ft ³)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
0.000	0.00000	0.000	1,072	0.00000	0.00000	0.00000
0.500	0.41326	536.000	1,072	0.00000	0.41326	3.98659
1.000	0.69719	1,072.000	1,072	0.00000	0.69719	7.84386
1.500	0.89519	1,342.527	536	0.00000	0.89519	9.84537
2.000	1.05672	1,610.527	536	0.00000	1.05672	11.79357
2.500	1.19664	1,878.527	536	0.00000	1.19664	13.72015
3.000	1.32183	3,206.442	2,680	0.00000	1.32183	22.69811
3.500	1.43615	4,546.442	2,680	0.00000	1.43615	31.74577
4.000	6.54026	5,886.442	2,680	0.00000	6.54026	45.78321
4.500	10.14640	7,226.442	2,680	0.00000	10.14640	58.32268

La Sierra 100-Yr Analysis

Subsection: Elevation-Volume-Flow Table (Pond)

Scenario: 100-yr 3-hr

Label: BMP C

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.000 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00000 ft ³ /s
Flow (Initial Infiltration)	0.00000 ft ³ /s
Flow (Initial, Total)	0.00000 ft ³ /s
Time Increment	5.000 min

Elevation (ft)	Outflow (ft ³ /s)	Storage (ft ³)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
0.000	0.00000	0.000	1,072	0.00000	0.00000	0.00000
0.500	0.41326	536.000	1,072	0.00000	0.41326	3.98659
1.000	0.69719	1,072.000	1,072	0.00000	0.69719	7.84386
1.500	0.89519	1,342.527	536	0.00000	0.89519	9.84537
2.000	1.05672	1,610.527	536	0.00000	1.05672	11.79357
2.500	1.19664	1,878.527	536	0.00000	1.19664	13.72015
3.000	1.32183	3,206.442	2,680	0.00000	1.32183	22.69811
3.500	1.43615	4,546.442	2,680	0.00000	1.43615	31.74577
4.000	6.54026	5,886.442	2,680	0.00000	6.54026	45.78321
4.500	10.14640	7,226.442	2,680	0.00000	10.14640	58.32268

La Sierra 100-Yr Analysis

Subsection: Level Pool Pond Routing Summary
 Label: BMP C (IN)

Scenario: 100-yr 1-hr

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	0.000 ft		
Volume (Initial)	0.000 ft ³		
Flow (Initial Outlet)	0.00000 ft ³ /s		
Flow (Initial Infiltration)	0.00000 ft ³ /s		
Flow (Initial, Total)	0.00000 ft ³ /s		
Time Increment	5.000 min		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	7.21000 ft ³ /s	Time to Peak (Flow, In)	55.000 min
Flow (Peak Outlet)	3.44826 ft ³ /s	Time to Peak (Flow, Outlet)	60.000 min
Peak Conditions			
Elevation (Water Surface, Peak)	3.697 ft		
Volume (Peak)	5,074.688 ft ³		
Mass Balance (ft ³)			
Volume (Initial)	0.000 ft ³		
Volume (Total Inflow)	9,411.000 ft ³		
Volume (Total Infiltration)	0.000 ft ³		
Volume (Total Outlet Outflow)	9,411.000 ft ³		
Volume (Retained)	0.000 ft ³		
Volume (Unrouted)	0.000 ft ³		
Error (Mass Balance)	0.0 %		

La Sierra 100-Yr Analysis

Subsection: Level Pool Pond Routing Summary
 Label: BMP C (IN)

Scenario: 100-yr 24-hr

Infiltration			
Infiltration Method (Computed)	No Infiltration		

Initial Conditions	
Elevation (Water Surface, Initial)	0.000 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00000 ft ³ /s
Flow (Initial Infiltration)	0.00000 ft ³ /s
Flow (Initial, Total)	0.00000 ft ³ /s
Time Increment	5.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	1.40000 ft ³ /s	Time to Peak (Flow, In)	810.000 min
Flow (Peak Outlet)	1.20614 ft ³ /s	Time to Peak (Flow, Outlet)	815.000 min

Elevation (Water Surface, Peak)	2.538 ft
Volume (Peak)	1,968.087 ft ³

Mass Balance (ft ³)	
Volume (Initial)	0.000 ft ³
Volume (Total Inflow)	30,360.000 ft ³
Volume (Total Infiltration)	0.000 ft ³
Volume (Total Outlet Outflow)	30,360.000 ft ³
Volume (Retained)	0.000 ft ³
Volume (Unrouted)	0.000 ft ³
Error (Mass Balance)	0.0 %

La Sierra 100-Yr Analysis

Subsection: Level Pool Pond Routing Summary
 Label: BMP C (IN)

Scenario: 100-yr 3-hr

Infiltration			
Infiltration Method (Computed)	No Infiltration		

Initial Conditions	
Elevation (Water Surface, Initial)	0.000 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00000 ft ³ /s
Flow (Initial Infiltration)	0.00000 ft ³ /s
Flow (Initial, Total)	0.00000 ft ³ /s
Time Increment	5.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	3.78000 ft ³ /s	Time to Peak (Flow, In)	160.000 min
Flow (Peak Outlet)	2.24309 ft ³ /s	Time to Peak (Flow, Outlet)	170.000 min

Elevation (Water Surface, Peak)	3.579 ft
Volume (Peak)	4,758.290 ft ³

Mass Balance (ft ³)	
Volume (Initial)	0.000 ft ³
Volume (Total Inflow)	14,052.000 ft ³
Volume (Total Infiltration)	0.000 ft ³
Volume (Total Outlet Outflow)	14,052.000 ft ³
Volume (Retained)	0.000 ft ³
Volume (Unrouted)	0.000 ft ³
Error (Mass Balance)	0.0 %

La Sierra 100-Yr Analysis

Subsection: Pond Inflow Summary

Scenario: 100-yr 1-hr

Label: BMP C (IN)

Summary for Hydrograph Addition at 'BMP C'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	C

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	C	9,393.000	55.000	7.21000
Flow (In)	BMP C	9,411.000	55.000	7.21000

La Sierra 100-Yr Analysis

Subsection: Pond Inflow Summary

Scenario: 100-yr 24-hr

Label: BMP C (IN)

Summary for Hydrograph Addition at 'BMP C'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	C

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	C	30,358.500	810.000	1.40000
Flow (In)	BMP C	30,360.000	810.000	1.40000

La Sierra 100-Yr Analysis

Subsection: Pond Inflow Summary

Scenario: 100-yr 3-hr

Label: BMP C (IN)

Summary for Hydrograph Addition at 'BMP C'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	C

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	C	14,041.500	160.000	3.78000
Flow (In)	BMP C	14,052.000	160.000	3.78000

La Sierra 100-Yr Analysis

Index

A

A (Read Hydrograph)...

B

BMP A (Elevation-Volume-Flow Table (Pond))...

BMP A (IN) (Level Pool Pond Routing Summary)...

BMP A (IN) (Pond Inflow Summary)...

BMP A (OUT) (Time vs. Elevation)...

BMP A (Time vs. Volume)...

BMP C (Elevation-Volume-Flow Table (Pond))...

BMP C (IN) (Level Pool Pond Routing Summary)...

BMP C (IN) (Pond Inflow Summary)...

BMP C (OUT) (Time vs. Elevation)...

BMP C (Time vs. Volume)...

C

C (Read Hydrograph)...

M

Master Network Summary...2

O

Outlet A (Outlet Input Data)...

Outlet C (Outlet Input Data)...

Outlet Input Data...47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58

Bioretention Basin (DMA C) Stage Storage Table

Bioretention Basin C	Porosity	Depth (ft)	Area (SF)	Volume (CF)
Gravel	0.4	0	1072	0
		1	1072	1072
BSM	0.2	1.01	536	1077.36
		2.5	536	1876
Open basin	1	2.51	2680	1902.8
		3.5	2680	4556

Project: **MLC La Sierra BMP - DMA A/South**



Chamber Model -
Units -
Number of Chambers -
Number of End Caps -
Voids in the stone (porosity) -
Base of Stone Elevation -
Amount of Stone Above Chambers -
Amount of Stone Below Chambers -

MC-7200
Imperial
64
12
40
0.00
12
12

Area of system - 4644 sf Min. Area - 4239 sf min. area

- Include Perimeter Stone in Calculations
- Click for Stage Area Data
- Click to Invert Stage Area Data
- [Click Here for Metric](#)

StormTech MC-7200 Cumulative Storage Volumes

Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Single End Cap (cubic feet)	Incremental Chambers (cubic feet)	Incremental End Cap (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch. EC and Stone (feet)	Cumulative System (cubic feet)	Elevation (feet)
84	0.00	0.00	0.00	0.00	154.80	154.80	20042.55	7.00
83	0.00	0.00	0.00	0.00	154.80	154.80	19887.75	6.92
82	0.00	0.00	0.00	0.00	154.80	154.80	19732.95	6.83
81	0.00	0.00	0.00	0.00	154.80	154.80	19578.15	6.75
80	0.00	0.00	0.00	0.00	154.80	154.80	19423.35	6.67
79	0.00	0.00	0.00	0.00	154.80	154.80	19268.55	6.58
78	0.00	0.00	0.00	0.00	154.80	154.80	19113.75	6.50
77	0.00	0.00	0.00	0.00	154.80	154.80	18958.95	6.42
76	0.00	0.00	0.00	0.00	154.80	154.80	18804.15	6.33
75	0.00	0.00	0.00	0.00	154.80	154.80	18649.35	6.25
74	0.00	0.00	0.00	0.00	154.80	154.80	18494.55	6.17
73	0.00	0.00	0.00	0.00	154.80	154.80	18339.75	6.08
72	0.06	0.01	3.80	0.16	153.22	157.17	18184.95	6.00
71	0.19	0.03	12.17	0.41	149.77	162.35	18027.78	5.92
70	0.28	0.05	17.61	0.62	147.51	165.74	17865.43	5.83
69	0.36	0.07	22.86	0.79	145.34	168.99	17699.69	5.75
68	0.46	0.08	29.34	1.00	142.67	173.00	17530.70	5.67
67	0.74	0.11	47.46	1.26	135.31	184.04	17357.70	5.58
66	1.10	0.13	70.17	1.59	126.10	197.85	17173.66	5.50
65	1.32	0.16	84.38	1.93	120.27	206.59	16975.81	5.42
64	1.50	0.19	95.89	2.26	115.54	213.69	16769.22	5.33
63	1.65	0.22	105.89	2.62	111.40	219.91	16555.53	5.25
62	1.79	0.25	114.81	2.96	107.69	225.47	16335.62	5.17
61	1.92	0.28	122.86	3.30	104.34	230.50	16110.16	5.08
60	2.04	0.30	130.40	3.62	101.19	235.21	15879.66	5.00
59	2.15	0.33	137.30	3.93	98.31	239.54	15644.45	4.92
58	2.25	0.35	143.85	4.25	95.56	243.66	15404.91	4.83
57	2.34	0.38	149.96	4.60	92.97	247.54	15161.25	4.75
56	2.43	0.41	155.74	4.91	90.54	251.19	14913.71	4.67
55	2.52	0.44	161.22	5.29	88.20	254.71	14662.52	4.58
54	2.60	0.47	166.44	5.63	85.98	258.04	14407.81	4.50
53	2.68	0.50	171.42	5.94	83.86	261.22	14149.77	4.42
52	2.75	0.52	176.16	6.25	81.83	264.25	13888.56	4.33
51	2.82	0.54	180.70	6.53	79.91	267.14	13624.31	4.25
50	2.89	0.57	185.05	6.80	78.06	269.91	13357.17	4.17
49	2.96	0.59	189.21	7.06	76.29	272.56	13087.26	4.08
48	3.02	0.61	193.20	7.32	74.59	275.11	12814.70	4.00
47	3.08	0.63	197.03	7.59	72.95	277.57	12539.58	3.92
46	3.14	0.64	200.72	7.79	71.42	279.86	12262.01	3.83
45	3.19	0.68	204.27	8.13	69.84	282.24	11982.15	3.75
44	3.25	0.70	207.68	8.40	68.37	284.45	11699.91	3.67
43	3.30	0.72	210.96	8.67	66.95	286.58	11415.46	3.58
42	3.35	0.74	214.12	8.92	65.58	288.63	11128.88	3.50
41	3.39	0.76	217.16	9.17	64.27	290.60	10840.25	3.42
40	3.44	0.79	220.09	9.43	62.99	292.51	10549.65	3.33
39	3.48	0.80	222.90	9.63	61.79	294.32	10257.15	3.25
38	3.53	0.82	225.62	9.84	60.62	296.08	9962.83	3.17
37	3.57	0.84	228.24	10.06	59.48	297.78	9666.75	3.08
36	3.61	0.85	230.76	10.22	58.41	299.38	9368.97	3.00
35	3.64	0.86	233.18	10.31	57.40	300.90	9069.59	2.92
34	3.68	0.89	235.52	10.67	56.32	302.51	8768.69	2.83
33	3.71	0.90	237.76	10.85	55.36	303.97	8466.17	2.75
32	3.75	0.92	239.92	11.01	54.43	305.35	8162.21	2.67
31	3.78	0.92	241.98	11.04	53.59	306.61	7856.85	2.58
30	3.81	0.94	243.97	11.32	52.68	307.98	7550.24	2.50
29	3.84	0.96	245.87	11.48	51.86	309.21	7242.27	2.42
28	3.87	0.97	247.69	11.62	51.07	310.39	6933.06	2.33
27	3.90	0.98	249.43	11.78	50.32	311.53	6622.67	2.25
26	3.92	0.97	251.10	11.65	49.70	312.45	6311.14	2.17
25	3.95	1.00	252.69	12.04	48.91	313.64	5998.69	2.08
24	3.97	1.01	254.20	12.13	48.26	314.60	5685.05	2.00
23	3.99	1.02	255.65	12.24	47.64	315.54	5370.45	1.92
22	4.02	1.03	257.02	12.36	47.05	316.43	5054.92	1.83
21	4.04	1.04	258.32	12.46	46.49	317.27	4738.49	1.75
20	4.06	1.05	259.55	12.56	45.96	318.06	4421.22	1.67
19	4.07	1.05	260.71	12.65	45.46	318.81	4103.15	1.58
18	4.09	1.05	261.79	12.61	45.04	319.44	3784.34	1.50
17	4.11	1.06	262.83	12.68	44.60	320.10	3464.90	1.42
16	4.12	1.08	263.81	12.91	44.11	320.83	3144.80	1.33
15	4.14	1.08	264.74	12.99	43.71	321.44	2823.97	1.25
14	4.15	1.09	265.60	13.06	43.34	321.99	2502.53	1.17
13	4.17	1.11	266.94	13.28	42.71	322.93	2180.53	1.08
12	0.00	0.00	0.00	0.00	154.80	154.80	1857.60	1.00
11	0.00	0.00	0.00	0.00	154.80	154.80	1702.80	0.92
10	0.00	0.00	0.00	0.00	154.80	154.80	1548.00	0.83
9	0.00	0.00	0.00	0.00	154.80	154.80	1393.20	0.75
8	0.00	0.00	0.00	0.00	154.80	154.80	1238.40	0.67
7	0.00	0.00	0.00	0.00	154.80	154.80	1083.60	0.58
6	0.00	0.00	0.00	0.00	154.80	154.80	928.80	0.50
5	0.00	0.00	0.00	0.00	154.80	154.80	774.00	0.42
4	0.00	0.00	0.00	0.00	154.80	154.80	619.20	0.33
3	0.00	0.00	0.00	0.00	154.80	154.80	464.40	0.25
2	0.00	0.00	0.00	0.00	154.80	154.80	309.60	0.17
1	0.00	0.00	0.00	0.00	154.80	154.80	154.80	0.08

Stage Area Data

Depth (feet)	Elevation (feet)	Area (ft²)	Area (acres)
0.00	0.00	1857.60	0.0426
0.08	0.08	1857.60	0.0426
0.17	0.17	1857.60	0.0426
0.25	0.25	1857.60	0.0426
0.33	0.33	1857.60	0.0426
0.42	0.42	1857.60	0.0426
0.50	0.50	1857.60	0.0426
0.58	0.58	1857.60	0.0426
0.67	0.67	1857.60	0.0426
0.75	0.75	1857.60	0.0426
0.83	0.83	1857.60	0.0426
0.92	0.92	1857.60	0.0426
1.00	1.00	1857.60	0.0426
1.08	1.08	3875.19	0.0890
1.17	1.17	3863.92	0.0887
1.25	1.25	3857.27	0.0886
1.33	1.33	3849.98	0.0884
1.42	1.42	3841.26	0.0882
1.50	1.50	3833.26	0.0880
1.58	1.58	3825.76	0.0878
1.67	1.67	3816.75	0.0876
1.75	1.75	3807.23	0.0874
1.83	1.83	3797.16	0.0872
1.92	1.92	3786.44	0.0869
2.00	2.00	3775.23	0.0867
2.08	2.08	3763.65	0.0864
2.17	2.17	3749.43	0.0861
2.25	2.25	3738.31	0.0858
2.33	2.33	3724.66	0.0855
2.42	2.42	3710.48	0.0852
2.50	2.50	3695.70	0.0848
2.58	2.58	3679.36	0.0845
2.67	2.67	3664.25	0.0841
2.75	2.75	3647.60	0.0837
2.83	2.83	3630.17	0.0833
2.92	2.92	3610.78	0.0829
3.00	3.00	3592.60	0.0825
3.08	3.08	3573.34	0.0820
3.17	3.17	3552.93	0.0816
3.25	3.25	3531.86	0.0811
3.33	3.33	3510.09	0.0806
3.42	3.42	3487.19	0.0801
3.50	3.50	3463.52	0.0795
3.58	3.58	3438.96	0.0789
3.67	3.67	3413.37	0.0784
3.75	3.75	3386.89	0.0778
3.83	3.83	3358.36	0.0771
3.92	3.92	3330.85	0.0765
4.00	4.00	3301.36	0.0758
4.08	4.08	3270.74	0.0751
4.17	4.17	3238.93	0.0744
4.25	4.25	3205.68	0.0736
4.33	4.33	3170.97	0.0728
4.42	4.42	3134.60	0.0720
4.50	4.50	3096.45	0.0711
4.58	4.58	3056.48	0.0702
4.67	4.67	3014.29	0.0692
4.75	4.75	2970.47	0.0682
4.83	4.83	2923.97	0.0671
4.92	4.92	2874.46	0.0660
5.00	5.00	2822.53	0.0648
5.08	5.08	2765.96	0.0635
5.17	5.17	2705.59	0.0621
5.25	5.25	2638.87	0.0606
5.33	5.33	2564.29	0.0589
5.42	5.42	2479.07	0.0569
5.50	5.50	2374.25	0.0545
5.58	5.58	2208.45	0.0507
5.67	5.67	2076.01	0.0477
5.75	5.75	2027.92	0.0466
5.83	5.83	1988.88	0.0457
5.92	5.92	1948.16	0.0447
6.00	6.00	1886.09	0.0433
6.08	6.08	1857.60	0.0426
6.17	6.17	1857.60	0.0426
6.25	6.25	1857.60	0.0426
6.33	6.33	1857.60	0.0426
6.42	6.42	1857.60	0.0426
6.50	6.50	1857.60	0.0426
6.58	6.58	1857.60	0.0426
6.67	6.67	1857.60	0.0426
6.75			

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



MLC LA SIERRA DMA A

RIVERSIDE, CA, USA



MC-7200 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-7200.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT³%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-7200 CHAMBER SYSTEM

- STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
- INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
- STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
- STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

- STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
 - THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER Tired LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-7200 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
 - FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.
- USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.**

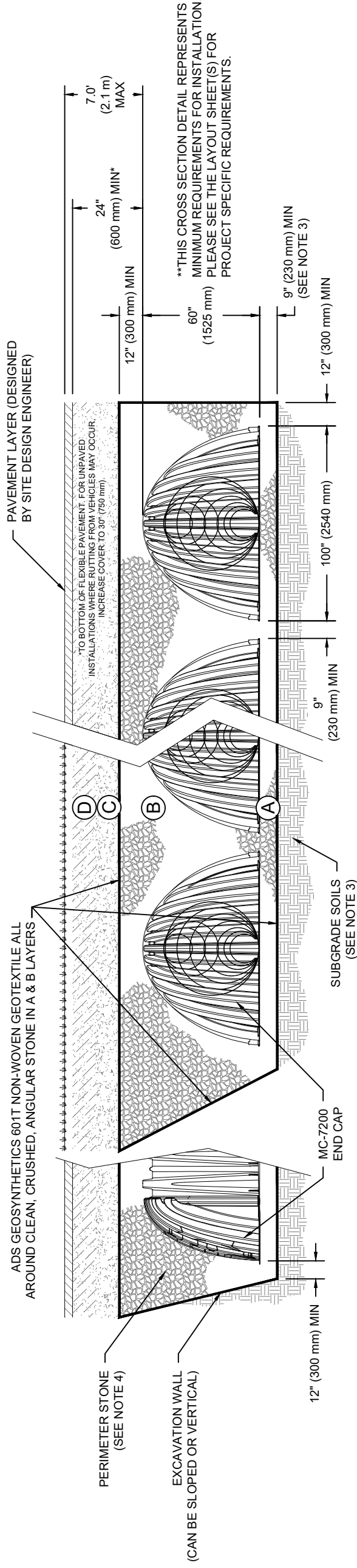
CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M145 ¹ A-1, A-2.4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

PLEASE NOTE:

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



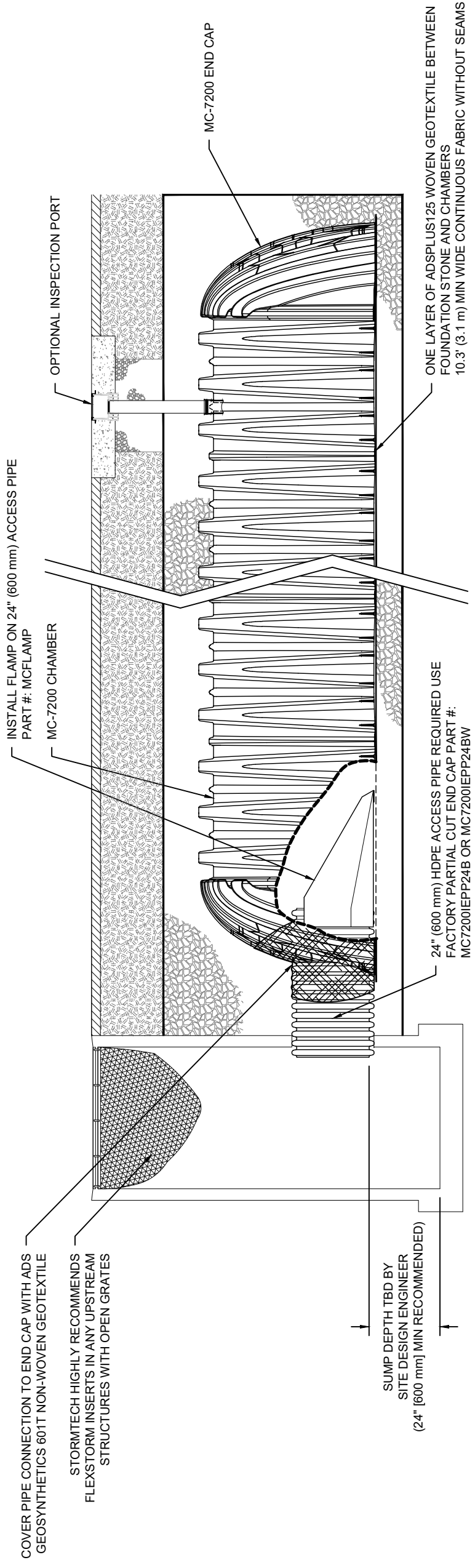
NOTES:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
- MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT³. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

StormTech 4640 TRUMAN BLVD HILLIARD, OH 43026 1-800-733-7473	StormTech Chamber System 1-800-821-6710 WWW.STORMTECH.COM	PROJECT #: DATE: 11/12/2024 DRAWN: BY CHECKED: N/A
		DESCRIPTION CHK DRW DATE

MLC LA SIERRA DMA A
RIVERSIDE, CA, USA

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS/STORMTECH UNDER THE DIRECTION OF THE PROJECT'S ENGINEER OF RECORD (EOR) OR OTHER PROJECT REPRESENTATIVE. THIS DRAWING IS NOT INTENDED FOR USE IN BIDDING OR CONSTRUCTION WITHOUT THE EOR'S PRIOR APPROVAL. EOR SHALL REVIEW THIS DRAWING AND/OR CONSTRUCTION, IT IS THE ULTIMATE RESPONSIBILITY OF THE EOR TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.



MC-7200 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

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

NOTES

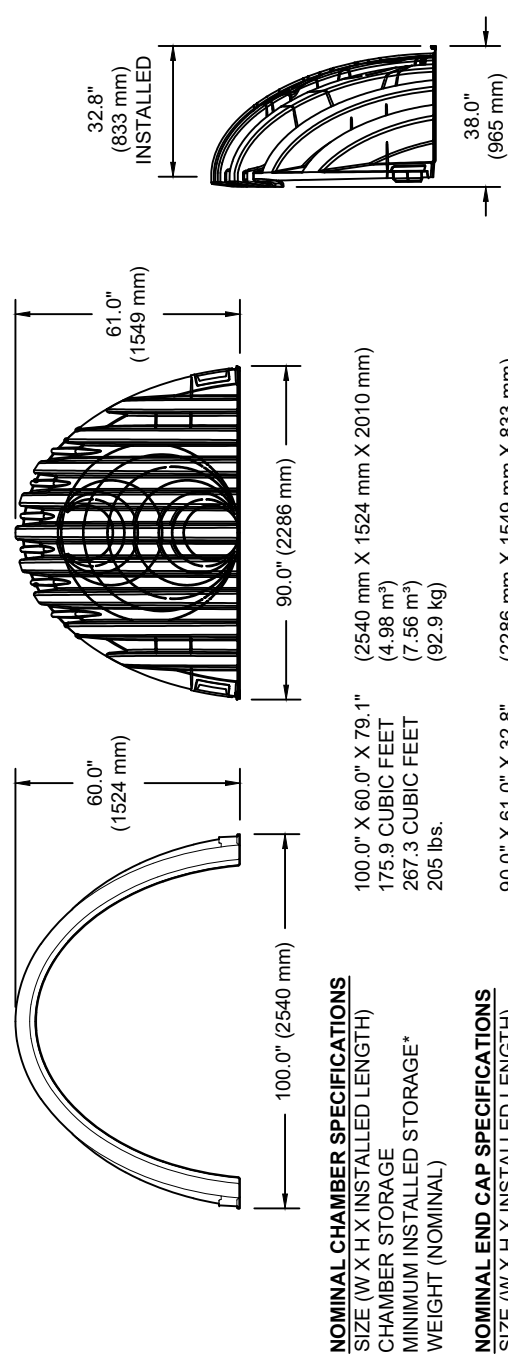
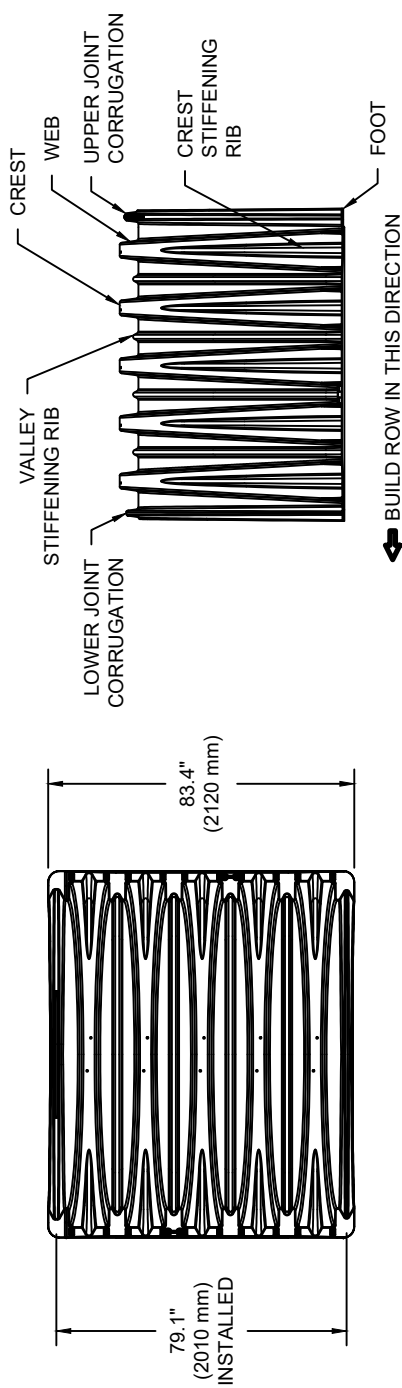
1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

MLC LA SIERRA DMA A RIVERSIDE, CA, USA DRAWN: BY CHECKED: N/A	DATE: 11/12/2024 PROJECT #:	DESCRIPTION	DATE DRW CHK	1-800-821-6710 WWW.STORMTECH.COM StormTech Chamber System	 4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473
---	--------------------------------	-------------	--------------------	--	---

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS/STORMTECH UNDER THE DIRECTION OF THE PROJECT'S ENGINEER OF RECORD (EOR) OR OTHER PROJECT REPRESENTATIVE. THIS DRAWING IS NOT INTENDED FOR USE IN BIDDING OR CONSTRUCTION WITHOUT THE EOR'S PRIOR APPROVAL. EOR SHALL REVIEW THIS DRAWING AND/OR CONSTRUCTION, IT IS THE ULTIMATE RESPONSIBILITY OF THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

MC-7200 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.9 CUBIC FEET	(4.98 m ³)
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FEET	(7.56 m ³)
WEIGHT (NOMINAL)	205 lbs.	(92.9 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m ³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m ³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

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

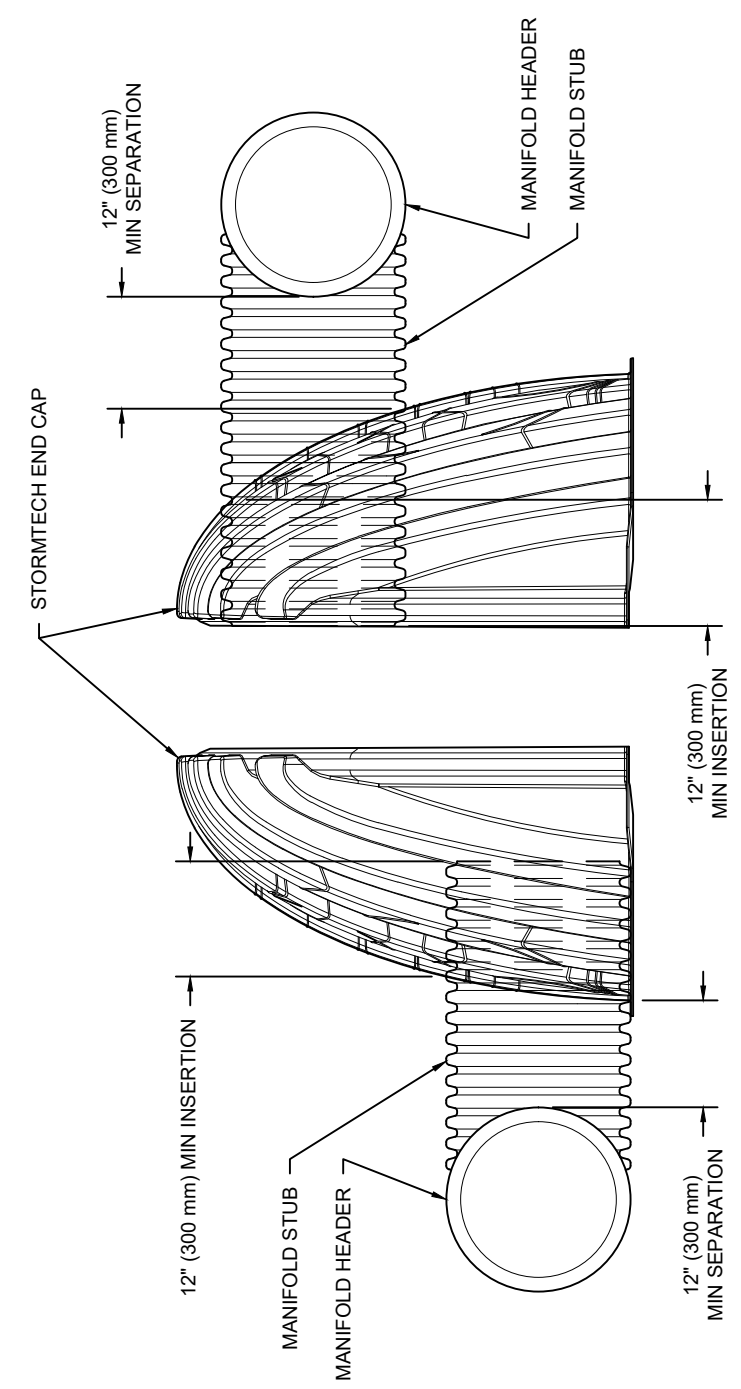
PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
 PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
 END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC7200IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200IEPP06B	6" (150 mm)	---	0.86" (22 mm)
MC7200IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200IEPP08B	8" (200 mm)	---	1.01" (26 mm)
MC7200IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200IEPP10B	10" (250 mm)	---	1.33" (34 mm)
MC7200IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC7200IEPP12B	12" (300 mm)	---	1.55" (39 mm)
MC7200IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200IEPP15B	15" (375 mm)	---	1.70" (43 mm)
MC7200IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200IEPP18TW	18" (450 mm)	---	---
MC7200IEPP18B	18" (450 mm)	---	1.97" (50 mm)
MC7200IEPP18BW	18" (450 mm)	---	---
MC7200IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200IEPP24TW	24" (600 mm)	---	---
MC7200IEPP24B	24" (600 mm)	---	2.26" (57 mm)
MC7200IEPP24BW	24" (600 mm)	---	2.95" (75 mm)
MC7200IEPP30BW	30" (750 mm)	---	3.25" (83 mm)
MC7200IEPP36BW	36" (900 mm)	---	3.55" (90 mm)
MC7200IEPP42BW	42" (1050 mm)	---	---

NOTE: ALL DIMENSIONS ARE NOMINAL

MC-SERIES END CAP INSERTION DETAIL

NTS



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

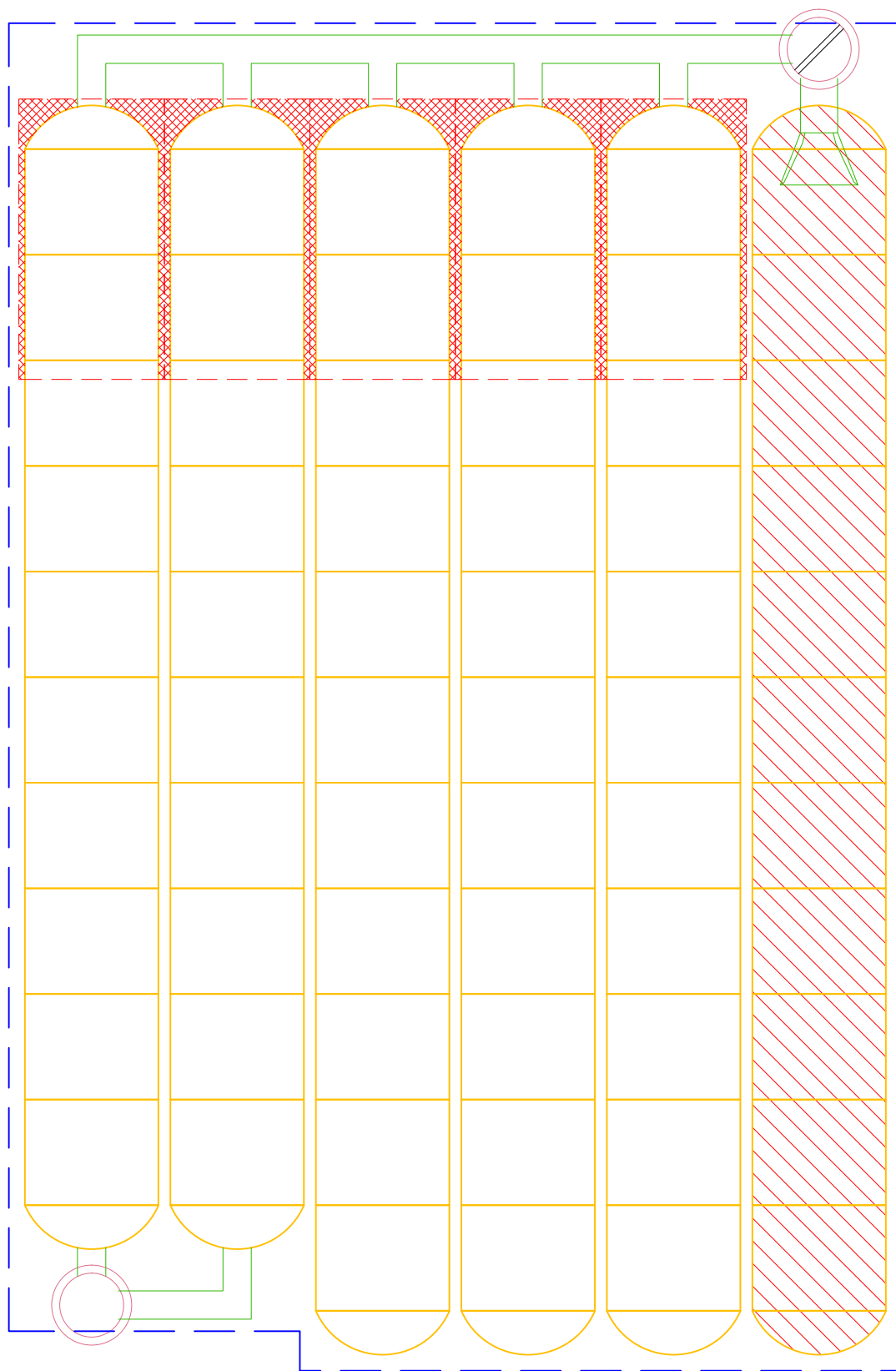
MLC LA SIERRA DMA A
RIVERSIDE, CA, USA
DRAWN: BY
CHECKED: N/A

PROJECT #:
DATE: 11/12/2024

StormTech®
1-800-733-7473
4640 TRUMAN BLVD
HILLIARD, OH 43026

StormTech Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS/STORMTECH UNDER THE DIRECTION OF THE PROJECT'S ENGINEER OF RECORD (EOR) OR OTHER PROJECT REPRESENTATIVE. THIS DRAWING IS NOT INTENDED FOR USE IN BIDDING OR CONSTRUCTION WITHOUT THE EOR'S PRIOR APPROVAL. EOR SHALL REVIEW THIS DRAWING FOR CONSTRUCTION AND/OR CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE EOR TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.



Appendix D: Drainage Structure Calculations

(To be provided during final design)

Appendix E: References

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

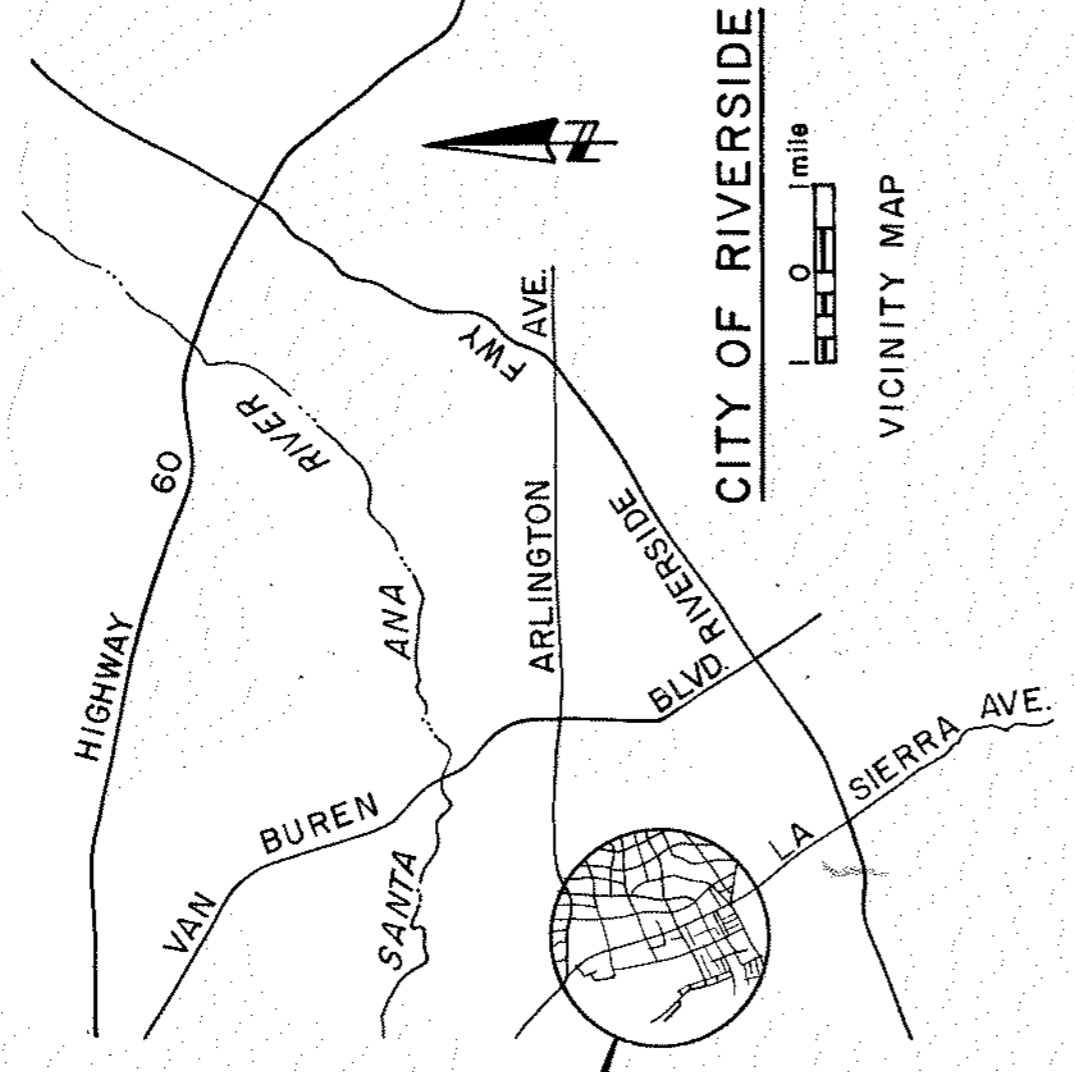
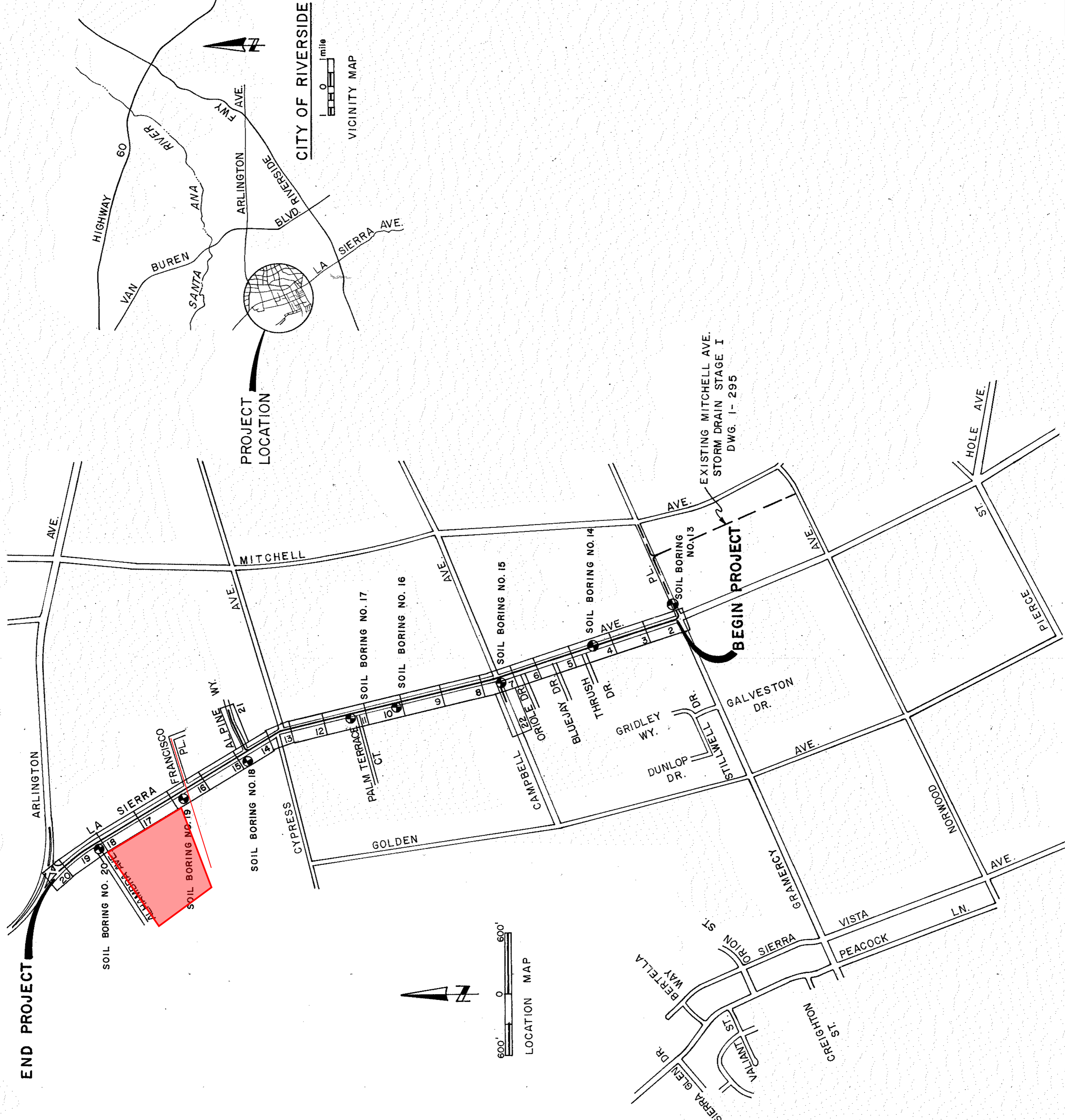
DISTRICT

INDEX

TITLE SHEET	1
PLAN & PROFILE, LA SIERRA AVE. STORM DRAIN	2-20
PLAN & PROFILE, ALPINE LATERAL	21
PLAN & PROFILE, CAMPBELL LATERAL	22
CONNECTOR PIPE PROFILES	23
MANHOLE DROP INLET DETAILS	24
TRAFFIC DETOUR PLAN	25

RCFC & WCD STANDARD DRAWINGS

CB 100 CATCH BASIN NO. 1	26
CB 103 MANHOLE FRAME AND COVER	27
CB 105 DETAIL OF CATCH BASIN OPENING	28
CB 106 CATCH BASIN REINFORCEMENT	29
CB 110 CONCRETE DROP INLET	30
LD 201 LOCAL DEPRESSION NO. 2	31
JS 227 JUNCTION STRUCTURE NO. 2	32-33
JS 229 JUNCTION STRUCTURE NO. 4	34
MH 252 MANHOLE NO. 2	35
MH 254 MANHOLE NO. 4	36-37
MH 255 MANHOLE FRAME & COVER, NON-ROCKING	38
MH 257 MANHOLE SHAFT FOR CAST PIPE	39
MH 259 STANDARD DROP STEP	40
M 803 CONCRETE COLLARS FOR PIPES 12 INCHES THROUGH 66 INCHES	41
M 807 SANITARY SEWER PROTECTION	42
M 808 REMODELING OF SANITARY SEWER HOUSE CONNECTIONS 43-44	43-44
M 811 SIGNS & MARKERS	45
M 813 CURB & GUTTER	46
M 814 ABBREVIATIONS & SYMBOLS	47
M 815 BEDDING & PAY LINES	48



GENERAL NOTES

- STATIONS SHOWN ON DRAWINGS ARE ALONG CENTER LINE OF CONDUIT OR ON A LINE NORMAL TO CENTER LINE OF CONDUIT.
- TIES TO CATCH BASINS ARE FROM THE CURB RETURN TO THE CENTERLINE OF THE CATCH BASIN UNLESS OTHERWISE SHOWN. WHERE NO TIE IS SHOWN, LOCAL DEPRESSION SHALL BEGIN AT THE CURB RETURN.
- J.S. NO. 4 SHALL BE USED FOR ALL THE INLET CONNECTIONS TO THE MAINLINE UNLESS OTHERWISE SHOWN.
- ALL OPENINGS RESULTING FROM CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS OR PIPE ENDS SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE NOTED ON PLANS AS "PLUG".
- STREET RESURFACING SHALL BE 3" A.C. ON 14" CLASS 3 AGGREGATE BASE FOR LA SIERRA AVE., 3" A.C. ON 6" CLASS 3 AGGREGATE BASE FOR ALL OTHER STREETS.
- SPOT WELD CATCH BASIN COVERS 3 PLACES @ 120° SPACING TO PREVENT ENTRY BY OTHERS. NOTED ON THE PLANS AS "WELD COVER".

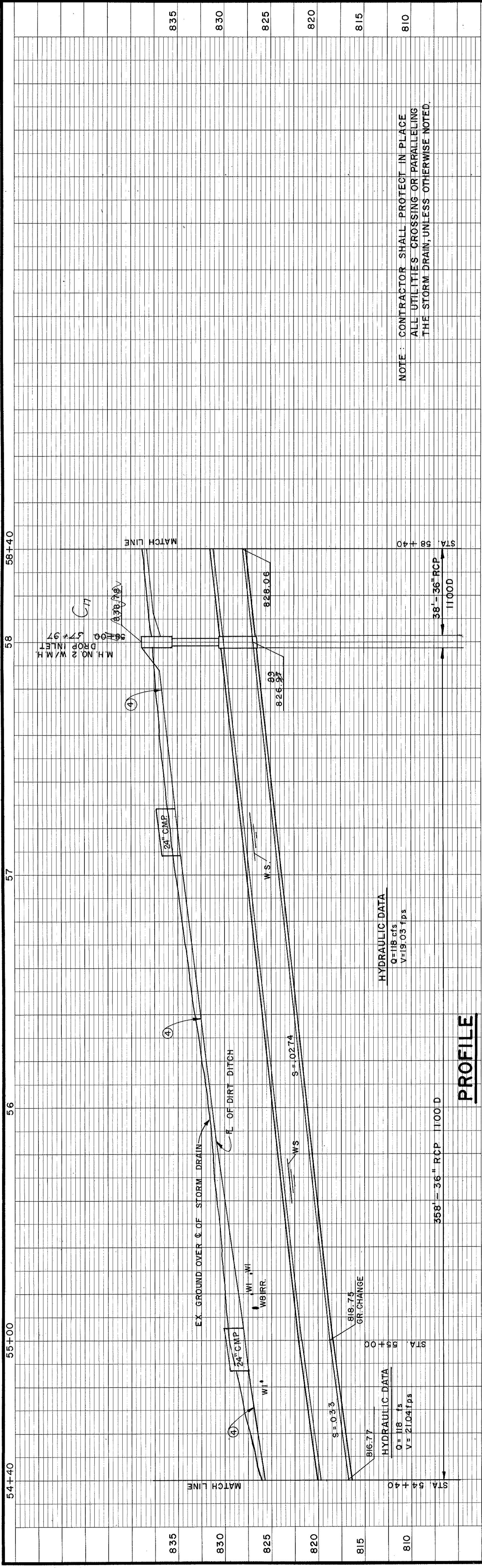
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	
DESIGNED BY: C.C.	APPROVED BY: <i>[Signature]</i>
DRAWN BY: <i>[Signature]</i>	DATE: 3-21-78
DATE DRAWN:	CHECKED BY:
DESCRIPTION	APPR. DATE
AS BUILT	

PROJECT NO. 1-0-066
DRAWING NO. 1-296
SHEET NO. 1 OF 48

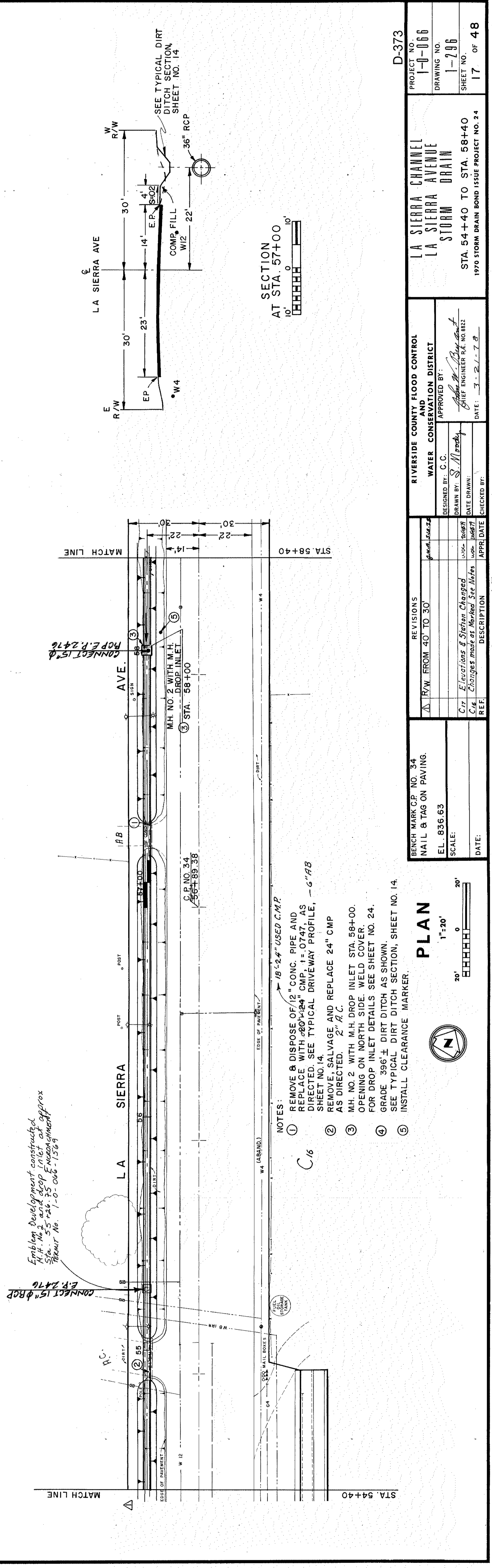
LA SIERRA CHANNEL
LA SIERRA AVENUE STORM DRAIN
TITLE SHEET
1970 STORM DRAIN BOND ISSUE PROJECT NO. 24

D-373

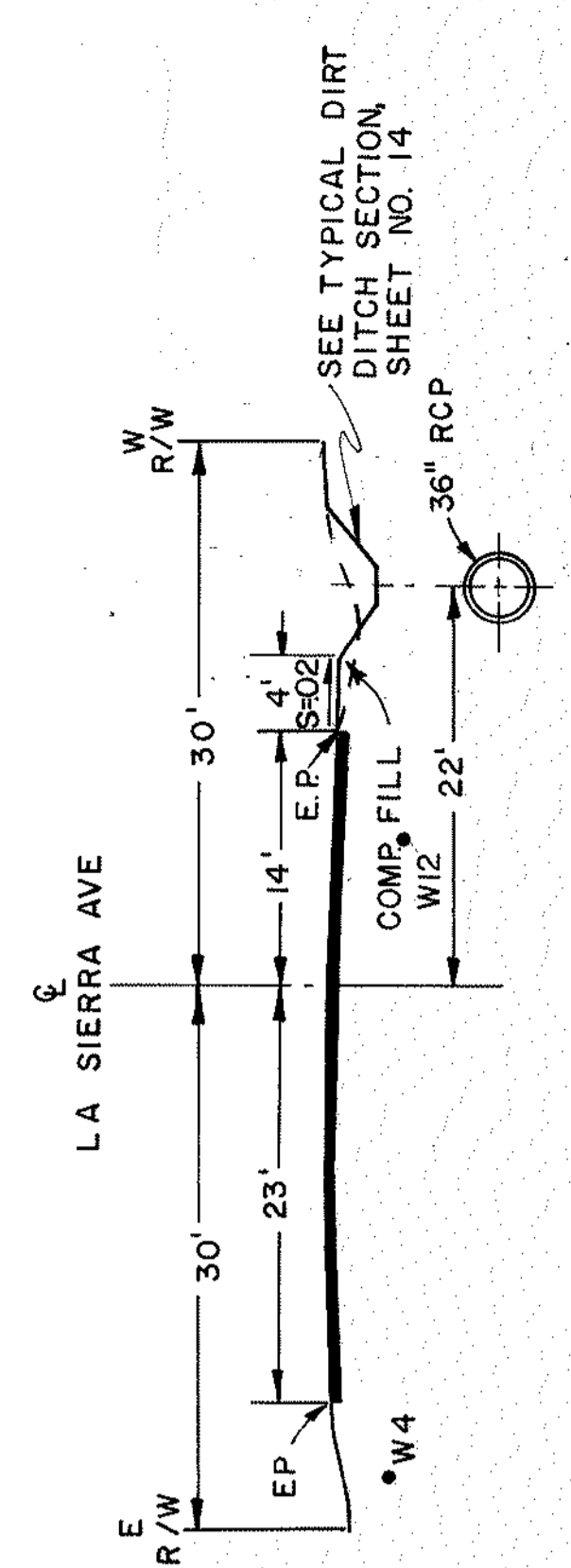
CITY OF RIVERSIDE
LA SIERRA



PROFILE



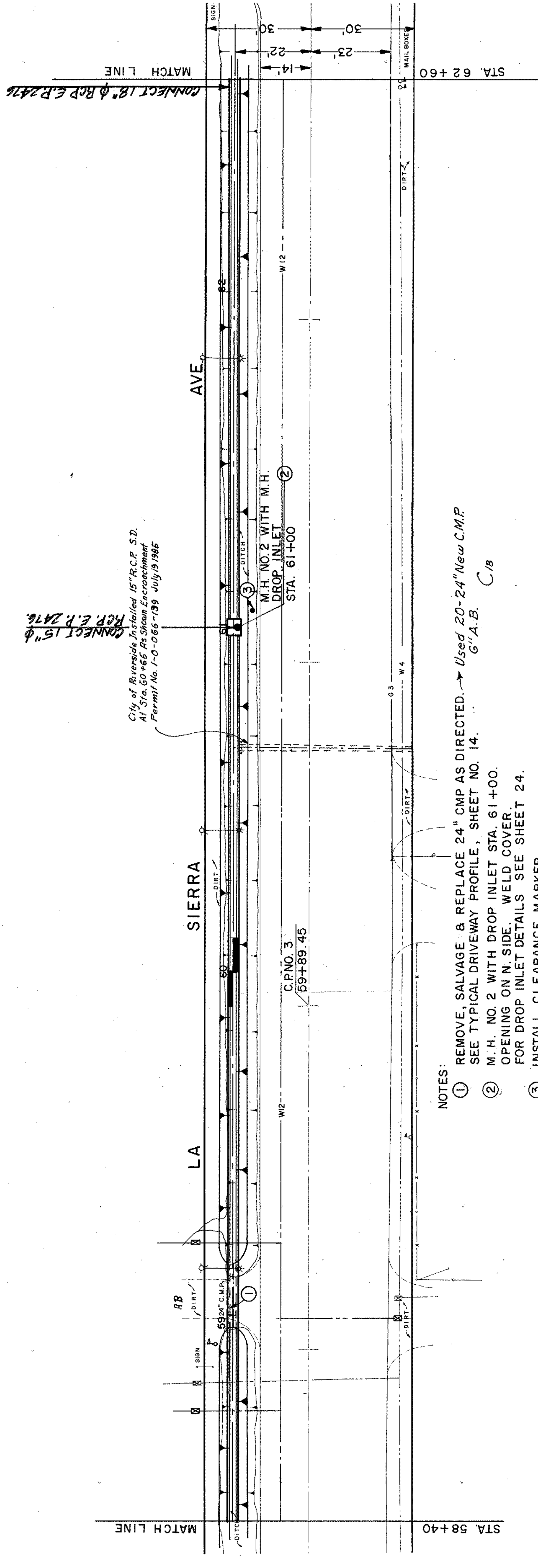
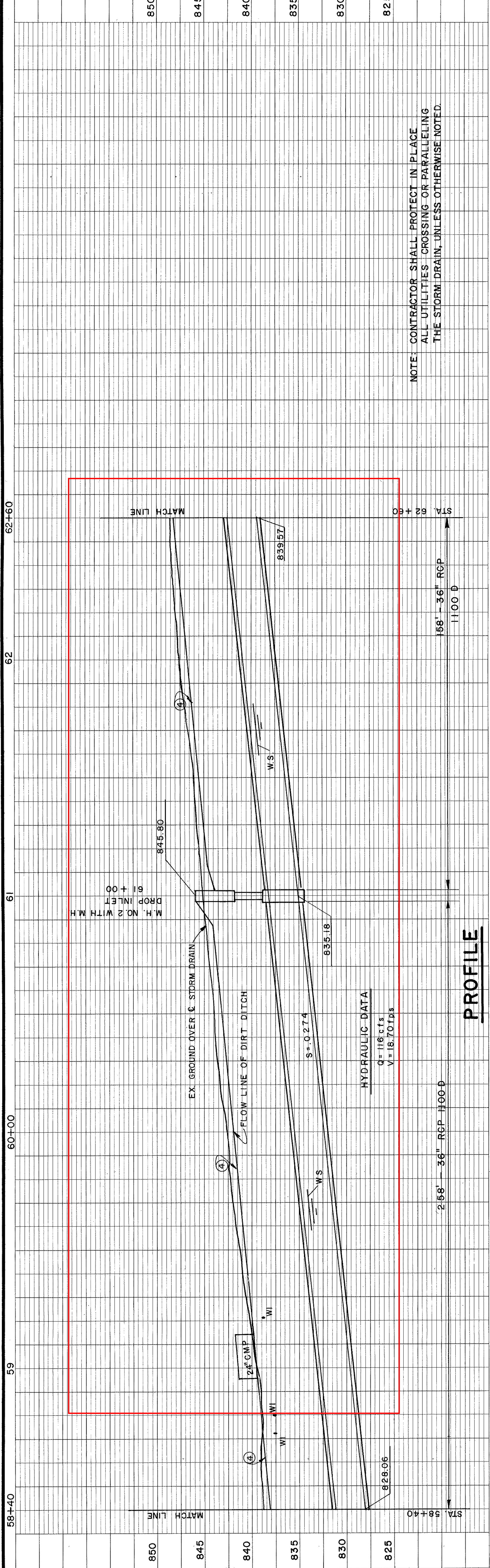
SECTION AT STA 57+00



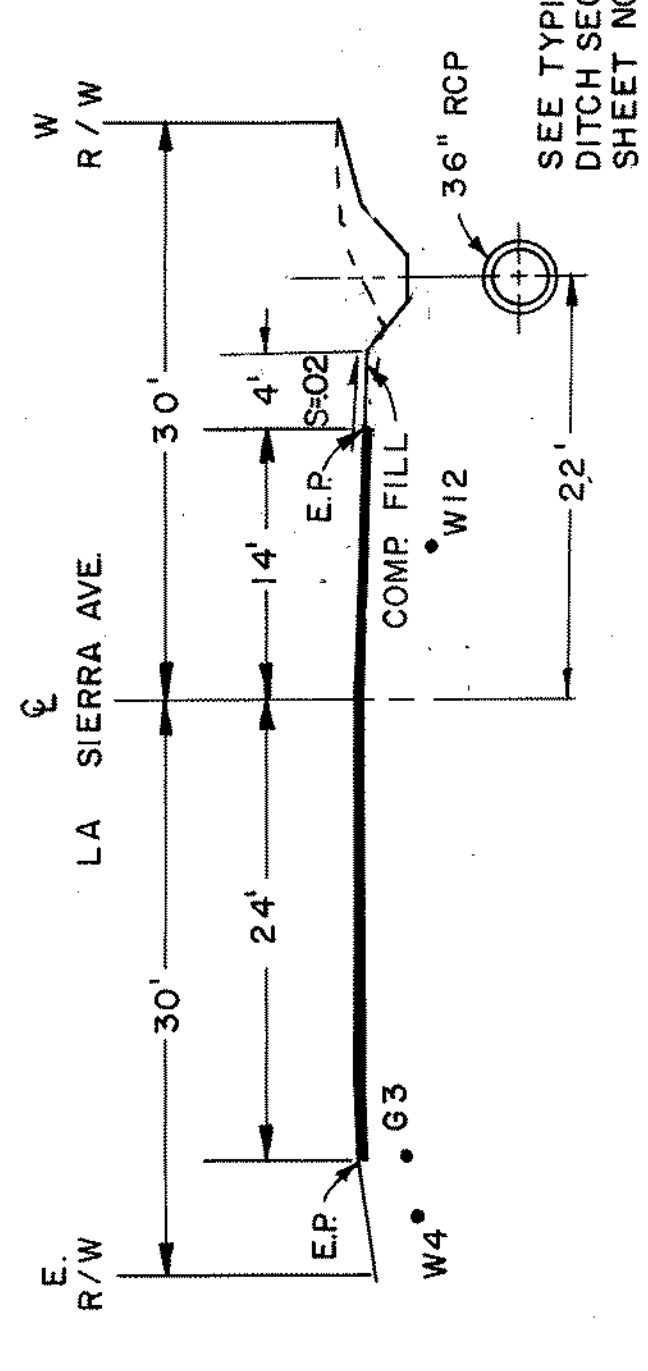
NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN, UNLESS OTHERWISE NOTED.

PROJECT NO. 1-0-066 DRAWING NO. 1-296 SHEET NO. 17 OF 48	
RIVERSIDE COUNTY FLOOD CONTROL WATER CONSERVATION DISTRICT DESIGNED BY: C. C. DRAWN BY: S. M. Priddy DATE DRAWN: 10-20-88 APPROVED BY: [Signature] CHIEF ENGINEER R.E. NO. 882 DATE: 3-2-78	
LA SIERRA CHANNEL LA SIERRA AVENUE LA STORM DRAIN	
STA. 54+40 TO STA. 58+40 1970 STORM DRAIN BOND ISSUE PROJECT NO. 24	
REVISIONS R/W FROM 40' TO 30' C17 Elevations & Station Changed C16 Changes made as Marked See Notes	AS BUILT
BENCH MARK C.P. NO. 34 NAIL & TAG ON PAVING. EL. 836.63 SCALE: 1"=20' DATE:	PLAN 1"=20' 20' 0' 20'

- NOTES:
- REMOVE & DISPOSE OF 12" CONC. PIPE AND REPLACE WITH 24" CMP. 1 = 0747 AS DIRECTED. SEE TYPICAL DRIVEWAY PROFILE, -6" AB SHEET NO. 14.
 - REMOVE, SALVAGE, AND REPLACE 24" CMP AS DIRECTED. 2' A.C.
 - M.H. NO. 2 WITH M.H. DROP INLET STA. 58+00. OPENING ON NORTH SIDE. WELD COVER FOR DROP INLET DETAILS SEE SHEET NO. 24.
 - GRADE 396" ± DIRT DITCH AS SHOWN. SEE TYPICAL DIRT DITCH SECTION, SHEET NO. 14.
 - INSTALL CLEARANCE MARKER.



SECTION
AT STA. 61+10



- NOTES:
- ① REMOVE SALVAGE & REPLACE 24" CMP AS DIRECTED. → Used 20'-24" New C.M.P. SEE TYPICAL DRIVEWAY PROFILE, SHEET NO. 14. G.A.B. C/B
 - ② M.H. NO. 2 WITH DROP INLET STA. 61+00. OPENING ON N. SIDE. WELD COVER. FOR DROP INLET DETAILS SEE SHEET 24.
 - ③ INSTALL CLEARANCE MARKER.
 - ④ GR. 416' ± DIRT DITCH AS SHOWN. SEE TYPICAL DIRT DITCH SECTION, SHEET 14.

PLAN
1" = 20'



AS BUILT

NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN, UNLESS OTHERWISE NOTED.

D-373
PROJECT NO. 1-0-066
DRAWING NO. 1-286
SHEET NO. 18 OF 48

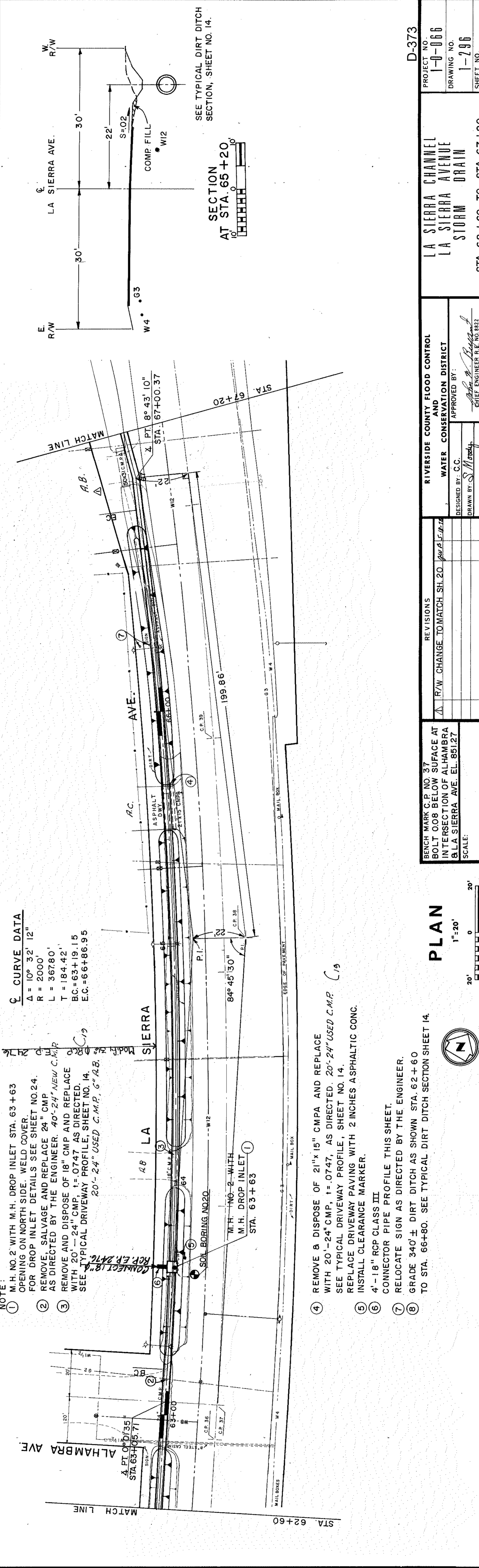
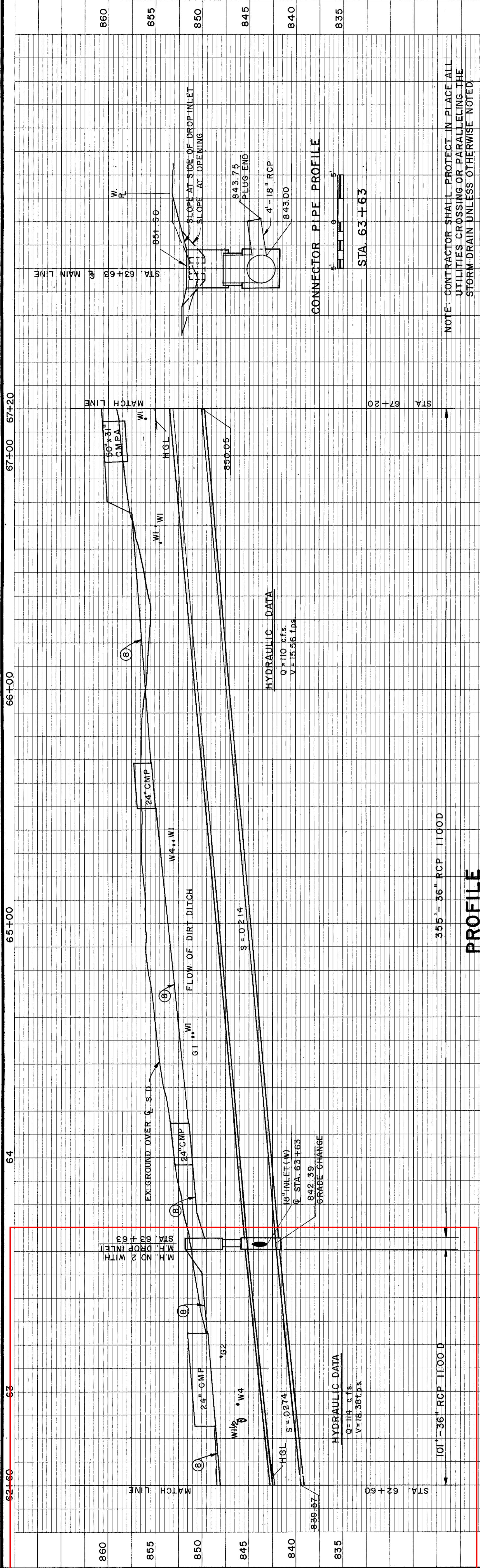
LA SIERRA CHANNEL
LA SIERRA AVENUE
LA SIERRA STORM DRAIN
STA. 58+40 TO STA. 62+60
1970 STORM DRAIN BOND ISSUE PROJECT NO. 24

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
DESIGNED BY: C. C.
DRAWN BY: S. M. Brady
DATE DRAWN: 10/27/73
SCALE: 1" = 20'

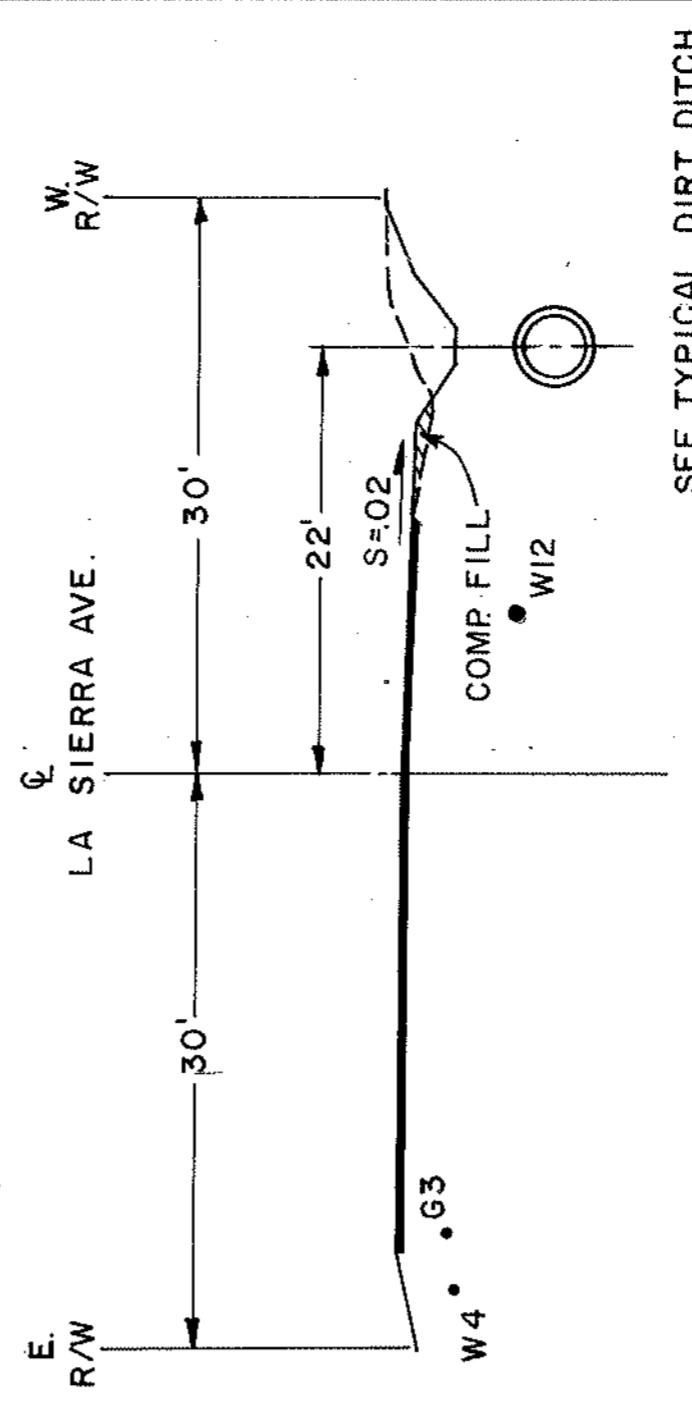
APPROVED BY: [Signature]
CHIEF ENGINEER R.E. NO. 8822
DATE: 3-21-73

REVISIONS	DESCRIPTION	DATE	CHECKED BY

BENCH MARK C.P. NO. 35
NAIL & TAG IN PAVING.
EL. 844.05
SCALE: 1" = 20'



SECTION
AT STA. 65+20



PROFILE

PLAN

AS BUILT

REVISIONS

NO.	DESCRIPTION	DATE
1	R/W CHANGE TO MATCH SH. 20	10/2/18
2	See Notes For Changes	10/2/18

DESIGNED BY: C.C.

DRAWN BY: S. M. [Signature]

DATE DRAWN: 10/2/18

APPROVED BY: [Signature]

DATE: 10/2/18

CHEF ENGINEER R.E. NO. 8822

PROJECT NO. 1-0-066

DRAWING NO. 1-296

SHEET NO. 19 OF 48

D-373

LA SIERRA CHANNEL

LA SIERRA AVENUE

LA SIERRA DRAIN

STORM DRAIN

STA. 62+60 TO STA. 67+20

1970 STORM DRAIN BOND ISSUE PROJECT NO. 24

18" INLET (W)

24" C.M.P.

36" RCP HOOD

W4, W1

W12

W1

W4

W12

W1

W4

W12

W1

W4

W12

W1

W4

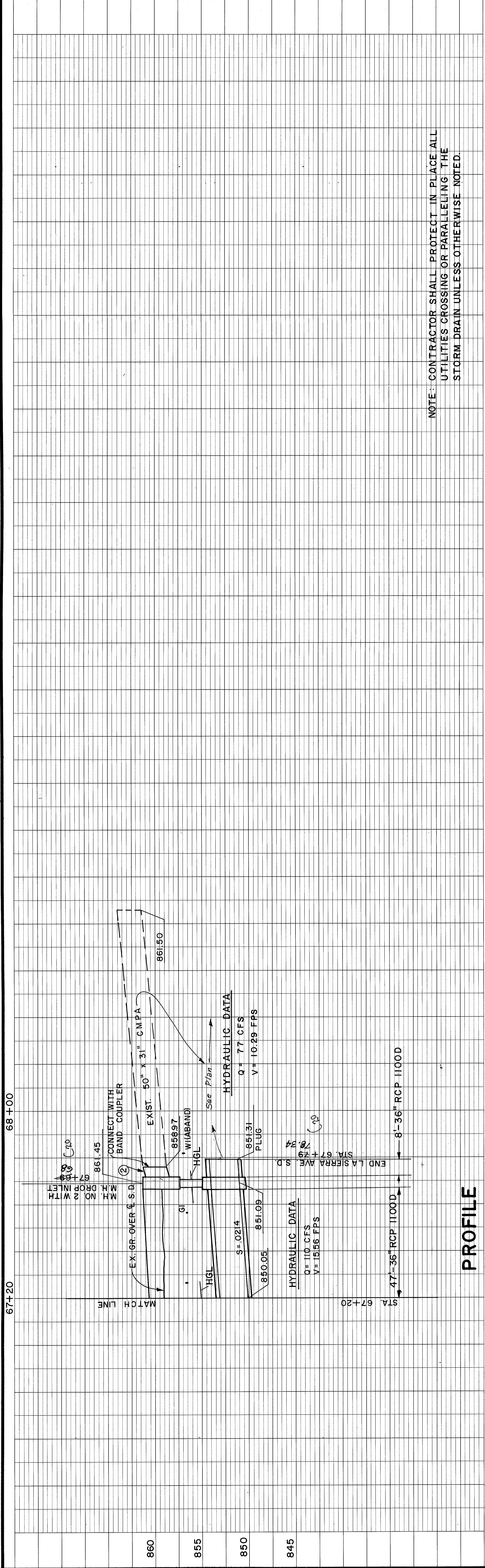
W12

W1

W4

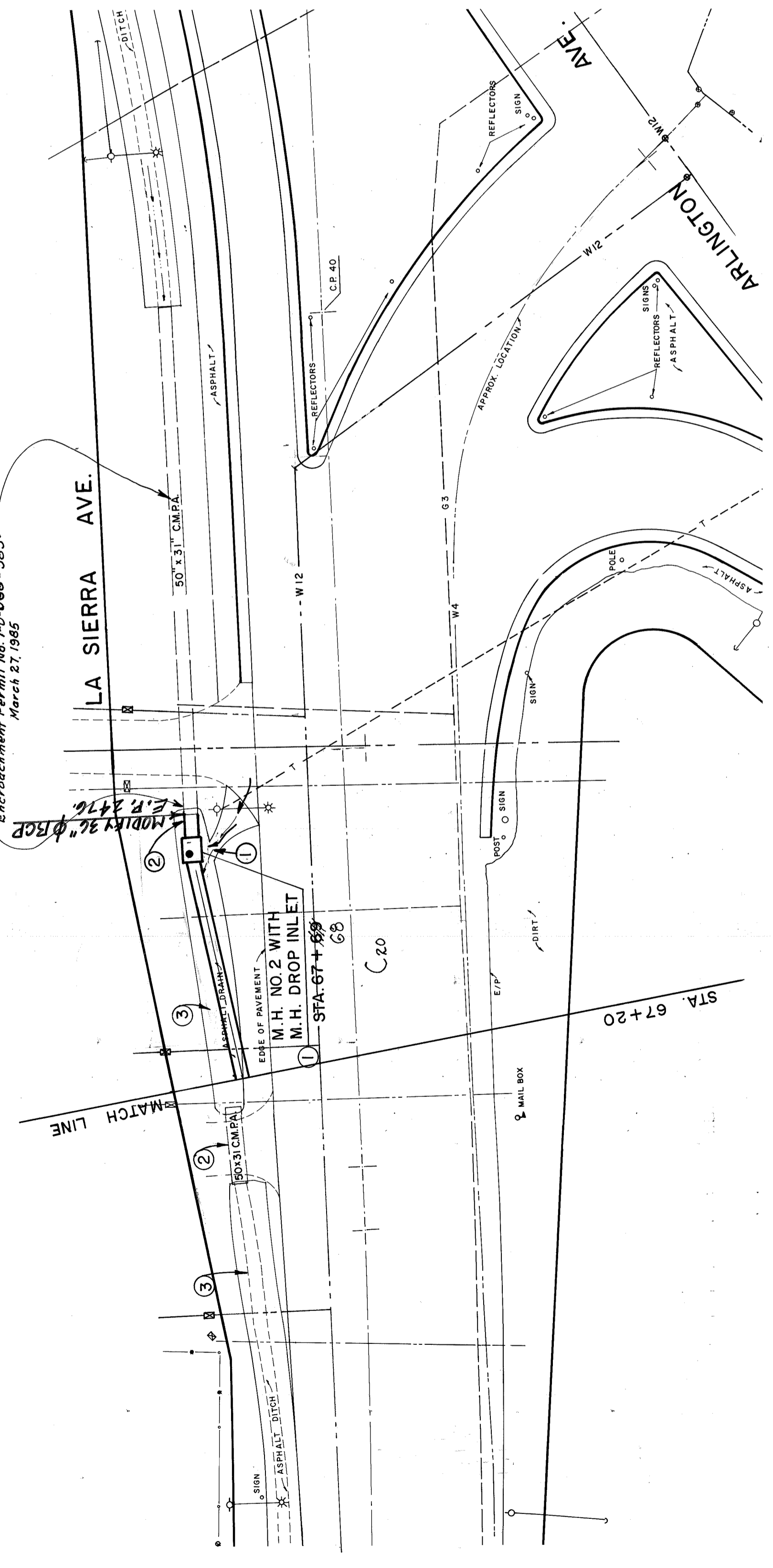
W12

W1



NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED.

- NOTES:
- M. H. NO. 2 WITH M. H. DROP INLET STA. 67+69 WELD COVER. A=50" OPENING ON E. SIDE WITH 2" ASPHALTIC CONCRETE SWALE TO OPENING AS DIRECTED BY THE ENGINEER. FOR DROP INLET DETAILS SEE SHEET NO. 24. *C21*
 - REMOVE 50" x 31" CMPA AND SALVAGE TO JOIN DROP INLET ON N. SIDE AND TO EX. 50" x 31" CMPA WITH BAND COUPLER AND CONC. COLLAR.
 - REMOVE ASPHALT DITCH AND FILL FROM STA. 66+80 TO 67+76 ± AS DIRECTED BY THE ENGINEER.



PLAN
1" = 20'
0 20' 40'

BENCH MARK C.P. NO. 40 N&T IN TRAFFIC ISLAND AT LA SIERRA & ARLINGTON AVE. E.L. 869.34
SCALE:
DATE:

D-373

PROJECT NO. 1-0-066	DRAWING NO. 1-296	SHEET NO. 20	OF 48
LA SIERRA CHANNEL LA SIERRA AVENUE STORM DRAIN			
STA. 67+20 TO STA. 67+79 1970 STORM DRAIN BOND ISSUE PROJECT NO. 24			
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		APPROVED BY: <i>[Signature]</i> CHIEF ENGINEER, RE/NO. 8822	
DESIGNED BY: C.C.	DRAWN BY: <i>[Signature]</i>	DATE DRAWN: 10/27/79	DATE: 3-21-79
REVISIONS	DESCRIPTION	APPR. DATE	CHECKED BY:
C21	See Notes for Changes		
C22	Sta. Change		
REF			

AS BUILT



NOAA Atlas 14, Volume 6, Version 2
 Location name: Riverside, California, USA*
 Latitude: 33.9425°, Longitude: -117.5009°
 Elevation: 852 ft**
 *source: ESRI Maps
 **source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerials](#)

PF tabular

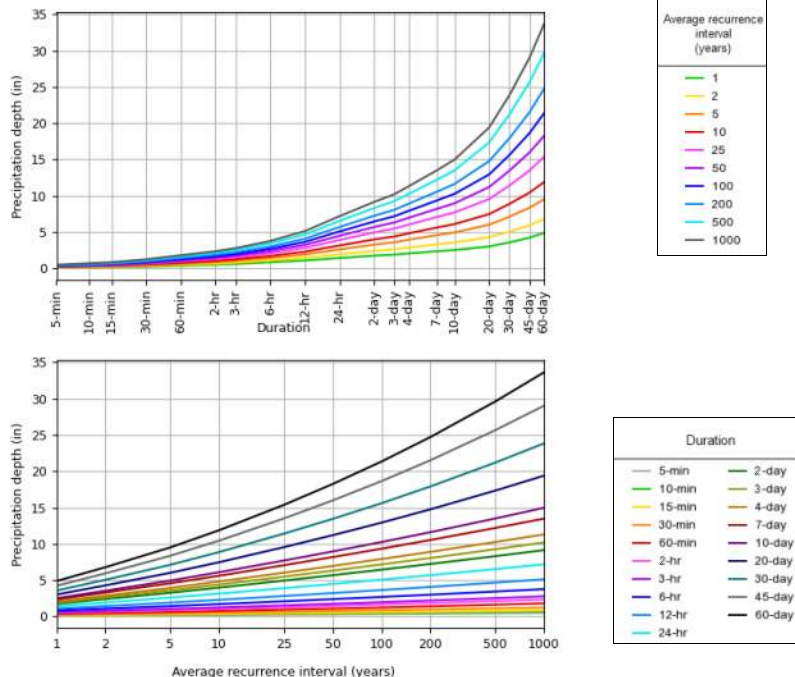
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.089 (0.074-0.108)	0.122 (0.102-0.147)	0.165 (0.137-0.201)	0.201 (0.166-0.246)	0.251 (0.200-0.318)	0.290 (0.226-0.376)	0.331 (0.251-0.440)	0.373 (0.275-0.511)	0.432 (0.305-0.618)	0.479 (0.326-0.710)
10-min	0.128 (0.107-0.155)	0.175 (0.146-0.211)	0.237 (0.197-0.288)	0.288 (0.238-0.353)	0.360 (0.287-0.456)	0.416 (0.324-0.539)	0.474 (0.360-0.630)	0.535 (0.395-0.733)	0.619 (0.437-0.886)	0.686 (0.468-1.02)
15-min	0.155 (0.129-0.187)	0.211 (0.176-0.256)	0.286 (0.238-0.348)	0.349 (0.288-0.427)	0.435 (0.347-0.552)	0.503 (0.392-0.652)	0.573 (0.435-0.762)	0.647 (0.477-0.886)	0.749 (0.529-1.07)	0.830 (0.566-1.23)
30-min	0.229 (0.192-0.277)	0.313 (0.261-0.379)	0.425 (0.354-0.516)	0.518 (0.427-0.634)	0.646 (0.515-0.819)	0.747 (0.582-0.968)	0.851 (0.646-1.13)	0.960 (0.708-1.32)	1.11 (0.785-1.59)	1.23 (0.840-1.83)
60-min	0.335 (0.280-0.405)	0.457 (0.381-0.553)	0.620 (0.516-0.753)	0.755 (0.623-0.924)	0.942 (0.750-1.19)	1.09 (0.848-1.41)	1.24 (0.942-1.65)	1.40 (1.03-1.92)	1.62 (1.14-2.32)	1.80 (1.22-2.66)
2-hr	0.490 (0.409-0.592)	0.649 (0.541-0.785)	0.860 (0.715-1.04)	1.03 (0.853-1.27)	1.27 (1.01-1.62)	1.46 (1.14-1.89)	1.65 (1.26-2.20)	1.85 (1.37-2.54)	2.13 (1.50-3.04)	2.34 (1.60-3.47)
3-hr	0.600 (0.501-0.725)	0.788 (0.658-0.954)	1.04 (0.863-1.26)	1.24 (1.02-1.52)	1.52 (1.21-1.93)	1.74 (1.36-2.26)	1.97 (1.50-2.62)	2.20 (1.62-3.02)	2.52 (1.78-3.60)	2.77 (1.89-4.11)
6-hr	0.831 (0.694-1.00)	1.09 (0.908-1.32)	1.43 (1.19-1.73)	1.71 (1.41-2.09)	2.09 (1.66-2.65)	2.38 (1.86-3.09)	2.68 (2.04-3.57)	3.00 (2.21-4.11)	3.43 (2.42-4.90)	3.76 (2.56-5.58)
12-hr	1.08 (0.899-1.30)	1.43 (1.20-1.74)	1.90 (1.58-2.31)	2.29 (1.89-2.80)	2.81 (2.24-3.57)	3.22 (2.51-4.18)	3.64 (2.76-4.84)	4.07 (3.00-5.57)	4.66 (3.29-6.66)	5.12 (3.48-7.58)
24-hr	1.41 (1.25-1.63)	1.92 (1.70-2.22)	2.60 (2.29-3.01)	3.15 (2.75-3.67)	3.90 (3.30-4.70)	4.48 (3.71-5.51)	5.07 (4.11-6.39)	5.68 (4.48-7.36)	6.52 (4.94-8.80)	7.18 (5.25-10.0)
2-day	1.74 (1.54-2.01)	2.40 (2.12-2.77)	3.26 (2.88-3.78)	3.97 (3.47-4.63)	4.94 (4.18-5.95)	5.68 (4.71-6.99)	6.44 (5.22-8.12)	7.23 (5.70-9.36)	8.30 (6.28-11.2)	9.14 (6.69-12.7)
3-day	1.89 (1.67-2.18)	2.62 (2.32-3.03)	3.59 (3.17-4.16)	4.39 (3.84-5.12)	5.47 (4.63-6.60)	6.31 (5.24-7.76)	7.17 (5.80-9.03)	8.05 (6.35-10.4)	9.26 (7.01-12.5)	10.2 (7.46-14.2)
4-day	2.04 (1.81-2.36)	2.86 (2.52-3.30)	3.93 (3.47-4.55)	4.82 (4.21-5.62)	6.02 (5.10-7.26)	6.96 (5.77-8.56)	7.91 (6.41-9.97)	8.90 (7.02-11.5)	10.2 (7.76-13.8)	11.3 (8.27-15.8)
7-day	2.34 (2.07-2.70)	3.29 (2.91-3.80)	4.56 (4.02-5.28)	5.61 (4.90-6.55)	7.05 (5.97-8.50)	8.18 (6.78-10.1)	9.33 (7.56-11.8)	10.5 (8.30-13.6)	12.2 (9.22-16.4)	13.5 (9.86-18.8)
10-day	2.52 (2.23-2.90)	3.55 (3.14-4.10)	4.94 (4.35-5.72)	6.09 (5.33-7.11)	7.70 (6.52-9.28)	8.95 (7.43-11.0)	10.3 (8.30-12.9)	11.6 (9.15-15.0)	13.5 (10.2-18.2)	15.0 (11.0-20.9)
20-day	3.02 (2.67-3.48)	4.28 (3.78-4.94)	6.01 (5.30-6.96)	7.47 (6.53-8.72)	9.54 (8.07-11.5)	11.2 (9.28-13.8)	12.9 (10.5-16.3)	14.8 (11.6-19.1)	17.3 (13.1-23.4)	19.4 (14.2-27.0)
30-day	3.56 (3.15-4.11)	5.05 (4.46-5.83)	7.11 (6.26-8.23)	8.87 (7.76-10.4)	11.4 (9.65-13.7)	13.4 (11.1-16.5)	15.6 (12.6-19.6)	17.9 (14.1-23.2)	21.2 (16.0-28.6)	23.8 (17.4-33.2)
45-day	4.22 (3.74-4.87)	5.94 (5.25-6.86)	8.35 (7.36-9.67)	10.4 (9.13-12.2)	13.5 (11.4-16.3)	16.0 (13.3-19.7)	18.6 (15.1-23.5)	21.5 (17.0-27.9)	25.7 (19.4-34.6)	29.0 (21.2-40.5)
60-day	4.87 (4.31-5.62)	6.78 (5.99-7.83)	9.50 (8.37-11.0)	11.9 (10.4-13.9)	15.4 (13.0-18.5)	18.2 (15.1-22.4)	21.3 (17.3-26.9)	24.7 (19.5-32.0)	29.6 (22.4-39.9)	33.6 (24.6-46.9)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates for a given duration and average recurrence interval will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

PF graphical

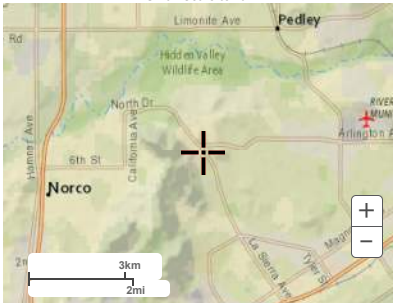
PDS-based depth-duration-frequency (DDF) curves
 Latitude: 33.9425°, Longitude: -117.5009°



[Back to Top](#)

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)



NOAA Atlas 14, Volume 6, Version 2
 Location name: Riverside, California, USA*
 Latitude: 33.9425°, Longitude: -117.5009°
 Elevation: 852 ft**
*source: ESRI Maps
 **source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Tryppaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

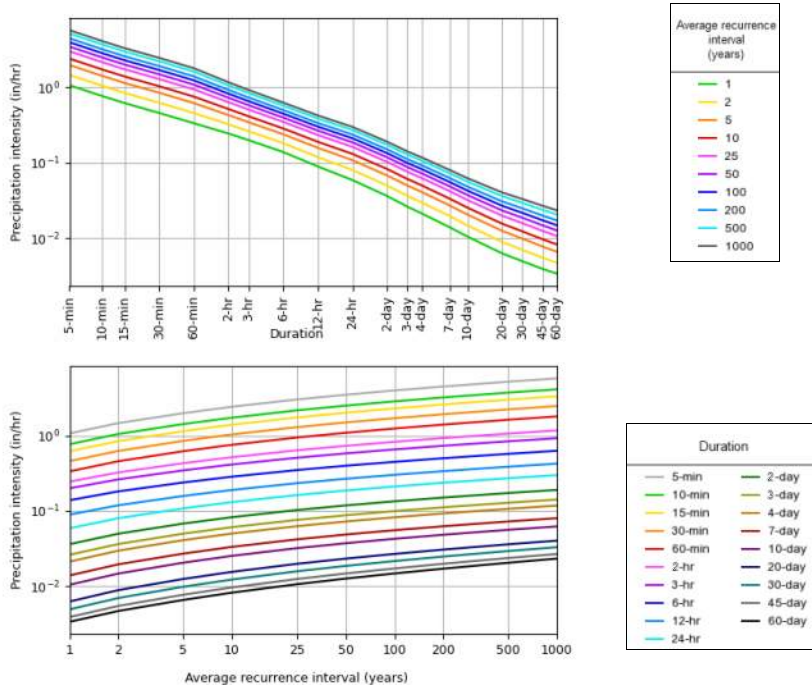
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.07 (0.888-1.30)	1.46 (1.22-1.76)	1.98 (1.64-2.41)	2.41 (1.99-2.95)	3.01 (2.40-3.82)	3.48 (2.71-4.51)	3.97 (3.01-5.28)	4.48 (3.30-6.13)	5.18 (3.66-7.42)	5.75 (3.91-8.52)
10-min	0.768 (0.642-0.930)	1.05 (0.876-1.27)	1.42 (1.18-1.73)	1.73 (1.43-2.12)	2.16 (1.72-2.74)	2.50 (1.94-3.23)	2.84 (2.16-3.78)	3.21 (2.37-4.40)	3.71 (2.62-5.32)	4.12 (2.81-6.11)
15-min	0.620 (0.516-0.748)	0.844 (0.704-1.02)	1.14 (0.952-1.39)	1.40 (1.15-1.71)	1.74 (1.39-2.21)	2.01 (1.57-2.61)	2.29 (1.74-3.05)	2.59 (1.91-3.54)	3.00 (2.12-4.28)	3.32 (2.26-4.92)
30-min	0.458 (0.384-0.554)	0.626 (0.522-0.758)	0.850 (0.708-1.03)	1.04 (0.854-1.27)	1.29 (1.03-1.64)	1.49 (1.16-1.94)	1.70 (1.29-2.26)	1.92 (1.42-2.63)	2.22 (1.57-3.18)	2.47 (1.68-3.65)
60-min	0.335 (0.280-0.405)	0.457 (0.381-0.553)	0.620 (0.516-0.753)	0.755 (0.623-0.924)	0.942 (0.750-1.19)	1.09 (0.848-1.41)	1.24 (0.942-1.65)	1.40 (1.03-1.92)	1.62 (1.14-2.32)	1.80 (1.22-2.66)
2-hr	0.245 (0.204-0.296)	0.324 (0.270-0.392)	0.430 (0.357-0.522)	0.517 (0.426-0.633)	0.637 (0.507-0.807)	0.730 (0.569-0.947)	0.826 (0.627-1.10)	0.926 (0.683-1.27)	1.06 (0.751-1.52)	1.17 (0.798-1.74)
3-hr	0.199 (0.166-0.241)	0.262 (0.219-0.317)	0.345 (0.287-0.419)	0.413 (0.341-0.506)	0.507 (0.404-0.643)	0.580 (0.452-0.752)	0.655 (0.497-0.871)	0.732 (0.540-1.00)	0.839 (0.592-1.20)	0.922 (0.628-1.37)
6-hr	0.138 (0.115-0.167)	0.181 (0.151-0.220)	0.238 (0.198-0.289)	0.284 (0.234-0.349)	0.348 (0.277-0.442)	0.397 (0.310-0.515)	0.448 (0.340-0.596)	0.500 (0.369-0.685)	0.572 (0.404-0.818)	0.628 (0.428-0.931)
12-hr	0.089 (0.074-0.108)	0.119 (0.099-0.144)	0.158 (0.131-0.191)	0.189 (0.156-0.232)	0.233 (0.186-0.296)	0.267 (0.208-0.346)	0.301 (0.229-0.401)	0.337 (0.249-0.462)	0.386 (0.272-0.552)	0.424 (0.289-0.629)
24-hr	0.058 (0.052-0.067)	0.080 (0.070-0.092)	0.108 (0.095-0.125)	0.131 (0.114-0.153)	0.162 (0.137-0.195)	0.186 (0.154-0.229)	0.211 (0.171-0.266)	0.236 (0.186-0.306)	0.271 (0.205-0.366)	0.299 (0.218-0.417)
2-day	0.036 (0.032-0.041)	0.049 (0.044-0.057)	0.067 (0.059-0.078)	0.082 (0.072-0.096)	0.102 (0.087-0.123)	0.118 (0.098-0.145)	0.134 (0.108-0.169)	0.150 (0.118-0.195)	0.172 (0.130-0.233)	0.190 (0.139-0.265)
3-day	0.026 (0.023-0.030)	0.036 (0.032-0.042)	0.049 (0.044-0.057)	0.060 (0.053-0.071)	0.076 (0.064-0.091)	0.087 (0.072-0.107)	0.099 (0.080-0.125)	0.111 (0.088-0.144)	0.128 (0.097-0.173)	0.141 (0.103-0.197)
4-day	0.021 (0.018-0.024)	0.029 (0.026-0.034)	0.040 (0.036-0.047)	0.050 (0.043-0.058)	0.062 (0.053-0.075)	0.072 (0.060-0.089)	0.082 (0.066-0.103)	0.092 (0.073-0.120)	0.106 (0.080-0.143)	0.117 (0.086-0.164)
7-day	0.013 (0.012-0.016)	0.019 (0.017-0.022)	0.027 (0.023-0.031)	0.033 (0.029-0.038)	0.041 (0.035-0.050)	0.048 (0.040-0.059)	0.055 (0.044-0.069)	0.062 (0.049-0.081)	0.072 (0.054-0.097)	0.080 (0.058-0.111)
10-day	0.010 (0.009-0.012)	0.014 (0.013-0.017)	0.020 (0.018-0.023)	0.025 (0.022-0.029)	0.032 (0.027-0.038)	0.037 (0.030-0.045)	0.042 (0.034-0.053)	0.048 (0.038-0.062)	0.056 (0.042-0.075)	0.062 (0.045-0.086)
20-day	0.006 (0.005-0.007)	0.008 (0.007-0.010)	0.010 (0.011-0.014)	0.015 (0.013-0.018)	0.019 (0.016-0.023)	0.023 (0.019-0.028)	0.026 (0.021-0.033)	0.030 (0.024-0.039)	0.036 (0.027-0.048)	0.040 (0.029-0.056)
30-day	0.004 (0.004-0.005)	0.007 (0.006-0.008)	0.009 (0.008-0.011)	0.012 (0.010-0.014)	0.015 (0.013-0.019)	0.018 (0.015-0.022)	0.021 (0.017-0.027)	0.024 (0.019-0.032)	0.029 (0.022-0.039)	0.033 (0.024-0.046)
45-day	0.003 (0.003-0.004)	0.005 (0.004-0.006)	0.007 (0.006-0.008)	0.009 (0.008-0.011)	0.012 (0.010-0.015)	0.014 (0.012-0.018)	0.017 (0.013-0.021)	0.019 (0.015-0.025)	0.023 (0.017-0.032)	0.027 (0.019-0.037)
60-day	0.003 (0.002-0.003)	0.004 (0.004-0.005)	0.006 (0.005-0.007)	0.008 (0.007-0.009)	0.010 (0.009-0.012)	0.012 (0.010-0.015)	0.014 (0.012-0.018)	0.017 (0.013-0.022)	0.020 (0.015-0.027)	0.023 (0.017-0.032)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates for a given duration and average recurrence interval will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

PF graphical

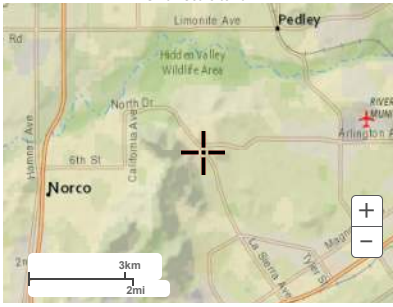
PDS-based intensity-duration-frequency (IDF) curves
 Latitude: 33.9425°, Longitude: -117.5009°



[Back to Top](#)

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

Appendix F: Geotechnical Report



GEOTECHNICAL

OPTIMIZED SOIL ENGINEERING

December 22, 2023

Project No. 23145-01

To: Meritage Homes
5 Peters Canyon Road, Suite 310
Irvine, California 92606

Attention: Ms. Louisa Feletto

Subject: Geotechnical Due Diligence Exploration and Preliminary Design Recommendations, Proposed Residential Development, Southwest Corner of La Sierra Avenue and Alhambra Avenue, City of Riverside, California

At your request, SA Geotechnical, Inc. (SA GEO) has conducted a geotechnical due diligence exploration and review for the proposed residential development located at the southwest corner of La Sierra Avenue and Alhambra Avenue in the City of Riverside, California (Figure 1). The purpose of this study was to evaluate the geotechnical site conditions in light of the proposed grading and improvements in order to provide a geotechnical summary and preliminary recommendations for project design, grading and construction. Our evaluation included review of collected geologic maps and data pertinent to the subject site; subsurface exploration; laboratory testing and analysis; and preparation of this report.

The subject site consists of a mixture of vacant/undeveloped property and rural single-family residential development. The site is composed of several conjoined parcels/lots, totaling approximately 9.8 acres. Based on our study, the primary geotechnical constraints at the site include: the presence of granitic bedrock at existing grade and/or shallow depth underlying the alluvium, the presence of undocumented artificial fills and weathered/unsuitable alluvium near-surface, and seismic shaking during a strong seismic event. The site geology generally consists of approximately 2.5 to 21.5 feet of older alluvium capping granitic bedrock. Along the central portion of the westerly boundary, granitic rock is mapped at existing grades. The older alluvium generally consists of reddish-brown silty sand and sandy silt with "Very Low" to "Medium" expansion potential. The underlying bedrock consists of fine to coarse-grained granitic bedrock (monzogranite, granodiorite, and diorite) that is generally weathered ("decomposed") in the uppermost 18 to 35 feet and considered rippable with heavy duty earthmoving equipment (i.e.: Caterpillar D9 bulldozer or equivalent). Groundwater was encountered in one boring (H-5) at a depth of 26.5 feet below ground surface. Percolation testing was also performed during this study and indicates that shallow stormwater infiltration is generally feasible at the site.

This report presents our findings, conclusions, and preliminary design recommendations for the subject residential development. Based on our review, the proposed development is considered geotechnically feasible provided the recommendations in this report are implemented during design, grading, and construction. Additional geotechnical exploration and analysis may need to be performed once the project plans for grading, foundations, and stormwater infiltration are developed.

References pertinent to the site are included in Appendix A. Boring and test pit logs are included in Appendix B. Laboratory test data is included in Appendix C. The geophysical survey/rippability report is included in Appendix D. Percolation test data is presented in Appendix E. Seismic design parameters are presented in Appendix F. General earthwork and grading specifications are presented in Appendix G.

If you have any questions regarding this report, please contact our office. We appreciate the opportunity to provide our services.

Respectfully submitted,

SA GEOTECHNICAL, INC.



Anthony Zepeda, CEG 2681
Project Geologist



Reza Saberi, GE 3071
Principal Engineer



Peter Anderson, CEG 2596
Principal Engineering Geologist

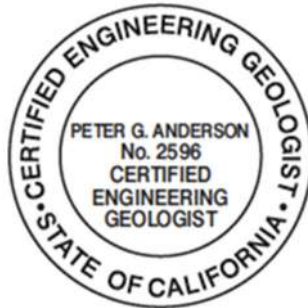


TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

1.0 INTRODUCTION 3

1.1 Introduction and Scope of Services 3

1.2 Site Location, Existing Conditions, and History 4

1.3 Proposed Grading and Improvements..... 4

1.4 Subsurface Exploration..... 5

1.5 Laboratory Testing..... 5

2.1 Geologic Setting and Earth Units 7

2.2 Geotechnical Conditions..... 7

2.3 Groundwater 9

2.4 Regional Faulting and Seismicity 9

2.5 Settlement 9

2.6 Shrinkage and Bulking..... 10

2.7 Rippability and Generation of Oversize Material..... 10

2.8 Percolation Testing 10

2.3 Existing Utilities 11

3.0 CONCLUSION AND PRELIMINARY RECOMMENDATIONS 12

3.1 General Conclusion and Recommendation..... 12

3.2 Site Preparation and Earthwork 12

3.2.1 Site Demolition and Clearing 12

3.2.2 Protection of Existing Improvements and Utilities 13

3.2.3 Remedial Grading Measures 13

3.2.4 Lot Capping/Overexcavation..... 13

3.2.5 Rippability and Placement of Oversize Material..... 14

3.2.6 Fill Placement..... 15

3.2.7 Import 15

3.3 Settlement Potential 15

3.4 Foundation Design..... 16

3.5 Retaining Wall Design and Lateral Earth Pressures 18

3.6 Seismic Design Parameters..... 18

3.7 Slope Setback..... 19

3.8 Corrosivity 20

3.9 Expansion Potential 20

3.10 Interior Slab Moisture Mitigation 20

3.11 Exterior Concrete 21

3.12 Preliminary Asphalt Concrete Pavement Design..... 22

3.13 Trench Excavation and Backfill..... 22

3.14 Groundwater 23

3.15 Stormwater Infiltration..... 23

3.16 Surface Drainage and Irrigation..... 24

3.17 Maintenance of Graded Slopes 25

3.18 Additional Subsurface Exploration and Laboratory Testing 25

3.19 Review of Future Plans 25

3.20 Observation and Testing during Grading and Construction 25

4.0 LIMITATIONS..... 26



TABLE OF CONTENTS (Continued)

List of Illustrations

- Figure 1 – Site Location Map – Rear of Text
- Figure 2 – Regional Geologic Map – Rear of Text
- Figure 3 – Regional Fault Map – Rear of Text
- Figure 4 – Retaining Wall Drainage Detail – Rear of Text

Appendices

- Appendix A – References
- Appendix B – Boring and Test Pit Logs
- Appendix C – Laboratory Test Data
- Appendix D – Geophysical Survey Report
- Appendix E – Percolation Data
- Appendix F – Seismicity Data
- Appendix G – General Earthwork and Grading Specifications

Plates

- Plate 1 – Geotechnical Map – Rear of Appendices

EXECUTIVE SUMMARY

The subject site is generally underlain at or near-surface by granitic bedrock that is successively overlain by variable thicknesses of older alluvium, generally thickening to the east. Granitic bedrock is exposed at the surface within the western portion of the site. Undocumented artificial fill associated with prior land use/grading was encountered in several test pits across the site, ranging from 1.5 to 5.5 feet thick. The older alluvium generally consisted of yellowish-brown, reddish-brown, and brown silty fine to coarse sand, sandy silt and sandy clay that was damp to moist and medium dense/stiff where encountered, ranging in thickness from 2.5 to 21.5 feet. Bedrock was found to consist of yellowish-brown, olive brown, pale reddish-brown, and gray fine to coarse-grained granitic rock (mixtures of monzogranitic, granodiorite, and diorite) that is damp to saturated, and dense to very dense. In general, the bedrock is weathered ("decomposed") in the uppermost 18 to 35 feet and moderately weathered to unweathered below. Bedrock will be encountered during onsite grading and within excavations for utility lines throughout the site. The granitic bedrock is generally considered excavatable (rippable) with heavy duty earthmoving equipment (i.e. Caterpillar D9 bulldozer) to a minimum depth of 18 feet. However, oversize rocks will be generated during grading and excavation for utilities.

The primary geotechnical constraints for site development include the following:

- Presence of shallow granitic bedrock throughout the site;
- Presence of undocumented fill and weathered/unsuitable alluvium near surface; and,
- Potential for strong seismic shaking during an earthquake event.

The undocumented fill and near surface/highly weathered older alluvium and granitic rock are considered unsuitable for support of compacted fill material and the proposed improvements. Remedial grading for the site should consist of the removal and recompaction of all undocumented fill materials, and highly weathered or disturbed alluvium and/or bedrock. Remedial removals are anticipated to range from 2.5 to 6 feet below existing grades. Overexcavation (within cut areas) is recommended to depths of 3 to 4 feet below design grades. Remedial removals and/or overexcavation within streets or utility alignments/connections should be performed to 1 foot below the deepest utility to facilitate future utility pipeline construction. The recommended remedial removal and overexcavation will also help reduce the potential for future differential settlement at the site. Based on verbal communication with the current landowner, the existing onsite residences rely on septic tanks and leach fields for sewage management. These features should be anticipated during demolition and grading. Wells, septic tanks, seepage pits, and related appurtenances will need to be properly removed and/or abandoned in accordance with County of Riverside Department of Environmental Health requirements (or other governing agency) and the project environmental consultant's recommendations.

Groundwater was encountered in one boring (H-5) during our exploration at a depth of 26.5 feet below ground surface. In general, groundwater is anticipated to remain more than 10 feet below design grades upon the completion of grading. However, perched groundwater may be present at shallow depths locally and along the bedrock contact. Groundwater will fluctuate on an annual and seasonal basis.

Building foundations and slabs should be designed to tolerate a total settlement of 1 inch and differential settlement of ½-inch over a span of 40 feet. The site is categorized as Site Class "C" for seismic design. Onsite soils are anticipated to have "Very Low" to "Low" expansion potential at the completion of grading. Onsite soils are not anticipated to be corrosive to concrete but are corrosive to metals.

Based on our findings, we conclude that the proposed residential development is feasible from a geotechnical viewpoint, provided it is designed and constructed in accordance with the recommendations presented in this report and any future design/plan review reports. The site is considered locally suitable for infiltration of stormwater at shallow depths.

1.0 INTRODUCTION

1.1 Introduction and Scope of Services

At your request, SA Geotechnical, Inc. (SA GEO) has conducted a geotechnical due diligence exploration and review for the proposed residential development at the subject property in the City of Riverside, California (Figure 1). The purpose of our study was to assess the onsite geologic and geotechnical conditions and provide preliminary recommendations for design, grading, and construction of the proposed improvements. We have reviewed the Conceptual Site Plan, dated November 8, 2023, which shows the generalized lot layout; however, contains no existing or proposed grades. A Google Earth satellite image was utilized as the base for our Geotechnical Map (Plate 1).

Our scope of services for this study included the following tasks:

- Review of available geologic and geotechnical maps, reports, and data for the subject site and surrounding area. A list of references is included in Appendix A.
- Review of available historic aerial photographs and topographic maps dating back to 1948.
- Notification and coordination with DigAlert to identify and clear boring and test pit locations of underground utilities.
- Subsurface exploration consisting of ten hollow-stem auger borings (H-1 through H-6 and P-1 through P-4) to depths ranging from 5 to 30.5 feet below ground surface (bgs). Eight backhoe test pits (TP-1 through TP-8) were also excavated, ranging in depth from 8.5 to 15 feet bgs. Boring and test pit logs are included in Appendix B.
- Percolation testing in four borings (P-1 through P-4) in general conformance with the 2011 Riverside County Design Handbook for Low Impact Development Best Management Practices.
- A geophysical refraction survey, which included two survey lines (SL-1 and SL-2), was performed to collect compression wave (p-wave) velocity data to assist in evaluation of hardness and rippability of the mapped granitic bedrock.
- Laboratory testing of selected samples to determine engineering properties of onsite soils, including in-situ moisture and density, grain size distribution, plasticity, consolidation, shear strength, maximum density and optimum moisture content, R-value, expansion potential, and soluble sulfate content. Laboratory test results are included in Appendix C.
- Geotechnical evaluation and analysis of the compiled data with respect to the proposed grading and development.
- Preliminary evaluation of faulting, seismicity, and seismic and static settlement in accordance with the 2022 California Building Code (CBC).
- Preparation of this report including our findings, conclusions, preliminary recommendations, and accompanying illustrations.

SA GEO's expertise and scope of services do not include assessment of potential subsurface environmental contaminants or environmental health hazards.

1.2 Site Location, Existing Conditions, and History

The subject site is located at the southwest corner of the La Sierra Avenue and Alhambra Avenue intersection, in the city of Riverside, California. The approximately 9.8-acre site is bound by La Sierra Avenue to the east, Alhambra Avenue to the north and west, and existing single family residential developments to the south and west. We understand that the subject site is composed of six conjoined lots/parcels, three of which are developed with rural single-family residences. The other parcels remain largely undeveloped and/or used for equestrian activity. The site is moderately sloping to the southeast with several mature trees throughout. Based on verbal communication with the current property owner, the existing onsite residences rely on septic systems and leach fields for sewage waste management.

Based on our review of available historic aerial photographs dating back to 1948, the following summarizes our understanding of the site history:

- **1948:** The aerial photograph depicts the northerly portion of the site used for agriculture (citrus orchard). Three residences appear to occupy the subject site, two of which are still present on site (at the east and southeast portions of the site). Various outbuildings are also located onsite. La Sierra Avenue and Alhambra Avenue are present. Neighboring properties to the south and northwest are undeveloped. Scattered rural residences are located to the north and west.
- **1959:** The subject property remained largely unchanged. A chicken farming operation was constructed to the northwest of the site, while scattered rural residences were constructed to the west.
- **1966/1967:** No significant changes were observed onsite.
- **1985:** The site appears to have been partially cleared of the orchard. The residence and swimming pool along the western boundary were present by this time. Additional outbuildings and equestrian-related features were also noted. The chicken farming operation to the northwest had been removed/demolished.
- **1994:** By 1994, the remaining portion of the orchard was removed. Additional equestrian-related features were noted in the northerly portion of the site. Otherwise, the site appears mostly unchanged. The single-family residences (offsite) adjacent to the southerly property line were constructed.
- **1998/1999:** No discernable changes to the site were observed.
- **2002-2023:** The site remained relatively unchanged during this time. Various outbuildings and equestrian features were added/removed. By 2018 the single-family residences to the northwest (Lindy Street) were under construction.

1.3 Proposed Grading and Improvements

Prior to site development and grading, the existing structures/foundations, and utilities to be abandoned will be demolished and removed from the site. Based on review of the Conceptual Site Plan, the development is proposed to include grading of 93 single-family residential lots, interior streets, a park/amenity area, stormwater infiltration features, and utility improvements to support the development. We anticipate that the proposed single-family units will be one to two-story wood-framed structures. Slopes and/or retaining walls will most likely be required to

accommodate grade changes, especially along the western property boundary. Grading cuts/fills and utility depths are not known at this time.

1.4 Subsurface Exploration

Our subsurface exploration was performed on December 6 through 13, 2023, and included drilling of 10 hollow-stem auger borings, excavation of eight backhoe test pits, field percolation testing, and a geophysical refraction survey consisting of two survey lines. The approximate boring, test pit, and seismic survey line locations are shown on the Geotechnical Map (Plate 1). Boring and test pit logs are provided in Appendix B.

Hollow-stem auger borings (H-1 through H-6 and P-1 through P-4) were drilled to depths of 5 to 30.5 feet below ground surface (bgs). All borings were geotechnically logged, and samples were taken at selected intervals. Relatively undisturbed ring samples were obtained from the exploratory borings with a 2.5-inch inside-diameter, split-barrel sampler. The samplers were driven into the soil with a 140-pound automatic safety hammer, free-falling 30-inches. The drive samples were also used to obtain a measure of resistance of the soil to penetration (recorded as blows-per-foot on our geotechnical boring logs). Bulk samples were collected for additional laboratory testing. After completion of drilling the excavations were backfilled with soil cuttings and tamped.

Following drilling, percolation testing was performed in four borings (P-1 through P-4) in general conformance with the 2011 County of Riverside Design Handbook for Low Impact Development Best Management Practices.

The test pit exploration included eight locations (TP-1 through TP-8) that were excavated with a rubber-tired backhoe (Deere 310SL) to depths ranging from 8.5 to 15 feet bgs. The excavations were geotechnically logged by an engineering geologist. Representative bulk samples of onsite soils were collected from trenching spoils and used for additional soil identification purposes.

A geophysical refraction survey was performed by GeoVision on December 13, 2023, and included two survey lines (SL-1 and SL-2), focused within the westerly portion of the site underlain by granitic bedrock at existing grades. The approximate geophysical survey line locations are shown on the Geotechnical Map (Plate 1). The refraction survey was used to measure compressional (P) wave velocities of the granitic bedrock as part of our rippability assessment. The geophysical report is provided in Appendix D.

1.5 Laboratory Testing

Laboratory testing was performed on representative samples of onsite soils collected during our field exploration to characterize their engineering properties. Laboratory tests performed on selected samples included:

- Moisture content and dry density;
- Grain-size distribution;
- Atterberg limits;
- Direct shear;
- Expansion Index;

- R-value;
- Soluble sulfate; and
- Maximum dry density and optimum moisture content.

Laboratory tests were conducted in general conformance with applicable ASTM International test methods. Laboratory test results are provided in Appendix C. In-situ moisture content and dry density data are included on the geotechnical boring logs (Appendix B).

2.0 GEOTECHNICAL FINDINGS

2.1 Geologic Setting and Earth Units

The site is located in the Peninsular Ranges geomorphic province of Southern California, characterized by series of ranges and northwest trending valleys, subparallel to regional faults. The subject site is mapped by the United States Geological Survey (USGS, 2001 & 2002) as underlain by older alluvial fan deposits overlying granitic bedrock. Granitic bedrock is also mapped at existing grade within the western-most portion of the site. Also, undocumented artificial fill material, associated with prior land use, was encountered in various test pits across the site. The Geotechnical Map (Plate 1) depicts the site earth unit distribution and estimated depth to bedrock. The earth units, as encountered during our exploration are described below from oldest to youngest.

Granitic Bedrock (Map Symbol - Kgr): The site is underlain by Cretaceous-age intrusive igneous bedrock that is generally described as yellowish-brown, olive brown, pale reddish-brown, and gray fine to coarse-grained granitic rock (monzogranite, granodiorite, and diorite) that is damp to saturated, and dense to very dense. In general, the bedrock is weathered ("decomposed") in the uppermost 18 to 35 feet. Boring H-1 was terminated due to hard rock and difficult drilling conditions at a depth of 8 feet bgs; the remainder of borings were drilled 10 to 27 feet into bedrock without encountering refusal. The backhoe test pits were generally excavated 2.5 to 9 feet into bedrock before encountering difficulty digging and/or refusal. Test pit location TP-2 was terminated less than 1 foot into bedrock due to hard rock conditions. The depth to bedrock, as encountered during our subsurface exploration, is provided on the Geotechnical Map (Plate 1).

Older Alluvium (Map Symbol – Qalo): Older alluvium is mapped covering most of the site and generally varies in thickness from 2.5 to 11.5 feet. Locally, along the easterly property line, older alluvium was encountered to a depth of 21.5 feet bgs. The alluvium generally consisted of yellowish-brown, reddish-brown, and brown silty fine to coarse sand, sandy silt, and sandy clay that was damp to moist and medium dense/stiff.

Undocumented Artificial Fill (Map Symbol – Afu): Undocumented artificial fill material was encountered in several test pits across the site, varying in thickness from 1.5 to 5.5 feet. The undocumented artificial fill material generally consists of brown to reddish brown silty fine-to-coarse sand that was damp to moist and loose to medium dense. Undocumented artificial fill is also mapped overlying bedrock in the western portion of the site (beneath the existing home/pool) as a result of grading and terracing for home construction.

2.2 Geotechnical Conditions

Based on our review of the geotechnical exploration and laboratory testing data (Appendix C), the geotechnical conditions are generally as follows:

Soil Moisture Content and Dry Density: Laboratory testing performed on samples collected from the borings indicate that the native older alluvium had moisture contents in the range of 1.9 to 14.6 percent and dry densities varying from 110.1 to 123.0 pounds per cubic foot (pcf). The blow counts in the alluvium varied from 9 to 61 blows per foot. The granitic bedrock samples had

dry densities in the range of 105.0 to 118.9 pcf and moisture contents in the range of 3.5 to 15.5 percent. Blow counts in bedrock were well over 50 blows per foot.

Soil Properties: Grain-size distribution tests were conducted on two bulk samples collected from the uppermost 5 feet and seven ring samples collected at depths of 5, 7.5, 10, and 15 feet. The near-surface bulk samples were classified in accordance with the Unified Soil Classification System (USCS) as sandy clay (CL) and silty sand (SM), with fines contents (passing No. 200 sieve) of 63 and 30 percent, respectively. Soil plasticity testing performed on the bulk samples indicates that the sandy clay soil has a Liquid Limit of 30 percent and Plasticity Index of 13 (USCS classification of CL). The silty sand sample was non-plastic.

The ring samples were found to have fines contents ranging from 44 to 50 percent (at a depth of 5 feet), 12 and 54 percent (at a depth of 7.5 feet), 67 percent (at a depth of 10 feet), and 79 percent (at a depth of 15 feet). The samples were given USCS classifications of SM and SM/ML (5 feet), SP-SM and ML (7.5 feet), CL (10 feet), and ML (15 feet). The Liquid Limit of the ring sample collected at a depth of 10 feet (CL) was 25 percent with Plasticity Index of 9.

Maximum dry density of the near-surface silty/sandy soil indicates a maximum dry density of 132.0 pounds per cubic foot (pcf) at an optimum moisture content of 8.0 percent.

Consolidation: Tests were performed on four samples collected at depths of 5, 7.5, and 15 feet. In general, the testing showed that the materials have relatively low compressibility potential. The samples had minor collapse potential (less than 0.75%) upon the addition of water at a load of 3.2 tsf.

Shear Strength: Direct shear testing was performed on one relatively undisturbed ring sample collected at a depth of 5 feet, representative of the native older alluvium. One remolded direct shear (remolded to 90% relative compaction of the maximum density) was also performed, representative of future compacted fill material. The test results for the in-situ sample indicate an ultimate internal friction angle of 32 degrees at zero cohesion with peak internal friction angle of 39 degrees and a cohesion of 100 pounds per square foot (psf). The remolded sample had an ultimate internal friction angle of 27 degrees and a cohesion of 150 psf. The peak values for the internal friction angles and the cohesion of the remolded sample were 28 degrees and 350 psf, respectively.

R-value: One sample collected from the uppermost 5 feet in Boring H-4 had an R-value of 18.

Expansion Potential: Two near-surface samples collected from the upper five feet were tested to evaluate the expansion potential of onsite alluvial soils. The testing shows that the silty sand and sandy clays have expansion indices of 0 to 59, respectively, indicating "Very Low" to "Medium" expansion potential.

Chemical Properties: Soluble sulfate content of the soil was measured in two samples representative of the near surface soils. Soluble sulfate content testing indicates the soil may be classified as "S0" per Table 19.3.1.1 of ACI-318-14. We anticipate that the onsite soils are corrosive to metals.

2.3 Groundwater

Groundwater was encountered in one boring, H-5, at a depth of 26.5 feet bgs. Based on the recorded groundwater depth and our understanding of the site geology, perched groundwater can occur within highly weathered portions of granitic bedrock and/or at the bedrock/alluvium/fill contact. Historic high groundwater mapping by the State has not been performed for the region.

Groundwater levels may fluctuate on an annual and seasonal basis, based on variations in future residential irrigation and rainfall amounts. The presence of locally saturated soils and/or perched water cannot be ruled out and may be encountered during grading, construction of utility infrastructure and future homeowner improvements.

2.4 Regional Faulting and Seismicity

Regional Faults: The site is not located within a fault-rupture hazard zone as defined by the Alquist-Priolo Special Studies Zones Act (CGS, 2018). Also, based on mapping by the State (Jennings and Bryant, 2010) and Riverside County (2023), there are no active faults mapped at the site.

Seismicity: Properties in southern California are subject to seismic hazards of varying degrees depending upon the proximity, degree of activity, and capability of nearby faults. These hazards can be primary (i.e., directly related to the energy release of an earthquake) or secondary (i.e., related to the effect of earthquake energy on the physical world). Since there are no active faults at the site, the potential for primary ground rupture is considered very low. The primary seismic hazard for this site is ground shaking during a future earthquake. The maximum moment magnitude for the controlling fault is 8.1 M_w , which would be generated from the San Jacinto Fault.

The site is located within an area of "high" liquefaction susceptibility per the County of Riverside (2023). However, based on the shallow bedrock condition and absence of groundwater within potentially liquefiable soils (older alluvium), the liquefaction potential is considered very low. Please also note that the alluvium in Boring H-6, which was encountered to a depth of 21.5 feet, generally consisted of fine-grained clayey soils that are typically not considered prone to liquefaction. Other secondary seismic hazards, such as tsunami and seiche are considered nil due to site elevation and distance from the ocean or other confined bodies of water.

2.5 Settlement

In general, the anticipated settlements depend upon the building loads, type of foundations, and the geotechnical properties of the supporting subgrade. Shallow bedrock is generally present throughout the site. Considering the subsurface soil conditions, laboratory test data, and lightly loaded residential structures, we estimate total settlement (combined static and seismic) to be on the order of 1 inch with differential settlement of ½-inch over a 40-foot span. This assumes remedial grading measures recommended in Section 3.2 of this report are implemented during grading.

2.6 Shrinkage and Bulking

The shrinkage and bulking (reduction or increase in volume of excavated materials upon recompaction and replacement as fill) varies by soil type, earth unit, and location. The volume changes depend primarily on in-situ density and the maximum dry density of the soil type. We anticipate that the near surface alluvial materials will have 0 to 5 percent shrinkage. The weathered bedrock is anticipated to bulk less than 5 percent. Ground subsidence is estimated to be on the order of 0.1 foot. These values exclude losses due to removal of vegetation and debris and is dependent on the accuracy of the site topographic survey and type of equipment and compaction method used by the contractor.

2.7 Rippability and Generation of Oversize Material

The rippability characteristics of bedrock depend upon the rock type, hardness, the depth and degree of weathering and fracturing, rock structure, equipment size/type used for excavation, and operator experience and skill level. Based on our subsurface exploration, the underlying granitic bedrock is weathered/decomposed to variable depths.

A geophysical refraction survey was performed as part of our study and included two survey lines (SL-1 and SL-2) within the western portion of the site, where grading cuts are anticipated, and the shallowest hard rock was encountered during drilling (see Plate 1). The refraction survey was used to measure compressional (P) wave velocities of the granitic bedrock to assist in rippability assessment. The survey lines were approximately 205 (SL-1) and 235 (SL-2) feet in length to provide a minimum investigation depth of approximately 40 feet bgs. The published Caterpillar Tractor Company bulldozer ripper performance charts, our experience, and the experience of the geophysics subcontractor indicate that granitic rocks with velocities below approximately 5,800 feet/second are "rippable" with some difficulty using a D9R (single shank) bulldozer.

SL-1 and SL-2 encountered weathered rock (p-wave velocity less than 5,800 feet/second) to depths generally ranging from 18 to 35 feet, below which mildly weathered to unweathered rock was encountered. Localized "plateaus" of hard rock were encountered in SL-2, within the vicinity of the existing home and where granitic outcrops were observed in the field. The seismic line velocity profile and accompanying geophysical report are included in Appendix D. Oversize rocks (defined as rock exceeding 12 inches in the maximum diameter) are anticipated to be generated during grading, especially in deeper excavations.

2.8 Percolation Testing

Percolation testing was performed on December 12, 2023, in general accordance with the Riverside County Design Handbook for Low Impact Development Best Management Practices (2011). The Percolation Test method was generally performed as described in the handbook. In order to prevent caving during testing, a 3-inch-diameter perforated pipe was installed in the boring and the annular space was backfilled with 3/4-inch gravel. The borings were presoaked and tested to determine if onsite soils fell under the "Sandy Soil" criteria as defined in the handbook. All percolation borings were considered "Sandy". Test results were tabulated, and final measurements were used to calculate the infiltration rate. The percolation data sheets are provided in Appendix E.

The County Handbook does not include calculation adjustments to account for the presence of the annular backfill material described above which can result in overestimation of infiltration rates. We have used a correction factor to account for the volume loss due to the annular material, based on the porosity, pipe size used, and the boring diameter. The correction factor is noted on the percolation test data sheets.

The calculated infiltration rates are provided below, which include the correction factor discussed above; however, the rates do not include a factor of safety reduction. A discussion of the overall feasibility of stormwater infiltration is provided in Section 3.15. The infiltration test results are representative of the location and depths the tests were performed.

TABLE 1 – PERCOLATION TEST RESULTS		
<i>Boring No.</i>	<i>Tested Depth (Below Ground Surface)</i>	<i>Calculated Infiltration Rate (in./hr.)</i>
P-1	3 to 5	1.5
P-2	2.5 to 5	2.6
P-3	7 to 10	0.3
P-4	4 to 7.25	1.0

2.3 Existing Utilities

No onsite utilities were marked during the DigAlert utility clearance process. We understand that active domestic water and numerous irrigation pipelines service the homes and equestrian areas. Overhead electrical lines are present along Alhambra Avenue, adjacent to the site. Also, based on verbal communication with the current property owner, the existing onsite residences rely on septic systems and leach fields for sewage management. Septic systems and related appurtenances should be anticipated during demolition and grading.



3.0 CONCLUSION AND PRELIMINARY RECOMMENDATIONS

3.1 General Conclusion and Recommendation

Based on our subsurface exploration and evaluation, construction of the proposed residential development, as described herein, is considered geotechnically feasible provided the preliminary recommendations in this report are implemented during design, grading, and construction. The geotechnical consultant should review the WQMP once available. Additional geotechnical exploration and percolation testing may need to be performed during the design phase, depending upon the location/depth of the infiltration device. Also, grading, foundation, utility, structural and wall plans for the project should be reviewed by the geotechnical consultant during the design phase. Updated recommendations should be provided once the project plans are finalized and reviewed by SA GEO and as needed.

The recommendations in this report should be considered minimum and may be superseded by more restrictive requirements of others. In addition to the following recommendations, General Earthwork and Grading Specifications are provided in Appendix G.

3.2 Site Preparation and Earthwork

Site preparation and grading should be performed in accordance with the recommendations included herein and the requirements of the City of Riverside.

3.2.1 Site Demolition and Clearing

Prior to remedial grading, the existing structures/foundations, landscape, and utilities to be abandoned should be demolished. Deleterious materials and debris should be cleared and disposed of offsite. Concrete material may be mixed with onsite soils and placed as compacted fill provided that it is broken into pieces that are smaller than 6 inches in the largest diameter and placed in accordance with Section 3.2.5. Excavations for the removal of existing foundations, utilities and vegetation, including onsite trees, should be observed by the geotechnical consultant. Large roots, highly organic soils, and utility/pipeline debris should be removed and not incorporated into new fills.

Soil that is disturbed as part of excavations or during removal of trees or underground utilities should be evaluated by the geotechnical consultant. Excavations that require backfill should be properly documented and compacted under the observation and testing of the geotechnical consultant in accordance with the recommendations provided in Section 3.2.6.

Based on verbal communication with the current landowner, the existing onsite residences rely on septic tanks and leach fields for sewage management. These features should be anticipated during demolition and grading. Wells (if any), septic tanks, seepage pits, and related appurtenances will need to be properly removed and/or abandoned in accordance with County of Riverside Department of Environmental Health requirements (or other governing agency) and the project environmental consultant's recommendations. Any voids created during demolition and removal should be backfilled with suitable onsite or import materials and compacted in accordance with the recommendations provided in Section 3.2.6.

3.2.2 Protection of Existing Improvements and Utilities

Existing buildings, improvements and utilities adjacent to the site that are to be protected in place should be located and visually marked prior to grading operations. Excavations adjacent to improvements to be protected in-place or any utility easement should be performed with care, so as not to undermine existing foundations or destabilize the adjacent ground.

Stockpiling of soils more than 5 feet in height at or near existing structures and over utility lines should not be allowed. If deep excavations are required, shoring or other special measures (i.e., setback or laybacks) to provide safety and mitigate the potential for lateral/vertical movements may be required.

3.2.3 Remedial Grading Measures

Remedial grading at the site should consist of removal of all undocumented fill materials, unsuitable alluvium, and highly weathered/disturbed bedrock. In general, we recommend that remedial removals (within design fill areas) consist of removal and recompaction of soils in the upper 2.5 to 6 feet. Where deeper unsuitable material is encountered, the removals should be extended to competent alluvium or bedrock. Bedrock is anticipated to be shallow throughout the site; thus, we recommend that removals within the proposed streets and at utility connections be deepened to approximately 1 foot below the lowest pipeline to facilitate utility construction and limit excavation difficulty. The geotechnical consultant should review and approve the removal bottoms prior to fill placement and should provide specific recommendations based on actual conditions, if necessary.

Excavations deeper than 4 feet will need to be laid back a minimum inclination of 1H:1V (horizontal to vertical) or provided with shoring. Shallow, unconfined excavations (4 feet or less) may consist of near-vertical excavation, pending field review of the exposed materials. Excavations should be performed in accordance with Cal/OSHA requirements for Soil Type "B". Locally, Soil Type "C" may be encountered (loose, friable sand) and should be laid back a minimum inclination of 1.5H:1V. The contractor's qualified person should verify compliance with Cal/OSHA requirements. Excavations near existing structures (within a 1H:1V projection) should be provided with shoring that is designed to support the surcharge load of the existing structure. Otherwise, excavations may be performed in sections that are 20 feet long or less. The conditions should be reviewed in the field by the project geotechnical consultant. Additional recommendations will be provided based on the actual conditions encountered during excavation and grading, as needed.

3.2.4 Lot Capping/Overexcavation

The proposed grading is anticipated to expose cut and fill transitions at finish grade within some lots. Lots with design cuts are also anticipated throughout the site but mostly within the western portion of the site. At minimum, we recommend overexcavation of the cut lots in the upper 4 feet and replacement with compacted fill to provide a uniform fill blanket over each lot. Lots with design cuts into bedrock should be overexcavated to depths of 3 to 4 feet. We recommend shallower overexcavation (3 feet) within the back of the lot and deeper overexcavation (4 feet) within the front of the lots. For lots underlain by bedrock it is recommended that the overexcavation bottoms slope a minimum of 1 percent toward deeper

fill areas or the adjacent street to limit ponding of nuisance water along the fill/bedrock contact.

In areas where granitic rock is expected within streets or utility trenches/connections, overexcavation is recommended to 1 foot below the deepest utility, to facilitate utility construction and limit excavation difficulty.

Additional lot overexcavation may be recommended during grading in areas where earth materials are highly variable within an individual lot. The conditions should be evaluated by the geotechnical consultant in the field during grading. The overexcavation bottoms should be mapped and approved by the geotechnical consultant.

A disclosure should be provided to homeowners that hard rock may be encountered below compacted fill. A table including a summary of fill thicknesses for each lot may be provided at the completion of grading in order to inform the homeowners of the subsurface soil conditions.

3.2.5 Rippability and Placement of Oversize Material

Granitic bedrock with p-wave velocities greater than 5,800 feet/second are generally regarded as very difficult to rip, marginally rippable, and/or non-rippable (greater than 7,000 to 8,000 feet/second). Velocities below 5,800 feet/second are anticipated to be rippable with some difficulty; however, it should be noted that rock characteristics, fracture spacing and orientation, and skill and experience level of operators play a significant role in determining rippability. These velocity thresholds for rippability should be scaled downward for trenching operations.

Seismic Lines 1 and 2 (SL-1 and SL-2) encountered weathered rock (p-wave velocity less than 5,800 feet/second) to depths ranging from 18 to 35 feet, below which mildly weathered to unweathered rock was encountered. Localized "plateaus" of weathered to mildly weathered rock (velocity of 5,000 to 5,800 feet/second) were encountered in SL-2, within 10 feet of existing grade. Localized hard zones and/or contact irregularities within the weathered rock zone, if encountered, will require additional excavation and processing effort. We anticipate bedrock to generally be rippable to the anticipated design/remedial grading and deepest utility lines with heavy duty earthmoving equipment (i.e., Caterpillar D-9 bulldozer, Caterpillar 330 excavator); however, this will need to be reviewed by the geotechnical consultant once grading and utility plans are available. Blasting is not anticipated to be required.

Grading cuts within bedrock are anticipated to produce some oversize rock (greater than 12 inches in size). If grading equipment cannot break down the material into smaller pieces, oversize rock will need to be disposed of in deeper fill areas. Oversize rocks may be placed in fills deeper than 10 feet below design grades. The grading contractor should consider performing the remedial grading within design fill areas to facilitate placement of oversize rocks. Rocks smaller than 6 inches may be placed in the upper 4 feet of each lot. Rocks larger than 6 inches and smaller than 12 inches in the largest dimension may be placed at depth between 4 and 10 feet below design finish grades or 1 foot below the deepest utility line, whichever is deeper. Rocks greater than 3 inches in dimension are typically not suitable for

backfill of utility trench excavations (unless accepted by the agency/utility owner). Thus, we recommend that the grading contractor consider placement of rocks larger than 3 inches in dimension outside of proposed utility alignments.

The Grading and Earthwork Specifications in Appendix G include details for placement of oversize rock.

3.2.6 Fill Placement

Upon the completion of remedial grading measures, the approved removal bottoms should be scarified a minimum of 6 inches. The removal bottoms and fill materials should be compacted to at least 90 percent of maximum dry density, as determined by ASTM Test Method D1557. Fill materials should be placed in loose lifts no thicker than 8 inches.

Fill materials should be relatively free of deleterious material. The existing undocumented fill material, native alluvial soils, and bedrock are considered suitable for re-use as compacted fill provided any deleterious material is removed and the recommendations provided in the prior sections are followed. Concrete material may be mixed with onsite soils and placed as compacted fill provided it is broken into pieces that are smaller than 6 inches in the largest diameter and placed in accordance with Section 3.2.5. Placement of concrete as compacted fill should be approved by the project environmental consultant.

We recommend that the moisture content of new compacted fill soils be above the optimum moisture content but should be within the compactable moisture range. Appropriate equipment should be used and other measures (e.g., mixing, stockpiling, drying) may be needed to achieve the uniform and correct moisture content for placement of the fill. If the soils become extremely wet, special measures for mixing and drying may be required that will need to be determined based on the actual field conditions.

3.2.7 Import

The geotechnical consultant should evaluate and accept any import soils prior to transportation to the subject site. We recommend that import soils have similar engineering properties as onsite soils. At minimum, the import materials should have Expansion Index of less than 50, Plasticity Index of less than 15, fines content (passing Sieve 200) of less than 50 percent, and negligible soluble sulfate content.

3.3 Settlement Potential

The amount of settlement will depend upon the type of foundation(s) selected and future loading by additional fill and structures. Based on our subsurface exploration and analysis, considering the remedial grading recommendations provided in this report are implemented during grading, and the anticipated structural loads typically associated with the proposed residential units, we estimate a total settlement of 1 inch and a differential settlement of ½-inch over a span of 40-foot.

SA GEO should be provided with the foundation plans and structural loads, once available, to further evaluate the potential for post-construction settlement of the proposed buildings and associated improvements. Additional laboratory testing will also be performed at the completion

of grading. The parameters provided herein will then be confirmed/updated based on the planned foundation layout and loads, and additional testing/analysis.

3.4 Foundation Design

The slab and foundations should be designed by the project structural engineer based on the proposed structure type and the anticipated loading conditions. Onsite soils are anticipated to have "Very Low" to "Low" expansion potential ($EI > 20$) at the completion of grading. Thus, they are subject to climatic and landscape moisture fluctuations and should be designed in accordance with the requirements of the 2022 California Building Code. The following foundation recommendations are provided with the assumption that the recommendations included in Section 3.2 of this report are implemented during grading of the site.

The recommended net allowable bearing capacity for continuous and isolated footings may be calculated based on the following equation:

$$q_{all} = 600 D + 200 B + 1,000 \text{ (but not to exceed 4,000 psf)}$$

where:

D = embedment depth of footing, in feet

B = width of footing, in feet

Also, the following parameters may be used for design of foundation and slabs:

- Soil unit weight = 120 pcf
- Soil internal friction angle = 28 degrees
- Coefficient of Friction = 0.35
- Subgrade modulus (k) of 100 pci (corrected for large slabs)
- Soil elastic modulus (E_s) of 2,000 psi

The dead load of concrete below adjacent grades (buried concrete foundations) may be neglected. The allowable bearing pressure and friction coefficient may be increased by one-third for wind and seismic loading.

We recommend that strip and isolated footings for the buildings have a minimum embedment depth of 12 inches below the lowest adjacent grade. Continuous footings should be at least 12 inches wide and isolated column footings should be at least 24 inches wide. The footings of freestanding and isolated structures, such as walls and pilasters, should have a minimum embedment depth of 18 inches into approved soils.

The following table provides our general guidelines and preliminary recommendations for design of post-tensioned foundations and slabs on expansive soil in accordance with the 2022 California Building Code (CBC) and Post-Tension Institute (PTI) DC 10.5 Edition provisions.

**GEOTECHNICAL GUIDELINES
FOR DESIGN OF POST-TENSIONED SLABS***

<i>Parameter</i>	<i>Recommendation</i>
Center Lift	
* Edge Moisture Variation Distance, e_m	9.00 feet
* Center Lift, y_m	0.35 inches
Edge Lift	
* Edge Moisture Variation Distance, e_m	5.0 feet
* Edge Lift, y_m	0.50 inch
Presaturation, as needed, to obtain the minimum moisture down to the minimum depth	1.1 x optimum down to 6 inches
*Based on method in CBC 2022	

For post-tensioned slabs, we recommend that the slabs have a thickened edge such that the slab is embedded a minimum of 12 inches below the lowest adjacent grade. The thickened edge should be tapered and have a minimum width of 12 inches.

In addition, as indicated in the DC 10.5 Edition of PTI, shape factor calculations should be performed by the project structural engineer in order to determine if strengthening/modification of foundations are necessary. Per PTI guidelines, the modifications to the foundations design should be considered if the shape factor (ratio of square of foundation perimeter over foundation area) exceeds 24.

If non-post-tensioned slabs-on-grade and foundations are considered at the site in accordance with Wire Reinforcement Institute (WRI) method (per the 2022 CBC), an effective Plasticity Index of 15 or less is considered appropriate for the upper 15 feet of soil materials. For non-post-tensioned slabs, we recommend a minimum embedment of 12 inches below the lowest adjacent grade for the perimeter footings. Also, the upper 6 inches of subgrade soil should be pre-saturated to 110 percent of optimum moisture content prior to placement of moisture barrier and concrete.

The foundations and slabs should be designed to tolerate the total and differential settlements discussed in Section 3.3 of these recommendations.

For the design of pole-type foundations (i.e., light poles, shade structures, etc.), an allowable soil-bearing pressure (s_1) of 340 psf/ft may be used for Equation 18-1 (the "pole" equation) of the 2022 CBC, Section 1807.3.2.1, to determine the depth of embedment for the footings, considering level ground conditions. The equation is applicable for designed embedment depths of less than 12 feet for the purpose of computing lateral pressure. Also, for vertical loads on pole-type foundations, an allowable skin friction of 250 pounds per square foot may be used. For cast-in-place pole-type foundations, the vertical end bearing pressure should be neglected.



3.5 Retaining Wall Design and Lateral Earth Pressures

Recommendations for lateral earth pressures for permanent retaining walls and structures with approved onsite drained soils and above groundwater table are as follows:

<i>Conditions</i>	<i>Level (pcf)</i>	<i>2:1 Sloping</i>
Active	43	68
At-Rest	63	90
Passive	340	160 (sloping down)

The parameters provided above are based on a soil internal friction angle of 28 degrees and soil unit weight of 120 pcf.

To design an unrestrained retaining wall, such as a cantilever wall, the active earth pressure may be used. For a restrained retaining wall, the at-rest pressure should be used. Passive pressure is used to compute lateral soils resistance developed against lateral structural movement. The passive pressures provided above may be increased by one-third for wind and seismic loads. Passive resistance is taken into account only if it is ensured that the soil against embedded structure will remain intact with time. Future landscaping/planting and improvements adjacent to the retaining walls should also be taken into account in the design of the retaining walls. Excessive soil disturbance, trenches (excavation and backfill), future landscaping adjacent to footings and over-saturation can adversely impact retaining structures and result in reduced lateral resistance.

For sliding resistance, a friction coefficient of 0.35 may be used at the concrete and soil interface. The coefficient of friction may be increased by one-third for wind and seismic loading. The retaining walls may also need to be designed for additional lateral loads if other structures or walls are planned within a 1H:1V projection.

The seismic lateral earth pressure for walls retaining more than 6 feet of soil may be estimated to be an additional 18 pcf for active and at-rest conditions. The earthquake soil pressure has a triangular distribution and is added to the static pressures. For the active and at-rest conditions, the additional earthquake loading is zero at the top and maximum at the base. The seismic lateral earth pressure does not apply to walls retaining less than, or equal to, 6 feet of soil (2022 CBC Section 1803.5.12).

Drainage behind walls retaining more than 30 inches of soil should also be provided in accordance with the attached Figure 4. Specific drainage connections, outlets and avoiding open joints should be considered for the retaining wall design.

3.6 Seismic Design Parameters

The following table summarizes the seismic design criteria for the subject site. The seismic design parameters are developed in accordance with ASCE 7-16 and 2022 CBC. Please note that, considering the proposed structures and anticipated structural periods, site-specific ground-motion hazard analysis was not performed for the site. The seismic response coefficient, C_s , should be determined per the parameters provided below and using equation 12.8-2 of ASCE 7-16.



<i>Selected Seismic Design Parameters from 2022 CBC/ASCE 7-16</i>	<i>Seismic Design Values</i>	<i>Reference</i>
Latitude	33.6570 North	
Longitude	-117.1996 West	
Controlling Seismic Source	San Jacinto	USGS, 2023
Site Class per Table 20.3-1 of ASCE 7-16	C	
Spectral Acceleration for Short Periods (S _s)	1.5 g	SEA/OSHPD, 2023
Spectral Accelerations for 1-Second Periods (S ₁)	0.57 g	SEA/OSHPD, 2023
Site Coefficient F _a , Table 11.4-1 of ASCE 7-16	1.2	SEA/OSHPD, 2023
Site Coefficient F _v , Table 11.4-2 of ASCE 7-16	1.43	SEA/OSHPD, 2023
Design Spectral Response Acceleration at Short Periods (S _{DS}) from Equation 11.4-4 of ASCE 7-16	1.2 g	SEA/OSHPD, 2023
Design Spectral Response Acceleration at 1-Second Period (S _{D1}) from Equation 11.4-4 of ASCE 7-16	0.543 g	SEA/OSHPD, 2023
T _s , S _{D1} /S _{DS} 11.4.6 of ASCE 7-16	0.45 sec	
T _L , Long-Period Transition Period	8 sec	SEA/OSHPD, 2023
Peak Ground Acceleration Corrected for Site Class Effects (P _{GAM}) from Equation 11.8-1 of ASCE 7-16	0.618 g	SEA/OSHPD, 2023
Seismic Design Category, Section 11.6 of ASCE 7-16	D	SEA/OSHPD, 2023

3.7 Slope Setback

Footings for structures located above descending slopes should be set back from the slope face in accordance with the minimum requirements of the City of Riverside and section 1808.7.1 of the 2022 California Building Code, whichever is greater. The setback distance is measured from the outside edge of the footing bottom along a horizontal line to the face of the slope. The tables below summarize the minimum setback criteria for structures above descending slopes:

Structural Setback Requirements

Case A – Building and Retaining Wall Footings Above Descending Slopes

<i>Slope Height [H] (feet)</i>	<i>Minimum Setback from Slope face (feet)</i>
Less than 10	5
10 to 20	½ * H
20 to 30	10
Greater than 30	⅓ * H (maximum of 40')

Case B – Freestanding Wall Footings Above Descending Slopes

<i>Slope Height [H] (feet)</i>	<i>Minimum Setback from Slope face (feet)</i>
Less than 10	5
10 to 20	½ * H
Greater than 20	Maximum of 10

For freestanding walls and other structures that are sensitive to lateral movement (e.g., smooth stucco finish, glass screens, etc.), SA GEO recommends that the structural setback requirements in accordance with Case A above be followed or that additional design measures be used to help control the potential for cracking and displacements. Otherwise, typical freestanding walls may have a setback in accordance with Case B.

3.8 Corrosivity

Based on prior laboratory testing, soluble sulfate exposure in the onsite soils may be classified as "S0" per Table 19.3.1.1 of ACI-318-14. Structural concrete elements in contact with soil include footings and building slabs-on-grade. The flatwork and sidewalk concrete are typically not considered structural elements. Concrete mix for structural elements should be based on the "S0" soluble sulfate exposure class of Table 19.3.2.1 in ACI-318-14. Other American Concrete Institute (ACI) guidelines for structural concrete are recommended. Also, onsite soils are anticipated to be moderately corrosive to metals.

3.9 Expansion Potential

At the completion of grading, we anticipate that onsite soils will have "Very Low" to "Low" expansion potential. The geotechnical recommendations provided in this report including the design parameters for foundations, slab-on-grade and flatwork improvement should be implemented during design and construction.

Homeowners and their design/construction team should be familiar with the recommendations in this report as well as principles described in a useful reference published by the California Geotechnical Engineers Association (CalGeo), titled, "Coexisting with Expansive Soil: An Informational Guide for Homeowners." This free booklet can be downloaded at www.calgeo.org.

3.10 Interior Slab Moisture Mitigation

In addition to geotechnical and structural considerations, the project owner should also consider interior moisture mitigation when designing and constructing slabs-on-grade.

The intended use of the interior space, type of flooring, and type of goods in contact with the floor may dictate the need for, and design of, measures to mitigate potential effects of moisture emission from and/or moisture vapor transmission through the slab. Typically, for human occupied structures, a vapor retarder or barrier is recommended under the slab to help mitigate moisture transmission through slabs. The most recent guidelines by the American Concrete Institute (ACI 302.1R-04) suggest that the vapor retarder be placed directly under the slab (no sand layer). However, the location of the vapor retarder may also be subject to the builder's past successful practice. Placement of 1 or 2 inches of sand over the moisture retardant has been common practice by builders in southern California. Specifying the strength of the retarder to resist puncture and its permeance rating is important. These qualities are not necessarily a function of the retarder thickness. A minimum of 10-mil is typical but some materials, such as 10-mil polyethylene ("Visqueen"), may not meet the desired standards for toughness and permeance.

Vapor retarders, when used, should be installed in accordance with standards such as ASTM E 1643 and/or those specified by the manufacturer.

Concrete mix design and curing are also significant factors in mitigating slab moisture problems. Concrete with lower water/cement ratios results in denser, less permeable slabs that also "dry" faster with regard to when flooring can be installed (reduced moisture emission quantities and rates). Rewetting of the slab following curing should be avoided since it can result in additional drying time prior to flooring installation. Proper concrete slab testing prior to flooring installation is also important.

Concrete mix design, the type and location of the vapor retarder should be determined in coordination with all parties involved in the finished product, including the project owner, architect, structural engineer, geotechnical consultant, concrete subcontractors, and flooring subcontractors.

3.11 Exterior Concrete

The driveway, patio slabs and other flatwork elements should be at least 4 inches thick. Considering that the onsite soils are anticipated to have "Very Low" to "Low" expansion potential at the completion of grading, reinforcement of concrete is not necessary from a geotechnical standpoint; however, reinforcement will reduce the potential for concrete cracking as a result of shrinkage. If reinforcement is used, we recommend that No. 3 bars be placed at 24 inches on center both ways. Equivalent wire mesh reinforcement may also be used. Concrete slabs should be provided with construction or weakened plane control joints at a maximum spacing of 10 feet. The control joints should have a thickness that is $\frac{1}{4}$ of the total concrete thickness. The subgrade soils in the upper 6 inches should be presaturated to 110 percent of optimum moisture content.

For exterior slabs, the use of a granular sublayer is primarily intended to facilitate presaturation and subsequent construction by providing a better working surface over the saturated soil. It also helps retain the added moisture in the native soil in the event that the slab is not placed immediately. Where these factors are not significant, the layer may be omitted. If used, we recommend placement of 2 to 4 inches of granular material over subgrade soils.

Exterior concrete elements such as curb and gutter, driveways, sidewalks and patios are susceptible to lifting and cracking when constructed over expansive soils. With expansive soils, the impacts to flatwork/hardscape can be significant, generally requiring removal and replacement of the affected improvements. Please also note that reducing concrete problems is often a function of proper slab design, concrete mix design, placement, and curing/finishing practices. Adherence to guidelines of the American Concrete Institute (ACI) is recommended. Also, the amount of post-construction watering, or lack thereof, can have a very significant impact on the adjacent concrete flatwork.

On projects with expansive soils, additional measures such as thickened concrete edges/footings, subdrains and/or moisture barriers should be considered where planter or natural areas with irrigation are located adjacent to the concrete improvements. Design and maintenance of proper surface drainage is also very important.

For **vehicular** traffic, at minimum, a pavement section consisting of 6 inches of PCC over subgrade compacted to 95 percent relative compaction should be used. However, the recommended section should be evaluated during the design and grading phase based on the anticipated traffic loads/frequency of use and additional R-value testing.

The above recommendations typically are not applied to curb and gutter but should be considered in areas with highly expansive soils.

3.12 Preliminary Asphalt Concrete Pavement Design

Final structural pavement sections should be based on R-value testing after the completion of grading and in accordance with City of Riverside requirements. The laboratory test results on a sample collected in the upper 5 feet shows an R-value of 18. Using a design R-value of 15 and estimated traffic indices (TIs), we recommend the following preliminary pavement sections:

<i>Street Location</i>	<i>Estimated TIs</i>	<i>Pavement Section</i>
Parking Stalls	TI – 4.0	0.25' AC / 0.35' AB
General Drives	TI – 5.5	0.35' AC / 0.65' AB
Driveways with Heavy Truck Traffic	TI – 7.0	0.35' AC / 1.10' AB or 0.45' AC / 0.85'

AC = Asphalt Concrete, AB = Aggregate Base

Please note that for two-stage paving operations, we recommend that the final AC cap be a minimum of 0.10 foot thick and the base AC course have a minimum thickness of 0.25 foot.

Asphalt concrete pavement should be placed in accordance with the requirements of Sections 301 and 302 of the Standard Specifications of Public Works Construction (the Greenbook). Prior to construction of pavement sections, the subgrade soils should be scarified to a minimum depth of 6 inches, moisture-conditioned as needed, and recompacted in-place to a minimum of 90 percent relative compaction (per ASTM D1557). Subgrade should be firm prior to AB placement.

AB materials can be crushed aggregate base or crushed miscellaneous base in accordance with the Greenbook (Section 200-2). The materials should be free of any deleterious materials. Aggregate base materials should be placed in 6- to 8-inch-thick loose lifts, moisture-conditioned as necessary, and compacted to a minimum of 95 percent relative compaction (per ASTM D1557). Asphalt concrete should also be compacted to a minimum relative compaction of 95 percent.

Unpaved median and parkway areas should also be provided with vertical moisture barriers.

3.13 Trench Excavation and Backfill

Excavations should be performed in accordance with the requirements set forth by Cal/OSHA Excavation Safety Regulations (Construction Safety Orders, Section 1504, 1539 through 1547, Title 8, California Code of Regulations). In general, onsite soils may be classified as Type "B" soils for excavations into compacted fill, older alluvium, or bedrock. Locally, Type "C" soils



(loose, friable sand, bedrock fractures) may also be encountered. Cal/OSHA regulations indicate that, for workmen in confined conditions, the steepest allowable slopes in Type "B" and "C" soils are 1H:1V and 1.5H:1V, respectively, for excavations less than 20 feet deep. Where there is no room for these layback slopes, we anticipate that shoring will be necessary. Adequate shoring/shields should be provided, as deemed necessary. Excavations should be reviewed periodically by the contractor's qualified person to confirm compliance with Cal/OSHA requirements.

Utility trench backfill should be in accordance with City of Riverside and/or the governing jurisdiction's specifications. Please note that some agencies require select material for backfilling of trenches and therefore import soils may be required. Native onsite soils are generally considered suitable for use as trench backfill from a geotechnical viewpoint provided that they are approved by the governing agency. Native backfill materials should be compacted to a minimum of 90 percent relative compaction (per ASTM D1557). Rocks greater than 3 inches in largest diameter should generally not be used as trench backfill unless approved by the agency and geotechnical consultant of record. Excavation and backfilling of HDPE pipes (if any) should be in accordance with the manufacturer's requirement and the Greenbook. Select granular backfill (i.e., clean sand with SE 30 or better) may be used in lieu of native soils but should also be compacted or densified with water jetting and flooding.

Trenches excavated next to structures and foundations should also be properly backfilled and compacted to provide full lateral support and reduce settlement potential.

3.14 Groundwater

Groundwater was encountered in one boring (H-5) at a depth of 26.5 feet below ground surface. Groundwater levels may fluctuate on an annual and seasonal basis, based on variations in future residential irrigation and rainfall amounts. Locally saturated soils and/or perched water may be encountered during grading and construction of utility lines and during excavations by future homeowners. In general, groundwater is anticipated to remain more than 10 feet below design grades upon the completion of grading; however, perched water should be anticipated within weathered bedrock and/or at the bedrock/alluvium/fill contact.

3.15 Stormwater Infiltration

Based on our onsite percolation testing, storm water infiltration is considered locally feasible at the tested locations, between 3 and 7 feet bgs. Additional infiltration testing may need to be conducted onsite once a water quality management plan has been prepared in order to evaluate the infiltration rates at the actual location and depth of the proposed device(s). For preliminary design purposes, a design infiltration rate of 0.4 inches per hour may be used for devices that are 3 to 7 feet deep in the vicinity of percolation test borings (P-1 through P-4). For depths between 7 and 10 feet a rate of 0.1 inches per hour may be used. These rates include a minimum factor-of-safety of 3, in accordance with the 2011 Riverside County Design Handbook for Low Impact Development Best Management Practices.

Infiltration systems should maintain a minimum 5-foot vertical separation from bedrock/confining layers. The depth to granitic bedrock (Kgr) is noted on Plate 1 (Geotechnical Map). Infiltration

systems should also maintain a minimum 10-foot vertical separation from groundwater. Considering these constraints and the fine-grained nature of the soils at depths below 10 feet, the systems should not be deeper than 10 feet below existing grades.

Infiltration systems should be designed and constructed in accordance with County/City of Riverside guidelines. Infiltration systems should have a minimum setback of 15 feet from proposed residential structures. The subgrade soil utilized as the infiltration surface should be reviewed and approved by the geotechnical consultant prior to installation of any infiltration devices. Special care should be taken to limit disturbance to native soils used as the infiltration surface. Proper maintenance will also be required to extend the operational life and reduce siltation or reduction in infiltration performance. All infiltration devices should be provided with an overflow system.

3.16 Surface Drainage and Irrigation

Maintaining adequate surface drainage, proper disposal of run-off water, and control of irrigation will help reduce the potential for future moisture-related problems and differential movements from soil heave/settlement.

Surface drainage should be carefully taken into consideration during grading, landscaping, and building construction. Positive surface drainage should be provided to direct surface water away from structures and slopes and toward the street or suitable drainage devices. Ponding of water adjacent to the structures should not be allowed. Buildings should have roof gutter systems and the run-off should be directed to parking lot/street gutters by area drainpipes or by sheet flow over paved areas. Paved areas should be provided with adequate drainage devices, gradients, and curbing to prevent run-off flowing from paved areas onto adjacent unpaved areas.

Considering the climatic conditions in southern California and the relatively low expansion potential of onsite soils, a two-percent slope away from structures should be provided and is in substantial compliance with the 2022 CBC. Also, swales with one-percent slopes are acceptable from a geotechnical standpoint and are common practice in this locale.

Construction of planter areas immediately adjacent to structures should be avoided if possible. If planter boxes are constructed adjacent to or near buildings, the planters should be provided with controls to prevent excessive penetration of the irrigation water into the foundation and flatwork subgrades. Provisions should be made to drain excess irrigation water from the planters without saturating the subgrade below or adjacent to the planters. Raised planter boxes may be drained with weepholes. Deep planters (such as palm tree planters) should be drained with below-ground, water-tight drainage lines connected to a suitable outlet. Moisture barriers should also be considered.

It is also important to maintain a consistent level of soil moisture, not allowing the subgrade soils to become overly dry or overly wet. Properly designed landscaping and irrigation systems can help in that regard.

3.17 Maintenance of Graded Slopes

To reduce the erosion and slumping potential of graded slopes, all permanent manufactured slopes should be protected from erosion by planting with appropriate vegetation, or suitable erosion protection should be applied as soon as is practical. Proper drainage should be designed and maintained to collect surface waters and direct them away from slopes. A rodent-control program should also be established and maintained to reduce the potential for damage related to burrowing. In addition, the design and construction of improvements and landscaping should also provide appropriate drainage measures.

3.18 Additional Subsurface Exploration and Laboratory Testing

Additional subsurface exploration and laboratory testing may be necessary during the design phase of the project for determination/confirmation of the percolation rates, depending on the location and depth of the proposed system(s). Also, additional laboratory testing should be performed during and upon the completion of grading to confirm/update the design parameters provided herein.

3.19 Review of Future Plans

The project grading, foundation, street improvement, wall, water quality management, and landscape plans should be reviewed and accepted by the geotechnical consultant prior to grading and construction. Additional recommendations should be provided upon the review of the project plans and as needed.

3.20 Observation and Testing during Grading and Construction

Geotechnical observation and testing should be performed by SA GEO during the following phases of grading and construction:

- During site demolition, preparation and clearing;
- During excavations performed for remedial grading and to relocate or remove existing underground improvements;
- During removal/abandonment of cesspits, septic tanks, wells, etc.;
- During earthwork, including observation and acceptance of remedial removal and overexcavation bottoms and fill placement, including import material (if any);
- Following the completion of grading, in order to verify soil properties for foundations, slab-on-grade and pavement areas;
- Upon completion of any foundation or structural excavation, prior to pouring concrete;
- During slab and flatwork subgrade preparation including pre-saturation, prior to pouring of concrete;
- During placement of backfill for utility trenches;
- During construction of infiltration/stormwater filtration systems;
- During placement of backfill for retaining structures;
- During installation and backfill of subdrainage systems; and
- When any unusual soil conditions are encountered.


4.0 LIMITATIONS

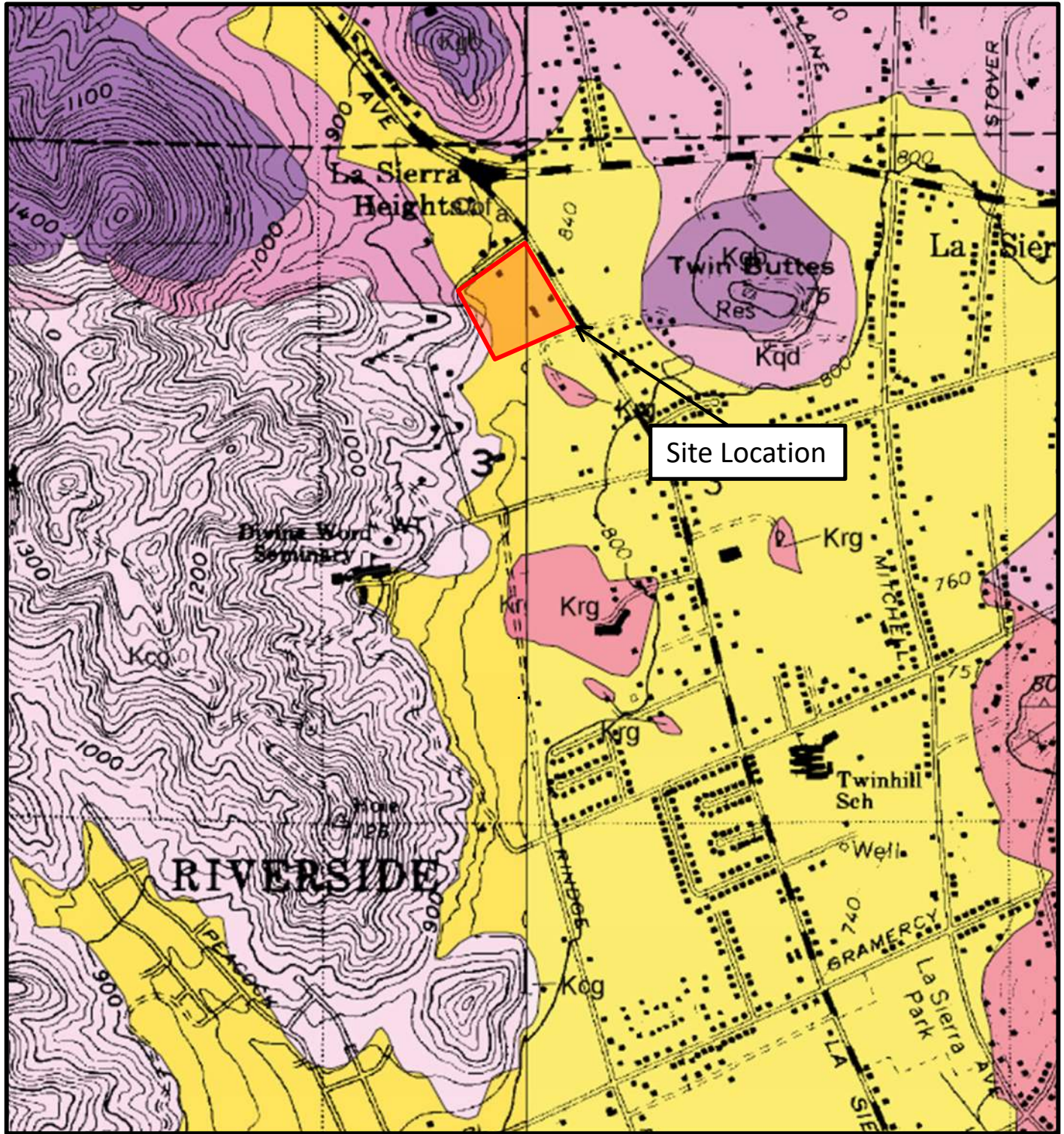
This report has been prepared for the exclusive use of our client, Meritage Homes, within the scope of services requested for the subject property described herein. This report or its contents should not be used or relied upon for other projects or purposes, or by other parties without the acknowledgement of SA GEO and the consultation of a geotechnical professional. The means and methods used by SA GEO for this study are based on local geotechnical standards of practice, care, and requirements of governing agencies. No warranty or guarantee, expressed or implied, is given.

Our findings, conclusions, and recommendations are professional opinions based on interpretations and inferences made from geologic and engineering data from specific locations and depths, observed or collected at a given time. By nature, geologic conditions can vary from point to point, can be very different in-between exploration points, and can also change over time. Our conclusions and recommendations are, by nature, preliminary and subject to verification and/or modification during grading and construction when more subsurface data is exposed.



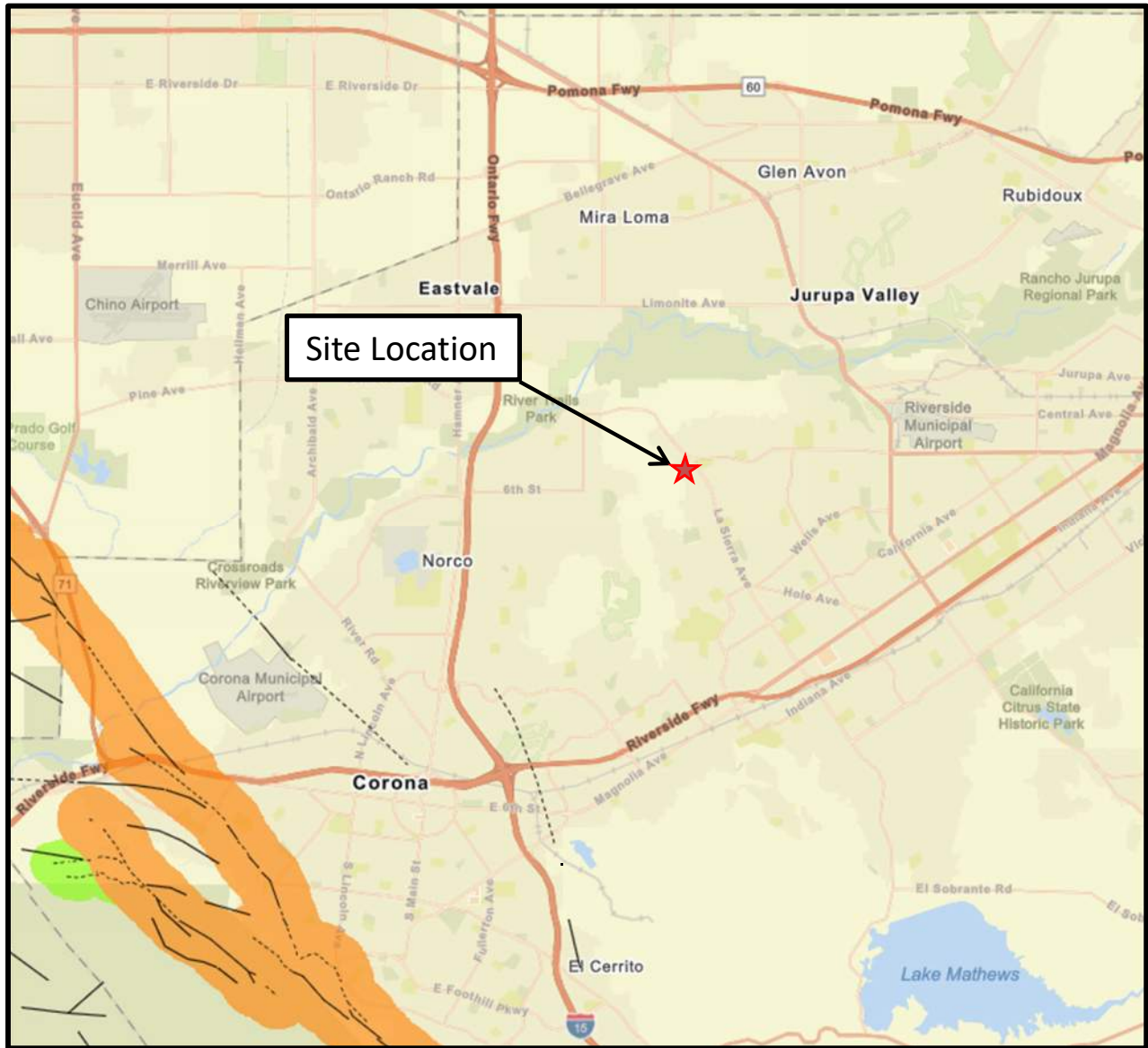
Source: Google Earth

<p style="text-align: center;">Site Location Map</p>		
<p>Meritage Homes Proposed Residential Development La Sierra Avenue/Alhambra Avenue Riverside, California</p>	<p>Project Number: 23145-01 Date: December 22, 2023 Figure 1</p>	

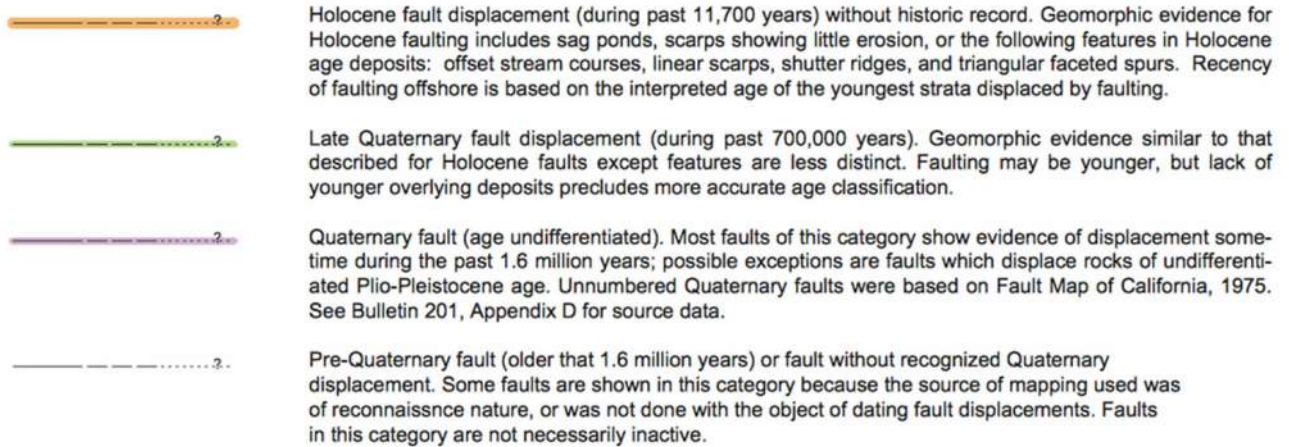


Source: Geologic Map of the Corona North and Riverside West 7.5' Quadrangles, (USGS, 2001 & 2002)

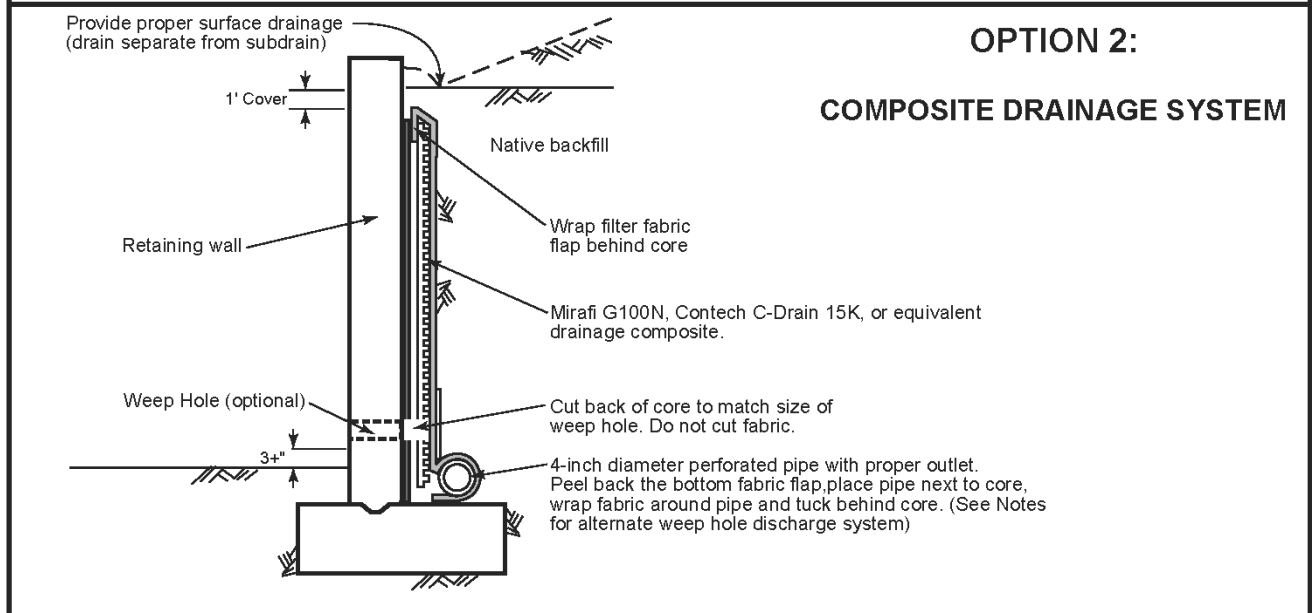
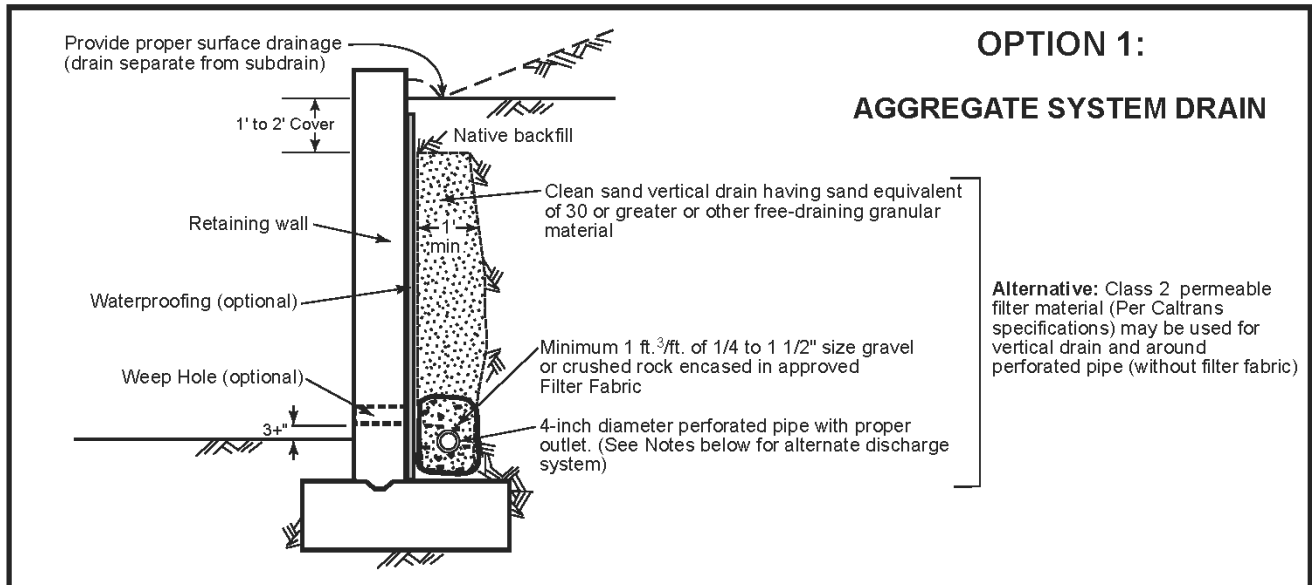
Regional Geologic Map		
Meritage Homes Proposed Residential Development La Sierra Avenue/Alhambra Avenue Riverside, California	Project Number: 23145-01 Date: December 22, 2023 Figure 2	



Source: Fault Activity Map of California (Jennings and Bryant, 2010)



Regional Fault Map		
Meritage Homes Proposed Residential Development La Sierra Avenue/Alhambra Avenue Riverside, California	Project Number: 23145-01 Date: December 22, 2023 Figure 3	



NOTES:

1. PIPE TYPE SHOULD BE PVC OR ABS, SCHEDULE 40 OR SDR35 SATISFYING THE REQUIREMENTS OF ASTM TEST STANDARD D1527, D1785, D2751, OR D3034.
2. FILTER FABRIC SHALL BE APPROVED PERMEABLE NON-WOVEN POLYESTER, NYLON, OR POLYPROPYLENE MATERIAL.
3. DRAIN PIPE SHOULD HAVE A GRADIENT OF 1 PERCENT MINIMUM.
4. WATERPROOFING MEMBRANE MAY BE REQUIRED FOR A SPECIFIC RETAINING WALL (SUCH AS A STUCCO OR BASEMENT WALL).
5. WEEP HOLES MAY BE PROVIDED FOR LOW RETAINING WALLS (LESS THAN 3 FEET IN HEIGHT) IN LIEU OF A VERTICAL DRAIN AND PIPE AND WHERE POTENTIAL WATER FROM BEHIND THE RETAINING WALL WILL NOT CREATE A NUISANCE WATER CONDITION. IF EXPOSURE IS NOT PERMITTED, A PROPER SUBDRAIN OUTLET SYSTEM SHOULD BE PROVIDED.
6. IF EXPOSURE IS PERMITTED, WEEP HOLES SHOULD BE 2-INCH MINIMUM DIAMETER AND PROVIDED AT 25-FOOT MAXIMUM SPACING ALONG WALL. WEEP HOLES SHOULD BE LOCATED 3+ INCHES ABOVE FINISHED GRADE.
7. SCREENING SUCH AS WITH A FILTER FABRIC SHOULD BE PROVIDED FOR WEEP HOLES/OPEN JOINTS TO PREVENT EARTH MATERIALS FROM ENTERING THE HOLES/JOINTS.
8. OPEN VERTICAL MASONRY JOINTS (I.E., OMIT MORTAR FROM JOINTS OF FIRST COURSE ABOVE FINISHED GRADE) AT 32-INCH MAXIMUM INTERVALS MAY BE SUBSTITUTED FOR WEEP HOLES.
9. THE GEOTECHNICAL CONSULTANT MAY PROVIDE ADDITIONAL RECOMMENDATIONS FOR RETAINING WALLS DESIGNED FOR SELECT SAND BACKFILL.

Retaining Wall Drainage Detail



Figure 4

Appendix A

APPENDIX A

REFERENCES

- California Geological Survey (CGS), 2008, Guidelines for Evaluation and Mitigating Seismic Hazards in California, Special Publication 117A.
- California Geological Survey (CGS), 2018, Earthquake Fault Zones, A Guide for Government Agencies, Property Owners / Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California, Special Publication 42.
- Earth Systems Southwest, 2003, Proposed Residential Development, Tentative Tract No. 28756, Alhambra Avenue, West of La Sierra Avenue, La Sierra Hills area of Riverside, California, File No. 09110-01, 03-05-776, Dated May 23, 2003.
- Google Earth Pro, 2023. V7.3.6, <https://www.google.com/earth/desktop/>
- Jennings, Charles W. and Bryant W.A., 2010, Fault Activity Map of California, Department of Conservation, California Geological Survey, Geologic Data Map No. 6.
- Nationwide Environmental Title Research, LLC (NETR), 2023, Historic Aerials by NETR Online, Date Accessed: December 14, 2023; website address: <http://historicaerials.com>
- Riverside County Flood Control (RCFC), 2011, Design Handbook for Low Impact Development Best Management Practices.
- Riverside County, 2023, Information Technology GIS, Map My County v10, website address: https://gis1.countyofriverside.us/Html5Viewer/index.html?viewer=MMC_Public
- State of California Water Resources Control Board, 2023, GeoTracker Website, <http://geotracker.waterboards.ca.gov/>
- Structural Engineers Association/Office of Statewide Health Planning and Development (SEA/OSHPD), 2023, U.S. Seismic Design Maps, web site address: <https://seismicmaps.org/>; Date Accessed: December 13, 2023.
- U.S. Geological Survey (USGS), 2001, Geologic Map of the Riverside West 7.5' Quadrangle, Riverside County, California, Version 1.0, Open File Report 01-451, 1:24,000 Scale.

APPENDIX A (Cont'd)

REFERENCES

- U.S. Geological Survey (USGS), 2002, Geologic Map of the Corona North 7.5' Quadrangle, Riverside and San Bernardino Counties, California, Version 1.0, Open File Report 02-22, 1:24,000 Scale.
- U.S. Geological Survey (USGS), 2023, Unified Hazard Tool, NSHM 2014 Dynamic Deaggregation Program; web site address: <https://earthquake.usgs.gov/hazards/interactive/>; Date Accessed: December 13, 2023.

Appendix B

SOIL CLASSIFICATION CHART

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

NOTE: Dual symbols are used to indicate gravels or sand with 5-12% fines and soils with fines classifying as CL-ML. Symbols separated by a slash indicate borderline soil classifications.

Sampler and Symbol Descriptions

- Modified California sample (D-#)
 - ▣ Standard Penetration Test (S-#)
 - ▢ Shelby tube sample (T-#)
 - ▣ Large bulk sample (B-#)
 - ⊠ Small bulk sample (SB-#)
 - ∇ Approximate depth of groundwater during drilling
 - ▽ Approximate depth of static groundwater
- Note: Number of blows required to advance driven sample 12 inches (or length noted).

Laboratory and Field Test Abbreviations

- AL** Atterberg limits (plasticity)
- CC** Chemical Testing incl. Soluble Sulfate
- CN** Consolidation
- DS** Direct Shear
- EI** Expansion Index
- GS** Grain Size Analysis (Sieve, Hydro. and/or -No. 200)
- MD** Maximum Density and Optimum Moisture
- RV** Resistance Value (R-Value)
- SE** Sand Equivalent
- UU** Unconsolidated Undrained Shear Strength

Notes:


1. Soil classifications are based on the Unified Soil Classification System and include color, moisture, and relative density or consistency. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate. Bedrock descriptions are based on visual classification and include rock type, moisture, color, grain size, strength, and weathering.
2. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were drilled. They are not warranted to be representative of subsurface conditions at other locations or times.



KEY TO LOG OF BORING


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-1	Page 1 of 1
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft) 8	Approximate Ground Surface Elevation (ft)
Approximate Groundwater Depth: Groundwater Not Encountered			
Comments:			

Depth (ft)	SAMPLES		USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type Number	Blows Per Foot					
0	B-1		SM	Granitic Bedrock (Kgr) @ 0-2.5': Pale yellow silty fine- to medium-grained GRANITE, damp, dense, highly weathered (decomposed granite).			B-1 @ 0-5'
	D-1	50/2"	SP-SM	@ 2.5': Pale yellow to light grey silty to clean fine- to coarse-grained GRANITE, dry, very dense, weathered (decomposed granite). - No Ring Recovery -			
5	D-2	50/3"	SP-SM	@ 5': Yellow to white fine- to coarse-grained GRANITE, dry to damp, very dense, weathered. - No Ring Recovery - No 7' sample due to hard drilling conditions.			
10				Notes: Total Depth: 8 Feet (Refusal). No Groundwater Encountered. Backfilled with Cuttings and Tamped.			
15							
20							
25							
30							

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-2	Page 1 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft)	30
Approximate Groundwater Depth: Groundwater Not Encountered		Approximate Ground Surface Elevation (ft)	
Comments:			

Depth (ft)	SAMPLES		USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number Blows Per Foot					
0				Older Alluvium (Qalo)			
	B-1		CL	@ 0-2.5': Reddish brown silty fine-grained sandy CLAY, dry, medium stiff.			B-1 @ 0-5' GS, AL, EI, CC
	D-1	50/6"	SM	@ 2.5': Reddish brown silty fine- to medium-grained SAND, damp to slightly moist, very dense.	10.5	120.8	
5	D-2	50/4"	SP-SM	Granitic Bedrock (Kgr) @ 5': Reddish brown to yellowish brown fine- to medium-grained GRANITE, damp, very dense, highly micaceous, weathered (decomposed granite).	6.0	105.0	
	D-3	50/3"	SP-SM	@ 7.5': Yellowish brown to grey fine- to medium-grained GRANITE, moist, very dense, highly micaceous, weathered (decomposed granite).	4.3		GS
10	D-4	50/3"	SP-SM	@ 10': Pale yellowish grey to light grey fine- to medium-grained GRANITE, damp, very dense, micaceous, highly silicic, weathered (decomposed granite).	4.6	108.0	Harder drilling at 11'
15	D-5	50/3"	SP-SM	@ 15': Dark grey to yellowish grey fine- to medium-grained GRANITE, damp, very dense, highly micaceous, weathered (decomposed granite).	4.5		
20	D-6	50/2"	SP-SM	@ 20': Dark grey to yellowish grey fine- to coarse-grained GRANITE, moist, very dense, highly micaceous, weathered (decomposed granite). - No Ring Recovery -			
25	D-7	50/3"	SP-SM	@ 25': Dark grey to light grey silty fine- to medium-grained GRANITE, damp, very dense, micaceous, weathered (decomposed granite). - No Ring Recovery -			
30							

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-2	Page 2 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft) 30	Approximate Ground Surface Elevation (ft)
Approximate Groundwater Depth: Groundwater Not Encountered			
Comments:			

Depth (ft)	SAMPLES			USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number	Blows Per Foot					
30	D-8	50/2"		SP-SM	@ 30': Pale yellow to light grey fine- to coarse-grained GRANITE, damp, very dense, weathered (decomposed granite). - No Ring Recovery -			
35					Notes: Total Depth: 30 Feet. No Groundwater Encountered. Backfilled with Cuttings and Tamped.			
40								
45								
50								
55								

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-3	Page 1 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft)	30.5
Approximate Groundwater Depth: Groundwater Not Encountered		Approximate Ground Surface Elevation (ft)	
Comments:			

Depth (ft)	SAMPLES		USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number Blows Per Foot					
0				Hand Augered to 3.5' for Utility Clearance			
0-3.5'	B-1		SM	Older Alluvium (Qalo) @ 0-3.5': Reddish brown silty fine- to medium-grained SAND, dry to damp, loose.			B-1 @ 0-5'
3.5-5'	D-1	9	SM	@ 3.5': Reddish brown silty fine- to medium-grained SAND, slightly moist, loose.	6.6	115.3	
5-7.5'	D-2	13	SM/ML	@ 5': Reddish brown silty fine-grained SAND/sandy SILT, moist, medium dense/stiff.	7.0	117.3	GS, CN
7.5-10'	D-3	32	ML	@ 7.5': Reddish brown fine sandy slightly clayey SILT, moist, very stiff.	14.6	118.7	
10-15'	D-4	61	SM	@ 10': Upper: Reddish brown silty fine- to coarse-grained SAND, moist, dense, some bedrock fragments.	11.6	123.5	
10-15'			SP-SM	Granitic Bedrock (Kgr) Lower: Yellowish brown to grey silty to clean fine- to coarse-grained GRANITE, moist, dense, highly weathered (decomposed granite).			
15-20'	D-5	50/5"	SP	@ 15': Yellowish brown to brownish grey fine- to coarse-grained GRANITE, damp, very dense, micaceous, highly weathered (decomposed granite).	3.5	114.5	
20-25'	D-6	50/3"	SP	@ 20': Light grey to yellowish grey fine- to coarse-grained GRANITE, damp, very dense, micaceous, weathered (decomposed granite).	3.7	115.7	
25-30'	D-7	50/5"	SP	@ 25': Olive grey to grey fine- to coarse-grained GRANITE, damp, very dense, micaceous, weathered (decomposed granite).	3.7		
30'							Harder drilling at 28'

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01	
	Appendix B	


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-3	Page 2 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft) 30.5	
Approximate Groundwater Depth: Groundwater Not Encountered		Approximate Ground Surface Elevation (ft)	
Comments:			

Depth (ft)	SAMPLES			USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number	Blows Per Foot					
30	D-8	50/3"		SP	@ 30': Dark grey to white fine- to coarse-grained GRANITE, damp, very dense, micaceous, weathered (decomposed granite), quartz veins up to 1" thick.	3.8		
35					Notes: Total Depth: 30.5 Feet. No Groundwater Encountered. Backfilled with Cuttings and Tamped.			
40								
45								
50								
55								

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-4	Page 1 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft)	30.5
Approximate Groundwater Depth: Groundwater Not Encountered		Approximate Ground Surface Elevation (ft)	
Comments:			

Depth (ft)	SAMPLES		USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number Blows Per Foot					
0	B-1		SM/ML	Older Alluvium (Qalo) @ 0-2.5': Reddish brown silty fine-grained SAND/sandy SILT, damp, medium dense/medium stiff.			B-1 @ 0-5' RV
	D-1	40	SM	@ 2.5': Reddish brown to brownish grey silty fine- to coarse-grained SAND, damp, medium dense, Kgr in sampler tip.	7.3	123.9	
5	D-2	50/4"	SC-CL	Granitic Bedrock (Kgr) @ 5': Reddish brown to pale reddish brown clayey fine to coarse grained GRANITE, moist, very dense, highly weathered (decomposed granite).	14.7	114.9	DS
	D-3	50/4"	SP-SM	@ 7.5': Pale reddish brown to yellowish brown fine- to coarse-grained GRANITE, damp, very dense, weathered (decomposed granite).	6.5		
10	D-4	50/4"	SP-SM	@ 10': Pale yellow to white fine- to coarse-grained GRANITE, damp, very dense, trace mica, weathered (decomposed granite).	4.5		
15	D-5	50/4"	SP-SM	@ 15': Pale yellow to pale reddish brown fine- to coarse-grained GRANITE, damp, very dense, trace mica, weathered (decomposed granite). - No Ring Recovery -			
20	D-6	50/4"	SP-SM	@ 20': Light grey to yellowish grey fine- to coarse-grained GRANITE, damp, very dense, micaceous, weathered (decomposed granite).	4.7		
25	D-7	50/4"	SP-SM	@ 25': Olive grey to grey fine- to coarse-grained GRANITE, damp, very dense, micaceous, weathered (decomposed granite).	3.9		
30							

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-4	Page 2 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft) 30.5	Approximate Ground Surface Elevation (ft)
Approximate Groundwater Depth: Groundwater Not Encountered			
Comments:			

Depth (ft)	SAMPLES		USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type Number	Blows Per Foot					
30	D-8	50/5"	SP-SM	@ 30': Yellowish brown to brownish grey fine- to coarse-grained GRANITE, moist, very dense, highly micaceous, weathered (decomposed granite).	7.6		
35				Notes: Total Depth: 30.5 Feet. No Groundwater Encountered. Backfilled with Cuttings and Tamped.			
40							
45							
50							
55							

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-5	Page 1 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft)	30
Approximate Groundwater Depth: 26.5 feet		Approximate Ground Surface Elevation (ft)	
Comments:			

Depth (ft)	SAMPLES		USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number Blows Per Foot					
0	B-1		SM/ML	Older Alluvium (Qalo) @ 0-2.5': Reddish brown silty fine-grained SAND/sandy SILT, dry to damp, loose to medium dense/stiff.			B-1 @ 0-5' GS, AL, DS, MD, EI, CC
	D-1	18	SM	@ 2.5': Reddish brown silty fine- to medium-grained SAND, damp, medium dense.	3.0	110.1	
5	D-2	20	SM	@ 5': Reddish brown silty fine- to coarse-grained SAND, damp, medium dense.	2.8	116.4	
	D-3	19	SM/ML	@ 7.5': Reddish brown silty fine-grained SAND/sandy SILT, damp, medium dense/stiff.	6.2	116.7	
10	D-4	34	ML	@ 10': Reddish brown fine sandy SILT, damp to moist, very stiff, Kgr in sampler tip.	9.1	123.5	
			SM	Granitic Bedrock (Kgr)			
15	D-5	50/4"	SM	@ 15': Reddish brown to yellowish brown to dark grey silty fine- to coarse-grained GRANITE, damp, very dense, weathered (decomposed granite), highly micaceous.	4.1	112.1	
20	D-6	50/4"	SP-SM	@ 20': Dark grey to yellowish grey fine- to coarse-grained GRANITE, damp, very dense, highly micaceous, weathered (decomposed granite).	3.1		
25	D-7	50/3"	SP-SM	@ 25': Dark grey to yellowish grey fine- to coarse-grained GRANITE, damp to moist, very dense, highly micaceous, weathered (decomposed granite).	3.6	102.5	
30				Groundwater at 28' during drilling; 26.5' after 5 minutes			

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-5	Page 2 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft) 30	Approximate Ground Surface Elevation (ft)
Approximate Groundwater Depth: 26.5 Feet			
Comments:			

Depth (ft)	SAMPLES			USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number	Blows Per Foot					
30	D-8	50/1"	SP-SM		@ 30': Dark grey to yellowish grey fine- to coarse-grained GRANITE, saturated, very dense, highly micaceous, weathered (decomposed granite). - No Ring Recovery -			
35					Notes: Total Depth: 30 Feet. Groundwater Encountered at 26.5 feet. Backfilled with Cuttings and Tamped.			
40								
45								
50								
55								

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-6	Page 1 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft)	30.5
Approximate Groundwater Depth: Groundwater Not Encountered		Approximate Ground Surface Elevation (ft)	
Comments:			

Depth (ft)	SAMPLES		USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number Blows Per Foot					
0			SM	Older Alluvium (Qalo) @ 0-2.5': Reddish brown silty fine- to coarse-grained SAND, dry to damp, loose.			B-1 @ 0-5'
	B-1						
	D-1	11	SM	@ 2.5': Reddish brown silty fine- to coarse-grained SAND, damp, loose.	3.1	115.4	
5	D-2	7	SM	@ 5': Reddish brown silty fine-grained SAND, damp to moist, loose.	6.9	111.9	GS, CN
	D-3	14	ML	@ 7.5': Reddish brown silty fine-grained sandy SILT, damp to moist, medium stiff.	8.6	121.3	GS, CN
10	D-4	16	CL	@ 10': Reddish brown fine sandy CLAY, moist, stiff.	12.4	118.4	GS, AL
15	D-5	23	CL	@ 15': Reddish brown sandy CLAY, moist, very stiff.	13.4	117.6	GS, CN
20	D-6	30	CL	@ 20': Reddish brown sandy CLAY, moist, very stiff to hard. Kgr in sampler tip.	13.8	121.6	
			SM	Granitic Bedrock (Kgr)			
25	D-7	50/5"	SM	@ 25': Yellowish grey to white to pale olive grey fine- to coarse-grained GRANITE, very moist, very dense, micaceous, weathered (decomposed granite), quartz veins up to 0.25" thick.	15.5	118.9	
30							

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-08-2023	Logged By: AC, AZ	H-6	Page 2 of 2
Drilling Method: Hollow Stem	Drill Bit Size/Type: 10"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California, Bulk		Total Depth Drilled (ft) 30.5	
Approximate Groundwater Depth: Groundwater Not Encountered		Approximate Ground Surface Elevation (ft)	
Comments:			

Depth (ft)	SAMPLES			USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number	Blows Per Foot					
30	D-8	50/3"		SP-SM	@ 30': Yellowish grey to dark grey silty fine- to coarse-grained GRANITE, moist, very dense, highly micaceous, weathered (decomposed granite). - No Ring Recovery -			
35					Notes: Total Depth: 30.5 Feet. No Groundwater Encountered. Backfilled with Cuttings and Tamped.			
40								
45								
50								
55								

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-11-2023	Logged By: AC, AZ	P-1 Page 1 of 1
Drilling Method: Hollow Stem	Drill Bit Size/Type: 8"	
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")	
Sampling Method(s): Modified California		Total Depth Drilled (ft) 5
Approximate Groundwater Depth: Groundwater Not Encountered		Approximate Ground Surface Elevation (ft)
Comments:		

Depth (ft)	SAMPLES			USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number	Blows Per Foot					
0					Older Alluvium (Qalo)			
	D-1	22		SM	@ 2': Reddish brown silty fine- to medium-grained SAND, damp, medium dense.	3.3	114.1	
	D-2	38		SM	@ 3.5': Reddish brown silty fine- to coarse-grained SAND, damp, medium dense.	3.6	111.0	
5					Notes: Total Depth: 5 Feet. No Groundwater Encountered. Installed 3" Slotted Pipe. Annular Backfill with ¾" Gravel. Presoak Performed 12/11/23. Percolation Testing Performed 12/12/23. Backfilled with Gravel and Cuttings.			
10								
20								
25								
30								

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-11-2023	Logged By: AC, AZ	P-2	Page 1 of 1
Drilling Method: Hollow Stem	Drill Bit Size/Type: 8"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California		Total Depth Drilled (ft) 5	Approximate Ground Surface Elevation (ft)
Approximate Groundwater Depth: Groundwater Not Encountered			
Comments:			

Depth (ft)	SAMPLES			USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS	
	Type	Number	Blows Per Foot						
0					Older Alluvium (Qalo)				
	D-1	15		SM	@ 2': Reddish brown to brownish grey silty fine- to medium-grained SAND, dry to damp, medium dense.	2.2	103.1		
	D-2	26		SM	@ 3.5': Reddish brown to brownish grey silty fine- to coarse-grained SAND, dry to damp, medium dense.	2.2	110.1		
5					Notes: Total Depth: 5 Feet. No Groundwater Encountered. Installed 3" Slotted Pipe. Annular Backfill with 3/4" Gravel. Presoak Performed 12/11/23. Percolation Testing Performed 12/12/23. Backfilled with Gravel and Cuttings.				
10									
20									
25									
30									

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	


Date(s) Drilled: 12-11-2023	Logged By: AC, AZ	P-3	Page 1 of 1
Drilling Method: Hollow Stem	Drill Bit Size/Type: 8"		
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")		
Sampling Method(s): Modified California		Total Depth Drilled (ft)	10
Approximate Groundwater Depth: Groundwater Not Encountered		Approximate Ground Surface Elevation (ft)	
Comments:			

Depth (ft)	SAMPLES			USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number	Blows Per Foot					
0					<u>Older Alluvium (Qalo)</u>			
2.5	D-1	27	SM		@ 2.5': Reddish brown silty fine- to coarse-grained SAND, dry, medium dense, slightly friable.	1.9	111.6	
5	D-2	26	SM		@ 5': Reddish brown silty fine-grained SAND, damp, medium dense, trace root hairs.	3.9	116.1	GS
8	D-3	16	SM		@ 8': Reddish brown silty fine-grained SAND, damp to moist, medium dense.	9.1	119.8	
10					Notes: Total Depth: 10 Feet. No Groundwater Encountered. Installed 3" Slotted Pipe. Annular Backfill with 3/4" Gravel. Presoak Performed 12/11/23. Percolation Testing Performed 12/12/23. Backfilled with Gravel and Cuttings.			
20								
25								
30								

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

Date(s) Drilled: 12-11-2023	Logged By: AC, AZ	P-4 Page 1 of 1
Drilling Method: Hollow Stem	Drill Bit Size/Type: 8"	
Drill Rig Type: CME 75	Hammer Type: Auto (140lbs @ 30")	
Sampling Method(s): Modified California		Total Depth Drilled (ft) 7.5
Approximate Groundwater Depth: Groundwater Not Encountered		Approximate Ground Surface Elevation (ft) 836
Comments:		

Depth (ft)	SAMPLES			USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number	Blows Per Foot					
0					<u>Older Alluvium (Qalo)</u>			
2.5	D-1	18		SM	@ 2.5': Reddish brown silty fine- to medium-grained SAND, damp, medium dense.	4.5	117.1	
6	D-2	33		SM	@ 6': Reddish brown silty fine-grained SAND, damp to slightly moist, medium dense.	6.0	115.7	
10					Notes: Total Depth: 7.5 Feet. No Groundwater Encountered. Installed 3" Slotted Pipe. Annular Backfill with 3/4" Gravel. Presoak Performed 12/11/23. Percolation Testing Performed 12/12/23. Backfilled with Gravel and Cuttings.			
20								
25								
30								

Log Of Boring		
Meritage Homes Proposed Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

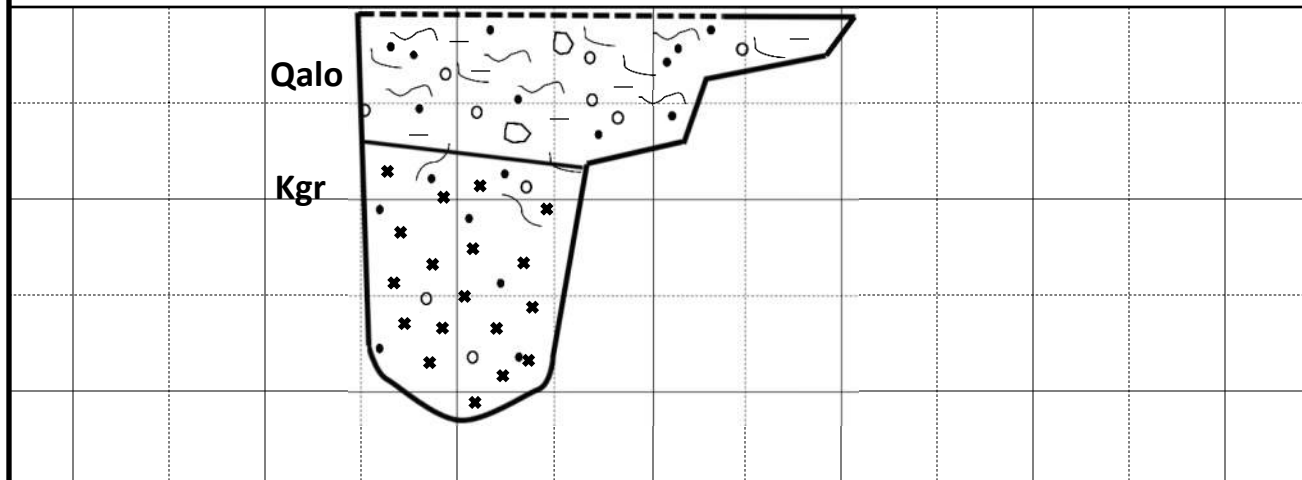
Date(s)Excavated: 12/06/2022	Logged By: AZ/AC	TP- 1
Excavation Method: Backhoe		
Equipment Type: Deere 310		
Sampling Method(s): Bulk		Total Depth (ft): 11.5
Approximate Groundwater Depth: Not Encountered		Approximate Ground Surface Elevation (ft)
Comments:		

Depth (ft)	SAMPLES		USCS	Log Of Test Pit	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type Number	Blows Per Foot					
0				Surface: Dirt & weeds			
			SM	Older Alluvium (Qalo) @ 0-2.5': Reddish brown silty fine- to medium-grained SAND, dry, medium dense, root hairs in upper 8".			
			SM	Granitic Bedrock (Kgr) @ 2.5-5': Yellow to red to grey fine- to medium-grained GRANITE, dry to damp, dense, highly weathered (D.G.), with local hard rock fragments.			
5			SP-SM	@ 5-11.5': Pale olive grey fine- to coarse-grained GRANITE, damp, dense, weathered (D.G.).			B-1 @ 5-7'
10				Notes: Total Depth: 11.5 Feet (Refusal). Groundwater Not Encountered. Backfilled with Cuttings.			
15							

Graphic Orientation: North Wall

Trend: -N58E-->

Scale: 1" = 5'



Log Of Test Pit		
Meritage Homes Proposed New Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

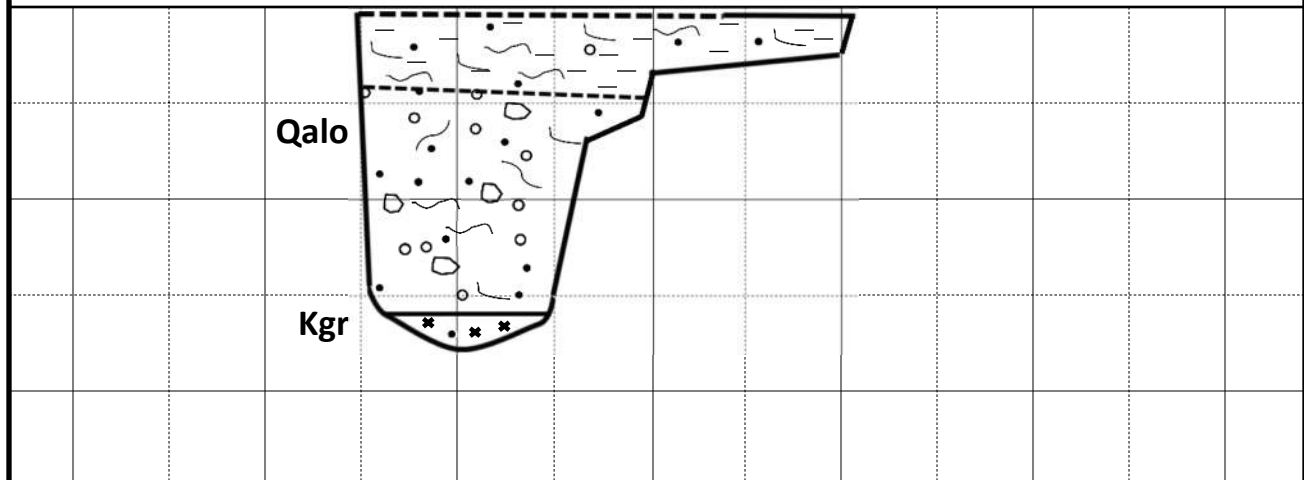
Date(s)Excavated: 12/06/2022	Logged By: AZ/AC	TP- 2
Excavation Method: Backhoe		
Equipment Type: Deere 310		
Sampling Method(s): Bulk		Total Depth (ft): 8.5
Approximate Groundwater Depth: Not Encountered		Approximate Ground Surface Elevation (ft)
Comments:		

Depth (ft)	SAMPLES		USCS	Log Of Test Pit	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number Blows Per Foot					
0				Surface: Dirt & weeds			
0-2			SM	Older Alluvium (Qalo) @ 0-2': Reddish brown silty fine-grained SAND, dry, medium dense, root hairs in upper 12-18".			
2-8	B-1		SM	@ 2-8': Reddish brown silty fine- to coarse-grained SAND, damp, dense, few coarse-grained bedrock fragments.			B-1 @ 2-6'
8-8.5			SP	Granitic Bedrock (Kgr) @ 8-8.5': Pale olive grey fine- to coarse-grained GRANITE, damp, dense, weathered (D.G.).			
Notes:	Total Depth: 8.5 Feet (Refusal). Groundwater Not Encountered. Backfilled with Cuttings.						

Graphic Orientation: North Wall

Trend: -N70E-->

Scale: 1" = 5'



Log Of Test Pit		
Meritage Homes Proposed New Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

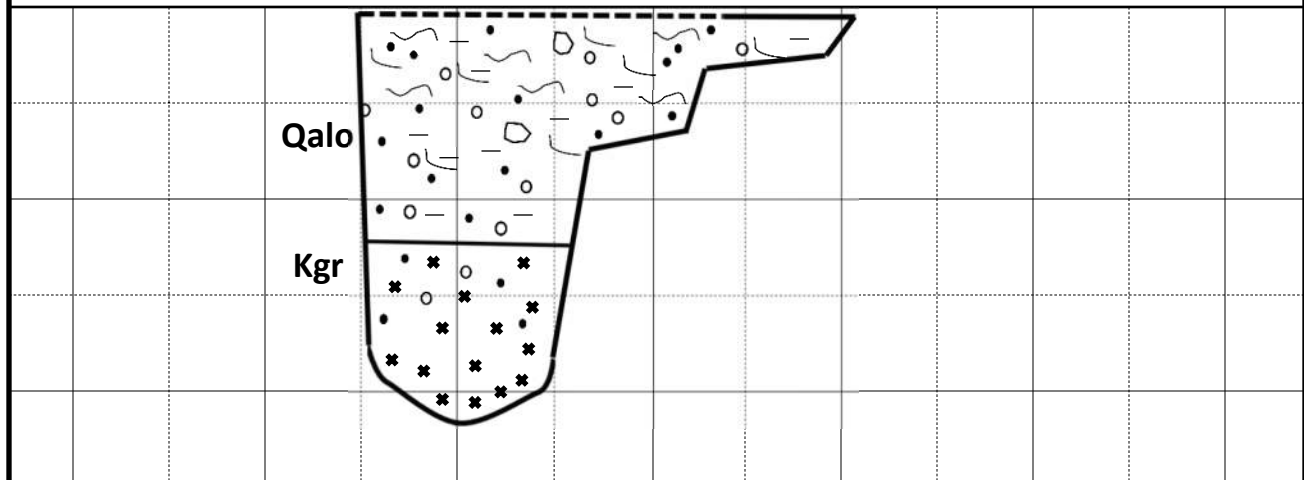
Date(s) Excavated: 12/06/2022	Logged By: AZ/AC	TP- 3
Excavation Method: Backhoe		
Equipment Type: Deere 310		
Sampling Method(s): None		Total Depth (ft): 11.5
Approximate Groundwater Depth: Not Encountered		Approximate Ground Surface Elevation (ft)
Comments:		

Depth (ft)	SAMPLES		USCS	Log Of Test Pit	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type Number	Blows Per Foot					
0				Surface: Dirt & weeds			
5			SM/ML	<u>Older Alluvium (Qalo)</u> @ 0-6.5': Reddish brown silty fine-grained SAND/sandy SILT, damp to moist, medium dense/stiff, soil pores up to ¼" in upper 1.5', roots and root hairs in upper 4'.			
10			SM	<u>Granitic Bedrock (Kgr)</u> @ 6.5-9': Yellow, reddish brown, and grey fine- to medium-grained GRANITE, dry to damp, dense, highly weathered (D.G.), with local hard rock fragments.			
15			SP-SM	@ 9-11.5': Pale olive grey fine- to coarse-grained GRANITE, damp, dense, weathered (D.G.). Notes: Total Depth: 11.5 Feet (Refusal). Groundwater Not Encountered. Backfilled with Cuttings.			

Graphic Orientation: North Wall

Trend: -N74E-->

Scale: 1" = 5'



Log Of Test Pit		
Meritage Homes Proposed New Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

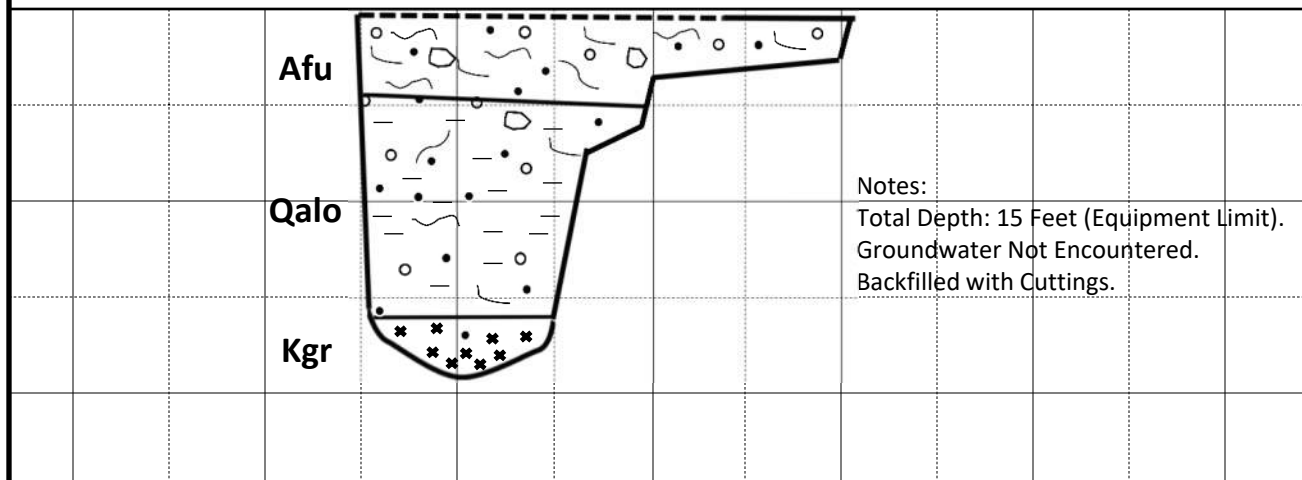
Date(s) Excavated: 12/06/2022	Logged By: AZ/AC	TP- 4
Excavation Method: Backhoe		
Equipment Type: Deere 310		
Sampling Method(s): None		Total Depth (ft): 15
Approximate Groundwater Depth: Not Encountered		Approximate Ground Surface Elevation (ft)
Comments:		

Depth (ft)	SAMPLES		USCS	Log Of Test Pit	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type Number	Blows Per Foot					
0				Surface: Dirt & weeds			
			SM	Undocumented Artificial Fill (Afu) @ 0-2.5': Brown to reddish brown silty fine- to coarse-grained SAND, dry to damp, loose, root hairs in upper 2'.			
			SM	@ 2.5-5.5': Reddish brown silty fine- to medium-grained SAND, damp to moist, loose, some caving, slightly friable.			
5				Older Alluvium (Qalo)			
			SM/ML	@ 5.5-12.5': Reddish brown to dark reddish brown silty fine-grained SAND/sandy SILT, moist, medium dense, scattered old root hairs.			
10				Granitic Bedrock (Kgr)			
			SP-SM	@ 12.5-15': Reddish brown to yellowish brown fine- to coarse-grained GRANITE, moist, medium dense, micaceous, highly weathered (D.G.).			
15							

Graphic Orientation: North Wall

Trend: -N45E-->

Scale: 1" = 8'



Log Of Test Pit		
Meritage Homes Proposed New Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

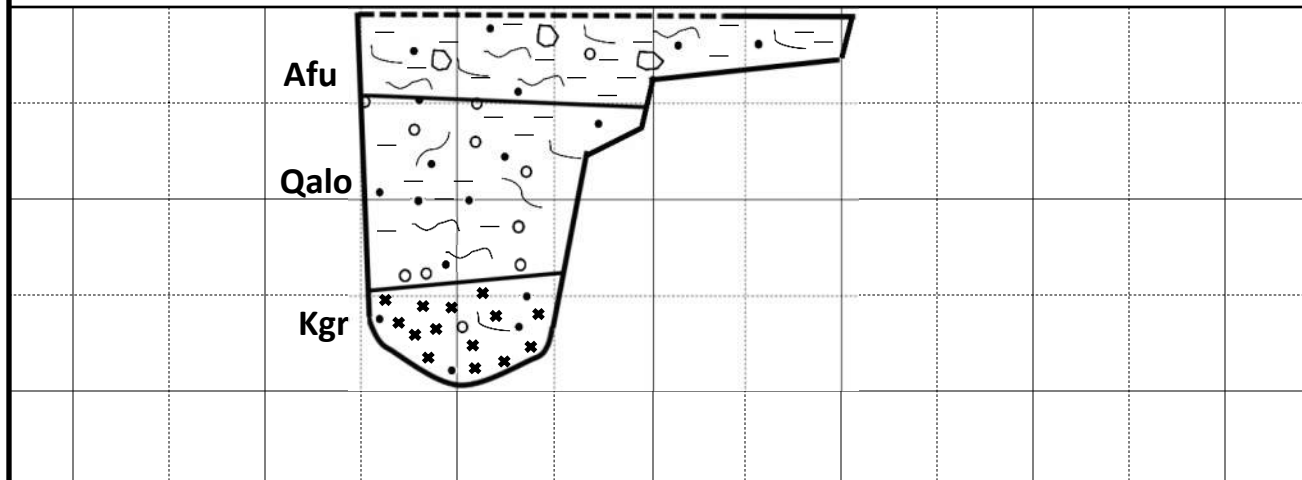
Date(s)Excavated: 12/06/2022	Logged By: AZ/AC	TP- 5
Excavation Method: Backhoe		
Equipment Type: Deere 310		
Sampling Method(s): None		Total Depth (ft): 9.5
Approximate Groundwater Depth: Not Encountered		Approximate Ground Surface Elevation (ft)
Comments:		

Depth (ft)	SAMPLES		USCS	Log Of Test Pit	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number Blows Per Foot					
0				Surface: Dirt & weeds			
			SM	Undocumented Artificial Fill (Afu) @ 0-2.5': Reddish brown to brown silty fine- to coarse-grained SAND, dry, loose to medium dense, root hairs in upper 6".			
5			SM	Older Alluvium (Qalo) @ 2.5-7': Reddish brown silty fine-grained SAND, damp to moist, loose to medium dense.			
10			SP	Granitic Bedrock (Kgr) @ 7-9.5': Reddish brown to olive brown fine- to coarse-grained GRANITE, damp to moist, weathered (D.G.), with cohesive rock fragments 2-4".			
15				Notes: Total Depth: 9.5 Feet (Refusal). Groundwater Not Encountered. Backfilled with Cuttings.			

Graphic Orientation: North Wall

Trend: -N60E-->

Scale: 1" = 5'



Log Of Test Pit		
Meritage Homes Proposed New Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

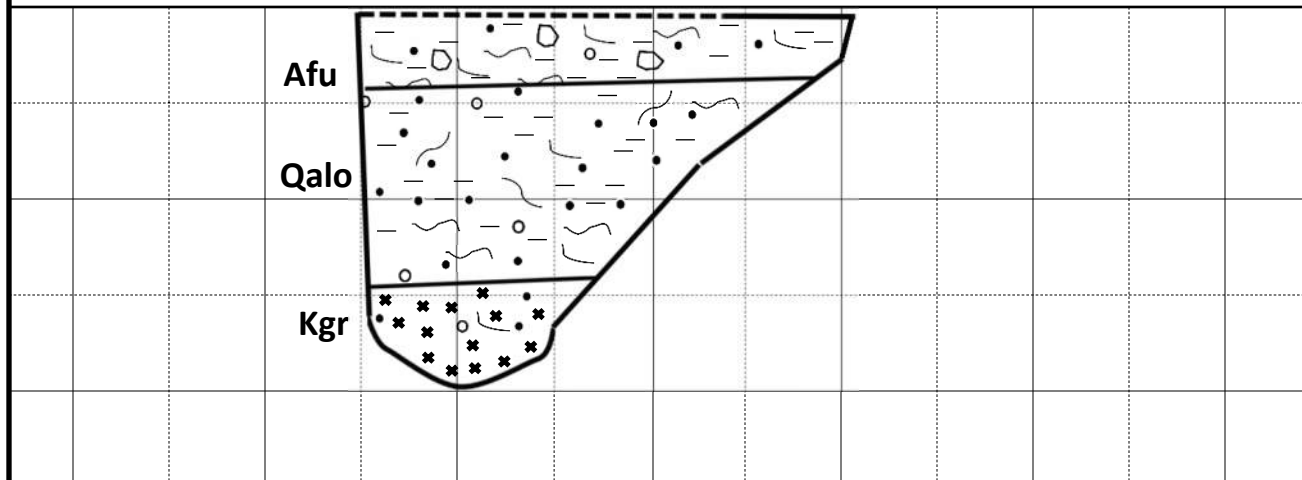
Date(s)Excavated: 12/06/2022	Logged By: AZ/AC	TP- 6
Excavation Method: Backhoe		
Equipment Type: Deere 310		
Sampling Method(s): None		Total Depth (ft): 9.5
Approximate Groundwater Depth: Not Encountered		Approximate Ground Surface Elevation (ft)
Comments:		

Depth (ft)	SAMPLES		USCS	Log Of Test Pit	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type Number	Blows Per Foot					
0				Surface: Dirt & weeds			
			SM	Undocumented Artificial Fill (Afu) @ 0-1.5': Brown to reddish brown silty fine- to coarse-grained SAND, dry, loose to medium dense.			
5			SM	Older Alluvium (Qalo) @ 1.5-7': Reddish brown silty fine-grained SAND, moist, loose to medium dense, trace clay.			
10			SM	Granitic Bedrock (Kgr) @ 7-9.5': Pale reddish brown to light grey silty fine- to medium-grained GRANITE, moist, dense, hard rock fragments up to 14" in diameter, highly weathered (D.G.), last 6-12" very dense. Notes: Total Depth: 9.5 Feet (Refusal). Groundwater Not Encountered. Backfilled with Cuttings.			
15							

Graphic Orientation: North Wall

Trend: -N44E-->

Scale: 1" = 5'



Log Of Test Pit		
Meritage Homes Proposed New Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

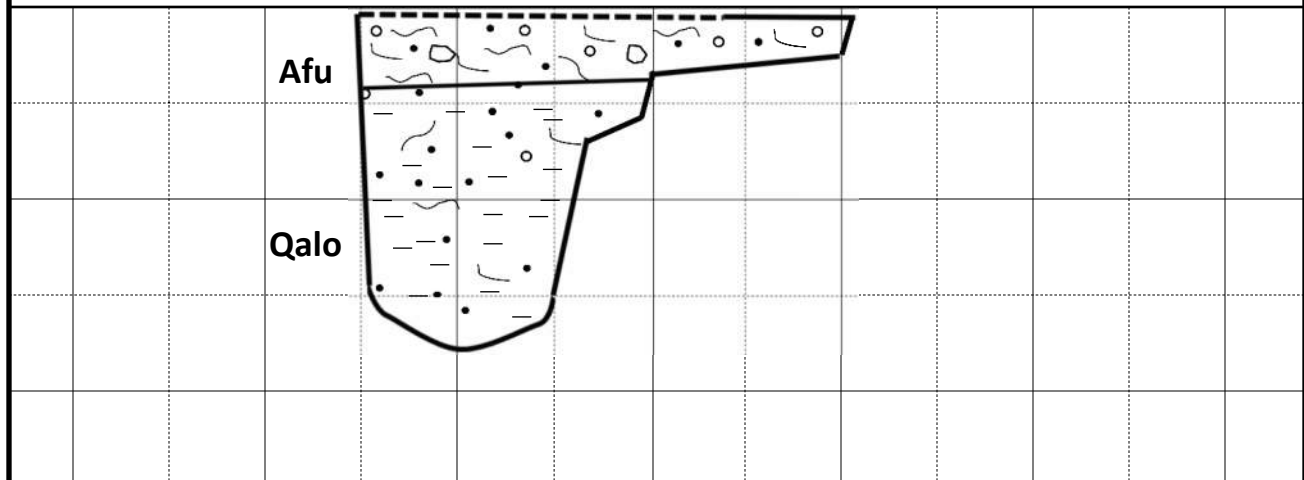
Date(s) Excavated: 12/06/2022	Logged By: AZ/AC	TP- 7
Excavation Method: Backhoe		
Equipment Type: Deere 310		
Sampling Method(s): None		
Approximate Groundwater Depth: Not Encountered		Total Depth (ft): 14
Comments:		Approximate Ground Surface Elevation (ft)

Depth (ft)	SAMPLES		USCS	Log Of Test Pit	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type Number	Blows Per Foot					
0				Surface: Dirt & weeds			
0 - 2.5			SM	Undocumented Artificial Fill (Afu) @ 0-2.5': Reddish brown to brownish grey silty fine- to coarse-grained SAND, dry to damp, loose, soil pores up to 2 millimeters in diameter.			
2.5 - 7	B-1		SM/ML	Older Alluvium (Qalo) @ 2.5-14': Reddish brown silty fine-grained SAND/sandy SILT, moist to very moist, loose/soft to medium stiff, soil pores present to 4' in depth. @ 7-14': Bedrock fragments up to 8" in diameter.			B-1 @ 2.5-7'
7 - 14				Notes: Total Depth: 14 Feet (Equipment Limit). Groundwater Not Encountered. Backfilled with Cuttings.			

Graphic Orientation: North Wall

Trend: -N18E-->

Scale: 1" = 8'



Log Of Test Pit		
Meritage Homes Proposed New Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

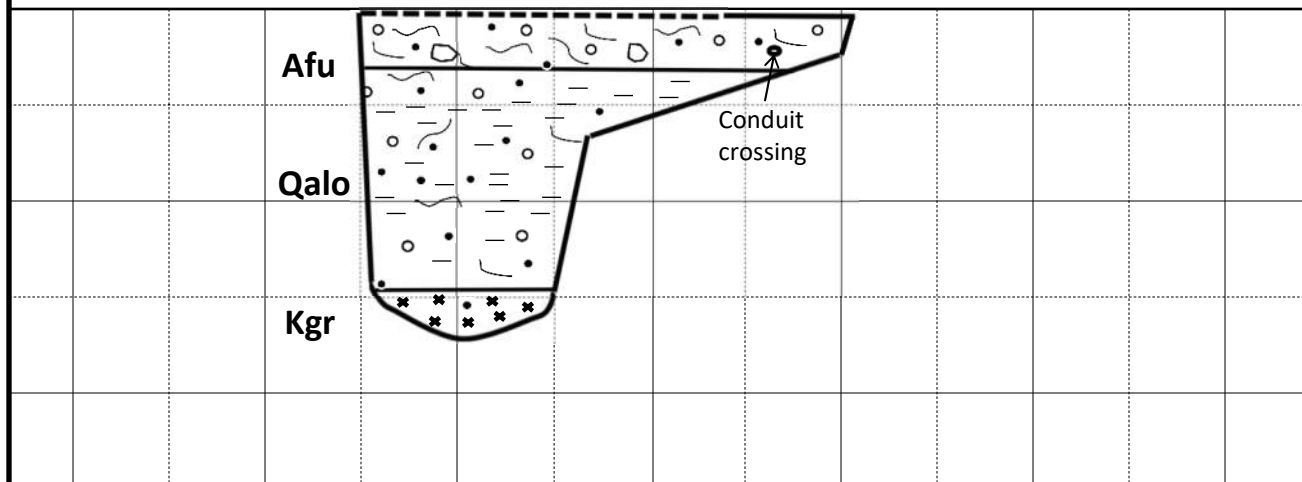
Date(s) Excavated: 12/06/2022	Logged By: AZ/AC	TP- 8
Excavation Method: Backhoe		
Equipment Type: Deere 310		
Sampling Method(s): None		Total Depth (ft): 13.5
Approximate Groundwater Depth: Not Encountered		Approximate Ground Surface Elevation (ft)
Comments:		

Depth (ft)	SAMPLES		USCS	Log Of Test Pit	Moisture Content (%)	Dry Density (pcf)	REMARKS
	Type	Number Blows Per Foot					
0				Surface: Dirt & weeds			
			SM	Undocumented Artificial Fill (Afu) @ 0-1.5': Reddish brown to brown fine- to coarse-grained silty SAND, dry, loose, slightly friable, scattered root hairs.			
5			SM	Older Alluvium (Qalo) @ 1.5-11': Reddish brown silty fine- to medium-grained SAND, damp to moist, loose to medium dense. @4.5': Becomes medium dense.			
10			SP-SM	Granitic Bedrock (Kgr) @ 11-13.5': Yellowish brown to reddish brown fine- to coarse-grained GRANITE, moist, dense, micaceous, highly weathered (D.G.). Notes: Total Depth: 13.5 Feet (Equipment Limit). Groundwater Not Encountered. Backfilled with Cuttings.			
15							

Graphic Orientation: North Wall

Trend: -N65E-->

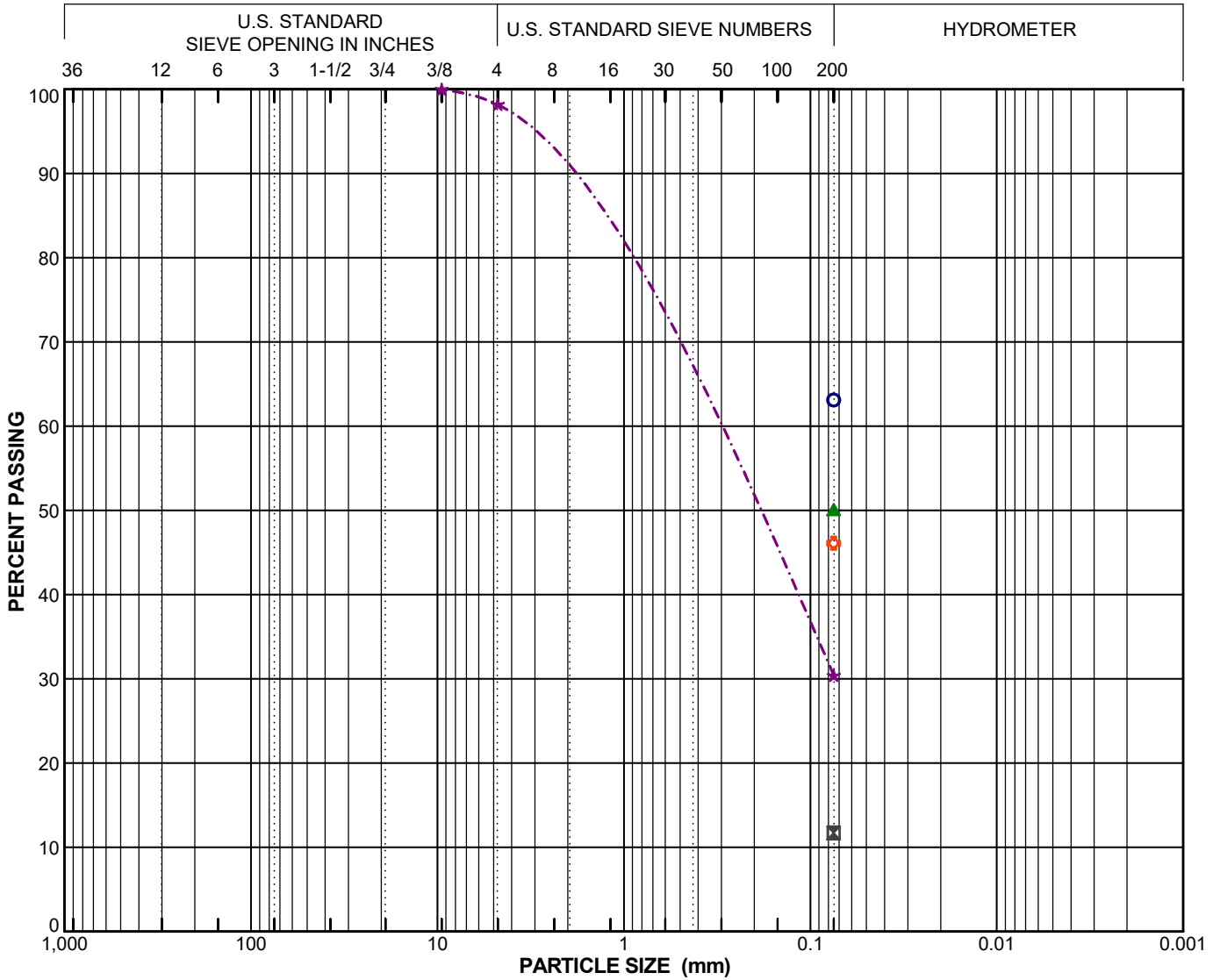
Scale: 1" = 8'



Log Of Test Pit		
Meritage Homes Proposed New Residential Development La Sierra Ave & Alhambra Ave Riverside, California	Project Number: 23145-01 Appendix B	

Appendix C

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	



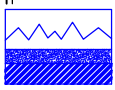
Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2 μ	C _u	C _c	Passing No. 200 Sieve (%)	Passing 2 μ (%)	USCS
○	H-2	B-1	0.0 - 5.0		30	13				63		CL
⊠	H-2	D-3	7.5	4						12		SP-SM
▲	H-3	D-2	5.0	7						50		ML/SM
★	H-5	B-1	0.0 - 5.0	15	NP	NP				30		SM
◊	H-6	D-2	5.0	7						46		SM

PARTICLE SIZE DISTRIBUTION

SA Geo / Meritage La Sierra (23145-01)

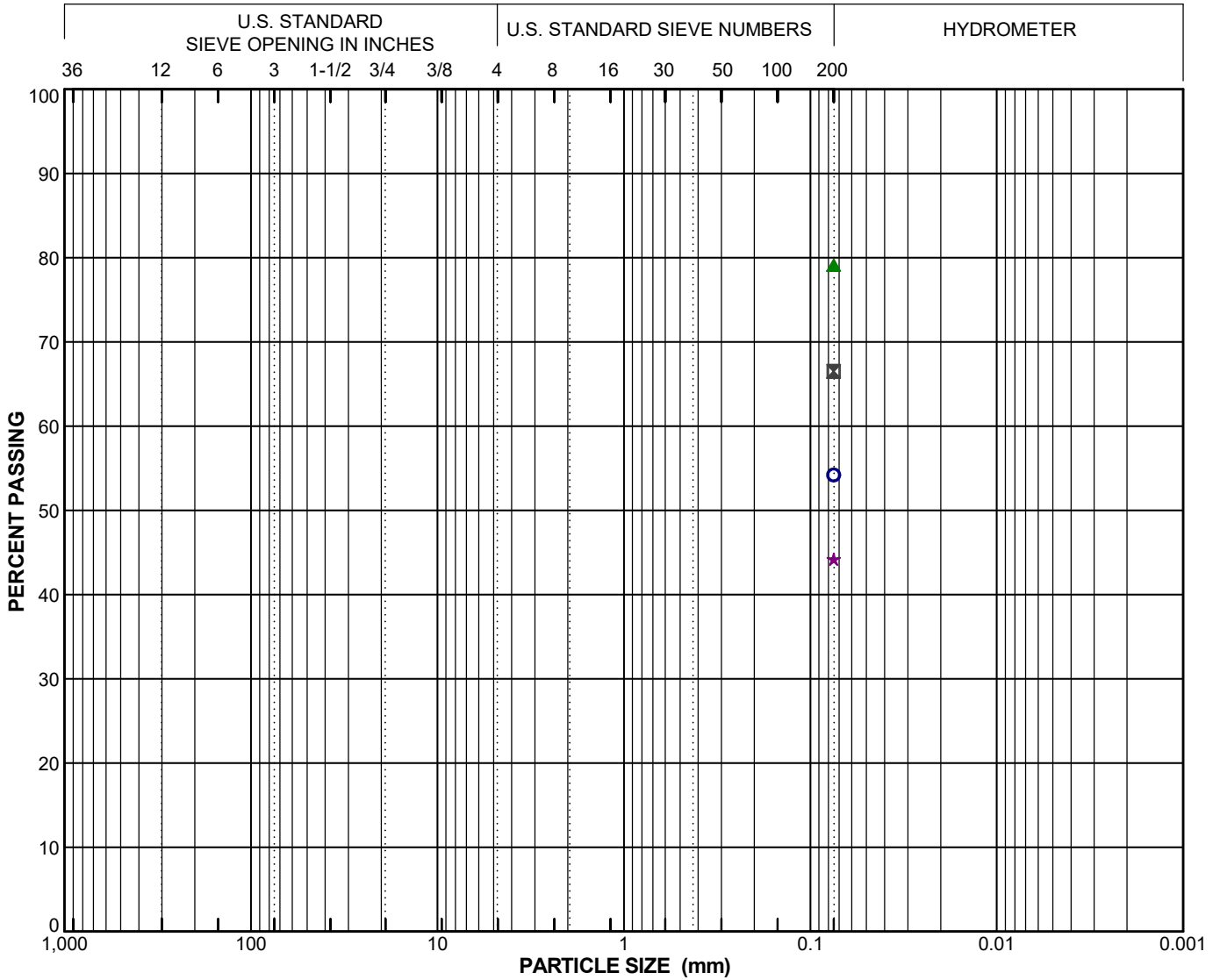
California

PROJECT NO. 22026-88



NMG Geotechnical, Inc.

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	



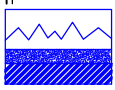
Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2 μ	C _u	C _c	Passing No. 200 Sieve (%)	Passing 2 μ (%)	USCS
○	H-6	D-3	7.5	9						54		ML
⊠	H-6	D-4	10.0	12	25	9				67		CL
▲	H-6	D-5	15.0	13						79		ML
★	P3	D2	5.0	4						44		SM

PARTICLE SIZE DISTRIBUTION

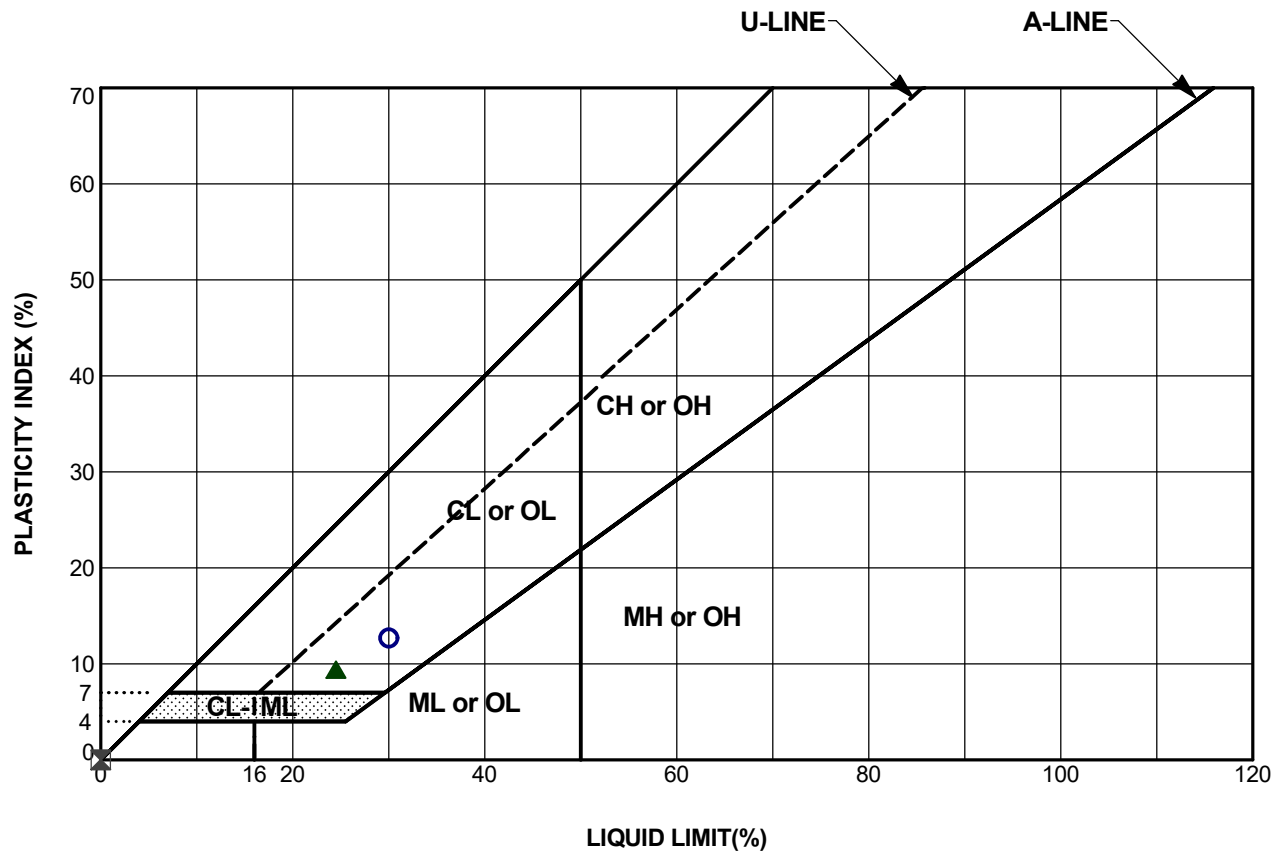
SA Geo / Meritage La Sierra (23145-01)

California

PROJECT NO. 22026-88

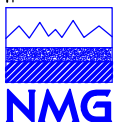


NMG Geotechnical, Inc.

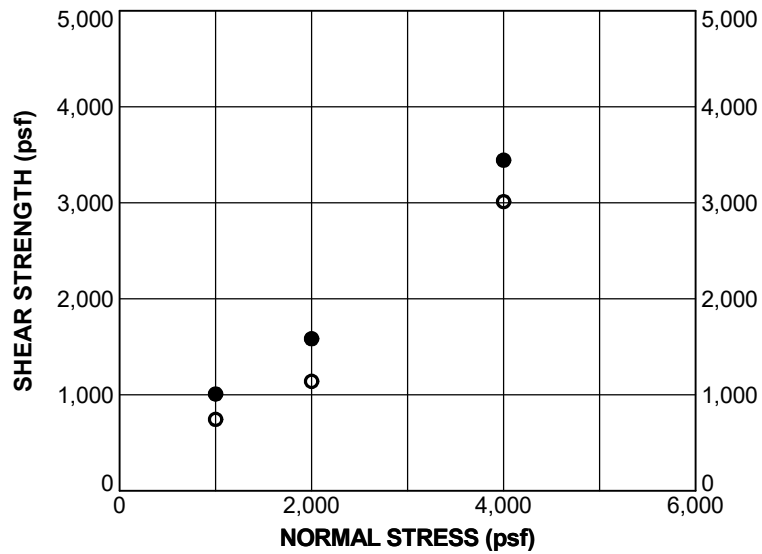
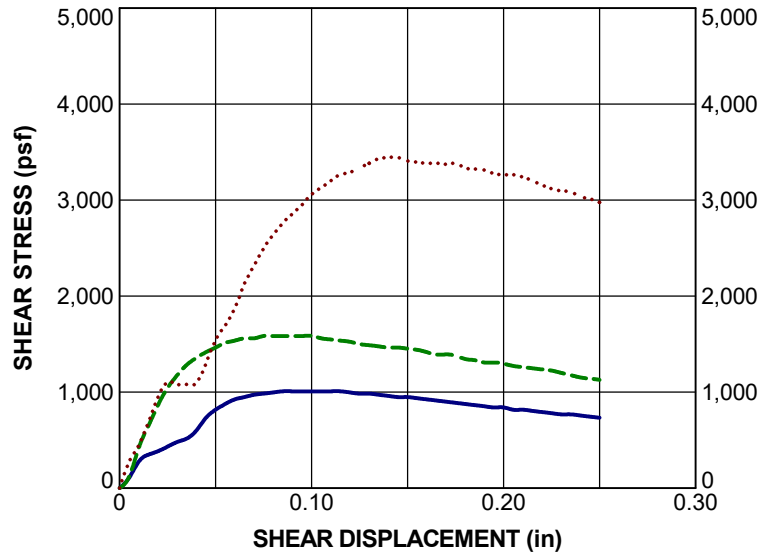


Symbol	Boring Number	Sample Number	Depth (feet)	Passing No. 200 Sieve (%)	LL	PI	USCS	Description
○	H-2	B-1	0.0 - 5.0	63	30	13	CL	Brown silty CLAY
⊠	H-5	B-1	0.0 - 5.0	30	NP	NP	SM	Dark yellowish brown silty SAND
▲	H-6	D-4	10.0	67	25	9	CL	Dark yellowish brown sandy CLAY

PLASTICITY CHART
 SA Geo / Meritage La Sierra (23145-01)
 California
 PROJECT NO. 22026-88



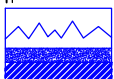
N = 1,000 psf ———
 N = 2,000 psf - - - -
 N = 4,000 psf ·····



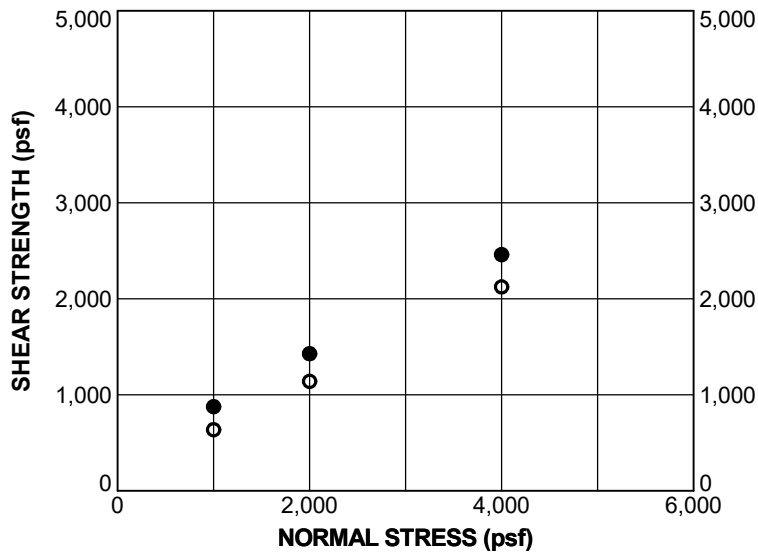
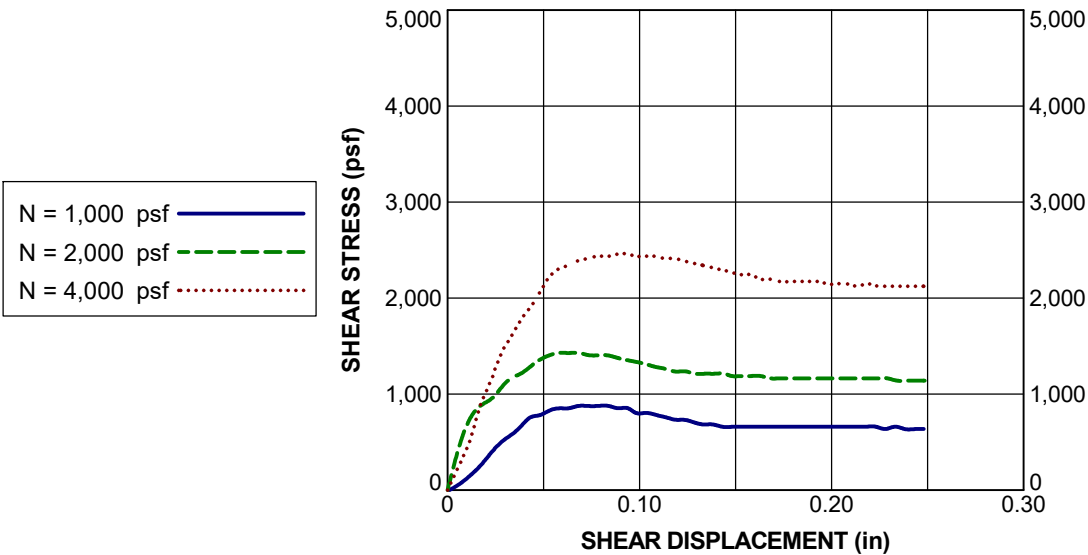
Boring No. H-4		Sample No. D-2		Depth: 5.0 ft	
Sample Description: Light yellowish brown sandy CLAY				USCS: CL	
Liquid Limit:		Plasticity Index:		Percent Passing No. 200 Sieve:	
Final Moisture Content (%):	25.5	Final Dry Density (pcf):	112.2	Degree of Saturation (%):	100
Sample Type: Undisturbed			Rate of Shear (in./min.): 0.005		

SHEAR STRENGTH PARAMETERS		
Parameter	Peak ●	Ultimate ○
Cohesion (psf)	100	0
Friction Angle (degrees)	39	32

DIRECT SHEAR TEST RESULTS
 SA Geo / Meritage La Sierra (23145-01)
 California
 PROJECT NO. 22026-88



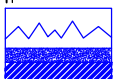
Geotechnical, Inc.

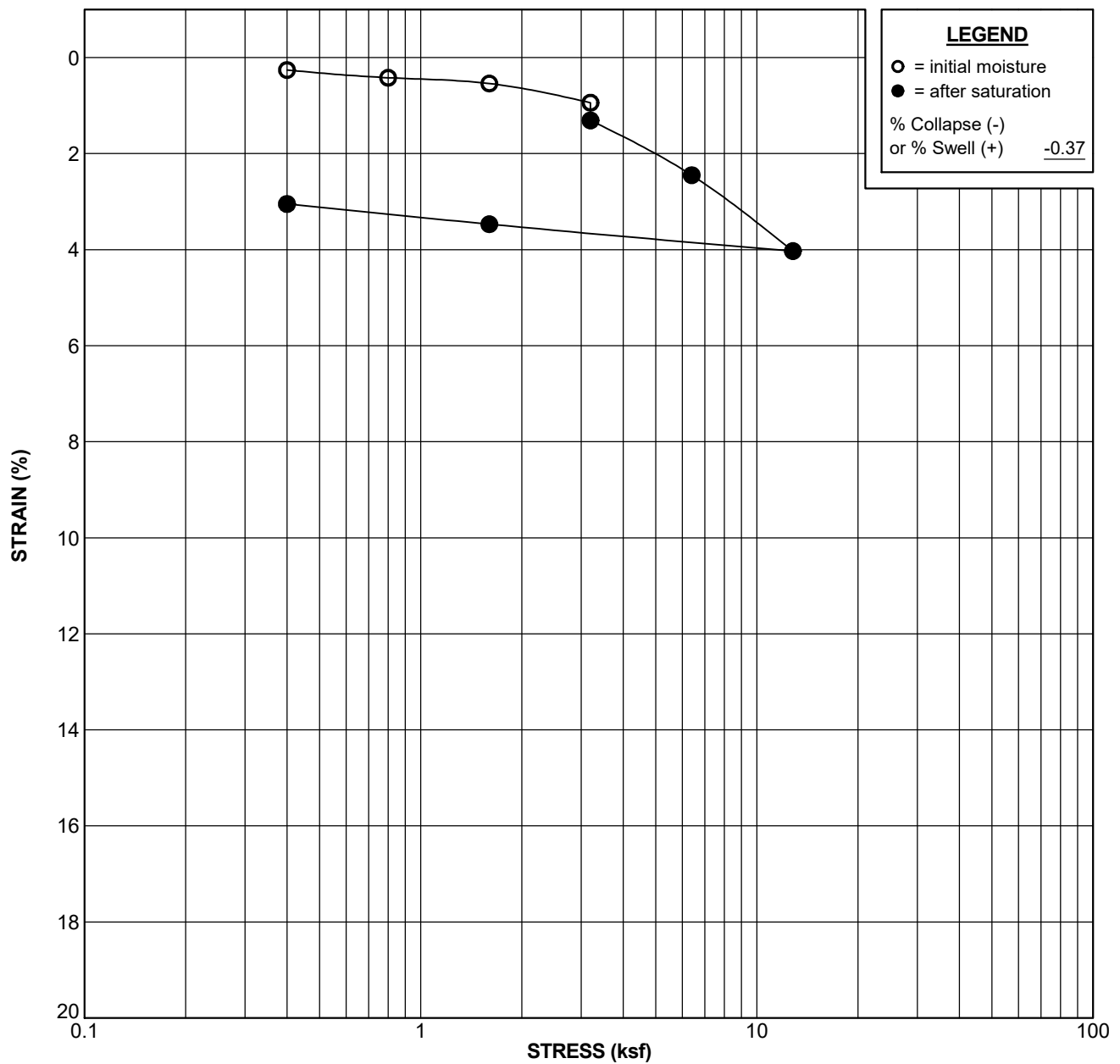


Boring No. H-5		Sample No. B-1		Depth: 0.0 - 5.0 ft	
Sample Description: Dark yellowish brown silty SAND				USCS: SM	
Liquid Limit:	NP	Plasticity Index:	NP	Percent Passing No. 200 Sieve:	30
Final Moisture Content (%):	14.7	Final Dry Density (pcf):	118.8	Degree of Saturation (%):	99
Sample Type: Remolded to 90% RC		Rate of Shear (in./min.):		0.05	

SHEAR STRENGTH PARAMETERS		
Parameter	Peak ●	Ultimate ○
Cohesion (psf)	350	150
Friction Angle (degrees)	28	27

DIRECT SHEAR TEST RESULTS
 SA Geo / Meritage La Sierra (23145-01)
 California
 PROJECT NO. 22026-88





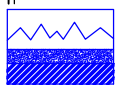
Boring No. H-3		Sample No. D-2		Depth: 5.0 ft	
Sample Description: Dark yellowish brown sandy SILT/silty SAND				USCS: ML/SM	
Liquid Limit:		Plasticity Index:		Percent Passing No. 200 Sieve: 50	
Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio	
Initial	7.3	115.2	44.8	0.430	
Final	14.6	118.7	99.4	0.388	

CONSOLIDATION TEST RESULTS

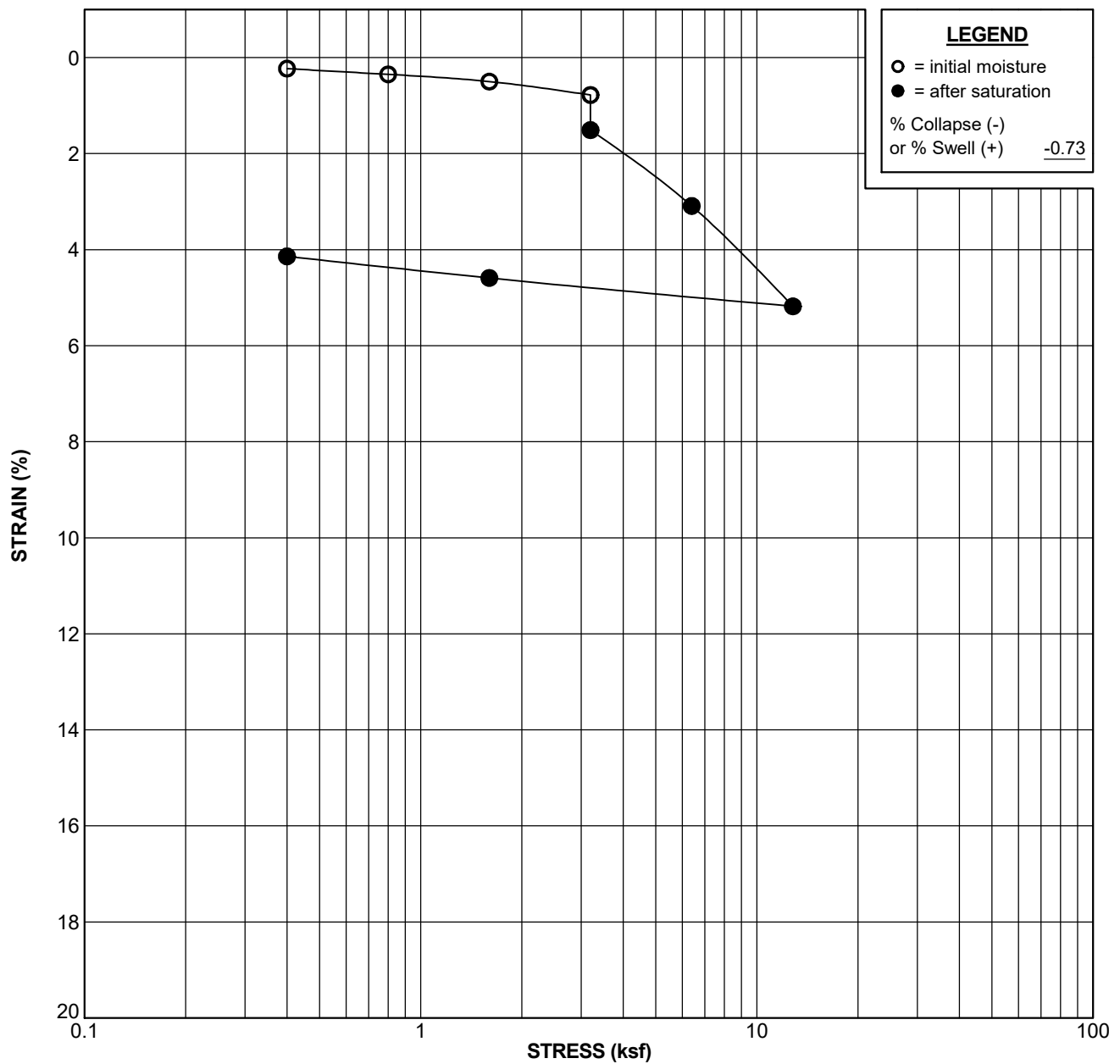
SA Geo / Meritage La Sierra (23145-01)

California

PROJECT NO. 22026-88



NMG Geotechnical, Inc.



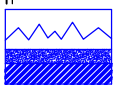
Boring No. H-6		Sample No. D-2		Depth: 5.0 ft	
Sample Description: Dark yellowish brown silty SAND				USCS: SM	
Liquid Limit:		Plasticity Index:		Percent Passing No. 200 Sieve: 46	
Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio	
Initial	7.3	110.6	41.0	0.461	
Final	15.5	115.1	99.3	0.404	

CONSOLIDATION TEST RESULTS

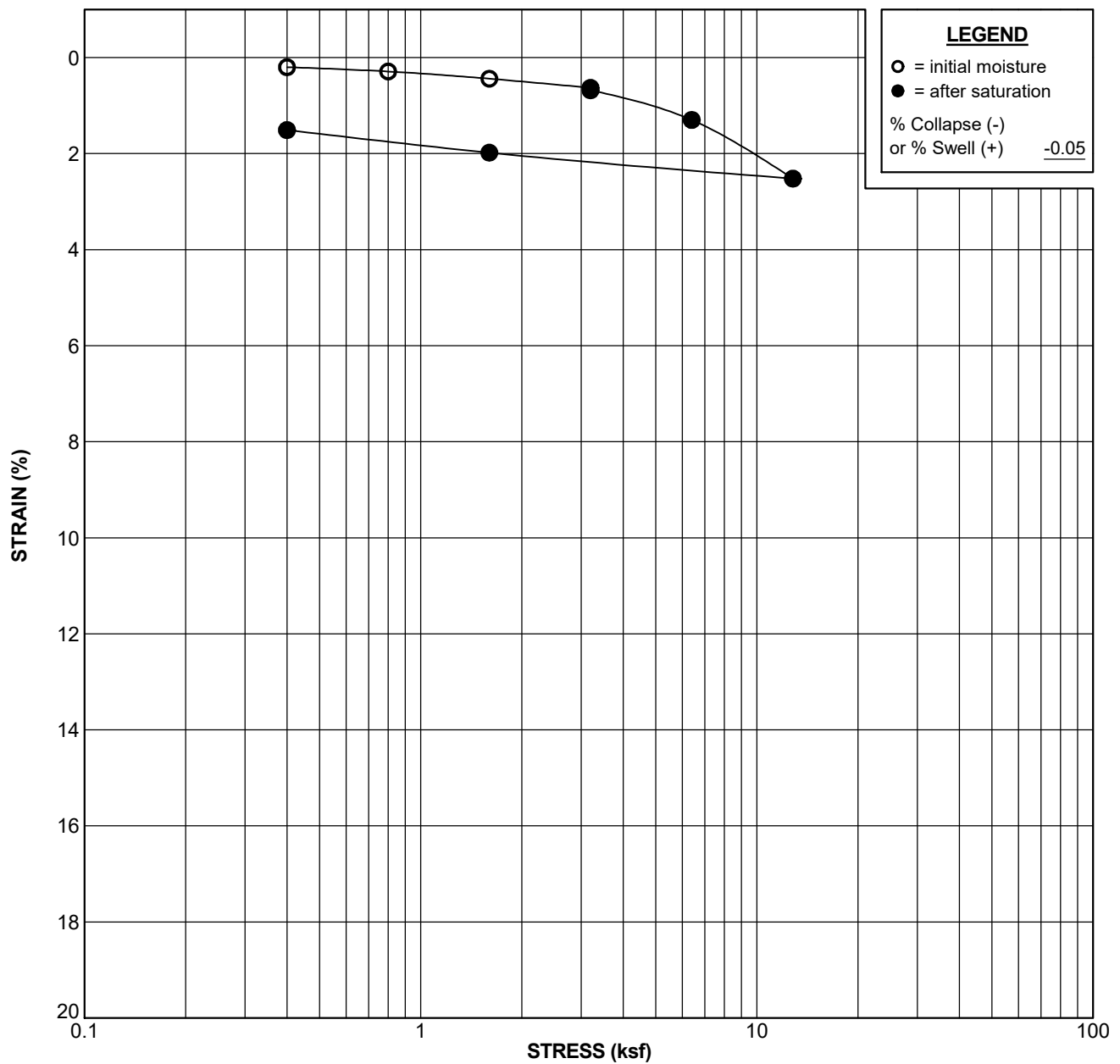
SA Geo / Meritage La Sierra (23145-01)

California

PROJECT NO. 22026-88



NMG Geotechnical, Inc.



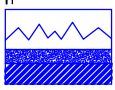
Boring No. H-6		Sample No. D-3		Depth: 7.5 ft	
Sample Description: Dark yellowish brown sandy SILT				USCS: ML	
Liquid Limit:		Plasticity Index:		Percent Passing No. 200 Sieve: 54	
Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio	
Initial	9.0	119.4	60.2	0.401	
Final	14.1	121.2	99.5	0.380	

CONSOLIDATION TEST RESULTS

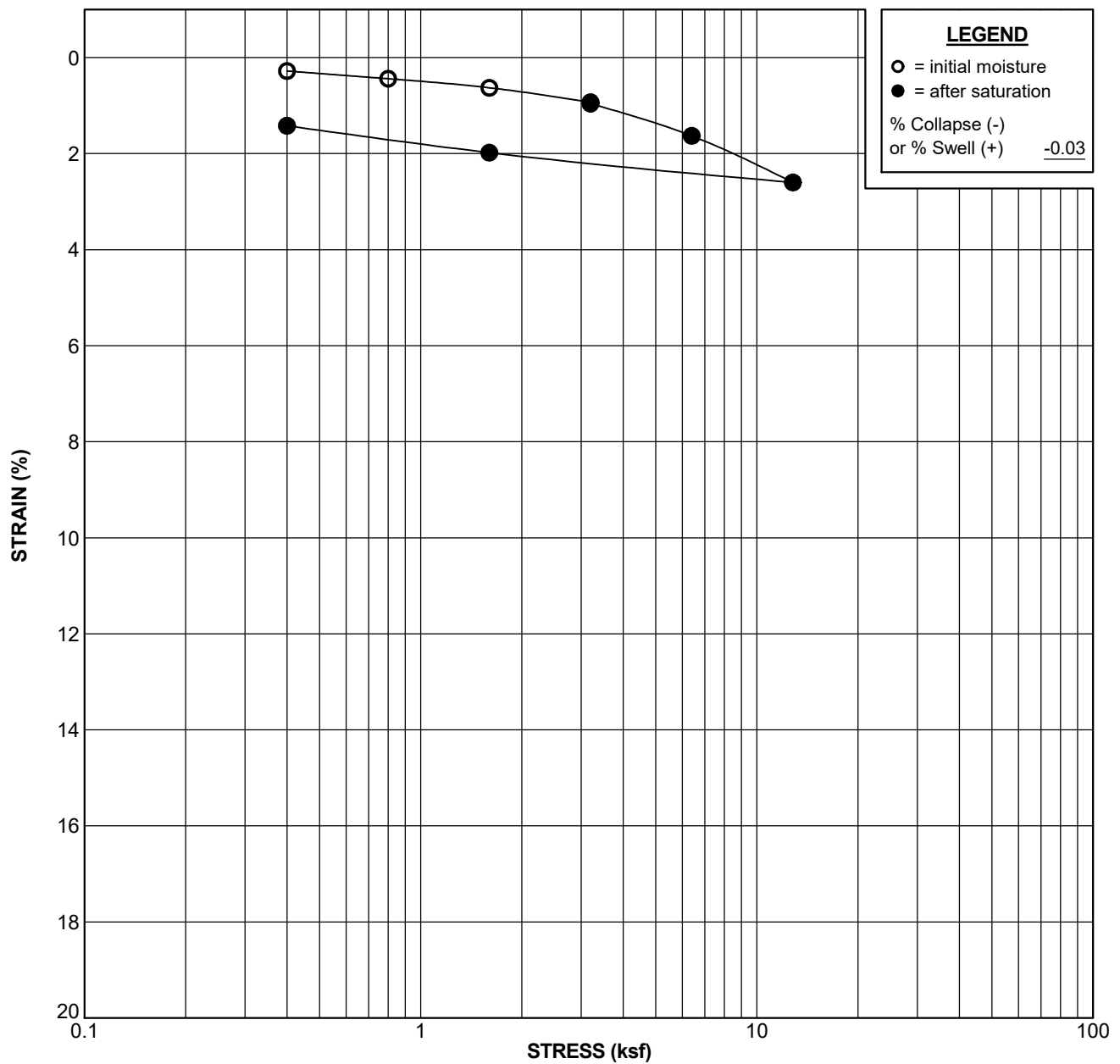
SA Geo / Meritage La Sierra (23145-01)

California

PROJECT NO. 22026-88



NMG Geotechnical, Inc.



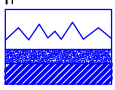
Boring No. H-6		Sample No. D-5		Depth: 15.0 ft	
Sample Description: Dark yellowish brown sandy SILT				USCS: ML	
Liquid Limit:		Plasticity Index:		Percent Passing No. 200 Sieve: 79	
Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio	
Initial	13.5	116.0	78.0	0.474	
Final	16.4	117.6	99.0	0.454	

CONSOLIDATION TEST RESULTS

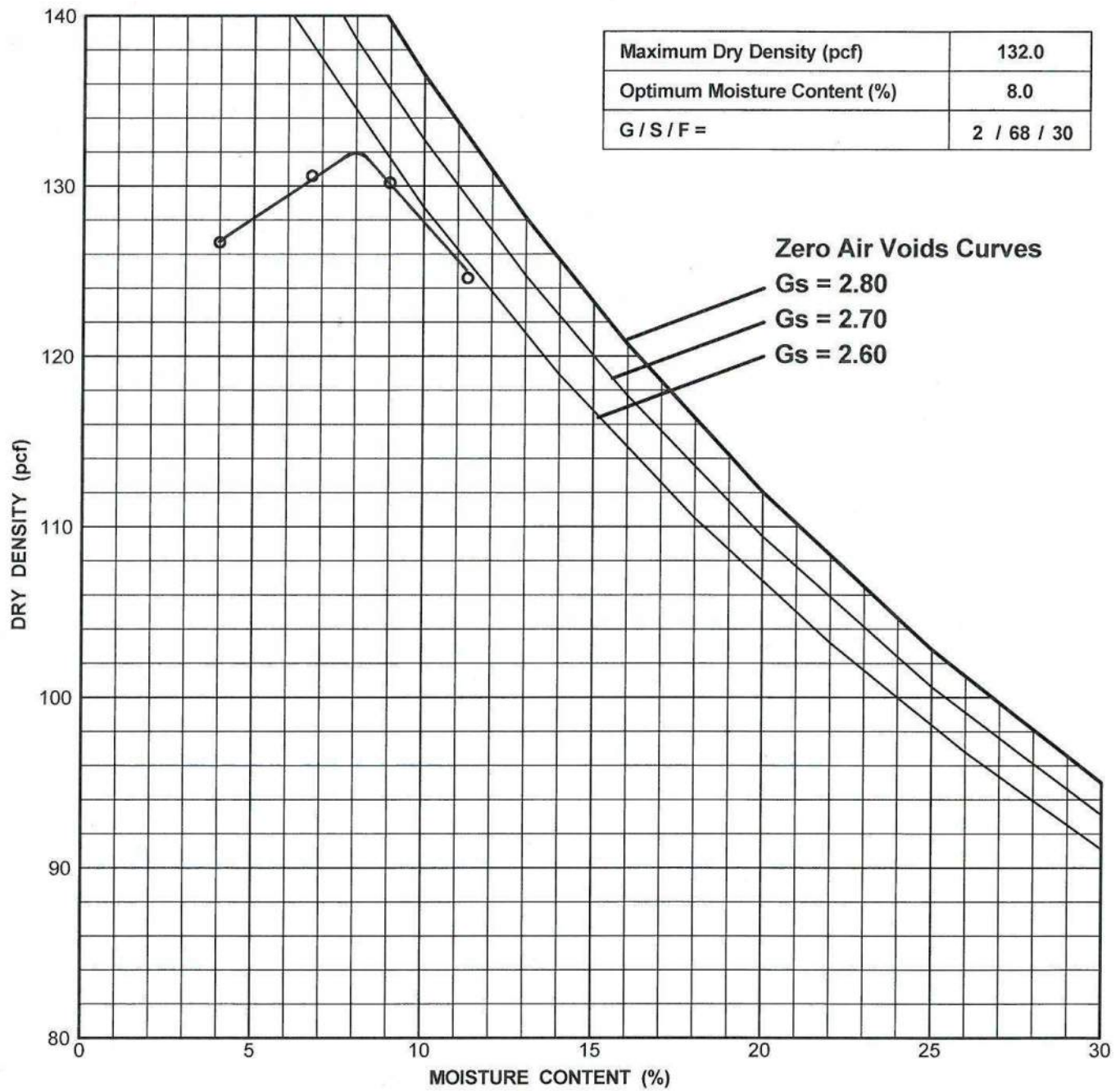
SA Geo / Meritage La Sierra (23145-01)

California

PROJECT NO. 22026-88



NMG Geotechnical, Inc.



COMPACTION TEST RESULTS

SA Geo / Meritage La Sierra (23145-01)

California

PROJECT NO. 22026-88



Geotechnical, Inc.

R-VALUE TEST DATA CTM 301 / ASTM D2844

Project: SA Geo/La Sierra	Project No: 22026-88	Date: 12/19/2023
Boring Trench No: H-4	Sample No: B-1	Sample Depth: 0-5'
Field Description: SM		
Lab Description: Dark reddish brown sandy SILT/silty SAND		

Specimen Number	1	2	3	4
Mold Number	1	2	3	
Water Adjustment (g)	+80	+92	+107	
Compactor Pressure (psi)	350	350	175	
Exudation Pressure (psi)	500	365	130	
Gross Weight (g)	3211.5	3278.3	3266.3	
Mold Tare (g)	2094.9	2114.1	2098.8	
Wet Weight (g)	1116.6	1164.2	1167.5	
Sample Height (in)	2.41	2.53	2.56	
Initial Dial Reading	0.0514	0.0410	0.0610	
Final Dial Reading	0.0523	0.0412	0.0611	
Expansion (in x10 ⁻⁴)	9	2	1	
Stability(psi) at 2,000 lbs (160 psi)	28 50	48 94	62 128	
Turns Displacement	3.92	4.80	4.68	
R-Value Uncorrected	58	27	12	
R-Value Corrected	55	27	12	
Moisture Content (%)	9.0	9.9	11.1	
Dry Density (pcf)	128.8	126.9	124.4	
Assumed Traffic Index	4.0	4.0	4.0	
G.E. by Stability	0.46	0.75	0.90	
G.E. by Expansion	0.30	0.07	0.03	
G _f	1.25			

Moisture Content				
Dish No.	ZZ	A	Q	
Weight of Moist Soil and Dish (g)	295.5	315.5	319.7	
Weight of Dry Soil and Dish (g)	275.2	291.7	292.8	
Water Loss (g)	20.3	23.8	26.9	
Weight of Dish (g)	50.3	50.1	50.3	
Dry Soil (g)	224.9	241.6	242.5	
Moisture Content (%)	9.0	9.9	11.1	

R-Value by Exudation = 18
 R-Value by Expansion = 57
 R-Value at Equilibrium = 18 by Exudation

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301 and/or ASTM Standard D2844

Remarks: A traffic index of 4.0 was used for calculation purposes.
 Set up by: AZE BAJ Run by: BAJ TG
 Calculated by: BAJ Checked by: BAJ Date Completed: 12/20/2023

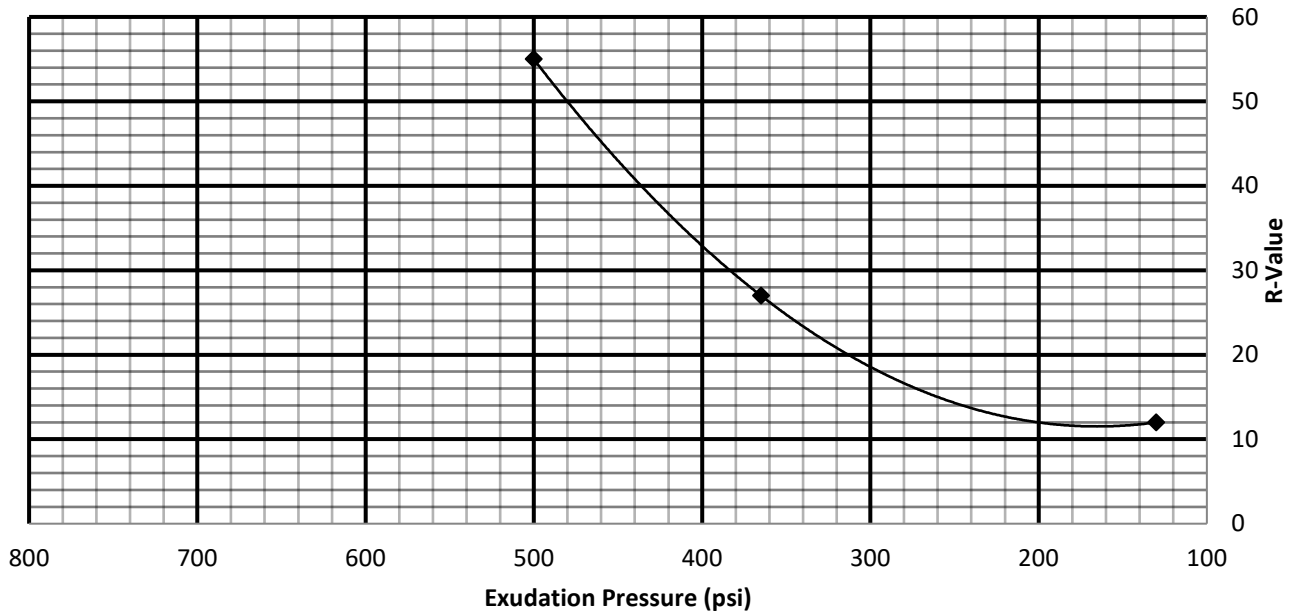


NMG
 Geotechnical, Inc.

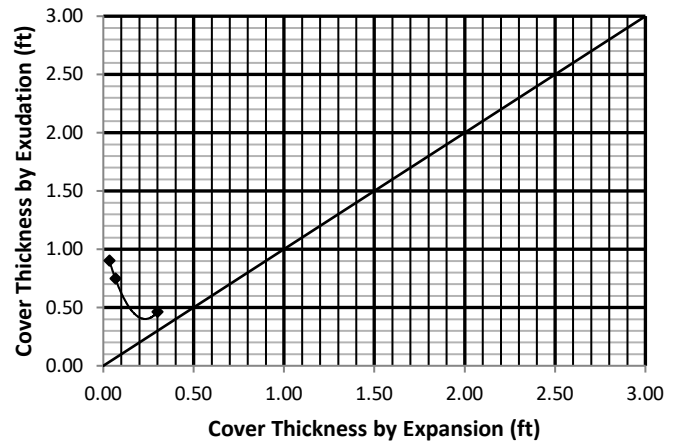
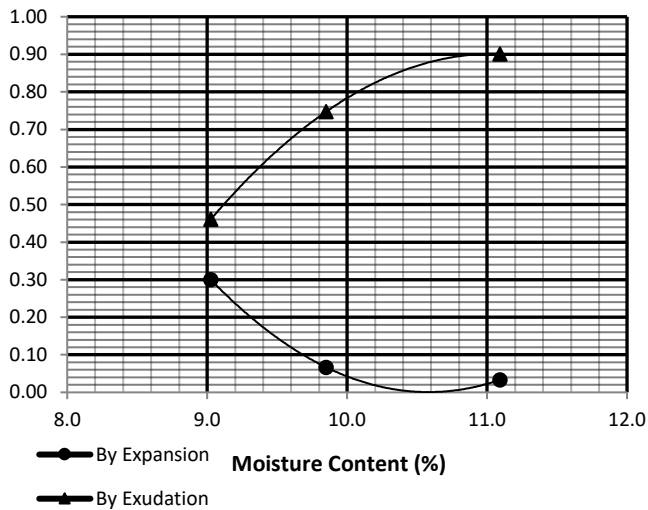
R-VALUE GRAPHICAL PRESENTATION

Project: SA Geo/La Sierra	Project No: 22026-88	Date: 12/19/2023
Boring Trench No: H-4	Sample No: B-1	Sample Depth: 0-5'
Field Description: SM		
Lab Description: Dark reddish brown sandy SILT/silty SAND		

R-Value vs. Exudation Pressure



Cover Thickness by Expansion and Exudation (ft)



Cover Thickness (ft) = 0.44

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301 and/or ASTM Standard D2844

Remarks: A traffic index of 4.0 was used for calculation purposes.
 Set up by: AZE BAJ Run by: BAJ
 Calculated by: BAJ Checked by: BAJ Date Completed: 12/20/2023



NMG
Geotechnical, Inc.

Appendix D



REPORT
SEISMIC REFRACTION SURVEY

11130 Alhambra Avenue
Riverside, California

GEOVision Project No. 23456

Prepared for

SA Geotechnical, Inc.
1000 N. Coast Highway, Suite 10
Laguna Beach, California 92651
(949) 403-7229

Prepared by

GEOVision, Inc.
1124 Olympic Drive
Corona, CA 92881
(951) 549-1234

Report 23456-01 Rev 0

December 21, 2023

TABLE OF CONTENTS

1	INTRODUCTION.....	1
2	METHODOLOGY.....	3
3	EQUIPMENT AND FIELD PROCEDURES	5
4	DATA REDUCTION AND MODELING.....	6
5	DISCUSSION OF RESULTS.....	7
6	REFERENCES.....	10
7	CERTIFICATION.....	11

LIST OF FIGURES

Figure 1	Site Map.....	2
Figure 2	Line 1 P-wave Seismic Refraction Model	8
Figure 3	Line 2 P-wave Seismic Refraction Model	9

1 INTRODUCTION

A P-wave seismic refraction survey was conducted at the property located at 11130 Alhambra Avenue, Riverside, California on December 13, 2023. The purpose of this investigation was to determine the rippability of the Mesozoic crystalline rock at the site. P-wave seismic refraction data was acquired along two profiles, designated as Lines 1 and 2 (Figure 1).

Depending on the degree of weathering, jointing, etc., granitic rock may broadly be characterized as rippable using a Caterpillar D8R, D9R, and D10R ripper at P-wave velocities less than 5,800, 6,800, and 7,200 ft/s, respectively (Caterpillar, 2018). Granitic rock is expected to be marginally rippable by a D8R, D9R, and D10R between a P-wave velocity of 5,800 and 8,000 ft/s, 6,800 and 8,000 ft/s, and 7,200 and 8,500 ft/s, respectively, and nonrippable at higher seismic velocities (Caterpillar, 2018).

The following sections include a discussion of equipment and field procedures, methodology, data processing, and results of the geophysical survey.

2 METHODOLOGY

Detailed discussions of the seismic refraction method can be found in Telford et al. (1990), Dobrin and Savit (1988), and Redpath (1973).

When conducting a seismic survey, acoustic energy is input to the subsurface by an energy source such as a sledgehammer impacting a metallic plate, weight drop, vibratory source, or explosive charge. The acoustic waves propagate into the subsurface at a velocity dependent upon the elastic properties of the material through which they travel. When the waves reach an interface where the density or velocity changes significantly, a portion of the energy is reflected to the surface and the remainder is transmitted into the lower layer. Where the velocity of the lower layer is higher than that of the upper layer, a portion of the energy is also critically refracted along the interface. Critically refracted waves travel along the interface at the velocity of the lower layer and continually refract energy back to the surface. Receivers (geophones) laid out in linear array on the surface record the incoming refracted and reflected waves. The seismic refraction method involves analysis of the travel times of the first energy to arrive at the geophones. These seismic first arrivals are from either the direct wave (at geophones close to the source) or critically refracted waves (at geophones further from the source).

Analysis of seismic refraction data depends upon the complexity of the subsurface velocity structure. If the subsurface target is planar then the slope intercept method (Telford et al., 1990) can be used to model multiple horizontal or dipping planar layers. A minimum of one end shot is required to model horizontal layers and reverse end shots are required to model dipping planar layers. If the subsurface target is undulating (i.e. bedrock valley) then layer based analysis routines such as the generalized reciprocal method (Palmer, 1980 and 1981, Lankston and Lankston, 1986 and Lankston, 1990); reciprocal method (Hawkins, 1961) also referred to as the ABC method; Hales' method (Hales, 1958); delay time method (Wyrobek, 1956 and Gardner, 1967); time-term inversion (Scheidegger and Willmore, 1959); plus-minus method (Hagedoorn, 1959); and wavefront method (Rockwell, 1967) are preferred to model subsurface velocity structure. These methods generally require a minimum of 5 shot points per spread (end shots, off end shots and a center shot). If subsurface velocity structure is complex and cannot be adequately modeled using layer-based modeling techniques (e.g., complex weathering profile in bedrock, numerous lateral velocity variations), then Monte Carlo or tomographic inversion techniques (Zhang and Toksoz, 1998; Schuster and Quintus-Bosz, 1993) are required to model the seismic refraction data. These techniques require a high shot density; typically, every 3 to 6 stations/geophones.

Errors in seismic refraction models not associated with errors in first arrival data can be caused by blind zones, hidden layers, and lateral velocity variability. A blind zone is a geologic layer with a lower seismic velocity than the overlying layer and, therefore, does not give rise to a seismic refraction. This type of layer, therefore, cannot be recognized or modeled and depths to underlying layers would be overestimated. The presence of blind zones will cause errors in depth averaged seismic velocity or slowness.

A hidden layer is a layer with a velocity increase, but of sufficiently small thickness relative to the velocities of overlying and underlying layers, that refracted arrivals do not arrive at the geophones before those from the deeper, higher velocity layer. Because the seismic refraction method generally only involves the interpretation of first arrivals, a hidden layer cannot be

recognized or modeled and depths to underlying layers would be underestimated. However, it can be demonstrated that the presence of hidden layers does not cause significant errors in depth averaged seismic velocity or slowness, such as the average velocity of the upper 100 ft. A subsurface velocity structure that increases as a function of depth rather than as discrete layers, will also cause depths to subsurface refractors to be underestimated, in a manner very similar to that of the hidden layer problem.

Lateral velocity variability within a layer that is not characterized by the modeling scheme utilized for analysis will also result in depth errors to underlying layers. Additionally, at sites with steeply dipping or highly irregular bedrock surfaces, out-of-plane refractions (refractions from structures to the side of the line rather than from beneath the line) may severely complicate modeling. Tomographic inversion techniques can often resolve the complex velocity structures associated with hidden layers, velocity gradients and lateral velocity variations. However, in the event of an abrupt increase in velocity at a geologic horizon, the velocity model generated using tomographic inversion routines will smooth the horizon with velocity being underestimated at the interface and possibly overestimated at depth.

3 EQUIPMENT AND FIELD PROCEDURES

Seismic refraction equipment used during this investigation consisted of two Geometrics Geode 24-channel signal enhancement seismographs, 10 Hz vertical geophones, seismic cables with 10-foot spaced connectors, piezo hammer switches, and a 20-lb sledgehammer with an aluminum strike plate.

The locations of the seismic refraction profiles were established by SA Geotechnical, Inc. Seismic Lines 1 and 2 consisted of 42 and 48 geophones spaced 5 feet apart for line lengths of 205 and 235 feet, respectively. All geophone and shot point locations along each line were measured using a 300-foot tape measure. Elevations along each seismic refraction line were surveyed using a Trimble R10 GPS system with CenterPoint RTX real-time differential corrections.

Source locations included end shots at each end geophone, off-end shot locations as possible, and interior shot locations at nominal 15 to 30 ft intervals for a total of 12 to 15 source locations per line. The 20-lb sledgehammer was used as the energy source for all source locations. A hammer switch mounted on the hammer was used to trigger the seismograph upon impact with the aluminum plate. The final seismic record at each shot point was the result of stacking 8 to 13 shots to increase the signal to noise ratio. All seismic records were stored on a laptop computer. Data acquisition parameters, file names, and other observations were recorded on a field log, which is retained in project files.

4 DATA REDUCTION AND MODELING

The first step in data processing consisted of picking the arrival time of the first energy (first arrival) received at each geophone for each shot point. The first arrivals on each seismic record are either a direct arrival from a compressional (P) wave traveling in the uppermost layer or a refracted arrival from a subsurface interface where there is a velocity increase. First-arrival times were selected using the manual picking routines in the SeisImager™ software suite (Geometrics, Inc.). These first-arrival times were saved in an ASCII file containing shot location, geophone locations, and associated first-arrival time. Errors in the first-arrival times were variable with error generally increasing with distance from the shot point. Elevations for each geophone location were calculated from the GPS data.

Seismic refraction data were then modeled using the tomographic analysis technique available in the SeisImager™ Plotrefa software package. Refraction tomography techniques are often able to resolve complex velocity structure (e.g., velocity gradients) that can be observed in bedrock weathering profiles. Layer-based modeling techniques such as the GRM are more applicable to characterize geologic structure that exhibits layering (e.g., low velocity sediments over high velocity rock). It should be noted, however, that tomographic modeling techniques will generate a velocity model with a gradual increase in velocity with depth even though an abrupt velocity increase may be present.

Tomographic analysis was conducted as outlined in the following steps. A smooth velocity gradient initial model was developed covering the expected velocity range in weathered rock at the site. The initial model had 18 layers with the top of the bottom layer at a depth related to the effective depth of investigation of the model. Velocity ranges were also set to values outside of the starting model minimum and maximum. The velocity models were extended to permit the use of off-end shot points during the inversion, as applicable. A minimum of 10 iterations of non-linear raypath inversion were then implemented to model the seismic data. The starting model parameters were then adjusted, as necessary, and the modeling process repeated until an acceptable fit between observed and calculated first arrival data was achieved.

The final tomographic velocity models for the seismic line were exported as ASCII files and imported into the Golden Software Surfer® mapping system where the velocity model was gridded, contoured, and annotated for presentation.

5 DISCUSSION OF RESULTS

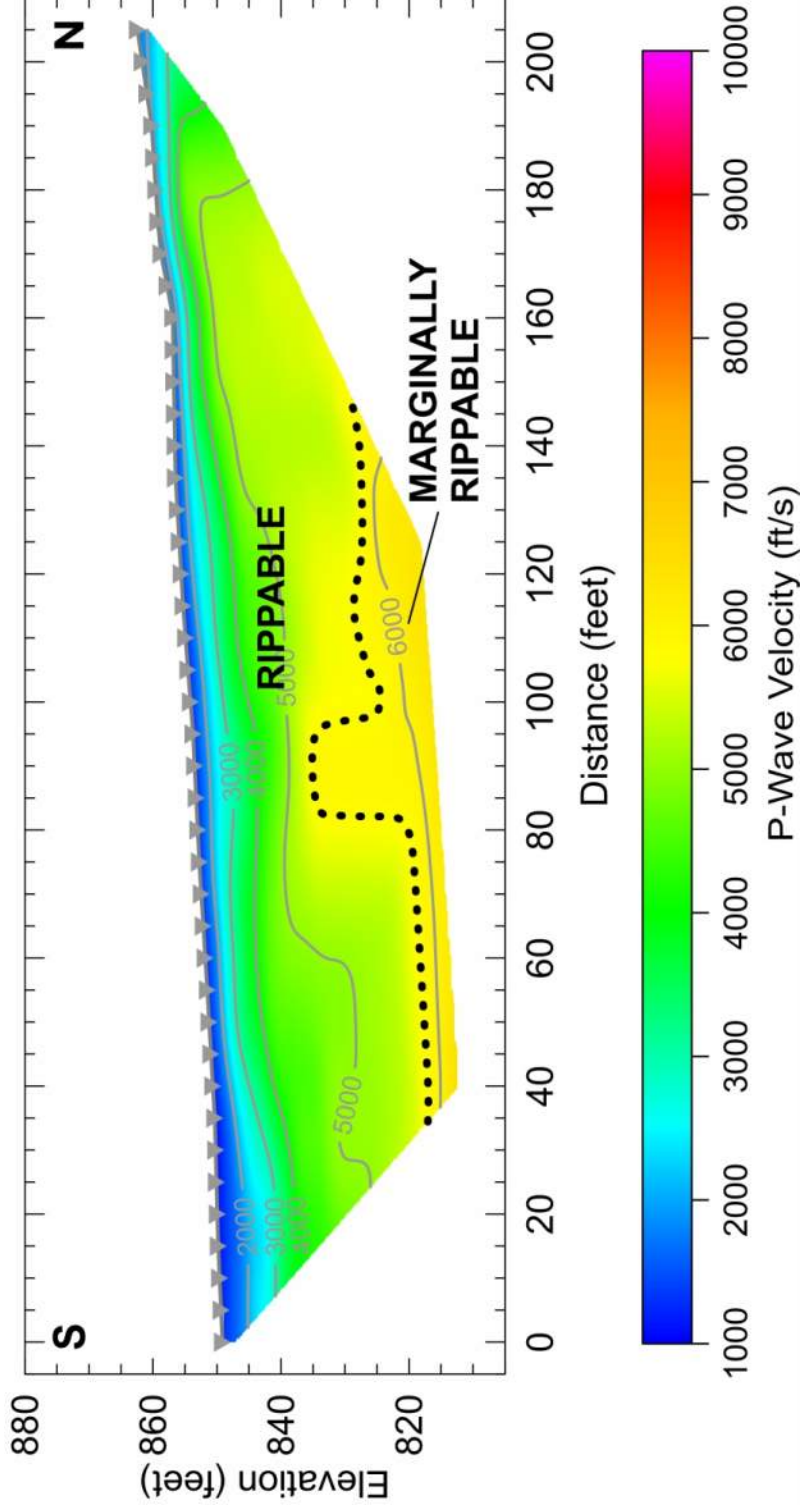
The P-wave seismic refraction models for Lines 1 and 2 are presented as Figures 2 and 3, respectively. A color scheme with blue-cyan, green-orange, and red-magenta representing low, intermediate, and high P-wave velocities, respectively, and velocity contours at 1,000 ft/s intervals are used to display the seismic velocity model. The depth of investigation for Lines 1 and 2 is about 35 and 70 feet, respectively.

Tomographic inversion techniques will typically model a gradual increase in seismic velocity with depth even if an abrupt velocity contact is present. Velocity gradients are, however, common in weathered rock geologic environments, such as the project site.

For the purpose of discussion, we assume that a Caterpillar D8R Ripper, or equivalent, will be used on site. Granitic rock with P-wave velocity of less than about 5,800 ft/s is considered rippable by a D8R assuming that the rock is sufficiently fractured and jointed. Granitic rock with P-wave velocity between about 5,800 and 8,000 ft/s is considered marginally rippable by a D8R, although it may be more cost effective to blast rather than rip rock in this velocity range. Granitic rock with P-wave velocity greater than 8,000 ft/s is considered nonrippable by a D8R.

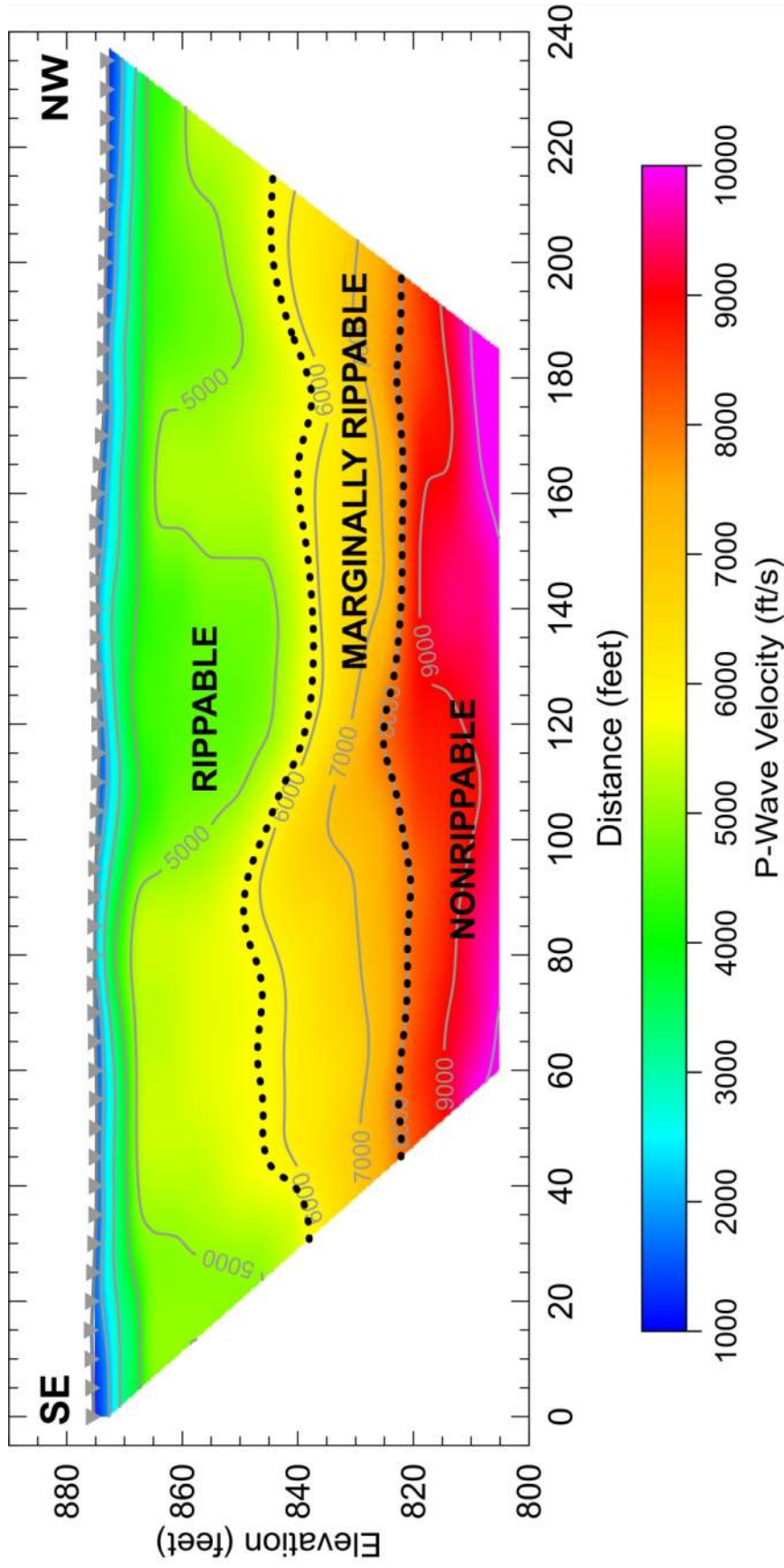
P-wave velocity increases with depth beneath Line 1 (Figure 2) from about 1,250 to 2,000 ft/s at the surface to over 6,000 ft/s at a depth between about 30 and 35 ft. The rock is expected to be rippable by a D8R to a depth of about 18 to 32 ft and then marginally rippable to a depth of over 35 ft.

P-wave velocity increases with depth beneath Line 2 (Figure 3) from about 1,250 to 2,000 ft/s at the surface to over 9,000 ft/s at a depth between about 55 and 65 ft. The rock is expected to be rippable by a D8R to a depth of about 25 to 35 ft and then marginally rippable to a depth of about 50 and 55 ft. The granitic rock is considered nonrippable below a depth of 50 to 55 ft.



GEOVision geophysical services	
Project No:	23456
Date:	DEC 21, 2023
Drawn By:	A MARTIN
Approved By:	<i>Aubrey Martin</i>
<small>R:\CV\Projects\2023\2456 SA Geotechnical\Report\Figure 2.dwg</small>	

FIGURE 2 LINE 1 P-WAVE SEISMIC REFRACTION MODEL	
11130 ALHAMBRA AVENUE RIVERSIDE, CALIFORNIA	
PREPARED FOR SA GEOTECHNICAL, INC.	



GEOS <i>geophysical services</i>	
Project No:	23456
Date:	DEC 21, 2023
Drawn By:	A MARTIN
Approved By:	<i>Aubrey Martin</i>
<small>R:\CV\Projects\2023\23456 SA Geotechnical Report\Figure 3.txd</small>	

FIGURE 3
LINE 2 P-WAVE SEISMIC REFRACTION MODEL

11130 ALHAMBRA AVENUE
RIVERSIDE, CALIFORNIA

PREPARED FOR
SA GEOTECHNICAL, INC.

6 REFERENCES

- Caterpillar Performance Handbook, 2018, 48th Edition, A publication by Caterpillar, Peoria, Illinois, U.S.A.
- Dobrin, M.S., and Savit, J., 1988, Introduction to Geophysical Prospecting, McGraw-Hill Co., New York.
- Gardner, L.W., 1967, Refraction seismograph profile interpretation, in Musgrave, A.W., ed., Seismic Refraction Prospecting: Society of Exploration Geophysicists, p. 338-347.
- Hagedoorn, J.G., 1959, The plus-minus method of interpreting seismic refraction sections, *Geophysical Prospecting*, v. 7, p. 158-182.
- Hales, F. W., 1958, An accurate graphical method for interpreting seismic refraction lines, *Geophysical Prospecting*, v. 6, p. 285-294.
- Hawkins, L. V., 1961, The reciprocal method of routine shallow seismic refraction investigation: *Geophysics*, v. 26, p. 806-819.
- Lankston, R. W., 1990, High-resolution refraction seismic data acquisition and interpretation, in Ward, S. H., ed., Geotechnical and Environmental Geophysics, Volume I: Review and Tutorial: Society of Exploration Geophysicists, Tulsa, Oklahoma, p. 45-74.
- Lankston, R. W., and Lankston, M. M., 1986, Obtaining multilayer reciprocal times through phantoming, *Geophysics*, v. 51, p. 45-49.
- Palmer, D., 1980, The generalized reciprocal method of seismic refraction interpretation, Society of Exploration Geophysics, Tulsa, Oklahoma, p. 104.
- Palmer, D., 1981, An introduction to the field of seismic refraction interpretation, *Geophysics*, v. 46, p. 1508-1518.
- Redpath, B. B., 1973, Seismic refraction exploration for engineering site investigations: U. S. Army Engineer Waterway Experiment Station Explosive Excavation Research Laboratory, Livermore, California, Technical Report E-73-4, 51 p.
- Rockwell, D.W., 1967, General Wavefront Method, in Musgrave, A.W., ed., Seismic Refraction Prospecting: Society of Exploration Geophysicists, p. 363-415.
- Scheidegger, A., and Willmore, P.L., 1957, The use of a least square method for the interpretation of data from seismic surveys, *Geophysics*, v. 22, p. 9-22.
- Schuster, G. T. and Quintus-Bosz, A., 1993, Wavepath eikonal traveltime inversion: Theory: *Geophysics*, v. 58, no. 9, p. 1314-1323.
- Telford, W. M., Geldart, L.P., Sheriff, R.E., 1990, Applied Geophysics, Second Edition, Cambridge University Press.
- Wyrobek, S.M., 1956, Application of delay and intercept times in the interpretation of multilayer time distance curves, *Geophysical Prospecting*, v. 4, p 112-130.
- Zhang, J. and Toksoz, M. N., 1998, Nonlinear refraction traveltime tomography, *Geophysics*, v. 63, p. 1726-1737.

7 CERTIFICATION

All geophysical data, analysis, interpretations, conclusions, and recommendations in this document have been prepared under the supervision of and reviewed by a **GEOVision** California Professional Geophysicist.

Reviewed and approved by,



12/21/2023

Antony J. Martin
California Professional Geophysicist, P. Gp. 989
GEOVision Geophysical Services

Date

- * This geophysical investigation was conducted under the supervision of a California Professional Geophysicist using industry standard methods and equipment. A high degree of professionalism was maintained during all aspects of the project from the field investigation and data acquisition, through data processing, interpretation, and reporting. All original field data files, field notes, observations, and other pertinent information are maintained in the project files and are available for the client to review for a period of at least one year.

A professional geophysicist's certification of interpreted geophysical conditions comprises a declaration of his/her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations, or ordinances

Appendix E

Percolation Data Sheet

Project Name: Meritage/La Sierra

Project Number: 23145-01

Test Hole Number: P-1

Date Excavated: 12/11/2023

Depth (in.): 60

Radius (in.): 4

Date Presoak: 12/11/2023

Tested By: AZ/AC

Pipe Diameter (in.): 3

Date Tested: 12/12/2023

Sandy Soil Criteria

Trial Number	Time	Time Interval (mins.)	Initial Water Level (in.)	Final Water Level (in.)	Δ in Water Level (in.)
1	8:16	10	24	33	9
	8:26				
2	8:26	12	33	40.2	7.2
	8:38				

Percolation Data

Time	Time Interval (mins.)	Total Elapsed Time (mins)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Δ in Water Level (in.)	Percolation Rate (in./hr.)
8:39	10	10	37.8	42.6	4.8	28.8
8:49						
8:49	10	20	36.4	41.6	5.3	31.7
8:59						
8:59	10	30	35.4	41.2	5.8	34.6
9:09						
9:10	10	41	35.4	40.8	5.4	32.4
9:20						
9:21	10	52	36.6	42.0	5.4	32.4
9:31						
9:31	10	62	36.2	42.0	5.8	34.6
9:41						

Initial Height of Water (Ho) = 23.8

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

Final Height of Water (Hf) = 18

$$I_t = 3.0 \text{ in./hr.}$$

Change in Height Over Time (ΔH) = 5.76

$$C \times I_t = 1.5 \text{ in./hr.}$$

Average Head Over Time (Havg) = 20.9

Annulus Gravel/Sand Correction (C) = 0.5

Percolation Data Sheet

Project Name: Meritage/La Sierra

Project Number: 23145-01

Test Hole Number: P-2

Date Excavated: 12/11/2023

Depth (in.): 57

Radius (in.): 4

Date Presoak: 12/11/2023

Tested By: AZ/AC

Pipe Diameter (in.): 3

Date Tested: 12/12/2023

Sandy Soil Criteria

Trial Number	Time	Time Interval (mins.)	Initial Water Level (in.)	Final Water Level (in.)	Δ in Water Level (in.)
1	8:11	6	28.8	37.2	8.4
	8:17				
2	8:17	8	37.2	43.2	6
	8:25				

Percolation Data

Time	Time Interval (mins.)	Total Elapsed Time (mins)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Δ in Water Level (in.)	Percolation Rate (in./hr.)
8:28	10	10	31.2	41.6	10.4	62.6
8:38						
8:38	10	20	31.8	42.0	10.2	61.2
8:48						
8:48	10	30	30.6	41.2	10.6	63.4
8:58						
8:58	10	40	30.0	41.2	11.2	67.0
9:08						
9:09	10	51	30.6	41.4	10.8	64.8
9:19						
9:20	10	62	32.28	41.8	9.5	56.9
9:30						

Initial Height of Water (H_o) = 24.7

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

Final Height of Water (H_f) = 15.2

$$I_t = 5.2 \text{ in./hr.}$$

Change in Height Over Time (ΔH) = 9.5

$$C \times I_t = \mathbf{2.6 \text{ in./hr.}}$$

Average Head Over Time (H_{avg}) = 20.0

Annulus Gravel/Sand Correction (C) = 0.5

Percolation Data Sheet

Project Name: Meritage/La Sierra

Project Number: 23145-01

Test Hole Number: P-3

Date Excavated: 12/11/2023

Depth (in.): 120

Radius (in.): 4

Date Presoak: 12/11/2023

Tested By: AC

Pipe Diameter (in.): 3

Date Tested: 12/12/2023

Sandy Soil Criteria

Trial Number	Time	Time Interval (mins.)	Initial Water Level (in.)	Final Water Level (in.)	Δ in Water Level (in.)
1	10:23	10	58.4	64.7	6.2
	10:33				
2	10:33	20	64.7	74.6	10.0
	10:53				

Percolation Data

Time	Time Interval (mins.)	Total Elapsed Time (mins)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Δ in Water Level (in.)	Percolation Rate (in./hr.)
11:04	10	10	80.4	84.0	3.6	21.6
11:14						
11:15	10	21	84.0	85.2	1.2	7.2
11:25						
11:25	10	31	85.2	87.1	1.9	11.5
11:35						
11:35	10	41	87.1	88.6	1.4	8.6
11:45						
11:47	10	53	81.2	83.6	2.4	14.4
11:57						
12:15	10	81	82.8	85.0	2.2	13.0
12:25						

Initial Height of Water (H_o) = 37.2

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

Final Height of Water (H_f) = 35.0

$$I_t = 0.7 \text{ in./hr.}$$

Change in Height Over Time (ΔH) = 2.2

$$C \times I_t = \mathbf{0.3 \text{ in./hr.}}$$

Average Head Over Time (H_{avg}) = 36.1

Annulus Gravel/Sand Correction (C) = 0.5

Percolation Data Sheet

Project Name: Meritage/La Sierra

Project Number: 23145-01

Test Hole Number: P-4

Date Excavated: 12/11/2023

Depth (in.): 86

Radius (in.): 4

Date Presoak: 12/11/2023

Tested By: AC

Pipe Diameter (in.): 3

Date Tested: 12/12/2023

Sandy Soil Criteria

Trial Number	Time	Time Interval (mins.)	Initial Water Level (in.)	Final Water Level (in.)	Δ in Water Level (in.)
1	10:24	10	43.2	50.16	6.96
	10:34				
2	10:34	10	50.16	56.28	6.12
	10:44				

Percolation Data

Time	Time Interval (mins.)	Total Elapsed Time (mins)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Δ in Water Level (in.)	Percolation Rate (in./hr.)
10:52	10	10	50.4	56.8	6.4	38.2
11:02						
11:04	10	22	52.7	58.1	5.4	32.4
11:14						
11:14	10	32	50.4	56.0	5.6	33.8
11:24						
11:24	10	42	49.2	55.3	6.1	36.7
11:34						
11:34	10	52	51.5	57.5	6.0	36.0
11:44						
11:45	10	63	48.1	54.2	6.1	36.7
11:55						

Initial Height of Water (Ho) = 37.9

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

Final Height of Water (Hf) = 31.8

$$l_t = 2.0 \text{ in./hr.}$$

Change in Height Over Time (ΔH) = 6.1

$$C \times l_t = \mathbf{1.0 \text{ in./hr.}}$$

Average Head Over Time (Havg) = 34.8

Annulus Gravel/Sand Correction (C) = 0.5

Appendix F

USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
 USGS web services are now operational so this tool should work as expected.



Latitude, Longitude: 33.94189, -117.50110



Date	12/13/2023, 4:22:41 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	C - Very Dense Soil and Soft Rock

Type	Value	Description
S _S	1.5	MCE _R ground motion. (for 0.2 second period)
S ₁	0.57	MCE _R ground motion. (for 1.0s period)
S _{MS}	1.8	Site-modified spectral acceleration value
S _{M1}	0.815	Site-modified spectral acceleration value
S _{DS}	1.2	Numeric seismic design value at 0.2 second SA
S _{D1}	0.543	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F _a	1.2	Site amplification factor at 0.2 second
F _v	1.43	Site amplification factor at 1.0 second
PGA	0.515	MCE _G peak ground acceleration
F _{PGA}	1.2	Site amplification factor at PGA
PGA _M	0.618	Site modified peak ground acceleration
T _L	8	Long-period transition period in seconds
SsRT	1.578	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.671	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.57	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.617	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGA _d	0.515	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA _{UH}	0.645	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C _{RS}	0.944	Mapped value of the risk coefficient at short periods
C _{R1}	0.924	Mapped value of the risk coefficient at a period of 1 s
C _V	1.2	Vertical coefficient

DISCLAIMER

While the information presented on this website is believed to be correct, SEAOC / OSHPD and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

Unified Hazard Tool



Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the [U.S. Seismic Design Maps web tools](#) (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Please also see the new [USGS Earthquake Hazard Toolbox](#) for access to the most recent NSHMs for the conterminous U.S. and Hawaii.

^ Input

Edition

Dynamic: Conterminous U.S. 2014 (updat...

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

33.94189

Time Horizon

Return period in years

2475

Longitude

Decimal degrees, negative values for western longitudes

-117.5011

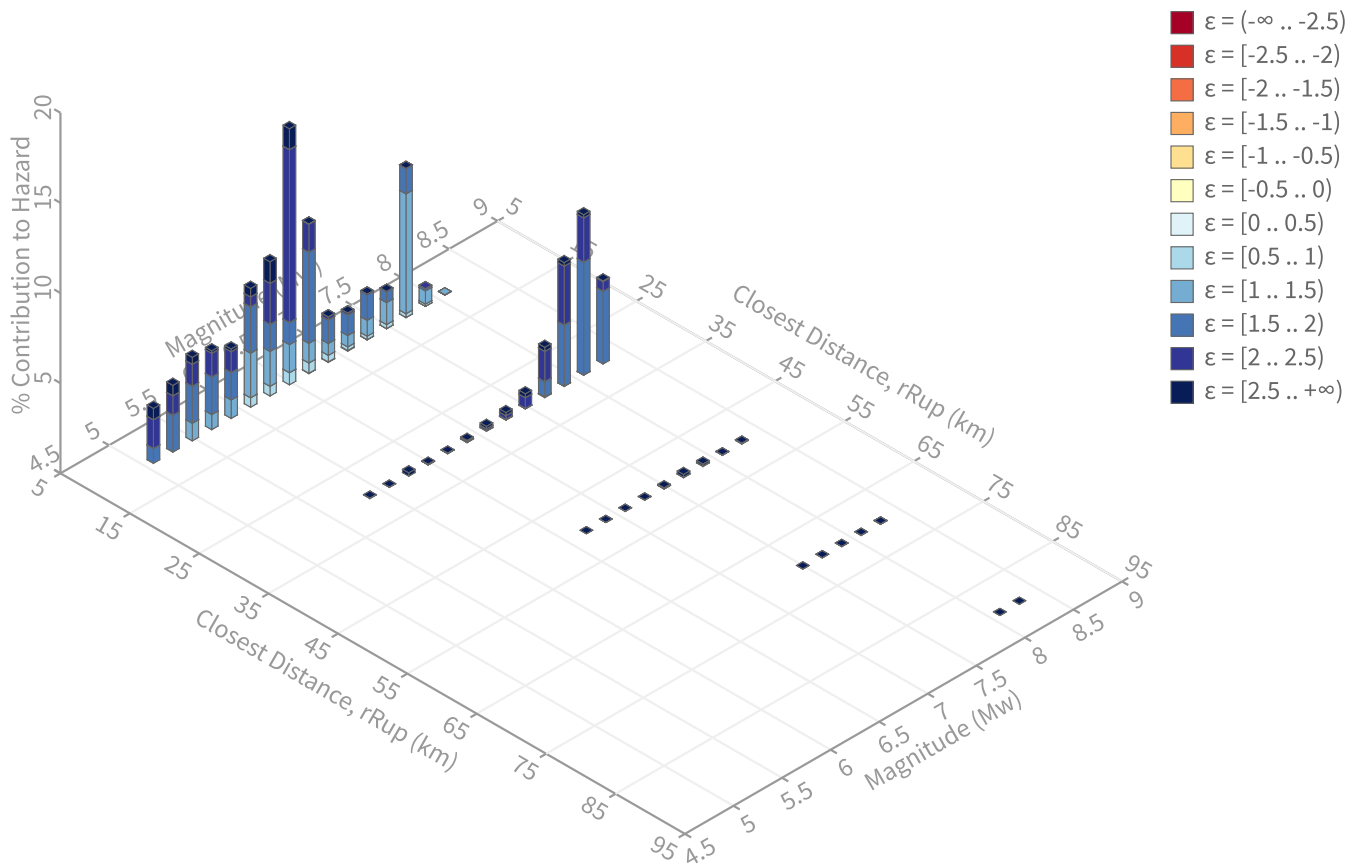
Site Class

537 m/s (Site class C)

^ Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr⁻¹
PGA ground motion: 0.71174273 g

Recovered targets

Return period: 2944.9187 yrs
Exceedance rate: 0.00033956794 yr⁻¹

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.07 %

Mean (over all sources)

m: 6.83
r: 15.41 km
ε₀: 1.81 σ

Mode (largest m-r bin)

m: 6.48
r: 13.3 km
ε₀: 2.06 σ
Contribution: 14.2 %

Mode (largest m-r-ε₀ bin)

m: 6.48
r: 14.84 km
ε₀: 2.26 σ
Contribution: 9.59 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set	Source	Type	r	m	ϵ_0	lon	lat	az	%
UC33brAvg_FM31		System							31.51
	San Jacinto (San Bernardino) [3]		23.89	8.06	1.79	117.303°W	34.080°N	49.95	7.11
	Elsinore (Glen Ivy) rev [0]		14.90	6.54	2.26	117.572°W	33.822°N	206.11	6.37
	Whittier alt 1 [0]		14.13	7.48	1.40	117.588°W	33.833°N	213.47	6.34
	San Andreas (San Bernardino N) [4]		32.90	8.00	2.17	117.314°W	34.194°N	31.47	2.88
	Fontana (Seismicity) [2]		9.46	6.61	1.58	117.572°W	34.001°N	315.28	2.51
	Chino alt 1 [4]		13.90	6.90	1.92	117.623°W	33.869°N	234.23	2.16
UC33brAvg_FM32		System							30.92
	San Jacinto (San Bernardino) [3]		23.89	8.06	1.80	117.303°W	34.080°N	49.95	7.04
	Elsinore (Glen Ivy) rev [0]		14.90	6.52	2.26	117.572°W	33.822°N	206.11	6.48
	Whittier alt 2 [0]		14.52	7.57	1.39	117.588°W	33.832°N	213.42	6.21
	San Andreas (San Bernardino N) [4]		32.90	8.00	2.17	117.314°W	34.194°N	31.47	2.91
	Chino alt 2 [3]		13.71	7.04	1.82	117.615°W	33.864°N	230.62	2.21
	Fontana (Seismicity) [2]		9.46	6.61	1.58	117.572°W	34.001°N	315.28	2.05
UC33brAvg_FM31 (opt)		Grid							19.03
	PointSourceFinite: -117.501, 33.982		6.57	5.78	1.44	117.501°W	33.982°N	0.00	3.25
	PointSourceFinite: -117.501, 33.982		6.57	5.78	1.44	117.501°W	33.982°N	0.00	3.25
	PointSourceFinite: -117.501, 34.000		7.94	5.75	1.68	117.501°W	34.000°N	0.00	2.28
	PointSourceFinite: -117.501, 34.000		7.94	5.75	1.68	117.501°W	34.000°N	0.00	2.28
	PointSourceFinite: -117.501, 34.036		9.72	6.18	1.72	117.501°W	34.036°N	0.00	1.74
	PointSourceFinite: -117.501, 34.036		9.72	6.18	1.72	117.501°W	34.036°N	0.00	1.74
	PointSourceFinite: -117.501, 34.045		10.67	6.12	1.87	117.501°W	34.045°N	0.00	1.66
	PointSourceFinite: -117.501, 34.045		10.67	6.12	1.87	117.501°W	34.045°N	0.00	1.66
UC33brAvg_FM32 (opt)		Grid							18.54
	PointSourceFinite: -117.501, 33.982		6.56	5.79	1.43	117.501°W	33.982°N	0.00	3.19
	PointSourceFinite: -117.501, 33.982		6.56	5.79	1.43	117.501°W	33.982°N	0.00	3.19
	PointSourceFinite: -117.501, 34.000		7.94	5.75	1.68	117.501°W	34.000°N	0.00	2.28
	PointSourceFinite: -117.501, 34.000		7.94	5.75	1.68	117.501°W	34.000°N	0.00	2.28
	PointSourceFinite: -117.501, 34.045		10.69	6.12	1.88	117.501°W	34.045°N	0.00	1.64
	PointSourceFinite: -117.501, 34.045		10.69	6.12	1.88	117.501°W	34.045°N	0.00	1.64
	PointSourceFinite: -117.501, 34.036		9.86	6.14	1.76	117.501°W	34.036°N	0.00	1.60
	PointSourceFinite: -117.501, 34.036		9.86	6.14	1.76	117.501°W	34.036°N	0.00	1.60

Appendix G

APPENDIX E

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 GENERAL

1.1 **Intent:** These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these general Specifications. Observations of the earthwork by the project Geotechnical Consultant during grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 **Geotechnical Consultant:** Prior to commencement of work, the project owner shall employ a geotechnical consultant. The geotechnical consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all keyway bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of subgrade and fill materials and perform adequate relative compaction testing of fill to determine the attained level of compaction and assess if, in their opinion, if the work was performed in substantial compliance

with the geotechnical report(s) and these specifications. The Geotechnical Consultant shall provide test results to the owner on a routine and frequent basis.

- 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 Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with applicable grading codes, the project plans, and these specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork planned for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

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

2.0 PREPARATION OF FILL AREAS

- 2.1 Clearing and Grubbing:** Areas to be excavated and filled shall be cleared and grubbed. Vegetation, such as brush, grass, roots, and other deleterious material, man-made structures, and similar debris shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant. Borrow areas shall be cleared and grubbed to the extent necessary to provide a suitable fill material.

Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 3 and 4. Earth fill material

shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent organic matter. Nesting of 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, etc.) have chemical constituents that are considered hazardous waste. As such, the indiscriminate dumping or spillage of such fluids may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

The Geotechnical Consultant shall not be responsible for the identification or analysis of potentially hazardous materials; however, if observations, odors, or soil discoloration are suspect, the Geotechnical Consultant may request from the owner the termination of grading operations until such materials are deemed not hazardous as defined by applicable laws and regulations.

- 2.2 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 the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.
- 2.3 Processing:** Ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Ground that is not satisfactory shall be removed/overexcavated as specified in the following section. 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. After scarification, the surface should be moisture conditioned, as necessary, to achieve the proper moisture content and compacted in accordance with Section 4 of these specifications.
- 2.4 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 recommended by the Geotechnical Consultant during grading.

2.5 Benching: Fills to be placed on ground sloping steeper than 5H:1V (horizontal to vertical units) shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for fill placement.

3.0 FILL MATERIAL

3.1 General: Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant 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 the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize: Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 12 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or other underground construction.

3.3 Import: If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1 and/or requirements defined in the project geotechnical report(s). The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before import begins so that suitability can be determined, and appropriate laboratory tests performed.

4.0 FILL PLACEMENT AND COMPACTION

4.1 Fill Layers: Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

- 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 ASTM International (ASTM Test Method D1557).
- 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 (ASTM Test Method D1557). 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 and uniformity.
- 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 in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.
- 4.4 **Compaction Testing:** Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant'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).
- 4.5 **Frequency of Compaction Testing:** Tests shall be taken at intervals required by the governing agency and as deemed necessary by the Geotechnical Consultant in order to adequately qualify the fill material. In general, it should be anticipated that tests will be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill, unless recommended otherwise by the Geotechnical Consultant. In addition, test(s) shall be taken on slope faces and/or each 10 feet of vertical height of slope as deemed necessary by the Geotechnical Consultant. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.6 Compaction Test Locations: The Geotechnical Consultant shall document the approximate elevation and location of each compaction test. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided. Alternatively, GPS units may be used to determine the approximate location/coordinates of the field density tests.

5.0 SUBDRAIN INSTALLATION

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and standard details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys. The Contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The Contractor is responsible for the performance of subdrains.

6.0 EXCAVATION

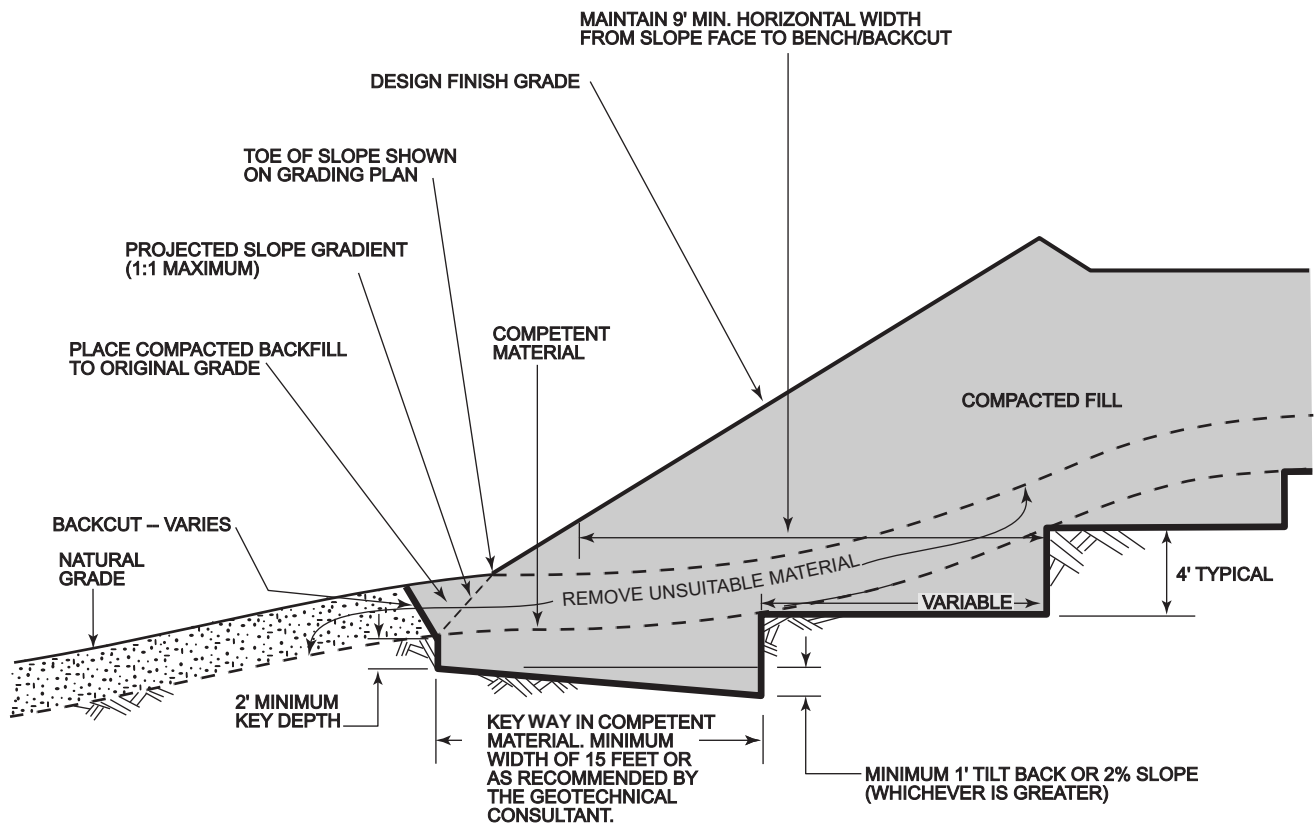
Excavations, including over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical report(s) and plans are estimates. The actual extent of removal shall be determined by the Geotechnical Consultant based on the 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 the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 TRENCH BACKFILLS

7.1 Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum 90 percent of maximum from 1 foot above the top of the conduit to the surface, except in traveled ways (see Section 7.6 below).

- 7.3** Jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.
- 7.4** Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill, unless required differently by the governing agency or the Geotechnical Consultant.
- 7.5** Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.
- 7.6** Trench backfill in the upper foot measured from finish grade within existing or future traveled way, shoulder, and other paved areas (or areas to receive pavement) should be placed to a minimum 95 percent relative compaction.

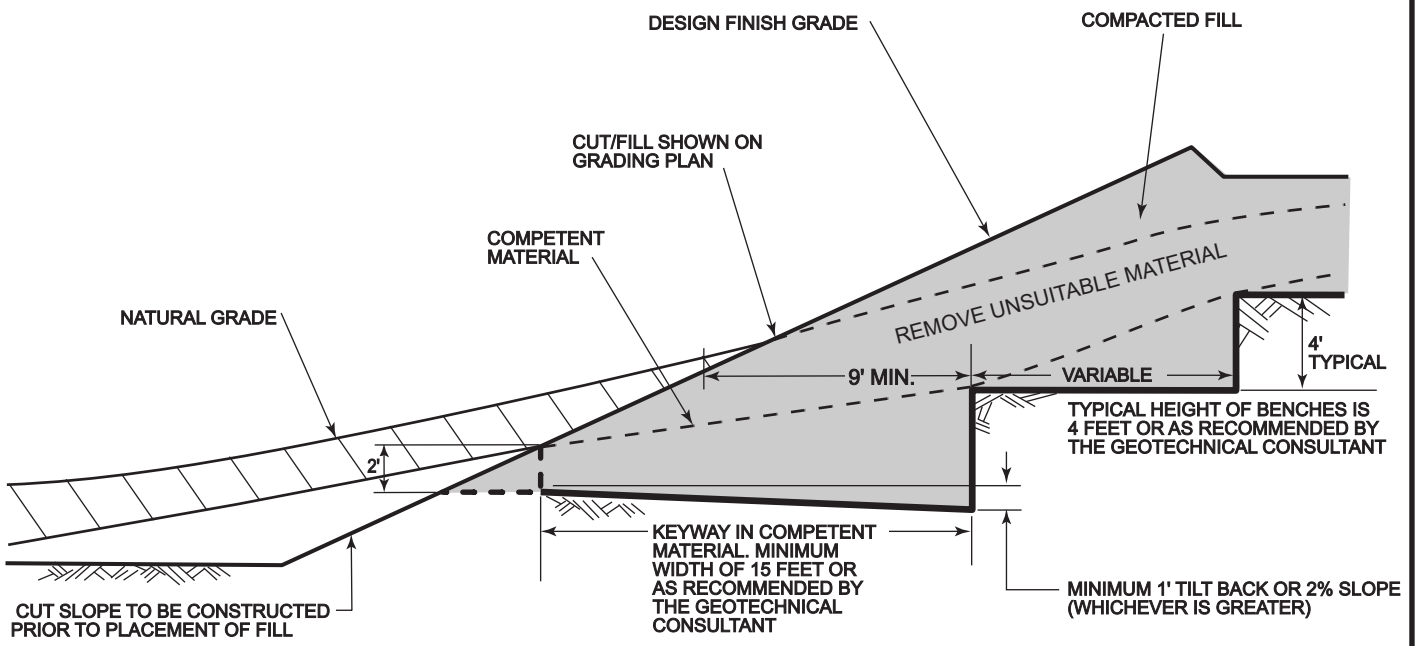


NOTE: BENCHING SHALL BE REQUIRED WHEN SLOPES ARE EQUAL TO OR STEEPER THAN 5H:1V OR WHEN RECOMMENDED BY THE GEOTECHNICAL CONSULTANT. WHERE THE NATURAL SLOPE APPROACHES OR EXCEEDS THE DESIGN SLOPE RATIO, SPECIFIC RECOMMENDATIONS SHOULD BE PROVIDED BY THE GEOTECHNICAL CONSULTANT.

FIGURE 1

**TYPICAL FILL KEY ABOVE NATURAL SLOPE
MINIMUM STANDARD GRADING DETAIL**





NOTE: BENCHING SHALL BE REQUIRED WHEN SLOPES ARE EQUAL TO OR STEEPER THAN 5H:1V OR WHEN RECOMMENDED BY THE GEOTECHNICAL CONSULTANT. WHERE THE NATURAL SLOPE APPROACHES OR EXCEEDS THE DESIGN SLOPE RATIO, SPECIFIC RECOMMENDATIONS SHOULD BE PROVIDED BY THE GEOTECHNICAL CONSULTANT.

FIGURE 2

**TYPICAL FILL ABOVE CUT SLOPE
MINIMUM STANDARD GRADING DETAIL**



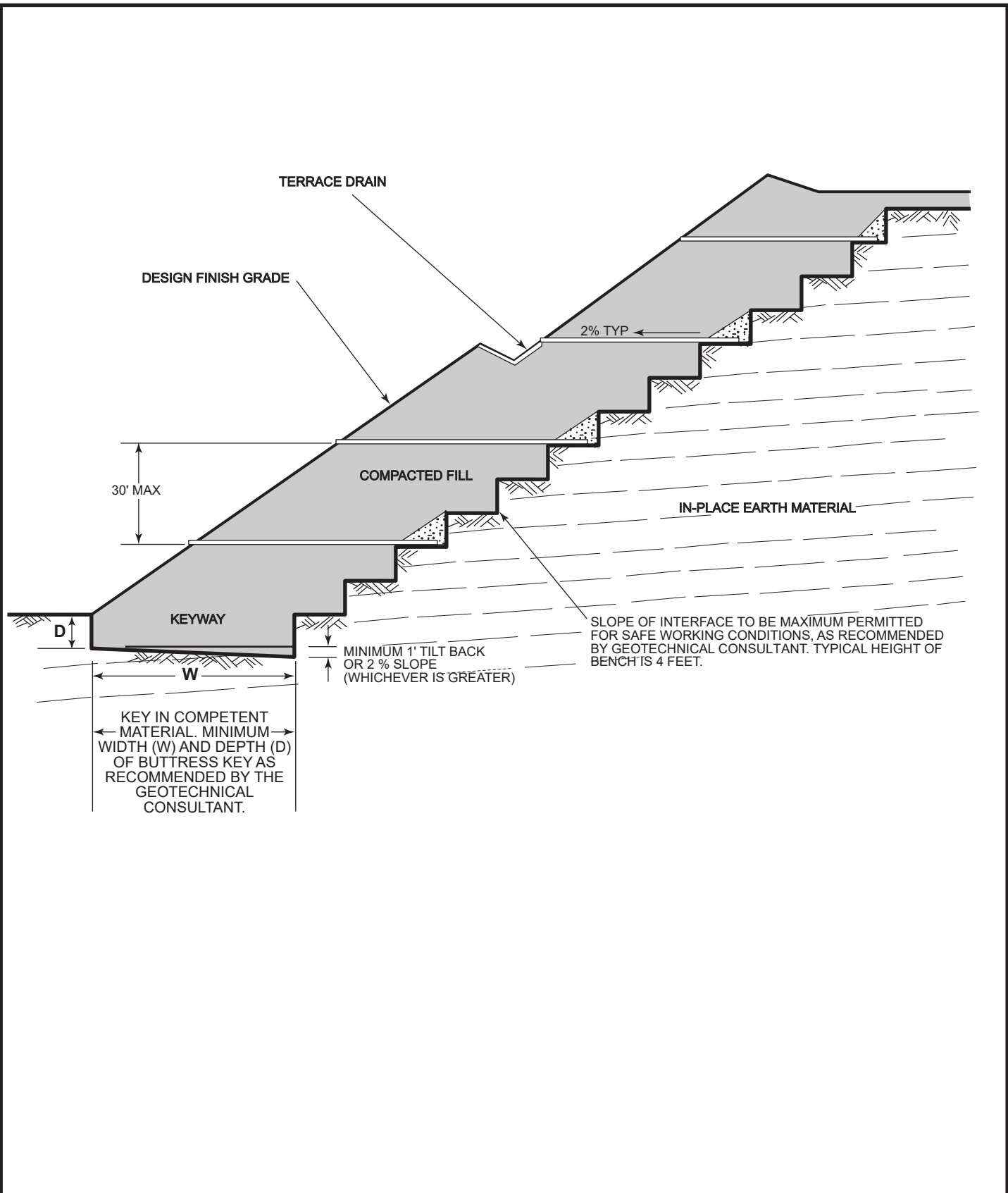
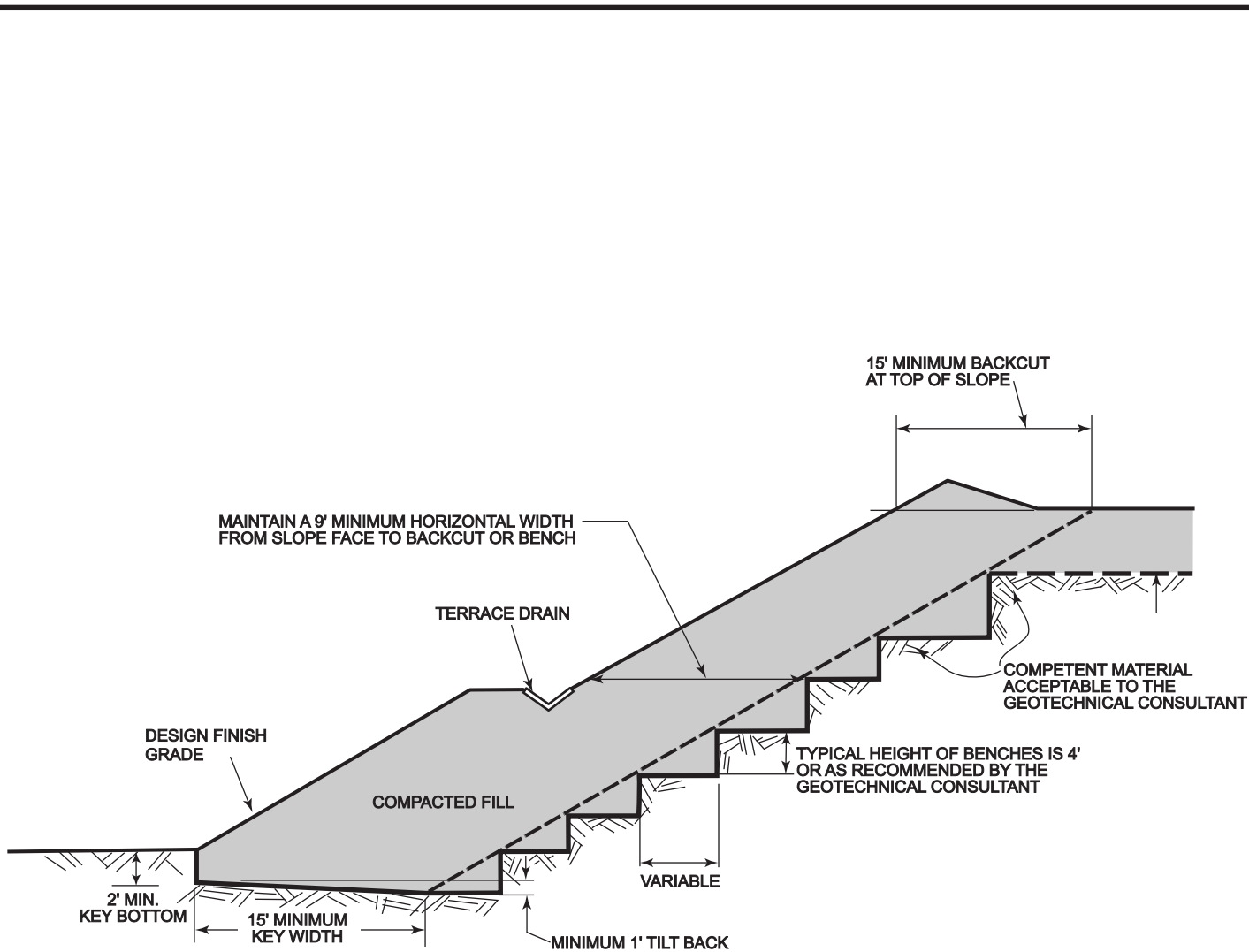


FIGURE 3

**TYPICAL BUTTRESS FILL
MINIMUM STANDARD GRADING DETAIL**



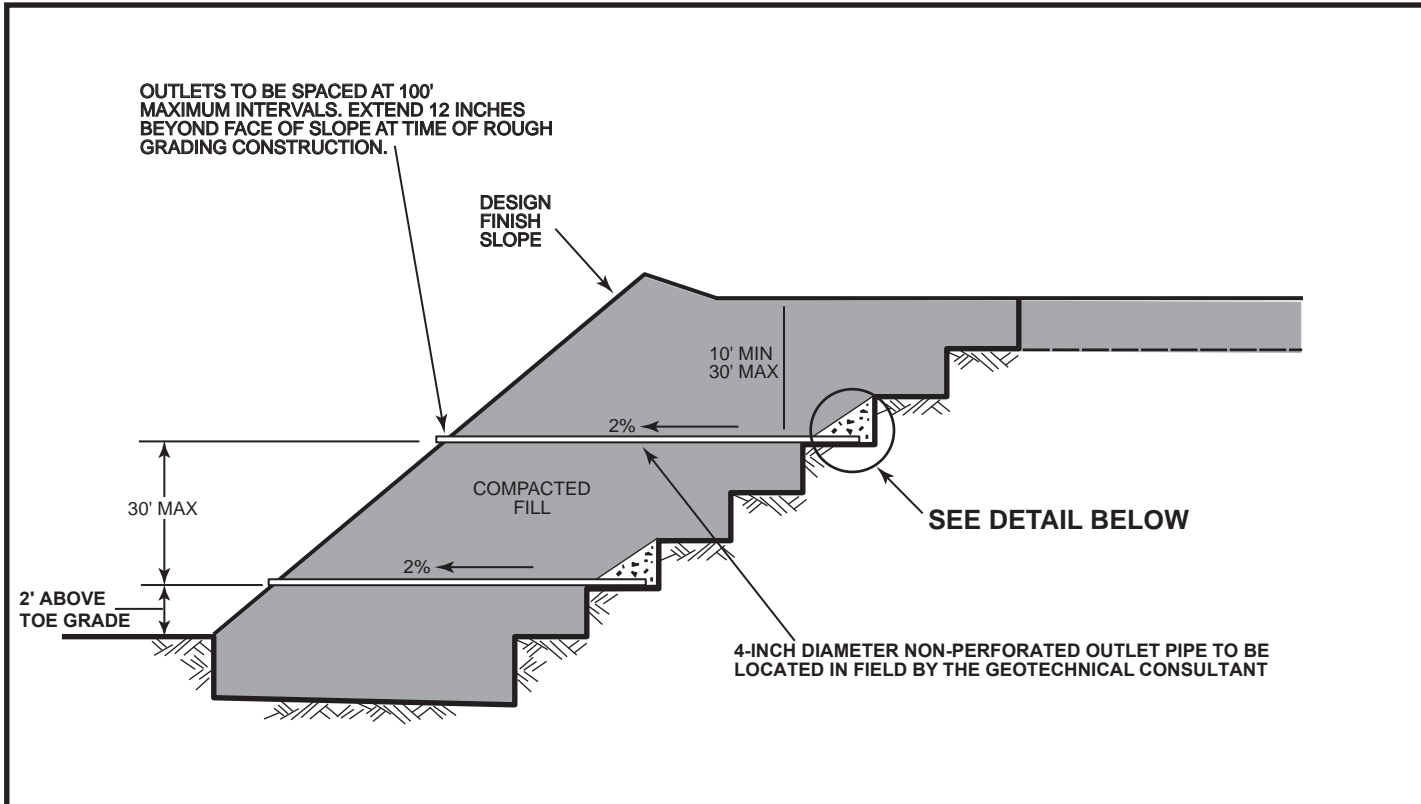


NOTE: FOR SUBDRAIN DETAILS, SEE FIGURE 5.

FIGURE 4

**TYPICAL STABILIZATION FILL
MINIMUM STANDARD GRADING DETAIL**





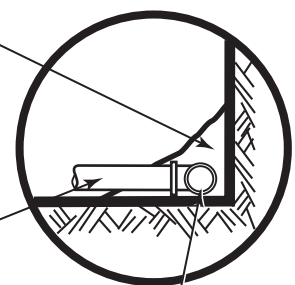
FILTER MATERIAL - MINIMUM OF THREE CUBIC FEET PER FOOT OF PIPE. SEE FILTER MATERIAL SPECIFICATION.

ALTERNATE: IN LIEU OF FILTER MATERIAL, THREE CUBIC FEET OF GRAVEL PER FOOT OF SUBDRAIN (WITHOUT PIPE) MAY BE ENCASED IN FILTER FABRIC.

GRAVEL TO CONSIST OF 1/2" TO 1" CRUSHED ROCK PER STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. FIGURE 6 FOR FILTER FABRIC SPECIFICATION

FILTER FABRIC SHALL BE LAPPED A MINIMUM OF 12 INCHES ON ALL JOINTS. SEE FIGURE 6 FOR FILTER FABRIC SPECIFICATION

DETAIL



OUTLET PIPE TO BE CONNECTED TO SUBDRAIN PIPE WITH TEE OR ELBOW

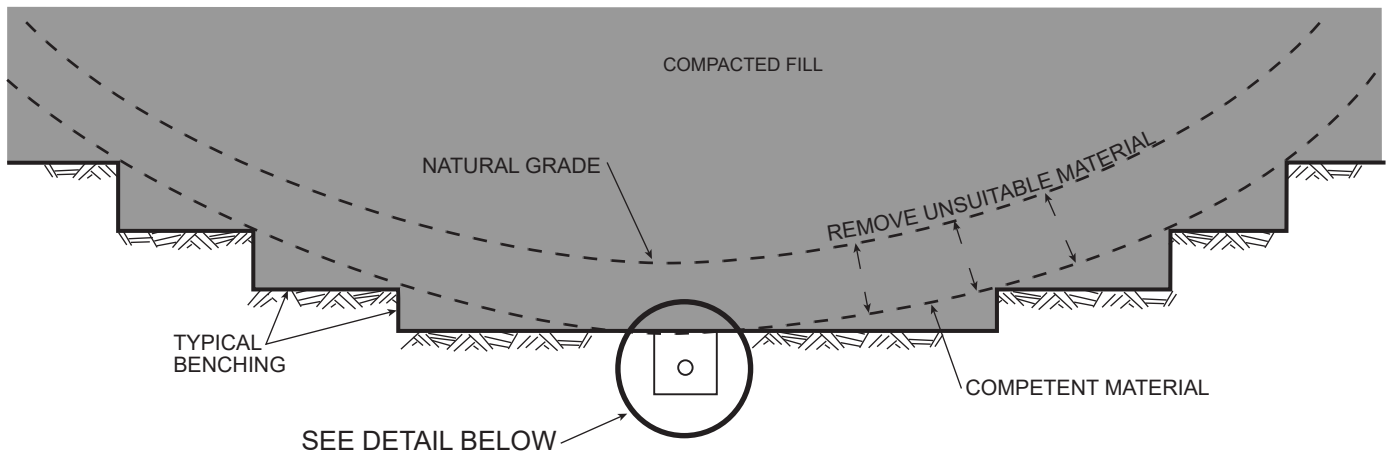
MINIMUM 4-INCH DIAMETER SCHEDULE 40 ASTM D1527 OR D1785 OR SDR 35 ASTM D2751 OR D 3034. FOR FILL DEPTH OF 60 FEET OR GREATER, USE ONLY SCHEDULE 40 OR EQUIVALENT. THERE SHALL BE A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE. PROVIDE CAP AT UPSTREAM END OF PIPE. SLOPE A MINIMUM OF 2 PERCENT TO OUTLET PIPE.

"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT.	
SIEVE SIZE	PERCENTAGE 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

FIGURE 5

TYPICAL STABILIZATION AND BUTTRESS FILL SUBDRAINS MINIMUM STANDARD GRADING DETAIL





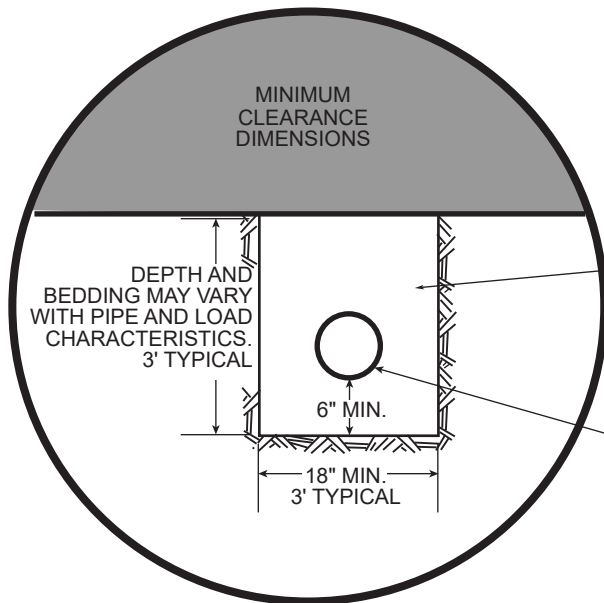
FILTER FABRICS SHALL BE PERMEABLE NON-WOVEN POLYESTER, NYLON, OR POLYPROPYLENE MATERIAL CONFORMING TO THE FOLLOWING:

- | | |
|---|------|
| 1) GRAB TENSILE STRENGTH, POUNDS, MIN. ASTM D 4632..... | 90 |
| 2) ELONGATION, AT PEAK LOAD, PERCENT, MIN. ASTM D 4632..... | 50 |
| 3) PUNCTURE STRENGTH, LBS., MIN. ASTM D 3787..... | 45 |
| 4) COEFFICIENT OF WATER PERMITTIVITY, 1/SEC. ASTM D 4491..... | >0.7 |
| 5) BURST STRENGTH, P.S.I., MIN. ASTM D 3786..... | 180 |

NOTES: DOWNSTREAM 20' OF PIPE AT OUTLET SHALL BE NON-PERFORATED AND BACKFILLED WITH FINE-GRAINED MATERIAL

PIPE SHALL BE A MINIMUM OF 4-INCH DIAMETER. FOR RUNS OF 500 FEET OR MORE, USE 6-INCH DIAMETER PIPE, OR AS RECOMMENDED BY THE GEOTECHNICAL CONSULTANT

DETAIL



FILTER MATERIAL - MINIMUM OF NINE CUBIC FEET PER FOOT OF PIPE. SEE FIGURE 5 FOR FILTER MATERIAL SPECIFICATIONS.

ALTERNATE: IN LIEU OF FILTER MATERIAL, NINE CUBIC FEET OF GRAVEL PER FOOT OF SUBDRAIN (WITHOUT PIPE) MAY BE ENCASED IN FILTER FABRIC. SEE FIGURE 5 TO GRAVEL SPECIFICATION. SEE ABOVE FOR FILTER FABRIC SPECIFICATION. FILTER FABRIC SHALL BE LAPPED MINIMUM OF 12 INCHES ON ALL JOINTS.

MINIMUM 4 INCH DIAMETER SCHEDULE 40 ASTM D 1527, OR D 1785, OR SDR 35 ASTM 2751 OR D 3034. FOR FILL DEPTH OF 60 FEET OR GREATER, USE ONLY SCHEDULE 40 OR APPROVED EQUIVALENT. THERE SHALL BE A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE.

FIGURE 6

**TYPICAL CANYON SUBDRAIN
MINIMUM STANDARD GRADING DETAIL**



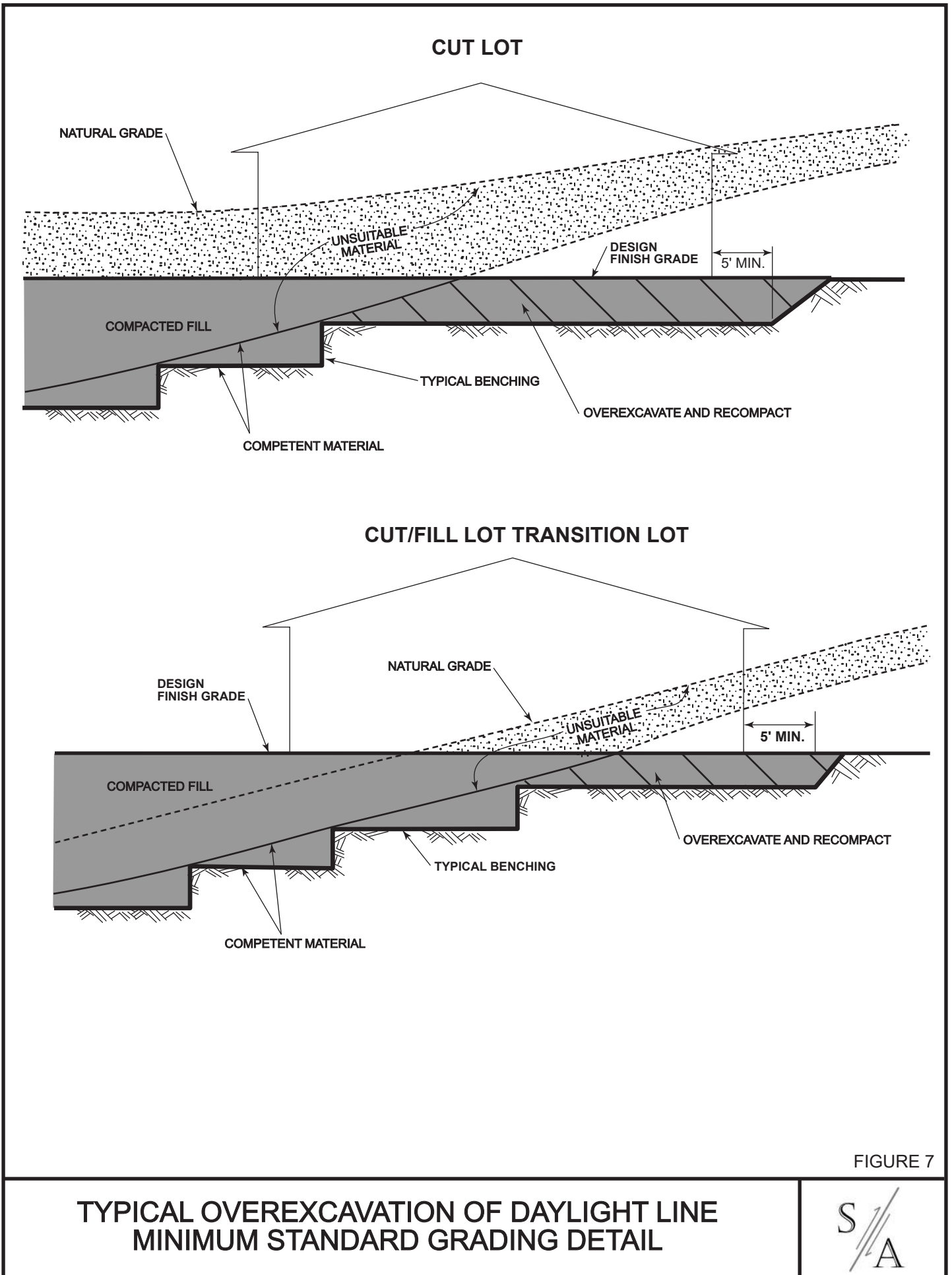
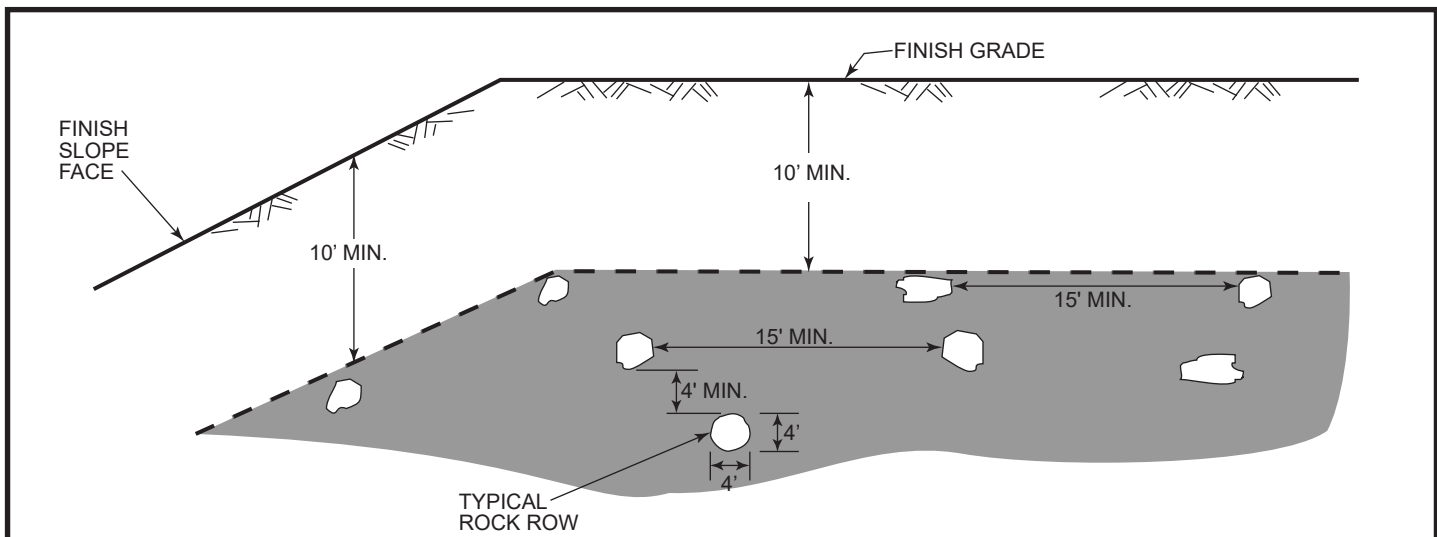


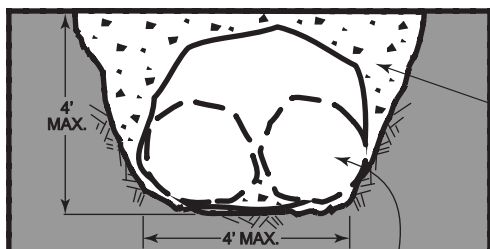
FIGURE 7

TYPICAL OVEREXCAVATION OF DAYLIGHT LINE
 MINIMUM STANDARD GRADING DETAIL



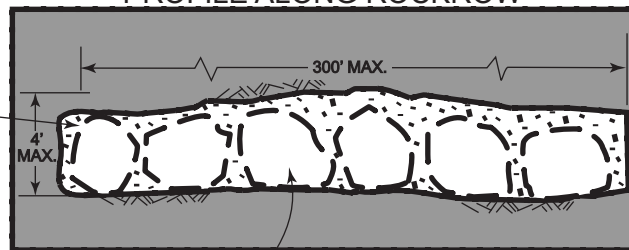


SECTION THROUGH ROCKROW



FILL VOIDS WITH SELECT GRANULAR SOIL PLACED BY WATER DENSIFICATION AND MECHANICAL COMPACTION.
 NESTING OR STACKING OF OVERSIZE MATERIAL IS NOT ACCEPTABLE.

PROFILE ALONG ROCKROW



PLACE OVERSIZE MATERIAL IN TRENCH. FALSE SLOPE OR CUT SLOT INTO APPROVED MATERIAL. OVERSIZE MATERIAL MAY BE PLACED SIDE BY SIDE IF SIZE PERMITS.

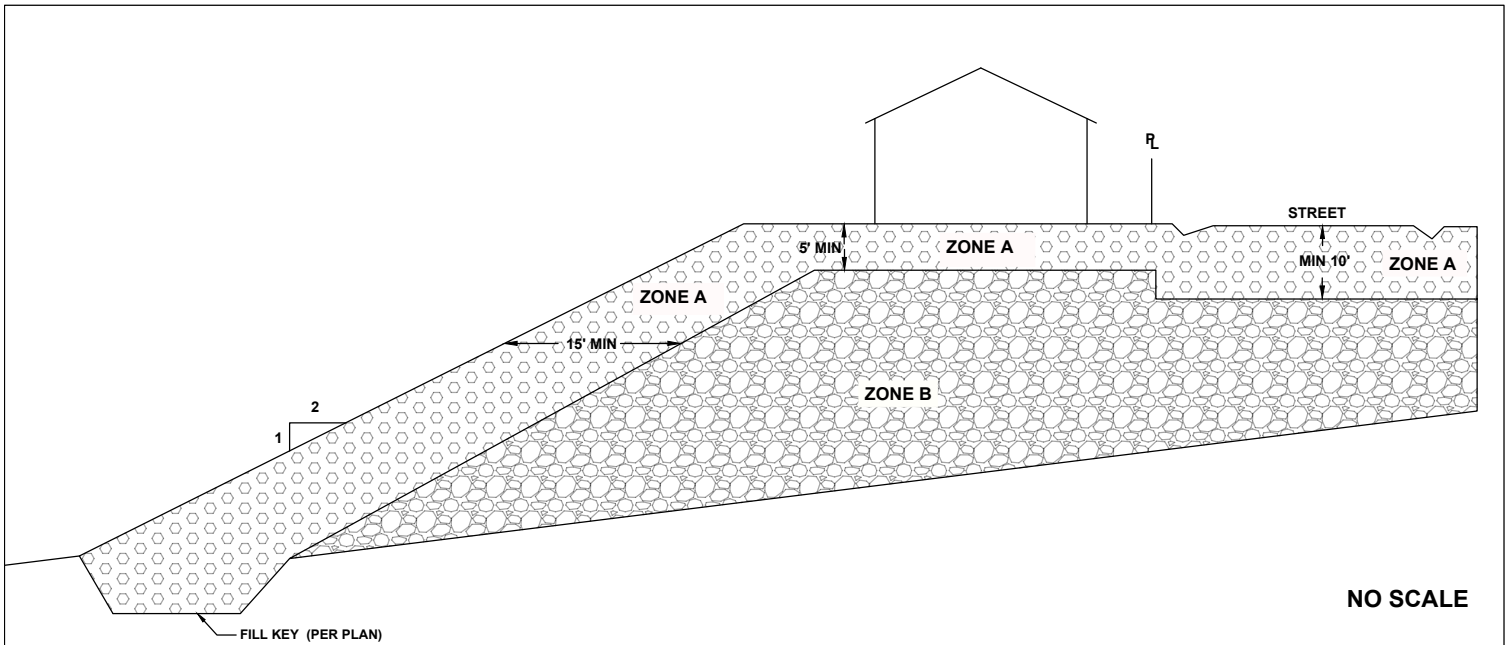
NOTES:

- A) OVERSIZED ROCK IS DEFINED AS LARGER THAN 12" IN SIZE IN GREATEST DIMENSION.
- B) SPACE BETWEEN ROCKROWS SHOULD BE ONE EQUIPMENT WIDTH OR A MINIMUM OF 15 FEET.
- C) THE WIDTH AND HEIGHT OF THE ROCKROW SHALL BE LIMITED TO FOUR FEET AND THE LENGTH LIMITED TO 300 FEET UNLESS APPROVED OTHERWISE BY THE GEOTECHNICAL CONSULTANT. OVERSIZE SHOULD BE PLACED WITH FLATEST SIDE ON THE BOTTOM.
- D) OVERSIZE MATERIAL EXCEEDING FOUR FEET MAY BE PLACED ON AN INDIVIDUAL BASIS IF APPROVED BY THE GEOTECHNICAL CONSULTANT.
- E) FILLING OF VOIDS WILL REQUIRE SELECT GRANULAR SOIL (SE > 20, OR LESS THAN 20 PERCENT FINES) AS APPROVED BY THE GEOTECHNICAL CONSULTANT. VOIDS IN THE ROCKROW TO BE FILLED BY WATER DENSIFYING GRANULAR SOIL INTO PLACE ALONG WITH MECHANICAL COMPACTION EFFORT.
- F) IF APPROVED BY THE GEOTECHNICAL CONSULTANT, ROCKROWS MAY BE PLACED DIRECTLY ON COMPETENT MATERIALS OR BEDROCK, PROVIDED ADEQUATE SPACE IS AVAILABLE FOR COMPACTION.
- G) THE FIRST LIFT OF MATERIAL ABOVE THE ROCKROW SHALL CONSIST OF GRANULAR MATERIAL AND SHALL BE PROOF-ROLLED WITH A D-8 OR LARGER DOZER OR EQUIVALENT.
- H) ROCKROWS NEAR SLOPES SHOULD BE ORIENTED PARALLEL TO SLOPE FACE.
- I) NESTING OR STACKING OF ROCKS IS NOT ACCEPTABLE.

FIGURE 8

**TYPICAL OVERSIZE ROCK PLACEMENT METHOD
 MINIMUM STANDARD GRADING DETAIL**





LEGEND

- ZONE A:**
- THE UPPER 5 FEET OF FILL UNDER PADS SHOULD NOT HAVE ROCKS GREATER THAN 12 INCHES IN THE LARGEST DIMENSION (12-INCH MINUS).
 - FILLS IN PUBLIC STREETS, RIGHT OF WAYS AND EASEMENTS SHOULD CONTAIN ONLY 12-INCH MINUS MATERIALS TO A DEPTH OF 10 FEET BELOW FINISH GRADE OR 2 FEET BELOW THE DEEPEST UTILITY, WHICHEVER IS DEEPER.
 - FILLS IN SLOPE AREAS MAY HAVE OVERSIZE ROCK PLACED PER ROCK BLANKET DETAIL TO WITHIN 15 FEET OF SLOPE FACE. FILL WITHIN 15 FEET OF SLOPE FACE SHOULD ONLY CONSIST OF 12-INCH MINUS MATERIAL.

ZONE B:

- ROCKS UP TO 2 FEET IN HEIGHT (LYING FLAT) WITH OCCASIONAL INDIVIDUAL FRAGMENTS UP TO 4 FEET MAXIMUM DIMENSION MAY BE PLACED WITHIN ZONE B AREA.
- ROCKS EXCEEDING 2 FEET IN THE SMALLEST DIMENSION MAY BE PLACED IN ROWS WITH THE FLATTEST SIDE DOWN (SEE NEXT PAGE). THE WIDTH OF THE ROWS MAY EXCEED 4 FEET PROVIDED THE FILL OPERATION CAN ACCOMMODATE A MINIMUM OF 15 FEET BETWEEN ROWS, AND PROVIDED THAT THERE IS SUFFICIENT EQUIPMENT TO PLACE FILL AGAINST AND OVER THE ROWS.
- FILL SOILS PLACED AGAINST OR OVER ROCK ROWS SHOULD BE FREE OF ROCKS THAT MAY CAUSE NESTING/VOIDS WITHIN THE ROCK ROWS AND ROCK FILL. THIS CONDITION SHOULD BE CAREFULLY REVIEWED IN THE FIELD BY THE GEOTECHNICAL CONSULTANT TO VERIFY SATISFACTORY OPERATIONS.
- ROCKS UP TO 10 FEET IN THE LEAST DIMENSION MAY BE PLACED AS INDIVIDUAL ROCKS WITHIN THE COMPACTED FILL. THE FILL SOILS NEAR AND AGAINST THESE ROCKS SHOULD BE FREE OF ROCKS THAT MAY CAUSE NESTING/VOIDS WITH THE LARGER ROCKS. THIS CONDITION SHOULD BE CAREFULLY REVIEWED IN THE FIELD BY THE GEOTECHNICAL CONSULTANT TO VERIFY SATISFACTORY OPERATIONS.
- ROCKS, LARGER THAN 10 FEET IN THE SMALLEST DIMENSION, SHOULD BE REDUCED IN SIZE TO MEET THE SPECIFIED DIMENSIONS FOR INDIVIDUAL ROCK PLACEMENT AND/OR FOR PLACEMENT IN ROCK ROWS.

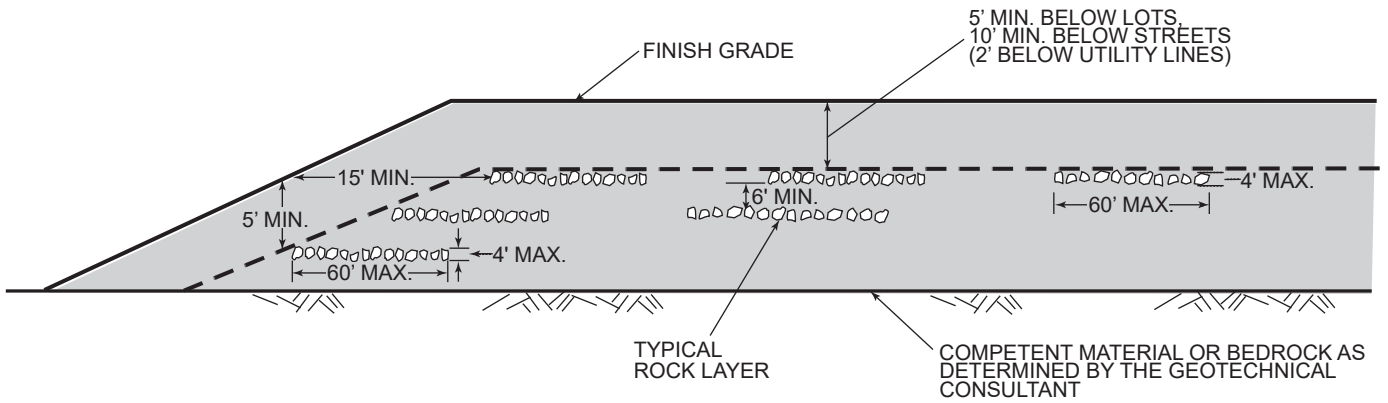
NOTES: CONTINUOUS OBSERVATION IS REQUIRED BY GEOTECHNICAL CONSULTANT DURING ROCK PLACEMENT.

FIGURE 9

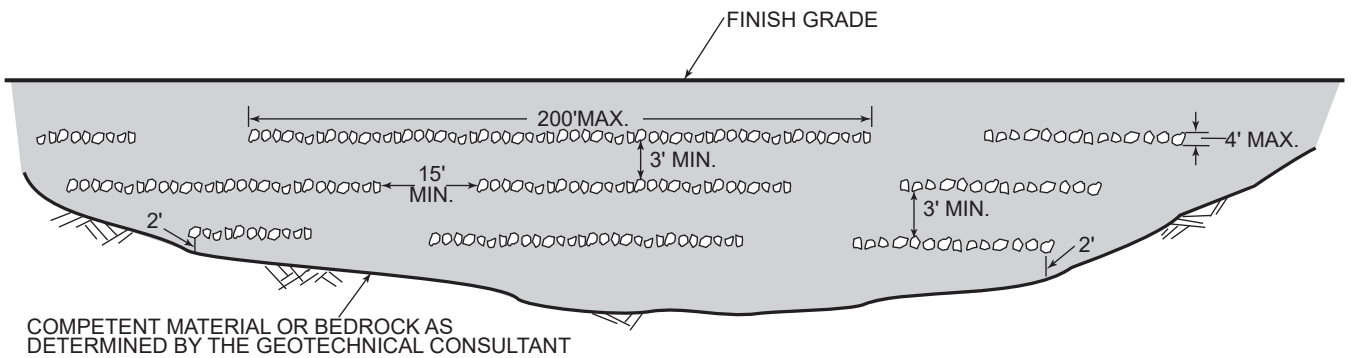
STRUCTURAL ROCK FILL PLACEMENT DETAIL



VIEW NORMAL TO SLOPE FACE



VIEW PARALLEL TO SLOPE FACE



NOTES:

- 1) ORIENTATION AND STAGGERING MAY VARY, BUT SHALL BE AS RECOMMENDED BY THE GEOTECHNICAL CONSULTANT.
- 2) ROCK LAYERS SHALL NOT BE MORE THAN 4 FEET IN HEIGHT. ROCK SHALL NOT BE STACKED OR NESTED.
- 3) EACH ROCK CELL MUST BE COVERED WITH A GRANULAR SOIL WITH A MINIMUM SAND EQUIVALENT (SE) OF 20 OR WITH LESS THAN 10% PASSING THE NO. 200 SIEVE AS DETERMINED BY THE GEOTECHNICAL CONSULTANT. THE GRANULAR SOIL IS TO BE FLUSHED, FLOODED, AND JETTED IN THE ROCK LAYER IN ORDER TO FILL THE VOIDS. ADDITIONAL LIFTS OF GRANULAR SOIL SHALL BE PLACED AS NECESSARY TO ALLOW FOR THE FILLING OF VOIDS BY FLOODING, AND JETTING. THE ROCK LAYER SHALL THEN BE ADEQUATELY COMPACTED WITH HEAVY EARTH MOVING EQUIPMENT.
- 4) ADEQUACY OF ABOVE PROCEDURE SHALL BE VERIFIED BY THE GEOTECHNICAL CONSULTANT.
- 5) ROCKS EXCEEDING 2 FEET IN THE SMALLEST DIMENSION MAY BE PLACED IN ROWS AS SHOWN IN THE FIGURE WITH THE FLATTEST SIDE DOWN. THE WIDTH OF THE ROWS MAY EXCEED 4 FEET PROVIDED THE FILL OPERATION CAN ACCOMMODATE A MINIMUM OF 15 FEET BETWEEN ROWS, AND PROVIDED THAT THERE IS SUFFICIENT EQUIPMENT TO PLACE FILL AGAINST AND OVER THE ROWS. THE FILL SOILS SHOULD BE FREE OF ROCKS THAT MAY CAUSE NESTING/VOIDS WITHIN THE ROCK ROWS. THIS CONDITION SHOULD BE CAREFULLY REVIEWED IN THE FIELD BY THE GEOTECHNICAL CONSULTANT TO VERIFY SATISFACTORY OPERATIONS.
- 6) ROCKS UP TO 10 FEET IN THE LEAST DIMENSION MAY BE PLACED AS INDIVIDUAL ROCKS WITHIN THE COMPACTED FILL. THE FILL SOILS NEAR AND AGAINST THESE ROCKS SHOULD BE FREE OF ROCKS THAT MAY CAUSE NESTING/VOIDS WITH THE LARGER ROCKS. THIS CONDITION SHOULD BE CAREFULLY REVIEWED IN THE FIELD BY THE GEOTECHNICAL CONSULTANT TO VERIFY SATISFACTORY OPERATIONS.
- 7) ROCKS, LARGER THAN 10 FEET IN THE SMALLEST DIMENSION, SHOULD BE REDUCED IN SIZE TO MEET THE SPECIFIED DIMENSIONS FOR INDIVIDUAL ROCK PLACEMENT AND/OR FOR PLACEMENT IN ROCK ROWS.

FIGURE 10

OVERSIZE ROCK ROW PLACEMENT
FOR ZONE B STRUCTURAL ROCK FILL

