PRELIMINARY DRAINAGE REPORT

Baker Industrial

City of Lake Elsinore, County of Riverside, California

PREPARED FOR:

RIVERSIDE LEGACY IV NICHOLS ROAD, LLC
1505 Bridgeway, Suite 107
Sausalito, CA 94965
(617) 877-7637

December, 2024
Revised June, 2025

PREPARED BY:

KWC ENGINEERS
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STATE OF CALIFORNIA

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Section

1

INTRODUCTION

1.1 PURPOSE OF STUDY

The purpose of this study is to hydrologically model the project site's onsite tributary watersheds to determine the existing and proposed peak runoffs. The hydrologic analysis was prepared using the Rational Method as specified in the Riverside County Hydrology Manual. The flows are used to estimate the size of the proposed drainage facilities that support the proposed project development.

1.2 PROJECT DESCRIPTION

The Baker Industrial project is comprised of 66.23 acres of developed land along Baker Street in the City of Lake Elsinore in Riverside County, California, adjacent to Pierce Street. Appendix A shows a vicinity map of the area illustrating the location of the project.

The Baker Industrial project is generally bounded to the northeast by Baker Street. Bounded on the northwest by Pierce Street. To the southeast and southwest of the site, the area is bounded by undeveloped hills.

The project site existing conditions is generally flat with some hills coming onto the site along the southern boundary. The existing project gross acreage is 66.23 acres. The site's drainage area flows from the south and southwest to the north and northeast to the north side of Baker Street. Two new buildings are proposed, building 1 is 206,982 sf and building 2 is 778,423 sf, landscape areas, driveways, and parking lots.

The proposed buildings will consist of a warehouse and connected office space with the necessary improvements to facilitate business. The offsite drainage areas will be captured with a flow-by basin and a debris basin routed through storm drain before discharging at their historical locations on the north side of baker street. The onsite drainage areas will be captured by CMP Detention System and treated by MWS Units.

Baker Street will be improved on the project frontage. The full width drainage of the street will be captured within the catch basin at the low points of Baker Street. The flows will continue into MWS units within Baker Street.

1.3 FLOODPLAIN MAPPING

The National Flood Insurance Act (1968) established the National Flood Insurance Program, which is based on the minimal requirements for floodplain management and is designed to minimize the flood damage within Other Flood Areas. The Federal Emergency Management Agency (FEMA) is the agency which administrates the National Flood Insurance Program. Other Flood Areas are defined as areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. Flood Insurance Rate Maps (FIRMs) were developed to identify areas of flood hazards within a community.

According to the Flood Insurance Rate Map (FIRM) catalog, there are FIRMs produced by FEMA for the project site:

MAP Number: 06065C2028G

MAP Revised: August 28, 2008

FEMA FIRM Panel (**Figure 4**) is attached in **Appendix E** shows the floodplain limits and mapped flood zones for the Baker Industrial project area. The project is located mostly within Zone X and a small portion is within Zone AE, which is an area within the flood hazard areas subject to inundation by the 1% annual chance flood.

1.4 DESIGN CRITERIA

The following are design criteria for this project, based on the Riverside County Hydrology Manual.

Protection Levels

1. The 100-year flood shall be contained 1’ below the building pads.

2. The 10-year flood shall be contained within the top of curbs.

1) Loss rates are to be determined for the 2- and 5-year events using an AMC I condition, while an AMC II are used for the 10-year event and 100-year event.

Section

2

HYDROLOGIC DATA AND MODEL DEVELOPMENT

2.1 EXISTING CONDITION MODEL

The project site existing condition consists of undeveloped land and characterized by steep topography, generally decreasing in elevation from the south to the north. Several ravines are present which will convey natural drainage across the project site washing towards the north side of Baker Street.

The site is comprised of four (4) major drainage areas and four (4) offsite drainage areas to describe the existing drainage conditions. Refer to Existing Condition Hydrology Key Map **Figure 2** in **Appendix C** for locations of the drainage sub-areas and peak flows. Hydrologic calculations to evaluate surface water runoff associated with the 10-year and 100-year storm frequency were performed for the on-site drainage areas. The Riverside County Rational Method Hydrologic calculations (as described in the RCHM) were performed using the CivilDesign Hydrology / Hydraulics computer program package 2005 by Bonadiman and Associates, Inc.

Precipitation point values for the 10-year and 100-year durations obtained from Riverside County Flood Control Plate D-4.3, D-4.4, and Plate D-4.6 (see **Appendix B**).

In order to proceed with analysis of the proposed developed condition, it is necessary to first establish the pre-developed peak runoff rates. **Table 1** summarizes the data and results for the 10-year and 100-year storm event for on-site and off-site flows. All calculations can be found in **Appendix C** of the report.

Table 1. Existing Condition Peak Flow Summary

Drainage Area	Area (AC)	Q100 (CFS)	Q10 (CFS)	Q5 (CFS)	Q2 (CFS)
A	167.70	338.96	201.69	134.95	86.35
B	23.93	60.11	36.54	25.63	16.88
C	7.46	19.38	11.95	9.72	6.78
D	217.10	478.84	289.46	199.77	131.16

2.2 PROPOSED CONDITION MODEL

In the proposed condition, the proposed improvements are to add two large industrial/warehouse type buildings, parking area with asphalt pavements, concrete slabs, landscape areas, and improvements to Baker Street. Refer to Appendix B for a preliminary soils report demonstrating soil type and hydrologic group classification. Two new buildings are proposed, building 1 is 206,982 sf and building 2 is 778,423 sf, landscape areas, driveways, and new drainage systems will all drain to Baker Street. Street improvements are proposed for Baker Street.

The developed condition site consists of six (6) major drainage areas and four (4) offsite drainage areas. The project site runoff will be picked up by a system of gutters and inlets that will discharge through a storm drain system that outlets to Baker Street. The offsite flows will discharge in desilting basins to the south of the property and continue as it does in its current existing conditions through proposed dual 48" storm drains and dual 5x4' storm drain box. Offsite drainage area will not comingle with onsite flows. Refer to Proposed Condition Hydrology Key Map **Figure 3** in **Appendix D** for locations of the drainage sub-areas and peak flows. Hydrologic calculations were evaluated for surface water runoff associated with the 10-year and 100-year storm frequency. The proposed condition watershed boundaries were delineated using the project's conceptual grading plan. Hydrologic land cover for the development is considered commercial.

Table 2 summarizes the proposed condition 10 and 100-year rational method results. Proposed condition rational method calculations can be found in **Appendix D** of the report.

Table 2. Proposed Condition Peak Flow Summary

Drainage Area	Area (AC)	Q100 (CFS)	Q10 (CFS)	Q5 (CFS)	Q2 (CFS)
A	165.60	339.31	202.37	136.36	87.65
B	25.98	79.94	50.02	39.81	28.16
C	5.35	12.43	7.73	6.20	4.41
D	175.52	392.28	237.49	110.40	97.47
E	27.21	73.30	45.84	35.51	24.88
F	10.83	25.38	15.66	12.57	8.87

Table 3 summarizes the comparison between the Existing Condition and Proposed Condition Hydrology results.

Table 3. Existing vs. Proposed Condition Peak Flow Summary

	Existing Condition			Proposed Condition			Note	
Drainage Area	**Area (Acres)**	**Q100 (CFS)**	**Q10 (CFS)**	**Area (Acres)**	**Q100 (CFS)**	**Q10 (CFS)**		
A	167.70	338.96	201.69	165.60	339.31	202.37	$\triangle Q_{100} = 0.35$ $Q_{Proposed} > Q_{Existing}$	$\triangle Q_{10} = 0.68$ $Q_{Proposed} > Q_{Existing}$
B	23.93	60.11	36.54	25.98	79.94	50.02	$\triangle Q_{100} = 19.83$ $Q_{Proposed} > Q_{Existing}$	$\triangle Q_{10} = 13.48$ $Q_{Proposed} > Q_{Existing}$
C	7.46	19.38	11.95	5.35	12.43	7.73	$\triangle Q_{100} = 6.95$ $Q_{Proposed} < Q_{Existing}$	$\triangle Q_{10} = 4.22$ $Q_{Proposed} < Q_{Existing}$
D, E, F	217.10	478.84	289.46	213.56	490.96	298.99	$\triangle Q_{100} = 12.12$ $Q_{Proposed} > Q_{Existing}$	$\triangle Q_{10} = 9.53$ $Q_{Proposed} > Q_{Existing}$
Total	416.19	897.29	539.64	410.49	922.64	559.11	$\triangle Q_{100} = 2.8\%$	$\triangle Q_{10} = 3.6\%$

In the existing condition, the project's watershed drains from the southwest to northeast across Baker Street and into Temescal Wash. The project proposes to continue this similar water course by picking up flows on the southwest, by-passing through the proposed development and discharging on the northeast side Baker Street that leads down into Temescal Wash. As shown in Table 3 above, the project's watershed will only increase flows into the Wash by 2.8% in the 100-year storm and 3.6% in the 10-year storm. Due to the increase in flow entering the Temescal Wash being minor (less than 5%), we felt that increase runoff mitigation was not necessary.

Section

3

HYDRAULIC ANALYSIS

3.1 ONSITE DRAINAGE FACILITIES

Preliminary onsite drainage facilities for the project were calculated utilizing the rational method hydrology program and are presented on the Proposed Condition Hydrology Key Maps. The approximate locations of drainage facilities are intended for conceptual purposes only and will be refined in the design review and final engineering process. Pipe sizes are based on the design criteria presented in Section 1.4. RCFC maintained pipes were designed as reinforced concrete pipe and privately maintained pipes were designed as HDPE with a roughness coefficient of 0.013. The proposed onsite storm drain system calculations will be performed in the Final Engineering phase.

3.2 OUTLET ANALYSIS

All six (6) drainage areas will outlet on the north side of Baker Street through wingwall structures and riprap that will be designed per RCFC standards. Each outlet location will have a 15 ft wide access road down from and back up to Baker Street. The outlet velocity shall be at or below the existing condition or to a non-erosive velocity in accordance with RCFCWCD hydraulic manual.

Section

4

DEBRIS BASIN ANALYSIS

4.1 DESIGN CRITERIA

This section determines the debris yield for the undeveloped tributary watershed areas upstream of the development. The corresponding calculated debris yield is then used to determine the size of the debris basin required upstream of the drainage watersheds. Sediment yield must be accounted for when designing drainage facilities to convey runoff from undeveloped (natural) areas. Soil erosion caused by runoff in undeveloped areas increases the amount of sediment yield or load in storm water discharge. In order to accommodate for the increase in discharge volume a debris factor must be accounted for when considering design flows.

The procedures described in the US Army Corps of Engineers Los Angeles District Method for Prediction of Debris Yield were used to calculate the debris yield as shown below.

4.2 DEBRIS YIELD

LOS ANGELES DISTIRCT METHOD FOR PREDICTION OF DEBRIS YIELD

February 1992, updated February 2000

For Watershed areas from 0.1 square mile to 3.0 square miles, use equation 1 as shown on page 15

LOG Dy = 0.65(LOG P) + 0.62(LOG RR) + 0.18(LOG A) + 0.12(FF)

Where:

Dy = Unit Debris Yield (yd^3/mi^2)
P = Maximum 1-Hour Precipitation (inches, taken to two decimal places after the decimal points, times 100)
RR = Relief Ratio (ft/mi) (Highest Watershed Elev-Basin Elev)/Maximum Length
A = Drainage Area (ac)
FF = Non-Dimensional Fire factor

Per the recommendations in the RCHM, typical designs assume 3 to 5 year recovery from a total burn for making estimates of design storm debris production since the probability of a design storm following a 100 percent burn of the entire watershed is extremely remote. Therefore, the fire factor used in the calculations is based on a 4 year recovery period from 100 percent burn. Refer to **Appendix G** for detailed calculations.

4.3 DEBRIS BULKING & UNIT HYDROGRAPH

The debris bulking factor of 1.05 and 1.02 were used in this study to be applied to natural drainage areas to increase the clear water flow rate caused by the additional debris.
The following table summarizes the calculated debris volume and bulked flow at each flow-by basin.

Table 4 Proposed Condition Debris Volume and Bulked Flow

Basin	Node	Debris Volume (cy)	Bulking Factor	100-Year Clear Water Flow (cfs)	100-Year Bulked Flow (cfs)
1	106	872	1.05	310.4	325.9
2	403	116	1.02	392.3	400.2

Table 5 presents the runoff peak flow rates and volumes that are tributary to each basin. See **Appendix H** for unit hydrograph key maps and calculations.

Table 5: Unit Hydrograph Results

Basin	Storm Frequency (yr)	Duration (hrs)	Peak Flow (cfs)	Storm Volume (ac-ft)
Debris Basin (Area A)	100	1	338.80	17.90
		3	276.63	28.20
		6	257.82	35.90
		24	108.55	45.70
Debris Basin (Area D)	Storm Frequency (yr)	Duration (hrs)	Peak Flow (cfs)	Storm Volume (ac-ft)
	100	1	392.32	4.50
		3	373.34	6.70
		6	367.46	8.00
		24	324.04	10.60

Section

5

CONCLUSIONS

This preliminary drainage study has evaluated the potential effects of runoff on the proposed project. In addition, the report has addressed the methodology used to analyze the existing and proposed conditions, which was based on the Riverside County Hydrology Manual. This section provides a summary discussion that evaluates the potential effects of the proposed project.

- The project is 66.23 acres of developed industrial land.
- Offsite tributary areas will be captured and moved into their original flow location along the north side of Baker Street.
- Baker Street and Pierce Street full width improvements will be captured, treated, and discharged to the north side of Baker Street.
- Onsite tributary areas will be captured, treated, and discharged to the north side of Baker Street.
- Preliminary alignment and pipe sizes of storm drain lines were presented.

All storm water runoff will be carried via gutters, catch basins, or onsite storm drain system that will outlet into the north side of Baker Street. The computed 10-year storm event is contained below the top of curb and the computed 100-year storm event is contained within the street right-of-way.

Section

6

REFERENCES

Riverside County Flood Control and Water Conservation District. Hydrology Manual. April 1978

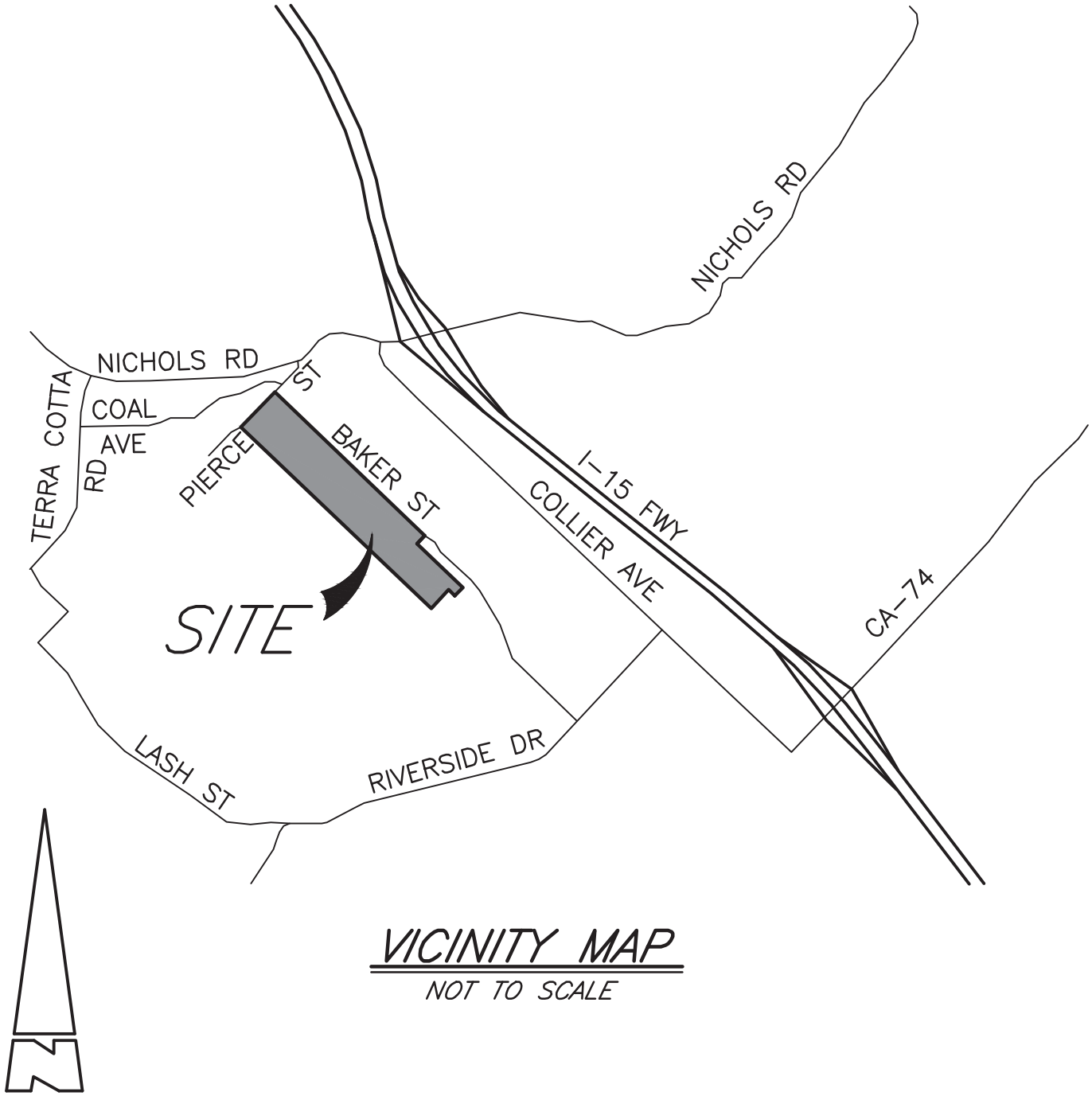
Riverside County Flood Control and Water Conservation District. Increased Runoff Mitigation Workshop. August 24, 1995

State of California – Department of Transportation, Interstate 91 Drainage Plans, December 1, 2008

Appendix

A

VICINITY MAP



VICINITY MAP

NOT TO SCALE

PREPARED BY:

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

VICINITY MAP
BAKER INDUSTRIAL

DATE	DRAWN BY	CHECKED BY	J.N.
04/28/23	AB	BB	19.1994

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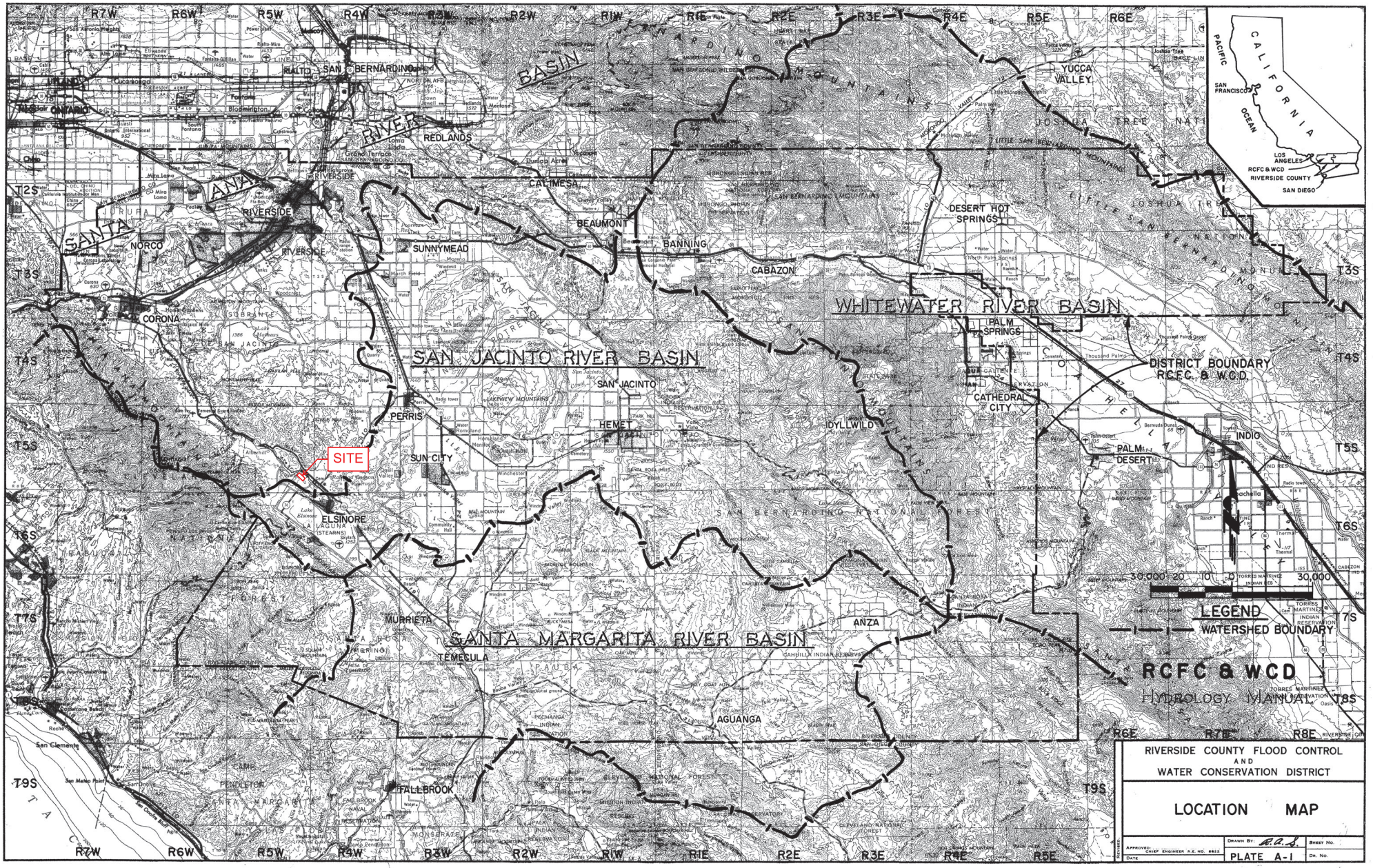
Appendix

B

RCFC PRECIPITATION DATA & NRCS SOILS REPORT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SAN JACINTO RIVER BASIN
WHITEWATER RIVER BASIN
SANTA MARGARITA RIVER BASIN
SANTA ANA RIVER BASIN
DISTRICT BOUNDARY
R.C.F.C. & W.C.D.
LEGEND
WATERSHED BOUNDARY
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
LOCATION MAP
PLATE A-1
CALIFORNIA
PACIFIC OCEAN
SAN FRANCISCO
LOS ANGELES
RCFC & WCD
RIVERSIDE COUNTY
SAN DIEGO
30,000 20 10 0 30,000
SAN BERNARDINO
RIVERSIDE
CORONA
NORCO
ONTARIO
RIALTO
REDLANDS
CALIMESA
BEAUMONT
BANNING
SUNNYMEAD
CABAZON
DESERT HOT SPRINGS
YUCCA VALLEY
PALM SPRINGS
CATHEDRAL CITY
PALM DESERT
INDIO
IDYLLWILD
SAN JACINTO
HEMET
PERRIS
SUN CITY
ELSINORE
MURRIETA
TEMECULA
ANZA
AGUANGA
FALLBROOK
SAN CLEMENTE
CAMP PENDLETON
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
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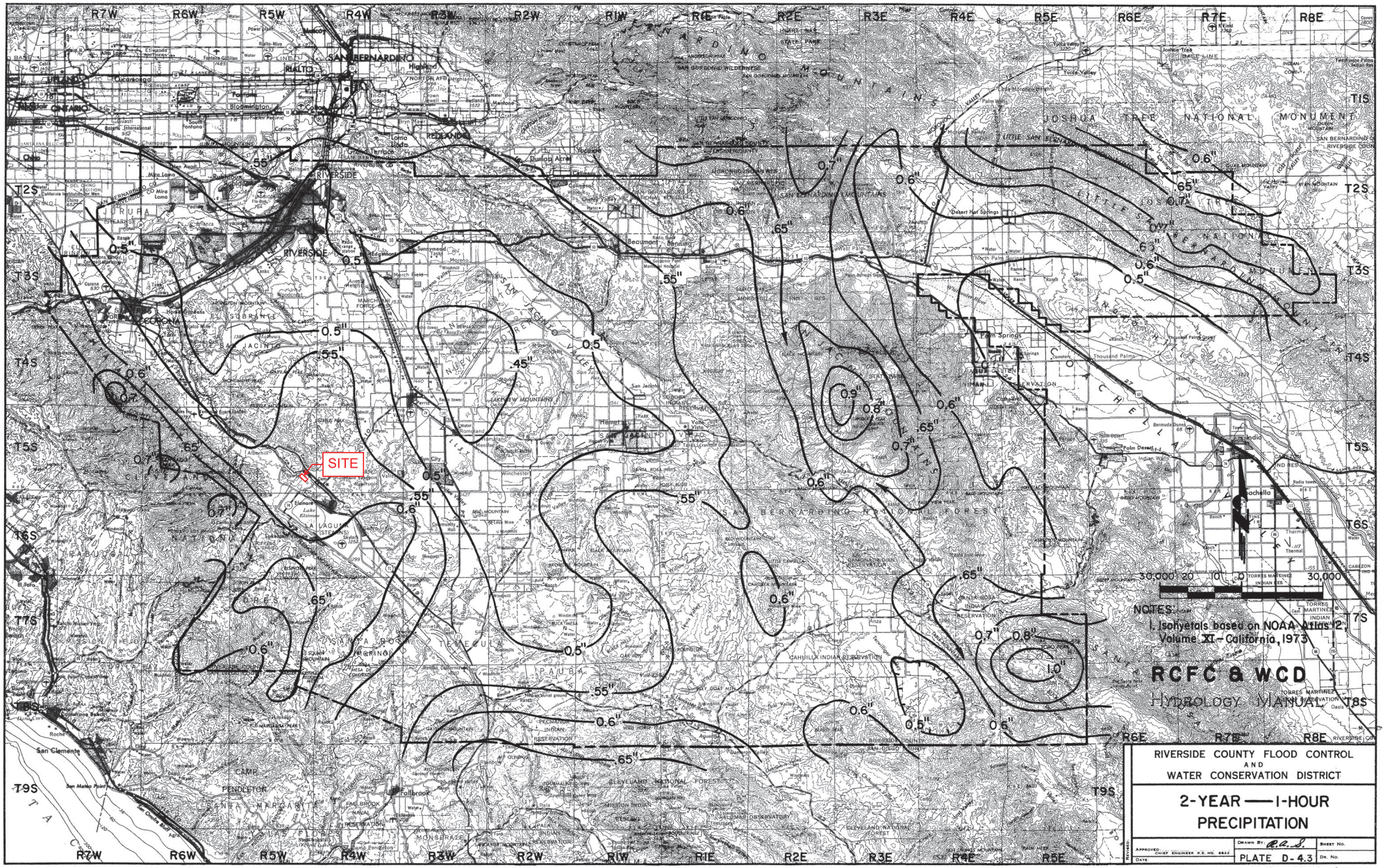
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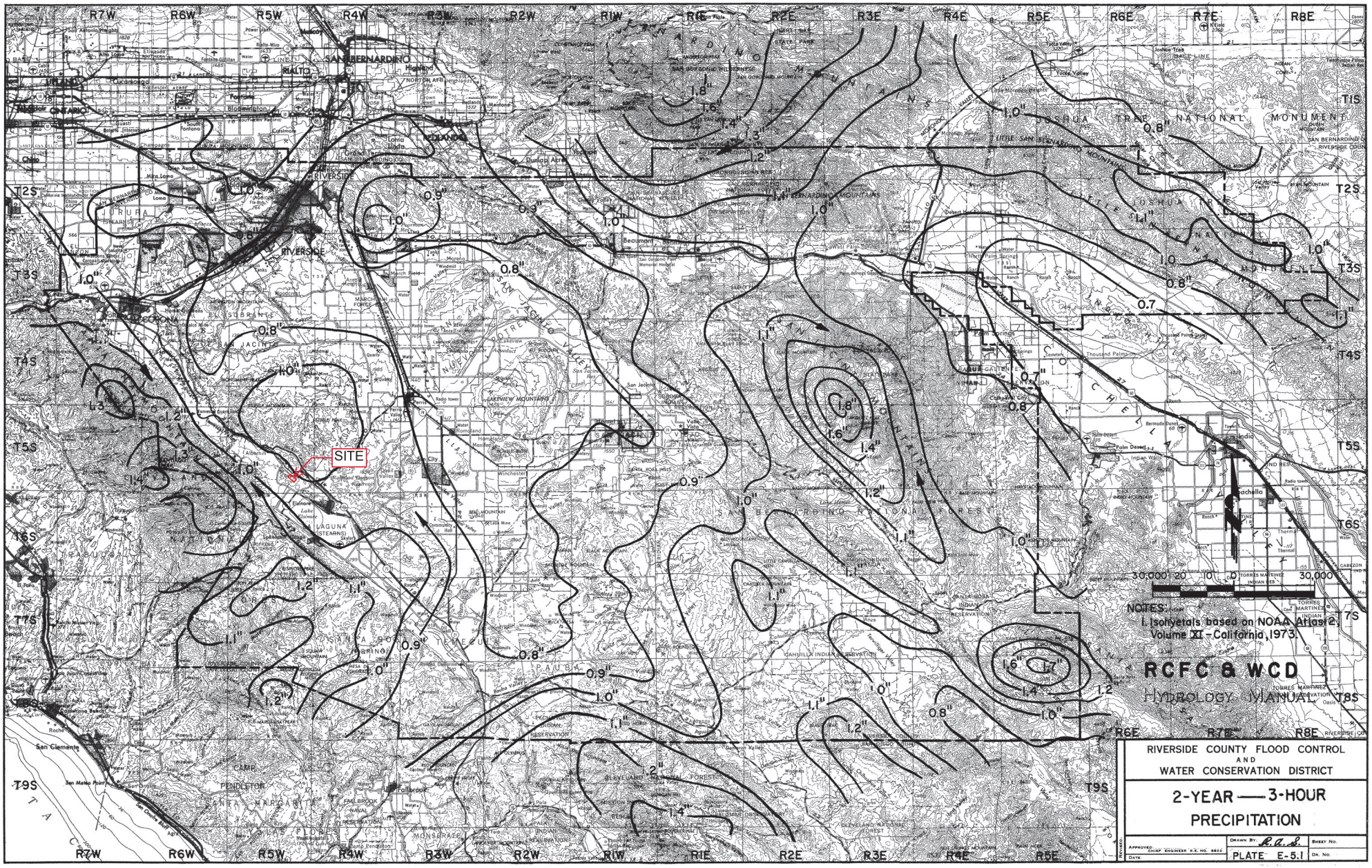
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.3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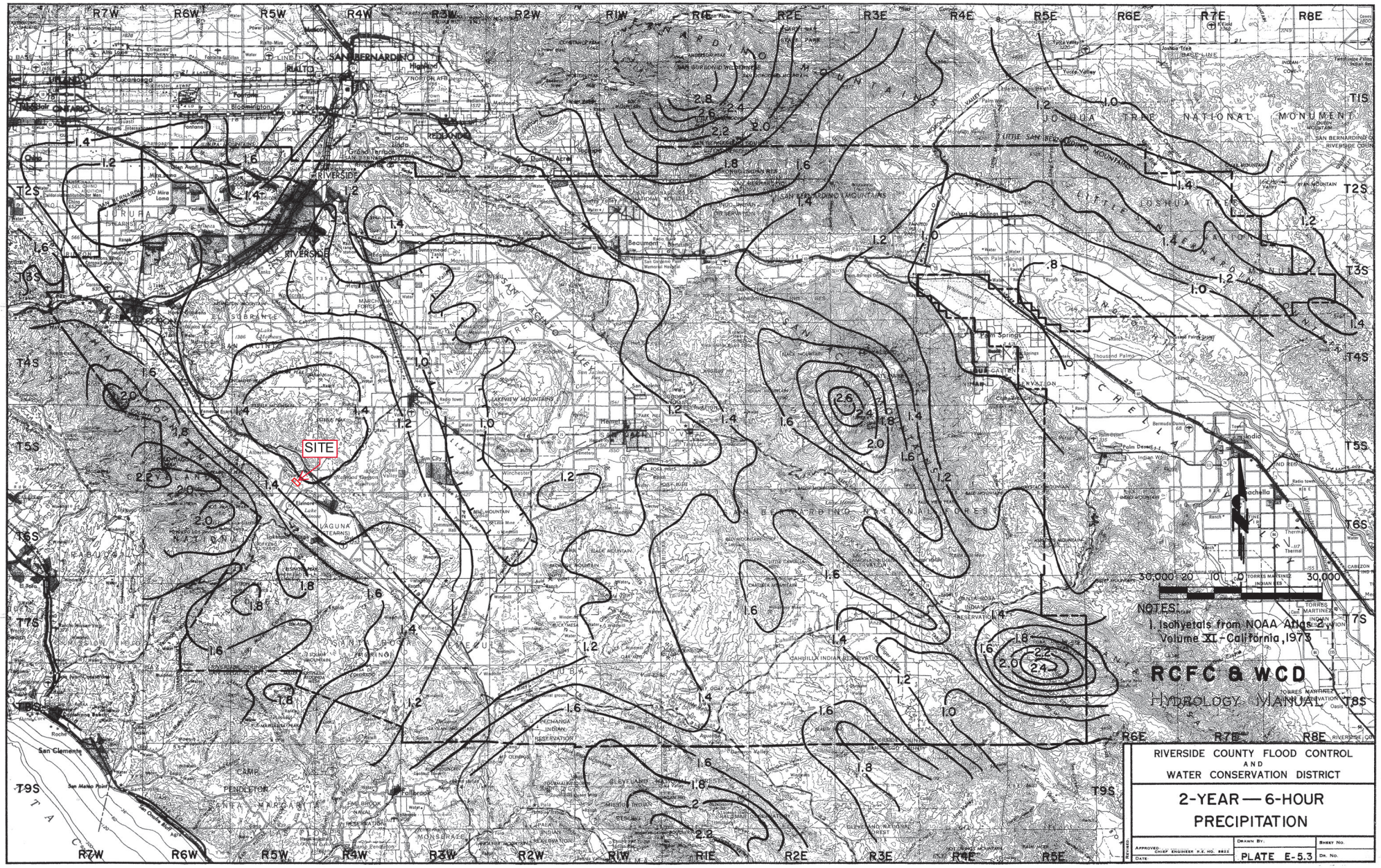
2-YEAR — 3-HOUR PRECIPITATION
PLATE E-5.1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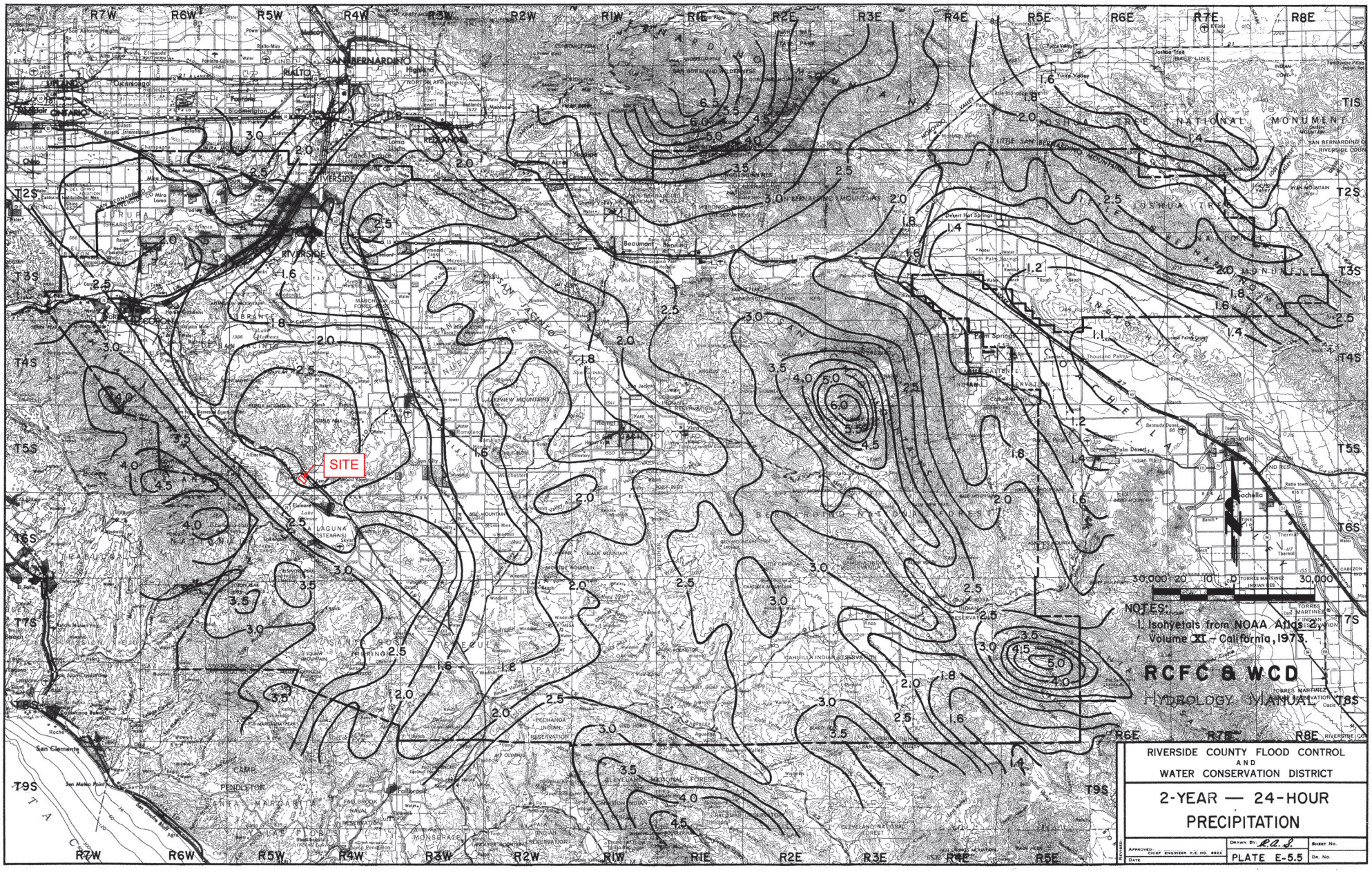
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 6-HOUR PRECIPITATION
PLATE E-5.3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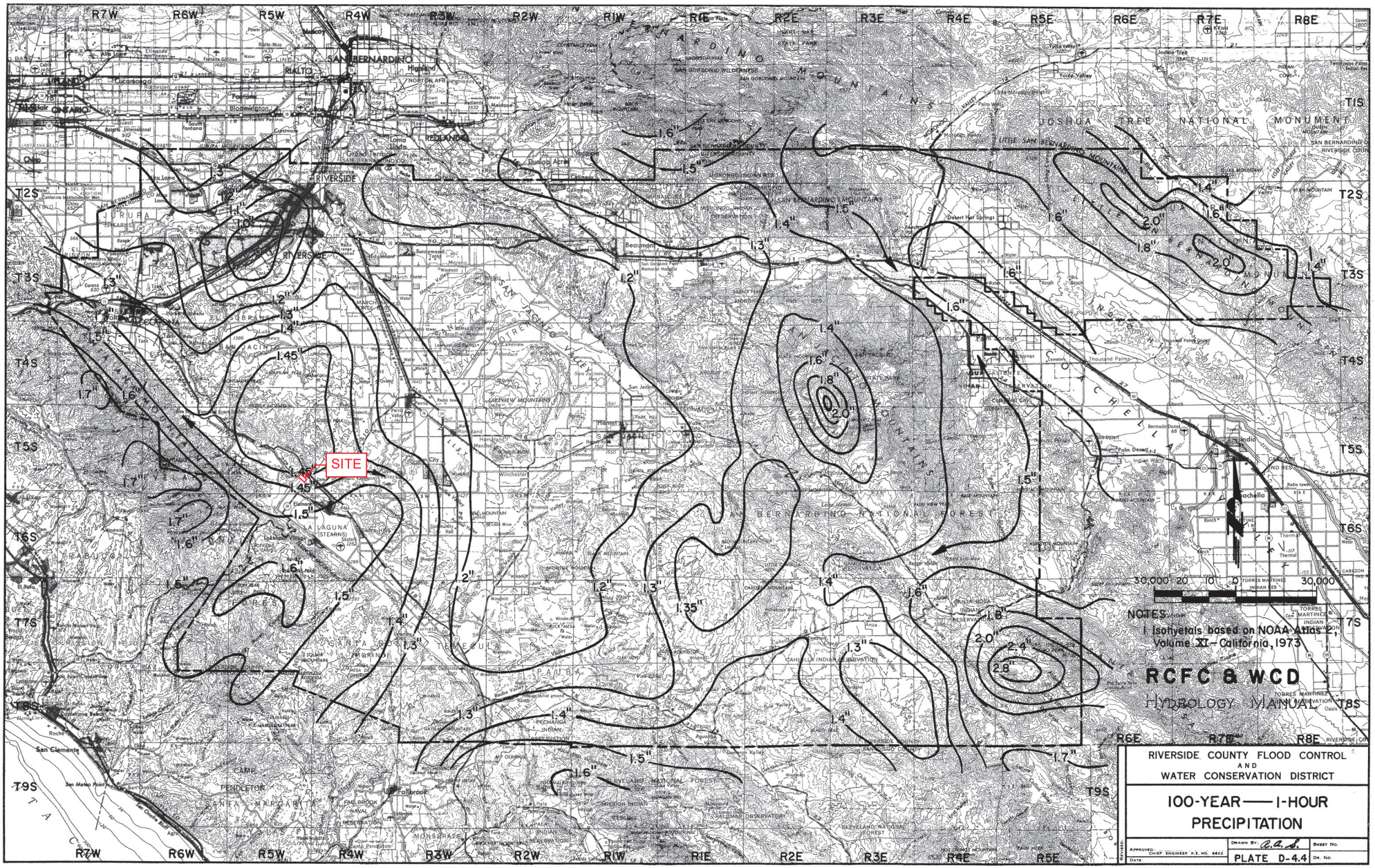
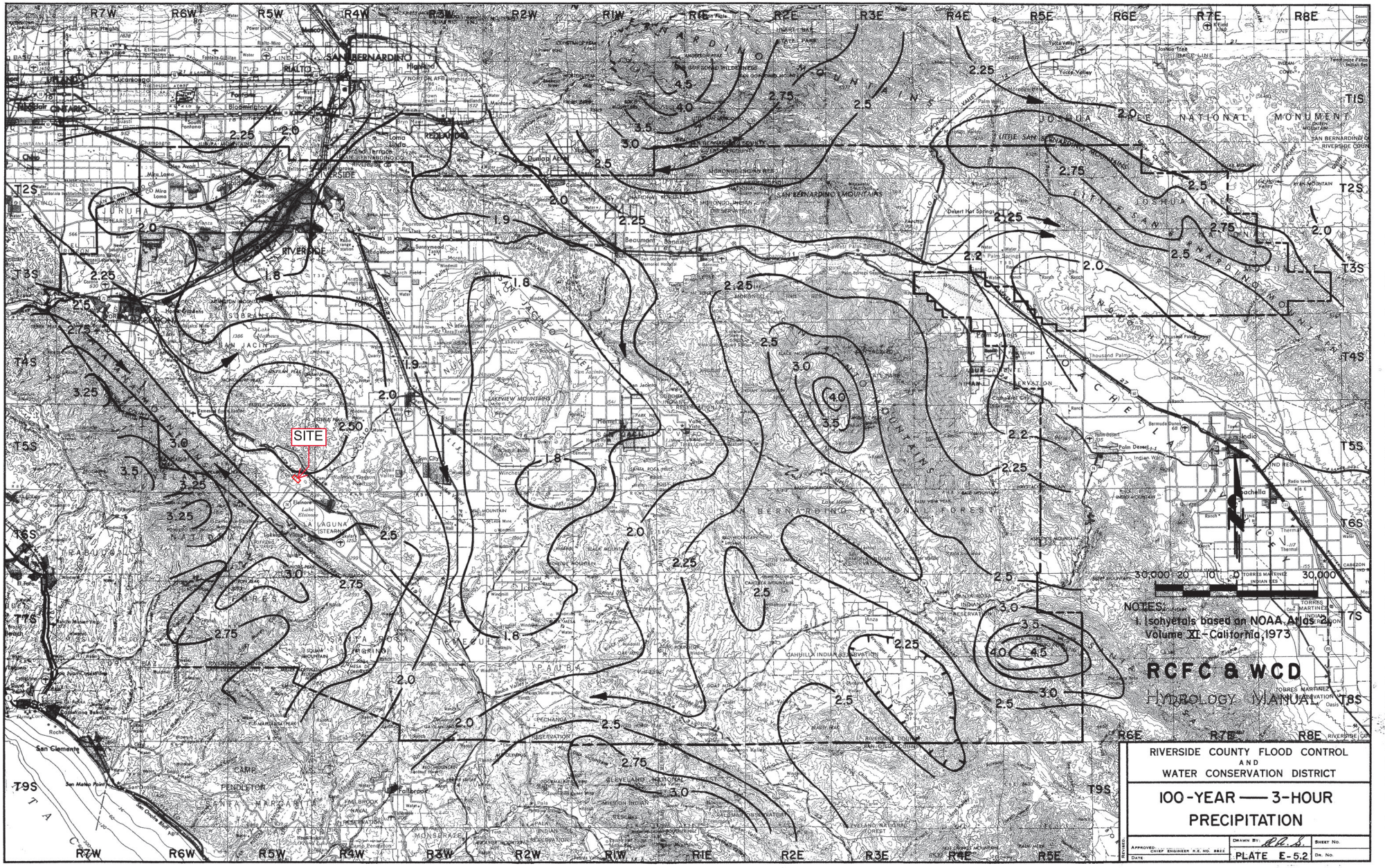
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.5


SITE
1.45"
1.5"
1.6"
1.7"
1.8"
2.0"
2.4"
2.8"
1.4"
1.3"
1.2"
1.35"
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
30,000 20 10 0 30,000
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.4
SAN BERNARDINO
RIVERSIDE
SAN JACINTO MOUNTAINS
SAN BERNARDINO NATIONAL FOREST
JOSHUA TREE NATIONAL MONUMENT
SANTA ROSA MOUNTAINS
R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E
T1S T2S T3S T4S T5S T6S T7S T8S T9S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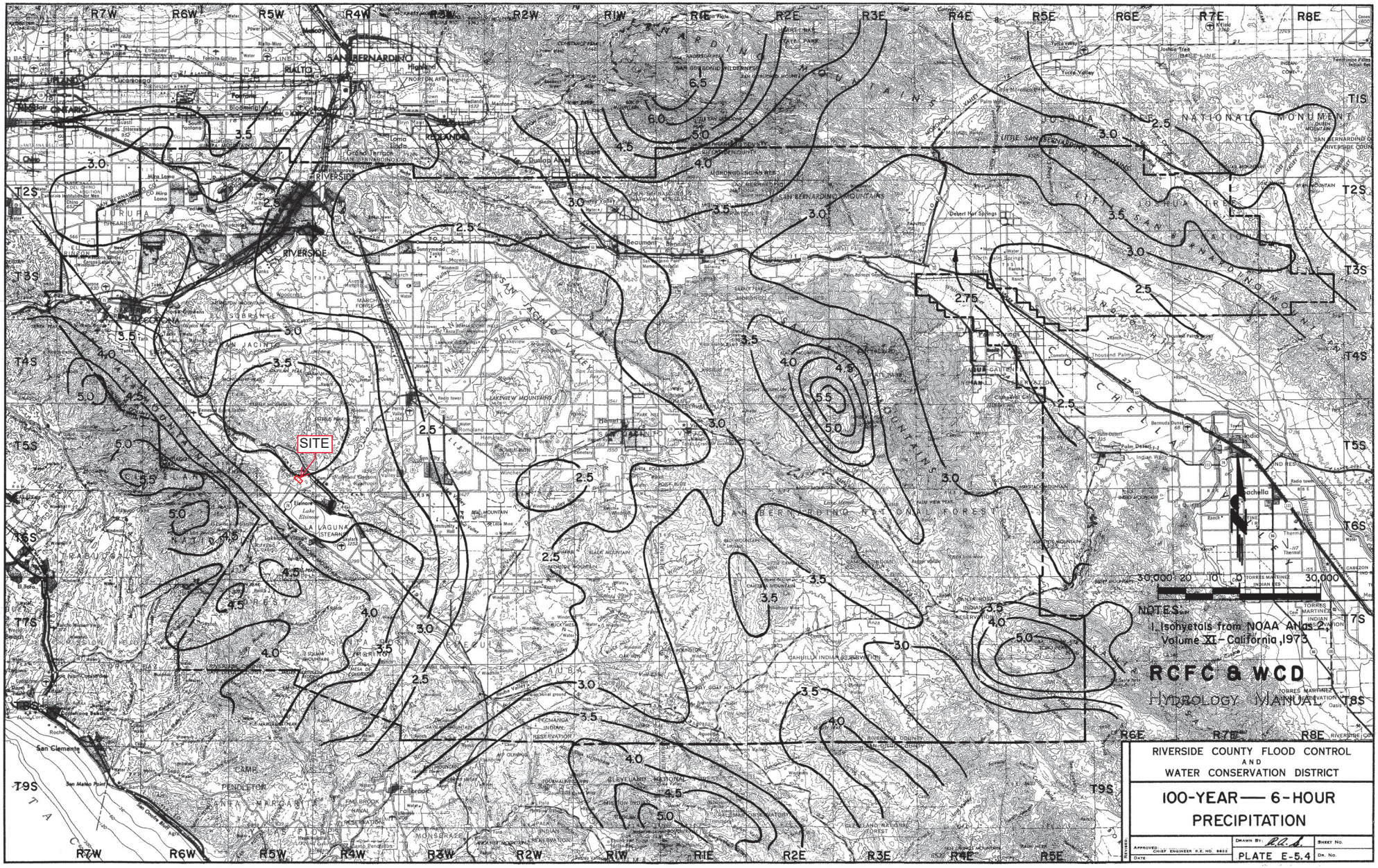
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 3-HOUR PRECIPITATION
PLATE E-5.2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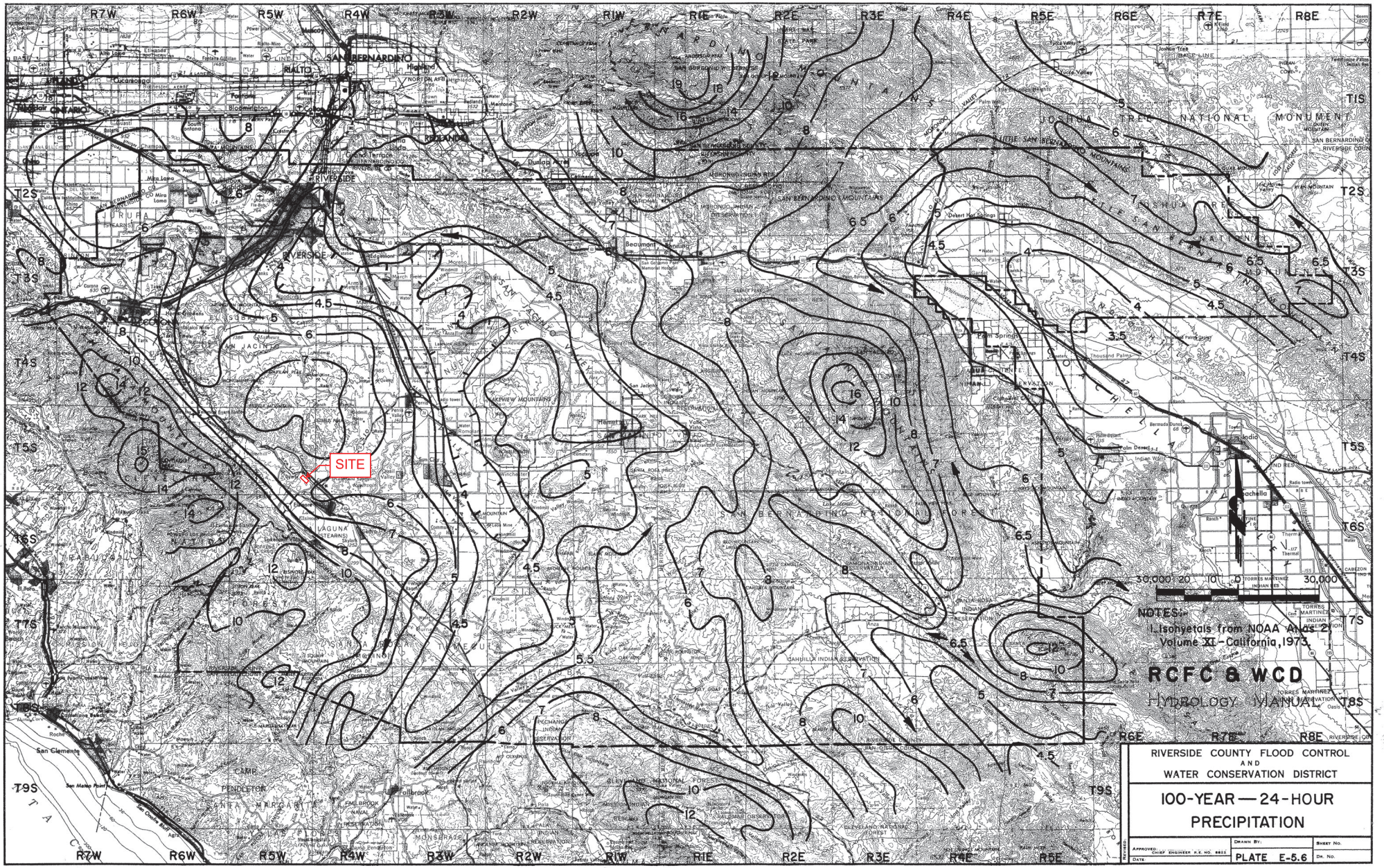
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 6-HOUR PRECIPITATION
PLATE E-5.4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RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.6

SITE
.45
.50
.55
.58
.60
.63
.65
NOTES:
1. Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
SLOPE OF INTENSITY DURATION CURVE
PLATE D-4.6

January 31, 2024 Project No. 23160-01

Mr. Trygg Danforth
Ecosystem Investment Partners
5550 Newbury Street, Suite B
Baltimore, Maryland 21209

Subject: ***Preliminary Geotechnical Subsurface Evaluation and Recommendations, Proposed Approximate 65-Acre Industrial Development, Baker Street, Lake Elsinore, California***

In accordance with your request, LGC Geotechnical, Inc. has performed a preliminary geotechnical subsurface evaluation and recommendations for the proposed approximately 65-acre industrial development located on Baker Street in the City of Lake Elsinore, California. The purpose of our study was to evaluate the existing onsite geotechnical conditions and to confirm that the site can be developed from a geotechnical perspective. This report presents the results of our evaluation and geotechnical analysis and provides a summary of our conclusions and recommendations relative to the proposed development of the site.

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Sincerely,

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Project Engineer

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Project Geologist

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STATE OF CALIFORNIA

RLD/BPG/BPP/amm

Distribution: (1) Addressee (electronic copy)

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1.2 Project Description 1
1.3 Field Evaluation 2
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1.0 INTRODUCTION

1.1 Purpose and Scope of Services

This report presents the results of our preliminary geotechnical evaluation for the proposed approximately 65-acre industrial development located along Baker Street in Lake Elsinore, California (Figure 1).

The purpose of our study was to provide a preliminary geotechnical evaluation relative to the proposed industrial development. As part of our scope, we have: 1) reviewed available geotechnical background information including in-house regional geologic maps; 2) performed a subsurface geotechnical evaluation in the area of the proposed development; 3) performed laboratory testing of select soil samples obtained during our subsurface evaluation; 4) incorporated field and laboratory data into our analysis; and 5) prepared this preliminary geotechnical summary report presenting our findings, preliminary conclusions and recommendations for the development of the proposed project.

The findings, conclusions, and recommendations presented herein should be considered preliminary and will need to be confirmed/updated as part of a future 40-scale grading plan review report. Additional fieldwork and laboratory testing may be required. It should be noted that LGC Geotechnical does not provide environmental consulting services and did not address the environmental conditions of the subject site.

1.2 Project Description

The subject property is located on an approximately 65-acre site along the southwest side of Baker Street, in the city of Lake Elsinore, California (Figure 1). Site elevations range from approximately 1,392 in the southwest portion of the site to approximately 1,260 in the northeast portion of the site. The site is mostly undeveloped with one existing structure in the eastern portion of the site. The site is covered by low lying vegetation and manmade (dirt) trails throughout.

The proposed development will include grading and construction of two industrial buildings totaling approximately 1,000,000 square feet, associated drive aisles, retaining walls, and parking areas (RGA, 2023). The proposed grading will include cutting into the hillsides on the southwest portion of the site. The proposed cut slopes will be up to approximately 70 feet tall. Proposed slope inclinations will be at 2:1 (horizontal to vertical) inclinations or flatter. Retaining walls are proposed along all sides of the site. One approximately 45-foot-tall retaining wall is proposed along the southwest portion of the site (KWC, 2024). The proposed industrial buildings are anticipated to be at-grade concrete tilt-up structures with estimated maximum column and wall loads of approximately 150 kips and 10 kips per linear foot, respectively. Please note no structural loads were provided to us at the time of this report.

The preliminary recommendations given in this report are based upon the provided preliminary grading information and the estimated structural loads as indicated above. We understand that the project plans are currently being developed at this time. LGC

Geotechnical should be provided with updated project plans and the actual structural loads when they become available, in order to either confirm or modify the recommendations provided herein. This may include, but is not limited to, additional subsurface field work, laboratory testing, and analysis to provide a design level 40-scale grading plan review geotechnical report.

1.3 Field Evaluation

The field portion of our evaluation included excavation of three large-diameter borings, fourteen small-diameter hollow-stem auger borings, and fourteen exploratory test pits.

Three large-diameter, bucket-auger borings (BA-1, BA-1B, and BA-2,) were excavated on the site by Big Johnny & Pam's Drilling under subcontract to LGC Geotechnical (Sheet 1). The maximum depth of the bucket-auger borings was approximately 100 feet below existing grade. The bucket-auger borings were excavated to evaluate the geologic structure of the underlying bedrock materials and to obtain samples for laboratory testing. Samples were obtained at select locations for laboratory testing. The large-diameter boreholes were surface logged during excavation and downhole logged by an engineering geologist in order to obtain structural geologic information. Borings were subsequently backfilled with cuttings and tamped.

Fourteen exploratory hollow-stem borings (HS-1 through HS-8 and I-1 through I-6) were drilled to depths ranging from approximately 3 to 50 feet below existing grades. An LGC Geotechnical engineer observed the drilling operations, logged the borings, and collected soil samples for laboratory testing. The borings were excavated using a track-mounted CME 75 drill rig equipped with both a 6 and 8-inch-diameter hollow-stem auger. Driven soil samples were collected by means of the Standard Penetration Test (SPT) and Modified California Drive (MCD) sampler generally obtained at 2.5 to 5-foot vertical increments. The MCD is a split-barrel sampler with a tapered cutting tip and lined with a series of 1-inch-tall brass rings. The SPT sampler and MCD sampler were driven using a 140-pound automatic hammer falling 30 inches to advance the sampler a total depth of 18 inches. The raw blow counts for each 6-inch increment of penetration were recorded on the boring logs. Bulk samples were also collected and logged at select depths for laboratory testing. At the completion of drilling, the borings were backfilled with the native soil cuttings and tamped. Some settlement of the backfill soils may occur over time.

Fourteen exploratory test pits (TP-1 through TP-14) were excavated utilizing a standard backhoe with a 3-foot bucket in order to estimate removal depths, geologic materials, and obtain samples for laboratory testing. An engineering geologist observed the operation, logged the geotechnical test pits, and collected the soil samples. Subsequent to logging, the test pits were backfilled with native soils and compacted using a compaction wheel. Some settlement of the backfill soils may occur over time.

Infiltration testing was performed within five of the borings (I-2 through I-6) at depths ranging from approximately 3 to 12 feet below existing grade. Please note that infiltration test I-1 was abandoned due to groundwater that was encountered at a depth of approximately 11 feet, prior to the design depth of the infiltration test being reached. Test well installation consisted of placing a 3-inch diameter perforated PVC pipe in each excavated borehole and backfilling the

annulus with crushed rock including the placement of approximately 2 inches of crushed rock at the bottom of each borehole. Infiltration testing was performed in accordance with guidelines set forth by the County of Riverside (2011). The PVC pipes were removed, and the holes were subsequently backfilled with native soils at the completion of testing.

The approximate locations of our borings and test pits are shown on the Preliminary Geotechnical Map (Sheet 1). Boring and test pit logs are presented in Appendix B.

1.4 Laboratory Testing

Representative bulk and driven samples were retained for laboratory testing during our field evaluation. Laboratory testing included in-situ moisture content and in-situ dry density, grain size analysis, Atterberg Limits, expansion index, laboratory compaction, consolidation, direct shear, R-value, and corrosion testing.

The following is a summary of the laboratory test results.

- Dry density of the samples collected ranged from approximately 87 pounds per cubic foot (pcf) to 125 pcf, with an average of 110 pcf. Field moisture contents ranged from approximately 3 percent to 26 percent, with an average of 15 percent.
- Five fines content and sieve analysis tests indicated fines content (passing No. 200 sieve) ranging from 27 to 73 percent. According to the Unified Soils Classification System (USCS), the tested samples are classified as “coarse-grained” and “fine-grained” soil.
- Five Atterberg Limit (liquid limit and plastic limit) tests were performed. Results indicated Plasticity Index values ranging from 22 to 41.
- Two Expansion Index (EI) tests indicated EI values ranging from 71 to 99, corresponding to “Medium” to “High” expansion potential.
- Laboratory compaction testing of two bulk samples indicated a maximum dry density ranging from 113.5 to 116.5 pcf with an optimum moisture content ranging from 12.0 to 14.0 percent.
- One consolidation test was performed on select samples. The deformation versus vertical stress plot is provided in Appendix C.
- Four direct shear tests were performed on select relatively undisturbed and disturbed samples. The plots are provided in Appendix C.
- One R-value test performed on a representative bulk sample indicates an R-value of less than 5. The R-value plot is provided in Appendix C.
- Corrosion testing indicated soluble sulfate contents less than approximately 0.03 percent, chloride contents ranging from 180 to 220 part per million (ppm), pH values ranging from 6.57 to 7.91 and minimum resistivity values ranging from 735 to 1240 ohm-cm.

A summary of the results is presented in Appendix C. The moisture and dry density test results are presented on the boring logs in Appendix B.

LGC Geotechnical, Inc.

FIGURE 1
Site Location Map

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	Not to Scale
DATE	January 2024

2.0 GEOTECHNICAL CONDITIONS

2.1 Regional Geology

Regionally, the site is located on the western edge of the Perris Block within the Peninsular Ranges Geomorphic Province of California. The Peninsular Ranges are characterized by steep, elongated valleys that trend west to northwest. The northwest-trending topography is controlled by the Elsinore fault zone, which extends from the San Gabriel River Valley southeasterly to the United States/Mexico border. The Santa Ana Mountains lie along the western side of the Elsinore fault zone, while the Perris Block is located along the eastern side of the fault zone. The mountainous regions are underlain by Pre-Cretaceous, metasedimentary and metavolcanic rocks and Cretaceous plutonic rocks of the Southern California Batholith. Tertiary and Quaternary rocks are generally comprised of non-marine sediments consisting of sandstone, mudstones, conglomerates, and occasional volcanic units.

The site is not located within a mapped State of California Earthquake Fault-Rupture Hazard Zone per compiled maps released by the CGS (2018), nor a County of Riverside Fault Zone (Riverside County, 2019) and no known active or potentially active faults cross the site.

2.2 Site Specific Geology

Based on our field investigation and review of available geologic maps and reports, the primary bedrock unit underlying the site is the Tertiary Silverado Formation. Surficial units consisting of undocumented artificial fill, topsoil, colluvium, and alluvium overlie the bedrock. A brief description of the geologic units on the site is presented below and their approximate lateral extents are provided on the Preliminary Geotechnical Map (Sheet 1).

2.2.1 Undocumented Artificial Fill (afu)

Few relatively thin zones of undocumented artificial fill were observed in the northern portion of the site. Undocumented fill was not mapped across most of the site apart from an observed trash and soil pit approximately 9 feet in depth, located adjacent an old building pad (see TP-7, Appendix B and Sheet 1 Preliminary Geotechnical Map). The undocumented fill, as observed, consisted of loose, dry, sandy silt with some trash and debris. The undocumented fill is considered potentially compressible and will need to be removed as it is encountered throughout the site to competent formational material. Although the observed undocumented fill was found to be on the order of 9 feet, deeper undocumented fill requiring deeper removals may be encountered during site grading.

2.2.2 Topsoil/Colluvium (Qcol)

A relatively thin veneer of topsoil/colluvium mantles much of the site. Topsoil and colluvium were not mapped across most of the site due to their relatively thin nature (less than 1-2 feet) and variable lateral extent. However, a thicker area of colluvium (up to 15

feet) was mapped in the southeast portion of the site. The topsoil/colluvium, as observed, consists predominantly of red brown-to-light brown, dry to moist, loose to medium dense silty to clayey sand to sandy clay. These soils are typically massive, porous and contain scattered roots and organics. The topsoil/colluvium is considered potentially compressible and will need to be removed to competent formational material in areas of proposed development. The potentially compressible topsoil is estimated to be approximately 1 to 2 feet in thickness in the hillside portions of the site. Topsoil/colluvium soils on the lower portions of the hillsides and on the margins of the onsite drainages can be expected to be up to approximately 15 feet in thickness. However, deeper removals may be encountered during site grading.

2.2.3 Quaternary Alluvium (Map Symbol: Qal)

Quaternary-aged alluvium is present throughout the low-lying areas of the site. The areas underlain by alluvial soils have been mapped on the Preliminary Geotechnical Map (Sheet 1). These soils typically consist of brown, dry to very moist, medium dense silty sand and very stiff silt and clay with varying amounts of sand and gravel. The upper portion of the alluvium is porous and usually contains localized zones of moderate to abundant roots and other organic matter. The upper portion of the alluvium is considered potentially compressible and will need to be removed to competent alluvium or formational material in areas of proposed development. In general, unsuitable alluvial removals are estimated to be up to approximately 8 feet below the surface. However, deeper removals may be encountered during site grading.

2.2.4 Tertiary Silverado Formation (Map Symbol: Tsi)

The Santiago Formation was deposited in a shallow marine and a non-marine environment. Typically, this material consists of sandstone, siltstone, claystone and some cobble conglomerate. The Silverado Formation can also locally include clay, carbonaceous shale, and lignite beds. The majority of the Silverado Formation material encountered during our subsurface investigation of the site consisted of moderately bedded to massive material dipping predominantly to the south (~ 5 to 30 degrees). Minor amounts of what may be Quaternary Pauba formation "fanglomerate" material was encountered at the top of the northeast trending ridgelines but were not differentiated for the purposes of this report.

2.3 Geologic Structure

The Silverado Formation was found to be moderate to massively bedded, generally dipping variably to the south (~ 5 to 30 degrees). Some thicker units of siltstone interbedding were found predominately within LGC-BA-2, dipping moderately into slope (15-30 degrees). Some polished surfaces confined within siltstone beds indicate some internal tectonic shearing within the unit. A continuous clay bed up to ¼" thick was found dipping approximately 20 degrees to the south within boring LGC-BA-1B. In general, bedding was found to be consistent with information found on the regional geologic maps (USGS, 2003).

2.4 Groundwater

Groundwater was encountered at depths ranging from approximately 11 to 45 feet below existing grade. Based on nearby groundwater wells, elevation of the nearby creek bottom approximately 750 feet northeast of the site, and groundwater data gathered during our subsurface evaluation, historic high groundwater is estimated to be approximately 10 feet below existing grade.

Seasonal fluctuations of groundwater elevations should be expected over time. In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present within the near-surface deposits due to local seepage or during rainy seasons. Local perched groundwater conditions or surface seepage may develop once site development is completed and landscape irrigation commences.

2.5 Preliminary Field Infiltration Testing

Estimation of infiltration rates was performed in general accordance with guidelines set forth by the County of Riverside (2011). In general, 3-inch diameter perforated PVC pipes were placed in each borehole to be tested and the annulus was backfilled with gravel, including placement of about 2 inches of gravel at the bottom of the borehole. The infiltration wells were pre-soaked prior to testing. Based on the County of Riverside methodology, the calculated (observed) infiltration rates are provided in Table 1. The observed infiltration rates are considered representative of the site soils where tested. These observed infiltration rates do not include any factor of safety. Observed infiltration rates have been normalized to correct the 3-Dimensional flow that occurs within the field test to 1-Dimensional flow out of the bottom of the boring. The approximate infiltration test locations are shown on the Preliminary Geotechnical Map (Sheet 1) and the infiltration test data is summarized in Table 1. Infiltration test results are provided in Appendix E. Please note that infiltration test I-1 was abandoned due to groundwater that was encountered at a depth of approximately 11 feet, prior to reaching the design depth of the infiltration test.

TABLE 1

Summary of Infiltration Testing

Infiltration Test Location	Infiltration Test Depth Below Existing Grade (ft)	Observed Infiltration Rate* (Inch/Hr.)
I-2	3	0.01
I-3	10	0.02
I-4	3	0.07
I-5	12	0.01
I-6	3	0.14

*Normalized to One-Dimensional Flow, does not include any Factor of Safety.

The tested infiltration rates provided in this report are considered a general representation of the infiltration rates at the location of the infiltration boring. Please note, the testing of infiltration rates is highly dependent upon the materials encountered at the point of testing (i.e., location and depth of testing). Varying subsurface conditions may exist outside of the test locations which could alter the calculated infiltration rates indicated above. Please refer to Section 5.14 for preliminary subsurface water infiltration recommendations.

2.6 Seismicity and Faulting

California is located on the boundary between the Pacific and North American Lithospheric Plates. The average motion along this boundary is on the order of 50-mm/yr. in a right-lateral sense. The majority of the motion is expressed at the surface along the northwest trending San Andreas Fault Zone with lesser amounts of motion accommodated by sub-parallel faults located predominantly west of the San Andreas including the Elsinore, Newport-Inglewood, Rose Canyon, and Coronado Bank Faults. Within Southern California, a large bend in the San Andreas Fault north of the San Gabriel Mountains has resulted in a transfer of a portion of the right-lateral motion between the plates into left-lateral displacement and vertical uplift. Compression south and west of the bend has resulted in folding, left-lateral, reverse thrust faulting, and regional uplift creating the east-west trending Transverse Ranges and several east-west trending faults. Further south within the Los Angeles Basin, "blind thrust" faults are believed to have developed below the surface also as a result of this compression, which have resulted in earthquakes such as the 1994 Northridge event along faults with little to no surface expression.

Prompted by damaging earthquakes in Northern and Southern California, State legislation and policies concerning the classification and land-use criteria associated with faults have been developed. The Alquist-Priolo Earthquake Fault Zoning Act was implemented in 1972 to prevent the construction of urban developments across the trace of active faults. California Geologic Survey Special Publication 42 was created to provide guidance for following and implementing the law requirements. Special Publication 42 was most recently revised in 2018 (CGS, 2018). According to the State Geologist, an "active" fault is defined as one which has had surface displacement within Holocene time (roughly the last 11,700 years). Regulatory Earthquake Fault Zones have been delineated to encompass traces of known, Holocene-active faults to address hazards associated with surface fault rupture within California. Where developments for human occupation are proposed within these zones, the state requires detailed fault evaluations be performed so that engineering-geologists can identify the locations of active faults and recommend setbacks from locations of possible surface fault rupture.

The subject site is not located within a State of California Earthquake Fault-Rupture Hazard Zone (CGS, 2018), nor a County of Riverside Fault or Fault Zone (Riverside County, 2019), and there are no known active or potentially active faults known to cross the site. Therefore, the possibility of damage due to ground rupture is considered low since no active faults are known to cross the site. The closest known active fault zones are the Elsinore (approximately 0.8 miles away) and San Jacinto (approximately 19 miles away) fault zones.

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region which may affect the site include ground lurching and shallow

ground rupture, soil liquefaction, dynamic settlement, seiches, and tsunamis. These secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology. A discussion of these secondary effects is provided in the following sections.

2.6.1 Liquefaction and Dynamic Settlement

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions coexist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose near-surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential. In general, cohesive soils are not considered susceptible to liquefaction, depending on their plasticity and moisture content (Bray & Sancio, 2006). Effects of liquefaction on level ground include settlement, sand boils, and bearing capacity failures below structures. Dynamic settlement of dry loose sands can occur as the sand particles tend to settle and densify as a result of a seismic event.

Portions of the site, near Baker Street and Pierce Street, are located within a zone of low to moderate liquefaction potential based on the Riverside County liquefaction zones map (County, 2023). The site will ultimately consist of compacted fill over dense sandy and hard clayey materials, which are not considered susceptible to liquefaction. The potential for liquefaction is considered very low.

2.6.2 Lateral Spreading

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass, gravity plus the earthquake inertial forces may cause the mass to move downslope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

Due to very low potential for liquefaction the potential for lateral spreading is considered very low.

2.7 Rippability

In general, the onsite surficial materials, such as undocumented fill, topsoil, colluvium, and alluvium are anticipated to be easily to moderately rippable utilizing conventional heavy-duty earth moving equipment (Caterpillar D9 or equivalent). Based on our hollow-stem auger borings and bucket auger borings that were located in areas that are proposed to have some of

the deepest cuts throughout the site, we anticipate the bedrock (Silverado Formation) to be moderately difficult to difficult to excavate. Localized areas of the bedrock may be very difficult to excavate but are anticipated to be able to be excavated utilizing a multi-shank ripper (Caterpillar D9) or equivalent method.

2.8 Oversized Material

Oversized material (material larger than 8 inches in maximum dimension) should be expected during site grading. When encountered, these materials will require special handling during grading which may include offsite disposal, crushing/breaking, or incorporating oversized materials into "rock fills" to meet project requirements. See Appendix F for more details.

2.9 Expansive Soil Characteristics

Laboratory test results indicate that site soils should be anticipated to have "Medium" to "High" expansion potential. Final expansion potential of site soils should be determined at the completion of grading.

3.0 ENGINEERING ANALYSES

3.1 Seismic Parameters for Structural Design

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2022 California Building Code (CBC) and applicable portions of ASCE 7-16 which has been adopted by the CBC. Please note that the following seismic parameters are only applicable for code-based acceleration response spectra and are not applicable for where site-specific ground motion procedures are required by ASCE 7-16. Representative site coordinates of latitude 33.6977 degrees north and longitude -117.3599 degrees west were utilized in our analyses. The maximum considered earthquake (MCE) spectral response accelerations (S_{MS} and S_{M1}) and adjusted design spectral response acceleration parameters (S_{DS} and S_{D1}) for Site Class C are provided in Table 2 below. The structural designer should contact the geotechnical consultant if structural conditions (e.g., number of stories, seismically isolated structures, etc.) require site-specific ground motions.

Section 1803.5.12 of the 2022 CBC (per Section 11.8.3 of ASCE 7) states that the maximum considered earthquake geometric mean (MCE_G) Peak Ground Acceleration (PGA) should be used for liquefaction potential. The PGA_M for the site is equal to 1.175g (SEAOC, 2023). The design PGA is equal to 0.783g (2/3 of PGA_M). The design PGA is applicable for retaining wall design.

A deaggregation of the PGA based on a 2,475-year average return period (MCE) indicates that an earthquake magnitude of 6.70 at a distance of 3.57 km from the site would contribute the most to this ground motion. A deaggregation of the PGA based on a 475-year average return period (Design Earthquake) indicates that an earthquake magnitude of 6.62 at a distance of 5.79 km from the site would contribute the most to this ground motion (USGS, 2014).

TABLE 2

Structural Seismic Design Parameters

Selected Parameters from 2022 CBC, Section 1613 - Earthquake Loads	Seismic Design Values	Notes/Exceptions
Distance to applicable faults classifies the site as a "Near-Fault" site.		Section 11.4.1 of ASCE 7
Site Class	C	Chapter 20 of ASCE 7
Ss (Risk-Targeted Spectral Acceleration for Short Periods)	2.306g	From SEAOC, 2023
S_1 (Risk-Targeted Spectral Accelerations for 1-Second Periods)	0.822g	From SEAOC, 2023
F_a (per Table 1613.2.3(1))	1.200	For Simplified Design Procedure of Section 12.14 of ASCE 7, F_a shall be taken as 1.4 (Section 12.14.8.1)
F_v (per Table 1613.2.3(2))	1.400	-
S_{MS} for Site Class C [Note: $S_{MS} = F_a S_S$]	2.767g	-
S_{M1} for Site Class C [Note: $S_{M1} = F_v S_1$]	1.151g	-
S_{DS} for Site Class C [Note: $S_{DS} = (^2/_3) S_{MS}$]	1.845g	-
S_{D1} for Site Class C [Note: $S_{D1} = (^2/_3) S_{M1}$]	0.767g	-
C_{RS} (Mapped Risk Coefficient at 0.2 sec)	0.896	ASCE 7 Chapter 22
C_{R1}(Mapped Risk Coefficient at 1 sec)	0.892	ASCE 7 Chapter 22

3.2 Soil Shear Strength Parameters

The soil shear strength parameters utilized in our slope stability analysis are primarily based on laboratory testing of the onsite materials. The shear strength of the along clay bedding was estimated from Atterberg Limits tests from clay materials obtained during downhole logging from our recent field evaluation (Stark, 2012). Where appropriate, soil shear strength parameters were increased for seismic loading conditions. Laboratory test results are provided in Appendix C.

TABLE 3

Soil Shear Strength Parameters

Soil Type	Static		Pseudo Static	
	ϕ (Degrees)	Cohesion (psf)	ϕ (Degrees)	Cohesion (psf)
Artificial Fill	32	100	32	200
Silverado Formation – Across Bedding	33	350	34	600
Silverado Formation – Clay Beds	18	100	18	200

3.3 Slope Stability Analyses

Slope stability analysis was performed for Cross Sections A-A,' B-B' and C-C.' This slope stability analysis was performed along a typical section of the relatively large slope and retaining wall combination in the western portion of the site (A-A'), the largest retaining wall height with an ascending slope behind it (B-B') and the largest cut slope within the southern portion of the site (C-C').

Slope stability analysis was performed using the computer program GEOSTASE, version 4.30.31 (Gregory Geotechnical Software, 2019). Potential block and rotational failure modes were analyzed using Janbu's Simplified Method and Bishop's Modified Method, respectively.

A minimum factor of safety of 1.5 is typically required for static loading conditions. Seismic slope stability analysis was performed in accordance with Special Publication 117A (CGS, 2008). Special Publication 117A requires a "screening" slope stability calculation based on modified horizontal seismic coefficient (Kh) derived from site-specific seismic parameters (i.e., Design PGA, earthquake magnitude and distance) based on a 15-cm threshold. If the resulting calculated factor of safety is equal to or greater than 1.0, the analysis passes the screening calculation and no further analysis is required. If the calculated factor of safety is less than 1.0, a displacement analysis is required in order to assess estimated slope movement during a seismic event. Based on the design peak ground acceleration of 0.783g, a horizontal seismic coefficient (Kh) of 0.261 was determined for a 15-cm threshold, see Appendix D.

Based on our slope stability analysis the site should be considered stable. Although, the slope stability analysis for Section B-B' indicated a single row of tieback anchors for the taller portions of the proposed soil nail retaining wall would be necessary to globally stabilize the slope and to construct the soil nail retaining wall. For this reason, we recommend the retaining wall at Cross Section B-B' be constructed as a soil nail retaining wall with one row of tiebacks anchors at the top of the retaining wall. Refer to Appendix D for preliminary results and Section 5.3 for preliminary tieback recommendations. Preliminary soil nail retaining wall recommendations are provided in Section 5.8. Updated design level analysis and recommendations should be provided during a 40-scale grading plan review evaluation. Preliminary slope stability analysis is provided in Appendix D.

3.4 Surficial Stability Analysis

A general surficial slope stability analysis was performed for the maximum proposed 2:1 (horizontal to vertical) cut slopes assuming a zone of saturation of 4-feet-deep parallel to the slope surface. The analysis indicated a surficial factor of safety greater than 1.5. Refer to Appendix D.

4.0 CONCLUSIONS

Based on the results of our geotechnical evaluation, it is our opinion that the proposed site development is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are incorporated into the site design, grading, and construction.

The following is a summary of the primary geotechnical factors which may affect future development of the site.

- The near-surface loose and compressible soils are not suitable for the planned improvements in their present condition (refer to Section 5.1).
- Groundwater was encountered at depths ranging from approximately 11 to 45 feet below existing grade. Based on nearby groundwater wells and elevation of the nearby creek bottom approximately 750 feet northeast of the site, historic high groundwater should be expected to be found at approximately 10 feet below existing grade.
- The subject site is not located within a State of California Fault Rupture Hazard Zone and there are no known active or potentially active faults onsite (CGS, 2018). The possibility of damage due to ground rupture is considered low since no active faults are known to cross the site.
- The main seismic hazard that may affect the site is from ground shaking from one of the active regional faults. The subject site will likely experience strong seismic ground shaking during its design life.
- The site is located in a mapped zone for low to moderate liquefaction potential (County, 2023). However, due to the site ultimately consisting of compacted fill over dense/hard native materials, the potential for liquefaction is considered very low.
- It should be noted that the site contains clayey soils with high fines content and expansion potential that are not suitable for backfill of retaining walls. Therefore, select grading and stockpiling or import of select sandy soils meeting project requirements will be required.
- Site soils should be considered to have “Medium” to “High” expansion potential. Mitigation measures are required for foundations and site improvements like concrete flatwork to minimize the impacts of expansive soils.
- Pre-soaking of the subgrade for at-grade building slabs and flatwork will be required due to site expansive soils. The duration of this process varies greatly based on the chosen method and is also dependent on factors such as soil type and weather conditions. Time duration for presoaking should be accounted for in the construction schedule (typically, two to three weeks for high expansion). Additional time at the completion of presoaking may be necessary for the surface soils of the pad to dry back sufficiently to be capable of supporting trenching equipment.
- Preliminary rippability analysis suggest the onsite surficial materials, such as undocumented fill, topsoil, colluvium, and alluvium are anticipated to be easily to moderately rippable utilizing conventional heavy-duty earth moving equipment (Caterpillar D9 or equivalent). We anticipate the bedrock (Silverado Formation) to be moderately difficult to difficult to excavate. Localized areas of the bedrock may be very difficult to excavate but are anticipated to be able to be excavated utilizing a multi-shank ripper (Caterpillar D9) or equivalent method.
- From a geotechnical perspective, the existing onsite soils are considered suitable material for use as general fill (with the exception for retaining wall backfill), provided that they are relatively free

from rocks (larger than 8 inches in maximum dimension), construction debris, and significant organic material. Moisture conditioning of site soils will be required to obtain the required compaction.

- Oversized materials (greater than 8-inches in maximum dimension) should be anticipated to be generated during grading. These materials will require special handling during grading which may include offsite disposal, crushing/breaking, and/or specialty placement in deep fills to meet project requirements.
- Design cut and fill slopes are anticipated to be both grossly and surficially stable, as long as they are constructed in accordance with our geotechnical recommendations contained herein and are properly landscaped and maintained. Detailed slope stability analysis and recommendations should be provided in a future 40-scale grading plan review report.

Please note that the conclusions and recommendations contained herein are based on preliminary subsurface conditions, which have been interpreted from a limited number of subsurface excavations. These conclusions and recommendations should be verified during site grading and adjusted according to the actual exposed field conditions.

5.0 PRELIMINARY RECOMMENDATIONS

The following recommendations are to be considered preliminary and should be confirmed upon completion of grading and earthwork operations. In addition, they should be considered minimal from a geotechnical viewpoint, as there may be more restrictive requirements from the architect, structural engineer, building codes, governing agencies, or the owner.

It should be noted that the following geotechnical recommendations are intended to provide sufficient information to develop the site in general accordance with the 2022 CBC requirements. With regard to the possible occurrence of potentially catastrophic geotechnical hazards such as seismic shaking, earthquake-induced landslides, liquefaction, etc. the following geotechnical recommendations should provide adequate protection for the proposed development to the extent required to reduce seismic risk to an "acceptable level." The "acceptable level" of risk is defined by the California Code of Regulations as "that level that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project" [Section 3721(a)]. Therefore, repair and remedial work of the proposed improvements may be required after a significant seismic event. With regards to the potential for less significant geologic hazards to the proposed development such as expansive soils, fill settlement, groundwater seepage, etc., the recommendations contained herein are intended as a reasonable protection against potential damaging effects. It should be understood, however, that our recommendations are intended to maintain the structural integrity of the proposed development and structures given the site geotechnical conditions but cannot preclude the potential for some cosmetic distress or nuisance issues to develop as a result of the site geotechnical conditions.

The geotechnical recommendations contained herein must be confirmed to be suitable or modified based on the actual conditions encountered during grading and construction.

5.1 Site Earthwork

We anticipate that earthwork at the site will consist of required earthwork removals, fill placement, subgrade preparation, precise grading, and construction of the proposed improvements.

We recommend that earthwork onsite be performed in accordance with the following recommendations, the 2022 CBC, the City of Lake Elsinore Grading Requirements, and the General Earthwork and Grading Specifications for Rough Grading included in Appendix F. In case of conflict, the following recommendations shall supersede all previous recommendations and those included as part of Appendix F. The following recommendations should be considered preliminary and may be revised based upon future evaluation and review of the project plans and/or based on the actual conditions encountered during site grading/construction.

5.1.1 Site Preparation

Prior to grading of areas to receive structural fill or engineered improvements, the areas should be cleared of existing building structures, asphalt, surface obstructions, vegetation,

topsoil, and demolition debris. Vegetation, trash, and debris should be removed and properly disposed of off-site. Holes resulting from the removal of buried obstructions, which extend below proposed finish grades, should be replaced with suitable compacted fill material. Any abandoned sewer or storm drain lines should be completely removed and replaced with properly placed compacted fill. Deeper demolition may be required in order to remove existing foundations. We recommend the trenches associated with demolition which extend below the remedial grading depth be backfilled and properly compacted prior to the demolition contractor leaving the site.

If cesspools or septic systems are encountered, they should be removed in their entirety. The resulting excavation should be backfilled with properly compacted fill soils. As an alternative, cesspools or septic systems can be backfilled with lean sand-cement slurry. Any encountered wells should be properly abandoned in accordance with regulatory requirements. At the conclusion of the clearing operations, a representative of LGC Geotechnical should observe and accept the site prior to further grading.

5.1.2 Remedial Grading

In order to provide a relatively uniform bearing condition for the planned improvements, we recommend the site soils be temporarily removed and recompacted as fill. Existing undocumented artificial fill, residual soils, topsoil, unsuitable portions of colluvial and old alluvial fan deposits, and weathered bedrock within the zone of influence of the proposed structures shall be removed to suitable, competent native materials prior to placement of fill to design grades. These unsuitable soils that are removed will then be placed as compacted fill once a suitable bottom is encountered. Updated remedial grading recommendations should be provided in the future 40-scale grading plan review report.

Building Areas: For preliminary planning purposes, estimated removal and recompaction depths range from approximately 5 to 9 feet below existing grade; however, deeper removal and recompaction may be required during grading. Preliminary estimated depths of temporary removal and recompaction are depicted on the Preliminary Geotechnical Map (Sheet 1). We recommend a minimum removal and recompaction depth of 5 feet below existing grade in design fill conditions for areas not identified on the Preliminary Geotechnical Map within the building influence.

Pavement and Hardscape Areas: Within pavement and hardscape areas, temporary removal and recompaction should extend to a depth of at least 2 feet below existing grade or 2 feet below the bottom of the pavement section, whichever is deeper. Pavement areas encountering undocumented fill materials may require deeper removal and recompaction and should be determined based on the conditions exposed during grading. In general, the envelope for removal and recompaction should extend laterally a minimum lateral distance of 2 feet beyond the edges of the proposed pavement or hardscape improvements.

It should be noted that over-excavation is recommended in design cut areas (see Section 5.1.3). In addition, local conditions may be encountered during excavation that could

require additional removals beyond the above-noted minimum in order to obtain an acceptable subgrade. The actual depths and lateral extents of grading will be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Removal areas should be accurately staked in the field by the Project Surveyor. Please note that perched groundwater may be encountered at localized areas during grading.

5.1.3 Over-Excavation of Pads and Streets

In order to provide a uniform fill blanket beneath proposed structures, it is recommended that design cut, and cut/fill transition pads be over-excavated a minimum of 4 feet below ultimate finish pad grade, or a minimum of 2-feet below planned footings, whichever is greater. A maximum 2:1 differential fill thickness, up to a maximum over-excavation depth of 15 feet, underneath the industrial buildings should be maintained in order to reduce the potential for future differential settlement. Over-excavation should extend laterally a minimum of 5 feet beyond proposed building footprints. The bottom of the over-excavation should be graded to flow towards deeper fill areas. The over-excavated material should then be replaced by compacted fill material to design grade.

It may be desirable to over-excavate the parts of the site where deeper utilities are planned in the building and street areas and replace the excavated material with compacted fill during mass grading rather than facing potentially difficult excavation during excavation for utility placement with lighter equipment.

As a minimum, streets in design cut should be over-excavated a minimum of 2 feet below subgrade elevations. Scattered zones of oversize materials should be anticipated in utility trenches within design cut areas.

Over-excavations/undercuts must be confirmed and mapped by the geotechnical consultant prior to subsequent fill placement. The actual depth and lateral extents of over-excavation should be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Over-excavation areas should be accurately staked in the field by the Project Surveyor. Please note that some estimated removals in the existing alluvial areas of the site may extend deeper than the recommended over-excavation in order to remove unsuitable materials (see Removals Section 5.1.2). Updated overexcavation recommendations should be provided in the future 40-scale grading plan review report.

5.1.4 Temporary Excavations

Temporary excavations should be performed in accordance with project plans, specifications, and all Occupational Safety and Health Administration (OSHA) requirements. Temporary excavations should be laid back or shored in accordance with OSHA requirements before personnel or equipment are allowed to enter. Temporary excavations on the order of 30 feet or less should be sloped back to 1:1 or flatter or be properly shored. Temporary excavations greater than approximately 30 feet should be

sloped back to 1.5:1 or flatter. Conditions should be regularly evaluated during construction to verify conditions are as anticipated. The contractor shall be responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination with the geotechnical consultant should be maintained to facilitate construction while providing safe excavations. Excavation safety is the sole responsibility of the contractor.

Vehicular traffic, stockpiles, and equipment storage should be set back from the perimeter of excavations a distance equivalent to a 1:1 projection from the bottom of the excavation. Once an excavation has been initiated, it should be backfilled as soon as practical. Prolonged exposure of temporary excavations may result in some localized instability. Excavations should be planned so that they are not initiated without sufficient time to shore/fill them prior to weekends, holidays, or forecasted rain.

It should be noted that any excavation that extends below a 1:1 (horizontal to vertical) projection of an existing foundation will remove existing support of the structure foundation. If requested, temporary shoring parameters will be provided.

5.1.5 Removal Bottoms and Subgrade Preparation

In general, removal bottom areas and any areas to receive compacted fill should be scarified to a minimum depth of 6 inches, brought to a near-optimum moisture condition (generally within optimum and 4 percent above optimum moisture content), and re-compacted per project recommendations.

Removal bottoms and areas to receive fill should be observed and accepted by the geotechnical consultant prior to subsequent fill placement.

5.1.6 Material for Fill

From a geotechnical perspective, the onsite soils are generally considered suitable for use as general compacted fill, provided they are relatively free of organic materials and construction debris and any oversized material (8 inches in greatest dimension).

From a geotechnical viewpoint, any required import soils for general fill (not retaining wall backfill) should consist of clean, soils of Low expansion potential (expansion index 50 or less based on ASTM D4829) or less and no particles larger than 6 inches in greatest dimension. Source samples of planned importation should be provided to the geotechnical consultant for laboratory testing a minimum of 3 working days prior to any planned importation for required laboratory testing.

Retaining wall backfill should consist of sandy soils with a maximum of 35 percent fines (passing the No. 200 sieve) per American Society for Testing and Materials (ASTM) Test Method D1140 (or ASTM D6913/D422) and a "Very Low" expansion potential (EI of 20 or less per ASTM D4829). Soils should also be screened of organic materials, construction debris, and any material greater than 3 inches in maximum dimension. The site contains

soils that are not suitable for retaining wall backfill due to their clay content and expansion potential; therefore, import and/or select grading and stockpiling of select sandy soils will be required by the contractor for obtaining suitable backfill soil. Refer to Figures 2A and 2B.

Aggregate base (crushed aggregate base or crushed miscellaneous base) should conform to the latest requirements of Section 200-2 of the Standard Specifications for Public Works Construction ("Greenbook") for untreated base materials (except processed miscellaneous base) or Caltrans Class 2 aggregate base.

5.1.7 Fill Placement and Compaction

Material to be placed as fill should be brought to a near-optimum moisture condition (generally within optimum and 4 percent above optimum moisture content) and recompacted to at least 90 percent relative compaction (per American Society for Testing and Materials [ASTM] Test Method D1557). Soils will require significant moisture conditioning (either adding water or drying back) in order to achieve adequate compaction. Soils are present that will require additional moisture in order to achieve the required compaction. Drying and/or mixing the very moist soils may also be required prior to reusing the materials in compacted fills.

The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in compacted thickness. Each lift should be thoroughly compacted and accepted prior to subsequent lifts. Generally, placement and compaction of fill should be performed in accordance with local grading ordinances and under the observation and testing performed by the geotechnical consultant. Any encountered oversized material as previously defined must be appropriately handled (Appendix F).

Fill placed on any slopes greater than 5:1 (horizontal to vertical) should be properly keyed and benched into firm and competent soils as it is placed in lifts. During backfill of excavations, the fill should be properly benched into firm and competent soils of temporary backcut slopes as it is placed in lifts.

Aggregate base material should be compacted to a minimum of 95 percent relative compaction at or slightly above optimum moisture content per ASTM D1557. Subgrade below aggregate base should be compacted to a minimum of 90 percent relative compaction per ASTM D1557 at near-optimum moisture content (generally within optimum and 4 percent above optimum moisture content).

If gap-graded ¾-inch rock is used for backfill (around storm drain storage chambers, retaining wall backfill, etc.) it will require compaction. Rock shall be placed in thin lifts (typically not exceeding 6 inches) and mechanically compacted with observation by geotechnical consultant. Backfill rock shall meet the requirements of ASTM D2321. Gap-graded rock is required to be wrapped in filter fabric (Mirafi 140N or approved alternative) or at the very minimum to be vertically separated from the trench backfill with filter fabric to prevent the migration of fines into the rock backfill.

5.1.7.1 Oversized Placement

The "rock blanket fill" method for placement of oversized rock greater than 8 inches and up to 36 inches may be performed within sufficiently deep areas that are laterally extensive, generally deeper than 10 feet below finish grades, and in areas that will not conflict with proposed improvements (e.g., building foundations, underground utilities, etc.).

The total thickness of any single rock blanket layer shall not exceed 36 inches. Rock fill blankets may consist of a mixture of native soils (fines, sand, gravel) and rock to a maximum dimension of 36 inches. In general, rock blankets shall not exceed approximately 50 percent particles greater than 8 inches and shall contain approximately 50 percent or more material that is less than 8 inches in diameter, on a volumetric basis. This may require select grading or temporary stockpiling of materials. During placement and compaction, the rock blanket shall be heavily watered and repeatedly worked with dozers and pneumatic compaction equipment (or approved equivalent) so that the resulting fill is comprised of a mixture of the various particle sizes (not gap graded), is without significant voids, and forms a dense, compact fill matrix. A relatively large amount of water must be provided continuously during these operations.

Upon the completion of a 3-foot rock blanket, the surface should be generally level, compacted, moisture conditioned, and accepted by LGC Geotechnical prior to the placement of the next rock blanket or rock windrow.

The contractor shall periodically excavate test pits within the recently completed rock blanket at various random locations selected by the geotechnical consultant. These test pits will be used to either pass or fail the rock blanket fill.

Additional recommendations for construction of rock blankets will be provided by LGC Geotechnical based on observed field conditions. The construction of a rock blanket fill shall be continuously observed by LGC Geotechnical.

Disposal of oversized rock (greater than 36 inches in diameter) within sufficiently deep fill areas shall be performed using the windrow method. Windrowing of oversized rock shall be done in accordance with the "Oversize and Disposal Detail" in Appendix F.

5.1.8 Trench and Retaining Wall Backfill and Compaction

Bedding material used within the pipe zone should conform to the requirements of the current Greenbook and the pipe manufacturer. Where applicable, sand having a sand equivalent (SE) of 20 or greater (per Caltrans Test Method [CTM] 217) may be used to bed and shade the pipes within the bedding zone. Sand backfill should be densified by jetting or flooding and then tamped to ensure adequate compaction. Bedding sand should be from a natural source, manufactured sand from recycled material is not suitable for jetting. The onsite soils may generally be considered suitable as trench backfill (zone

defined as 12 inches above the pipe to subgrade), provided the soils are screened of rocks greater than 6 inches in maximum dimension, construction debris and organic material. Trench backfill should be compacted in uniform lifts (as outlined above in Section "Material for Fill") by mechanical means to at least 90 percent relative compaction (per ASTM D1557). If gap-graded rock is used for trench backfill, refer to above Section 5.1.7.

Retaining wall backfill should consist of sandy soils as outlined in preceding Section 5.1.6. The limits of select sandy backfill should extend at minimum ½ the height of the retaining wall or the width of the heel (if applicable), whichever is greater (Figures 2A and 2B). Retaining wall backfill soils should be compacted in relatively uniform thin lifts to at least 90 percent relative compaction (per ASTM D1557). Jetting or flooding of retaining wall backfill materials should not be permitted.

In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, flowable fill such as sand-cement slurry may be substituted for compacted backfill. The slurry should contain about one sack of cement per cubic yard. When set, such a mix typically has the consistency of compacted soil. Sand cement slurry placed near the surface within landscape areas should be evaluated for potential impacts on planned improvements.

A representative from LGC Geotechnical should observe, probe, and test the backfill to verify compliance with the project recommendations.

5.1.9 Preliminary Shrinkage and Bulking

Volumetric changes in earth quantities will occur when excavated onsite earth materials are replaced as properly compacted fill. The following is an estimate of shrinkage and bulking factors for the various geologic units found onsite. These preliminary estimates are based on in-place densities of the various materials and on the estimated average degree of relative compaction achieved during grading.

TABLE 4

Estimated Shrinkage and Bulking

Soil Type	Allowance	Estimated Range
Topsoil/Colluvium/Undocumented Fill	Shrinkage	10% to 20%
Alluvium	Shrinkage	5% to 15%
Silverado Formation	Bulking	0% to 10%

Subsidence due to earthwork equipment is expected to be on the order of 0.1 feet. It should be stressed that these values are only estimates and that actual shrinkage factors are extremely difficult to predict. The effective shrinkage of onsite soils will depend primarily on the type of compaction equipment and method of compaction used onsite by

the contractor. Additionally, the onsite geology is complex; the above estimates are generalized groupings of similar lithologies and should be expected to vary across the site and with depth. The above shrinkage estimates are intended as an aid for others in determining preliminary earthwork quantities. However, these estimates should be used with some caution since they are not absolute values. Contingencies should be made for balancing earthwork quantities based on actual shrinkage and subsidence that occurs during grading. Shrinkage and bulking are also expected to vary with accuracy of the topographic survey and survey accuracy during rough grading.

Updated shrink and bulk estimations should be provided in a future 40-scale grading plan review report.

5.2 Slope Stability

Global slope stability for the site has been evaluated utilizing critical cross sections throughout the site, refer to Appendix D. At this time, design cut slopes are recommended to remain as cut slopes without stabilization keyways except for the southern slope adjacent to the truck trailer parking lot, refer to Cross Section C-C' (Sheet 2). One row of global stabilization tiebacks are proposed for the 45-foot-tall soil nail retaining wall (refer to Cross Section B-B'). Preliminary recommendations for construction of slopes and mitigation systems are presented below.

5.2.1 Fill Slopes

Design fill slopes at the site are anticipated to be both grossly and surficially stable as designed provided they are constructed in accordance with the Standard Earthwork and Grading Specifications (Appendix F) and proper irrigation, landscaping and maintenance is implemented (refer to Section 5.2.4). Fill slopes should be constructed with a maximum slope ratio of 2:1 (horizontal to vertical). Slope faces should also be compacted to minimum project recommendations. This may require overbuilding of the slope face and trimming back to design grades. To improve surficial stability, vegetation specified by the landscape architect should be established on the slope face as soon as it is practical, refer to Section 5.2.4.

5.2.2 Cut Slopes

Cut slopes should be constructed with a maximum slope ratio of 2:1 (horizontal to vertical). All cut slopes should be observed by the engineering geologist during grading. The cut slope near Cross Sections B-B' and C-C' were found to have adverse geologic conditions and the cut slope near Cross Section A-A' was found to have favorable geologic conditions. In general, cut slopes are not anticipated to require stabilization keyways. However, this should be confirmed during a 40-scale grading plan review and in the field during grading.

Modifications to the recommendations presented herein may be necessary and should be based upon conditions exposed in the field at the time of grading. It should be

understood that graded cut slopes with bedrock at the surface may be difficult to plant and may also be prone to surficial stability and erosional issues. Fill over cut slopes should be constructed in accordance with the Standard Earthwork and Grading Specifications included in Appendix F. Recommendations for keyway design and construction can be provided during a 40-scale grading plan review evaluation, if necessary.

5.2.3 Existing Native Slopes

Natural slopes will be left in their existing condition above portions of the site. These slopes will be subject to "natural" phenomena such as erosion, sloughing and surficial instabilities. It is impossible to predict where or when this may happen. Should erosion or slippage occur, it should be promptly repaired. Paramount in reducing the potential for either erosion or slippage is to properly maintain these slopes (refer to Section 5.2.4).

5.2.4 Slope Maintenance Guidelines

We recommend that graded slopes be properly landscaped with deep-rooted drought-tolerant, slope stabilizing vegetation as soon as possible to minimize the potential for erosion and/or other instabilities. Slopes should not be allowed to be bare of vegetation. Landscape vegetation should not be "trimmed" to root structures leaving no protection of the slopes.

Irrigation at the site should be kept at the minimum level to support plant growth, overwatering must be avoided. Future landowners/property managers should be made aware that even though the site has been developed in accordance with the local standard of practice that includes a subdrain system, improper maintenance and particularly significant overwatering or poor surface drainage could possibly lead to a buildup in localized groundwater levels. This may result in nuisance type water-related issues to foundations, flatwork, walls, landscaping improvements, etc., and in extreme cases a decrease in the stability of slopes. To help reduce the potential for excessive erosion of graded slopes we recommend that protective measures be implemented in accordance with the latest City of Lake Elsinore grading ordinances and other governing codes. Design of surface drainage provisions are within the purview of the project civil engineer.

Subdrains and v-ditches must be properly maintained, and their outlets kept free draining and clear of any potential obstructions. Routine maintenance should be performed, especially prior to and during the rainy season. Failure to properly maintain these elements may result in slope failures, slumps, excessive erosion, localized saturated zones, nuisance type water issues, etc.

Any future trenches excavated on a slope face for utility or irrigation lines and/or for any purpose should be properly backfilled and compacted to the slope face. Observation/testing and acceptance by the geotechnical consultant during trench

backfill are recommended.

A program for the elimination of burrowing animals in both native and graded slope areas must be established and properly maintained to protect slope stability by reducing the potential for surface water to penetrate into the soil. Continuous erosion control, rodent control, and maintenance are essential to the long-term stability of all slopes.

5.3 Preliminary Tieback Anchor Retaining Wall Design for Slope Stability Mitigation

The tieback array as modeled is recommended to be spaced horizontally across the top of the proposed soil nail retaining wall near Cross Section B-B' (refer to Appendix D). Preliminary tieback anchor design parameters are shown below, corresponding to the slope stability analysis Cross Section B-B.' Waler reaction walls for the tieback anchor system should be assumed. Design of the waler reaction walls should be determined during our future 40-scale geotechnical evaluation, and by the tieback anchor system designer.

Summary of preliminary Tieback Anchor Design Parameters:

- Design Load: 300 kips
- Center to Center Horizontal Spacing: 5 feet
- Unbonded Length: 50 feet
- Allowable Bond Stress: 30 psi (with post-grouting)
- Approximate Angle from Horizontal: 30 degrees
- Bonded Length: 35 feet
- Tieback Anchor Diameter: 8 inches

In general, the obtained capacity of post-grouted tieback anchors is primarily a function of construction methods and experience of the specialty contractor along with local site conditions. The capacity of tieback anchors may ultimately be determined through a performance specification. It is the contractor's responsibility to obtain the required pullout capacity, which may require extensive post grouting and/or field modifications.

The design PGA applicable for tieback anchor design per the 2022 CBC is provided in Section 3.1. Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. Typically, a tieback anchor wall is provided with a composite drainage mat (e.g., Miradrain, etc.) installed between the temporary facing and the excavation and collected at the wall bottom and properly outletted to a suitable discharge point per the project civil engineer.

5.3.1 Testing of Tieback Anchors

Tiebacks should be tested to a minimum of 1.33 times the design load and meet the requirements of the Post Tensioning Institute Manual for soil anchors (PTI, 2014). The first two or three anchors, as determined by the engineer, should be performance tested. Thereafter, a minimum of 2 percent of remaining anchors should be performance tested. In addition, extended creep tests should be performed on at least two anchors per the PTI

manual. Tieback anchor testing should be performed by the contractor and observed by LGC Geotechnical. Project plans should clearly indicate required tieback testing criteria, including required loading increments and acceptance criteria.

The contractor shall provide all necessary test equipment, including an independent fixed reference point (i.e., tripod) for placement of the dial gauge for measuring anchor deflections during tensioning. Dial gauge measuring anchor deflections should read to 0.001-inch and have sufficient travel distance required for the entire test. A minimum of two working days prior to testing, the contractor shall supply current (i.e., within the last 9 months) calibration records from an approved testing laboratory of the hydraulic jack and gauges to be used for anchor tensioning/testing. Calibration certificates and graphs should be available at the job site.

5.4 Foundation Recommendations

Provided that the remedial grading recommendations provided herein are implemented, the site may be considered suitable for support of the structure using a conventional foundation system designed to resist the impacts of expansive soils. Please note that the following foundation recommendations are preliminary and must be confirmed by LGC Geotechnical at the completion of grading.

5.4.1 Preliminary Foundation Design Parameters

In consideration of site expansive soils, the following preliminary recommendations may be used:

- Minimum Footing Depth: 24 inches below lowest adjacent grade.
- Minimum Slab Thickness: 7 inches (Structural conditions may govern)
- Minimum Slab Reinforcement: No. 4 bars at maximum 18-inches on-center each way (Structural conditions may govern)
- Slab Subgrade Options:
    - Moisture-condition (presoak) slab subgrade to 140% of optimum moisture content to a minimum depth of 24 inches prior to trenching.
    - Alternatively, the upper 3 feet of the building pad could be constructed with non-expansive soils (soils with an EI less than 20).

Slab thickness and reinforcement should ultimately be determined by the structural engineer.

For elastic design of a foundation supporting sustained concentrated loads, a modulus of vertical subgrade reaction (k) of 100 pounds per cubic inch (pounds per square inch per inch of deflection) may be used. This value is for a 1-foot by 1-foot square loaded area and should be adjusted by the structural designer for the area of the proposed foundation using the following formula:

$k = 100[(B+1)/2B]^2$
k = modulus of vertical subgrade reaction, pounds per cubic inch (pci)
B = foundation width (feet)

It is recommended that moisture content of the subgrade soils below slabs be maintained up to the time of concrete placement. The recommended moisture content of the slab subgrade soils should be approximately 140% percent of optimum moisture content to a depth of approximately 24 inches. Pre-soaking of the subgrade for building slabs will be required due to site expansive soils. The duration of this process varies greatly based on the chosen method and is also dependent on factors such as soil type and weather conditions. Time duration for presoaking from completion of rough grading to trenching of foundations should be accounted for in the construction schedule (typically 2 to 3 weeks). The subgrade moisture condition of the building pad soils should be maintained at the recommended moisture content up to the time of concrete placement. This moisture content should be maintained around the immediate perimeter of the slab during construction and up to occupancy of the building structures. Additional time at the completion of presoaking may be necessary for the surface soils of the pad to dry back sufficiently to be capable of supporting trenching equipment.

Alternatively, the upper 3 feet of the building pad could be constructed with non-expansive soils (soils with and EI less than 20). The subgrade below the non-expansive building pad backfill should be kept at above optimum moisture content prior to placing non expansive building pad soils.

5.4.2 Slab Underlayment Guidelines

The following recommendations are for informational purposes only, as they are unrelated to the geotechnical performance of the foundation. The following recommendations may be superseded by the foundation engineer and/or owner. Some post-construction moisture migration should be expected below the foundation. In general, interior floor slabs with moisture sensitive floor coverings should be underlain by a minimum 10 mil thick polyolefin material vapor retarder, which has a water vapor transmission rate (permeance) of less than 0.03 perms. The need for sand and/or the sand thickness (above and/or below the vapor retarder) should be specified by the structural engineer, architect or concrete contactor. The selection and thickness of sand is not a geotechnical engineering issue and is therefore outside our purview.

5.4.3 Shallow Foundation Maintenance

The geotechnical parameters provided herein assume that if the areas adjacent to the foundation are planted and irrigated, these areas will be designed with proper drainage and adequately maintained so that ponding, which causes significant moisture changes below the foundation, does not occur. Our recommendations do not account for excessive irrigation and/or incorrect landscape design. Plants should only be provided with sufficient irrigation for life and not overwatered to saturate subgrade soils. Sunken

planters placed adjacent to the foundation should either be designed with an efficient drainage system or liners to prevent moisture infiltration below the foundation. Some lifting of the perimeter foundation beam should be expected even with properly constructed planters.

In addition to the factors mentioned above, roots that extend near the vicinity of foundations can cause distress to foundations. Trees/large shrubs should not be planted closer to the foundations than a distance equal to half the mature height of the tree or 20 feet, whichever is more conservative unless specifically provided with root barriers to prevent root growth below the building foundation.

5.5 Foundation Setback from Slopes

Foundations should have adequate setback from top and bottom of slopes. Per the 2022 CBC, the minimum top-of-slope setback is H/3, with a maximum required setback of 40 feet, where H is the total height of the slope. This distance is measured horizontally from the outside bottom edge of the footing to the slope face. The minimum bottom-of-slope setback is H/2, with a maximum required setback of 15 feet. Refer to Chapter 18 of the 2022 CBC.

5.6 Soil Bearing and Lateral Resistance

Provided our earthwork recommendations are implemented, the following minimum footing widths and embedments for isolated spread and continuous wall footings are recommended for the corresponding allowable soil bearing pressures.

TABLE 5

Allowable Soil Bearing Pressures

Allowable Static Bearing Pressure (psf)	Minimum Footing Width (feet)	Minimum Footing Embedment* (feet)
3,500	4	2
3,000	3	2
2,500	2	2
1,500	1	2

*Refers to minimum depth to the bottom of the footing below lowest adjacent finish grade.

These allowable bearing pressures are applicable for level (ground slope equal to or flatter than 5 horizontal feet to 1-foot vertical) conditions only. Bearing values indicated above are for total dead loads and live loads. The above vertical bearing may be increased by one-third for short durations of loading which will include the effect of wind or seismic loading. The increase of bearing capacity is based on a reduced factor of safety (seismic factor of safety equal to

three-fourths of the static factor of safety) for short duration loading. For any bearing pressure less than 1,500 psf, a minimum footing width of 1 feet and embedment depth of 2 feet below lowest adjacent grade should be used.

Soil settlement is a function of footing dimensions and applied soil bearing pressure. In utilizing the above-mentioned allowable bearing capacity, assumed structural loads, and provided our earthwork recommendations are implemented, foundation settlement due to structural loads is anticipated to be on the order of 1-inch. Differential settlement should be anticipated between nearby columns or walls where a large differential loading condition exists. Settlement estimates should be evaluated by LGC Geotechnical when foundation plans are available.

Resistance to lateral loads can be provided by friction acting at the base of foundations and by passive earth pressure. For concrete/soil frictional resistance, an allowable coefficient of friction of 0.30 may be assumed with dead-load forces. For slabs constructed over a moisture retarder, the allowable friction coefficient should be provided by the manufacturer. An allowable passive lateral earth pressure of 250 psf per foot of depth (or pcf) to a maximum of 2,500 psf may be used for the sides of footings poured against properly compacted fill. Allowable passive pressure may be increased to 340 pcf (maximum of 3,400 psf) for short duration seismic loading. These passive pressure values are applicable for level (ground slope equal to or flatter than 5H:1V) conditions. Frictional resistance and passive pressure may be used in combination without reduction. We recommend that the upper foot of passive resistance be neglected if finished grade will not be covered with concrete or asphalt. The provided allowable passive pressures are based on a factor of safety of 1.5 and 1.1 for static and seismic loading conditions, respectively.

5.7 Lateral Earth Pressures for Retaining Walls

Lateral earth pressures for approved native sandy soils or import soil meeting indicated project recommendations are provided below. Lateral earth pressures are provided as equivalent fluid unit weights, in psf per foot of depth (or pcf). These values do not contain an appreciable factor of safety, so the retaining wall designer should apply the applicable factors of safety and/or load factors during design. A soil unit weight of 125 pcf may be assumed for calculating the actual weight of soil over the wall footing.

The following lateral earth pressures are presented in Table 6 for approved select granular soils a maximum of 35 percent fines (passing the No. 200 sieve per ASTM D1140) and an Expansion Index of 20 or less per ASTM D4829. The retaining wall designer should clearly indicate on the retaining wall plans the required select sandy soil backfill.

TABLE 6

Lateral Earth Pressures – Approved Select Sandy Material

Conditions	Equivalent Fluid Unit Weight (pcf)	
	Level Backfill	2:1 Backfill Sloping Upwards
	Sandy Backfill	Sandy Backfill
Active	35	55
At-Rest	55	80

If the wall can yield enough to mobilize the full shear strength of the soil, it can be designed for "active" pressure. If the wall cannot yield under the applied load, the earth pressure will be higher. This would include 90-degree corners of retaining walls. Such walls should be designed for "at-rest." The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical consultant.

Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. To reduce, but not eliminate, saturation of near-surface (upper approximate 1-foot) soils in front of the retaining walls, the perforated subdrain pipe should be located as low as possible behind the retaining wall. The outlet pipe should be sloped to drain to a suitable outlet. In general, we do not recommend retaining wall outlet pipes be connected to area drains. Typical retaining wall drainage is illustrated in Figure 2A & 2B. It should be noted that the recommended subdrain does not provide protection against seepage through the face of the wall and/or efflorescence. Efflorescence is generally a white crystalline powder (discoloration) that results when water containing soluble salts migrates over a period of time through the face of a retaining wall and evaporates. If such seepage or efflorescence is undesirable, retaining walls should be waterproofed to reduce this potential.

Surcharge loading effects from any adjacent structures should be evaluated by the basement/retaining wall designer. The amount of surcharge loading on a proposed retaining wall structure is primarily a function of the distance, magnitude and lateral extents of the surcharge loading and should be evaluated on a case-by-case basis. In addition to the recommended lateral earth pressure, retaining walls adjacent to streets should be designed to resist vehicular traffic if applicable. Uniform surcharges may be estimated using the applicable coefficient of lateral earth pressure using a rectangular distribution. A factor of 0.5 and 0.3 may be used for at-rest and active conditions, respectively for a level backfill. The vertical traffic surcharge may be determined by the structural designer. The structural designer should contact the geotechnical consultant for any required geotechnical input in estimating any applicable surcharge loads.

If required, the retaining wall designer may use a seismic lateral earth pressure increment of 15

pcf for a level backfill condition and 25 pcf for a sloping condition (up to an inclination of a 2:1). This increment should be applied in addition to the provided static lateral earth pressure using a triangular distribution with the resultant acting at H/3 in relation to the base of the retaining structure (where H is the retained height). For the restrained, at-rest condition, the seismic increment may be added to the applicable active lateral earth pressure (in lieu of the at-rest lateral earth pressure) when analyzing short duration seismic loading. Per Section 1803.5.12 of the 2022 CBC, the seismic lateral earth pressure is applicable to structures assigned to Seismic Design Category D through F for retaining wall structures supporting more than 6 feet of backfill height. The provided seismic lateral earth pressure should not be used for retaining walls exceeding 15 feet in height. If a retaining wall greater than 15 feet in height is proposed, the retaining wall designer should contact the geotechnical consultant for specific seismic lateral earth pressure increments based on the configuration of the planned retaining wall structures. Seismic lateral earth pressure recommendations for tieback anchor wall system and soil nail wall system are provided in Sections 5.3 and 5.8, respectively. This seismic lateral earth pressure is estimated using the procedure outlined by the Structural Engineers Association of California (Lew, et al, 2010) and the Federal Highway Administration (FHWA, 2011).

Soil bearing and lateral resistance (friction coefficient and passive resistance) are provided in Section 5.6. Earthwork considerations (temporary backcuts, backfill, compaction, etc.) for retaining walls are provided in Section 5.1 (Site Earthwork) and the subsequent earthwork related sub-sections.

5.8 Preliminary Soil Nail Wall Design Parameters

The proposed cut condition retaining wall along the southwestern edge of the subject site (Cross Section B-B') may be constructed as a top-down construction soil nail retaining wall up to approximately 45-feet in height. The following preliminary geotechnical parameters may be used for preliminary design of a soil nail wall. Updated global slope stability analysis should be performed once soil nail wall plans are in development to verify geologic stability is acceptable. One row of tieback anchors is proposed at the top of the soil nail retaining wall for global stability. Updated recommendations should be provided during a 40-scale grading plan review.

- Soil Friction Angle: 33 degrees
- Soil Cohesion: 350 pounds per square foot (psf)
- Soil Unit Weight: 120 pounds per cubic foot (pcf)
- Preliminary allowable Bond Stress: 7.5 psi (gravity grouting)

In general, the obtained capacity of gravity grouted soil nails is primarily a function of construction methods and experience of the specialty contractor along with local site conditions. The capacity of soil nails may ultimately be determined through a performance specification. It is the contractor's responsibility to obtain the required pullout capacity, which may require extensive post grouting and/or field modifications.

The design PGA applicable for soil nail wall design per the 2022 CBC is provided in Section 3.1. Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. Typically, a nail wall is provided with a composite drainage mat (e.g., Miradrain, etc.) installed between the temporary facing and the excavation and collected at the wall

bottom and properly outletted to a suitable discharge point per the project civil engineer.

Field pullout testing should be performed during construction to verify the estimated pullout resistance used in the design. Ultimately, it is the contractor's responsibility to obtain the required pullout capacity, which may require alternate construction techniques. Soil nail testing should be performed by the contractor and observed by LGC Geotechnical. Project plans should clearly indicate required soil nail testing criteria, including required loading increments and acceptance criteria.

The contractor shall provide all necessary test equipment, including an independent fixed reference point (i.e., tripod) for placement of the dial gauge for measuring anchor deflections during tensioning. Dial gauge measuring anchor deflections should read to 0.001-inch and have sufficient travel distance required for the entire test. A minimum of two working days prior to testing, the contractor shall supply current (i.e., within the last 9 months) calibration records from an approved testing laboratory of the hydraulic jack and gauges to be used for anchor tensioning/testing. Calibration certificates and graphs should be available at the job site.

5.9 Control of Surface Water and Drainage Control

From a geotechnical perspective, we recommend that compacted finished grade soils adjacent to proposed structures be sloped away from the proposed structures and towards an approved drainage device or unobstructed swale. Drainage swales, wherever feasible, should not be constructed within 5 feet of buildings. Where lot and building geometry necessitates that the drainage swales be routed closer than 5 feet to structural foundations, we recommend the use of area drains together with drainage swales. Drainage swales used in conjunction with area drains should be designed by the project civil engineer so that a properly constructed and maintained system will prevent ponding within 5 feet of the foundation. Code compliance of grades is not the purview of the geotechnical consultant.

Planters with open bottoms adjacent to buildings should be avoided. Planters should not be designed adjacent to buildings unless provisions for drainage, such as catch basins, liners, and/or area drains, are made. Overwatering must be avoided.

5.10 Preliminary Asphalt Concrete Pavement Sections

The following preliminary minimum asphalt concrete (AC) pavement sections are provided in Table 7 based on an assumed R-value of 5 and assumed Traffic Indices of 5.0, 6.0 and 7.0. These recommendations must be confirmed with R-value testing of representative near-surface soils at the completion of earthwork and after underground utilities have been installed and backfilled. Determination of the Traffic Index (TI) is not the purview of the geotechnical consultant. Final pavement sections should be confirmed by the project civil/transportation engineer or City Engineer based upon the final design Traffic Index. We are not responsible for selecting a design Traffic Index. If requested, LGC Geotechnical will provide sections for alternate TI values.

TABLE 7

Preliminary Asphalt Concrete Paving Section Options

Assumed Traffic Index	5.0	6.0	7.0
R-Value Subgrade	5	5	5
AC Thickness	4.0 inches	5.0 inches	6.0 inches
Aggregate Base Thickness	7.5 inches	9.5 inches	12.0 inches

It is common practice to only place the asphalt base course prior to the start of construction. The asphalt capping course often is not placed until after the industrial building construction is complete. Construction traffic including concrete trucks and delivery trucks can exceed the design limits of an asphalt base course only, increasing the potential for pavement distress. We recommend the full asphalt concrete section (base course and capping course) be placed prior to the street being subject to construction traffic or the base course thickness be increased to the recommended full asphalt concrete section.

The thicknesses shown are for minimum thicknesses. Increasing the thickness of any or all of the above layers will reduce the likelihood of the pavement/pavers experiencing distress during its service life. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the roadway will occur throughout the design life of the pavement/pavers. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement/pavers.

Earthwork recommendations regarding aggregate base and subgrade are provided in the previous section "Site Earthwork" and the related sub-sections of this report.

5.11 Preliminary Portland Cement Concrete Pavement Sections

The provided preliminary Portland Cement concrete (PCC) section options are based on the guidelines of the American Concrete Institute (ACI 330.2R-17). For the final design section, we recommend a traffic study be performed as LGC Geotechnical does not perform traffic engineering. Traffic study should include the design vehicle (number of axles and load per axle) and estimated number of daily repetitions/trips. LGC Geotechnical does not perform traffic engineering and determination of traffic loading is not the purview of the geotechnical consultant. The concrete should have a minimum compressive strength of 4,000 psi and a minimum flexural strength of 550 psi at the time the pavement is subjected to traffic. Steel reinforcement is not required (ACI, 2017). The provided pavement sections assume that edge restraints like a curb and gutter will be provided. To reduce the potential (but not eliminate) for cracking, paving should provide control joints at regular intervals in each direction not exceeding the maximum values provided below. Decreasing the spacing of these joints will further reduce, but not eliminate the potential for unsightly cracking.

The primary input for anticipated loadings over the lifetime of the concrete pavement is based on the Average Daily Truck Traffic (ADTT). Truck loading is defined one 16-kip axle and two 32-kip tandem axles. Other factor to be considered are potentially the use of industrial vehicles (e.g., lift trucks, mobile cranes, gantry cranes, reach stackers, etc.). Static loads from containers and

temporary structures stored on the pavement. If semi-trailers are to be disconnected from the tractors from dolly jacks the design should consider concentrated loads imposed on the concrete pavement. These loads typically exceed the axle loads of the semi-trailer combination and are applied to smaller contact areas, especially if applied near joint locations. If these irregular loadings are confined to specific areas of the site the pavement section required thickness can be economized. These and other factors (e.g., traffic patterns, irregular loading, doweled vs un-doweled joints, etc.) outlined in ACI, 2017 should be addressed for the final design.

TABLE 8

Preliminary Portland Cement Concrete Pavement Section Options

No. of Trucks per day design lane	Concrete Thickness* (inch)	Aggregate Base Thickness (inch)	Maximum Joint Spacing Thickness (inch)
≤ 10	5.5	4.0	12
50	6.5	4.0	14
100	7.0	4.0	15
300	7.5	4.0	15

*Minimum concrete compressive strength and Modulus of Rupture as indicated above.

The thicknesses shown are for minimum thicknesses. Increasing the thickness of any or all of the above layers will reduce the likelihood of the pavement/pavers experiencing distress during its service life. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the roadway will occur throughout the design life of the pavement/pavers. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement/pavers.

Earthwork recommendations regarding aggregate base and subgrade are provided in the previous section "Site Earthwork" and the related sub-sections of this report.

5.12 Soil Corrosivity

Although not corrosion engineers (LGC Geotechnical is not a corrosion consultant), several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils to buried concrete and metal facilities. We therefore present the results of our testing with regard to corrosion for the use of the client and other consultants, as they determine necessary.

Corrosion testing indicated soluble sulfate content less than approximately 0.03 percent, chloride contents ranging from 180 to 220 parts per million (ppm), pH values from 6.6 to 7.9, and minimum resistivity values ranging from 735 to 1,240 ohm-centimeters. Based on Caltrans Corrosion Guidelines (2021), soils are considered corrosive if the pH is 5.5 or less, or the chloride concentration is 500 ppm or greater, or the sulfate concentration is 1,500 ppm (0.15 percent) or

greater.

Based on laboratory sulfate test results, the near surface soils are designated to a class "S0" per ACI 318, Table 19.3.1.1 with respect to sulfates. Concrete in direct contact with the onsite soils can be designed according to ACI 318, Table 19.3.2.1 using the "S0" sulfate classification.

Laboratory testing may need to be performed at the completion of grading by the project corrosion engineer to further evaluate the as-graded soil corrosivity characteristics. Accordingly, revision of the corrosion potential may be needed, should future test results differ substantially from the conditions reported herein. The client and/or other members of the development team should consider this during the design and planning phase of the project and formulate an appropriate course of action.

5.13 Nonstructural Concrete Flatwork

Nonstructural concrete (such as flatwork, sidewalks, etc.) has a potential for cracking due to changes in soil volume related to soil-moisture fluctuations. To reduce the potential for excessive cracking and lifting, concrete should be designed in accordance with the minimum guidelines outlined below. These guidelines will reduce the potential for irregular cracking and promote cracking along construction joints but will not eliminate all cracking or lifting. Thickening the concrete and/or adding additional reinforcement will further reduce cosmetic distress.

Nonstructural and non-vehicular concrete flatwork placed on compacted subgrade should be a minimum 4-inches in thickness with crack control joints spaced 8 feet apart for flatwork slabs/patios and 6 feet apart for flatwork sidewalks. Crack control joints should be sawcut or deep open tool joint to a minimum of 1/3 the concrete thickness. Reinforcement should consist of No. 3 bars spaced at 24 inches on center, both ways. Flatwork edges should be thickened to 8 inches by 8 inches where flatwork is adjacent to landscaping or unpaved areas. The compacted subgrade below the nonstructural and non-vehicular concrete flatwork should be presoaked to a depth of 12 inches prior to placing concrete.

To reduce the potential for nonstructural concrete flatwork to separate from entryways and doorways, the owner may elect to install dowels to tie these two elements together.

5.14 Subsurface Water Infiltration

Recent regulatory changes have occurred that mandate that storm water be infiltrated below grade rather than collected in a conventional storm drain system. Typically, a combination of methods are implemented to reduce surface water runoff and increase infiltration including; permeable pavements/pavers for roadways and walkways, directing surface water runoff to grass-lined swales, retention areas, and/or drywells, etc.

It should be noted that collecting and concentrating surface water for the purpose of intentional infiltration below grade, conflicts with the geotechnical engineering objective of directing surface water away from slopes, structures and other improvements. The geotechnical stability and

integrity of a site is reliant upon appropriately handling surface water. In general, the vast majority of geotechnical distress issues are directly related to improper drainage. In general, distress in the form of movement of improvements could occur as a result of soil saturation and loss of soil support, expansion, internal soil erosion, collapse and/or settlement.

The results of our filed infiltration testing indicated the observed 1-D infiltration rate for I-2 through I-6 (not including required factors of safety for design) ranged from approximately 0.01 to 0.14 inches per hour. The design infiltration rate is thereby equal to the Observed Infiltration Rate divided by the design factor of safety. The design factor of safety must be a minimum of 3.0 but may be increased at the discretion of the design engineer (Riverside County, 2011). Per the Riverside County infiltration guidelines (2011), infiltration of stormwater is not required when the factored infiltration rate (measured infiltration rate with safety factors applied) is less than 0.3 inches per hour in the vicinity of the BMPs.

Based on the results of field infiltration testing indicating extremely low infiltration rates, anticipated subsurface conditions consisting of compacted fill over dense native materials, and presence of shallow groundwater, we strongly recommend against the intentional infiltration of stormwater into the subsurface soils.

5.15 Geotechnical Plan Review

When available, the rough grading, precise grading, retaining wall, and foundation plans should be reviewed by LGC Geotechnical in order to update and/or verify our geotechnical recommendations. Updated recommendations and/or additional fieldwork may be necessary. A more detailed 40-scale grading plan review geotechnical evaluation and report should be performed once the rough grading plans are further in development.

5.16 Geotechnical Observation and Testing During Construction

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field during grading by a representative of LGC Geotechnical. Geotechnical observation and testing is required per Section 1705 of the 2022 California Building Code (CBC).

Geotechnical observation and/or testing should be performed by LGC Geotechnical at the following stages:

- During grading (key excavations, removal bottoms, remedial grading, fill placement, etc.);
- Geologic mapping of cut slopes;
- During retaining wall backfill and compaction;
- During utility trench backfill and compaction;
- During precise grading;
- After presoaking building pads and other concrete-flatwork subgrades, and prior to placement of aggregate base or concrete;
- Preparation of pavement subgrade and placement of aggregate base;

- After building and wall footing excavation and prior to placing reinforcement and/or concrete; and
- When any unusual soil conditions are encountered during any grading or construction operation subsequent to issuance of this report.

6.0 LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is based on data obtained from limited observations of the site, which have been extrapolated to characterize the site. While the scope of services performed is considered suitable to adequately characterize the site geotechnical conditions relative to the proposed development, no practical evaluation can completely eliminate uncertainty regarding the anticipated geotechnical conditions in connection with a subject site. Variations may exist and conditions not observed or described in this report may be encountered during grading and construction.

The findings of this report are valid as of the present date. However, changes in the conditions of a site can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. The findings and conclusions presented in this report can be relied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site. This report is intended exclusively for use by the client, any use of or reliance on this report by a third party shall be at such party's sole risk.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification.

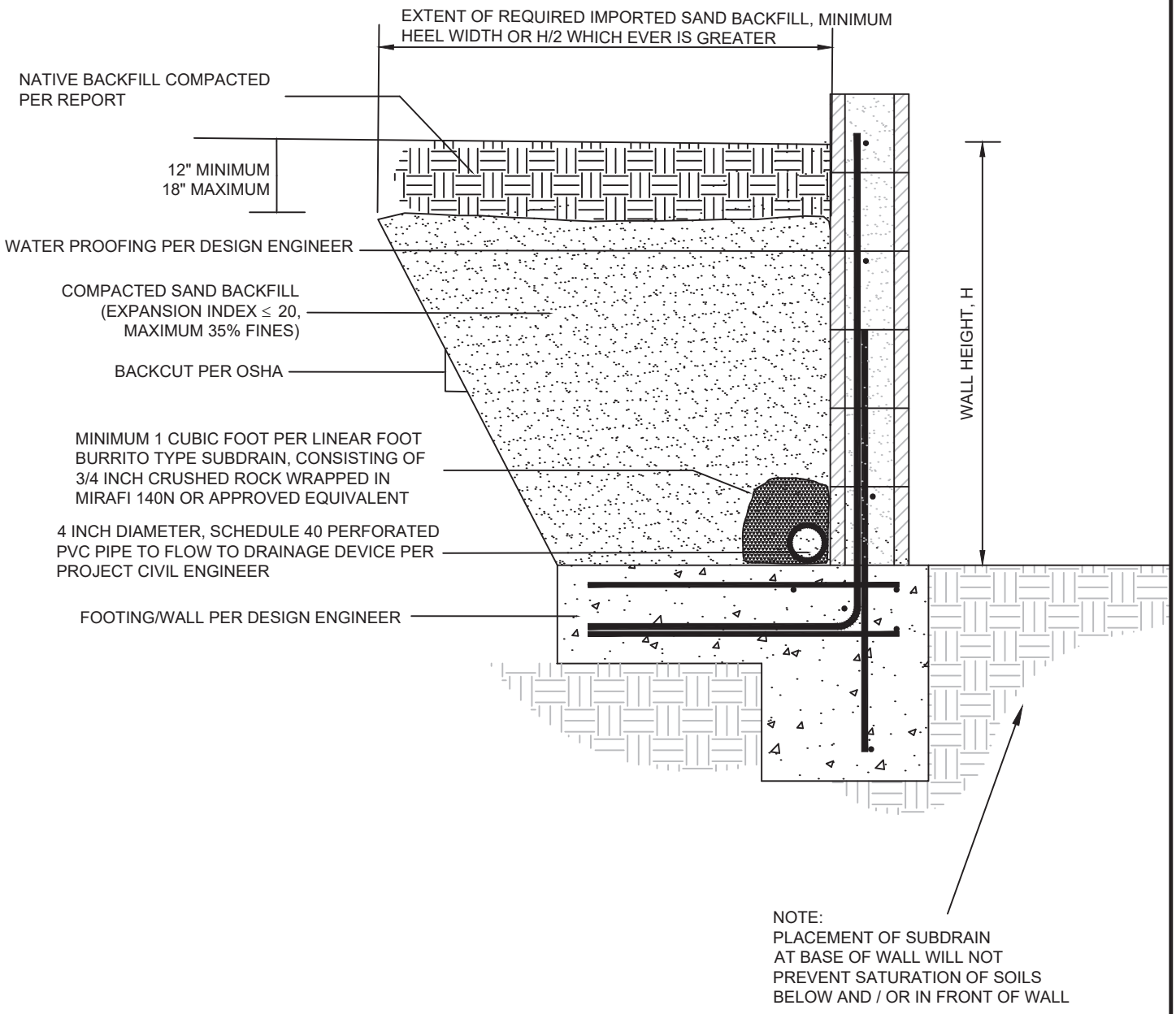

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FIGURE 2A
Retaining Wall Backfill Detail (Level Condition)

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	Not to Scale
DATE	January 2024

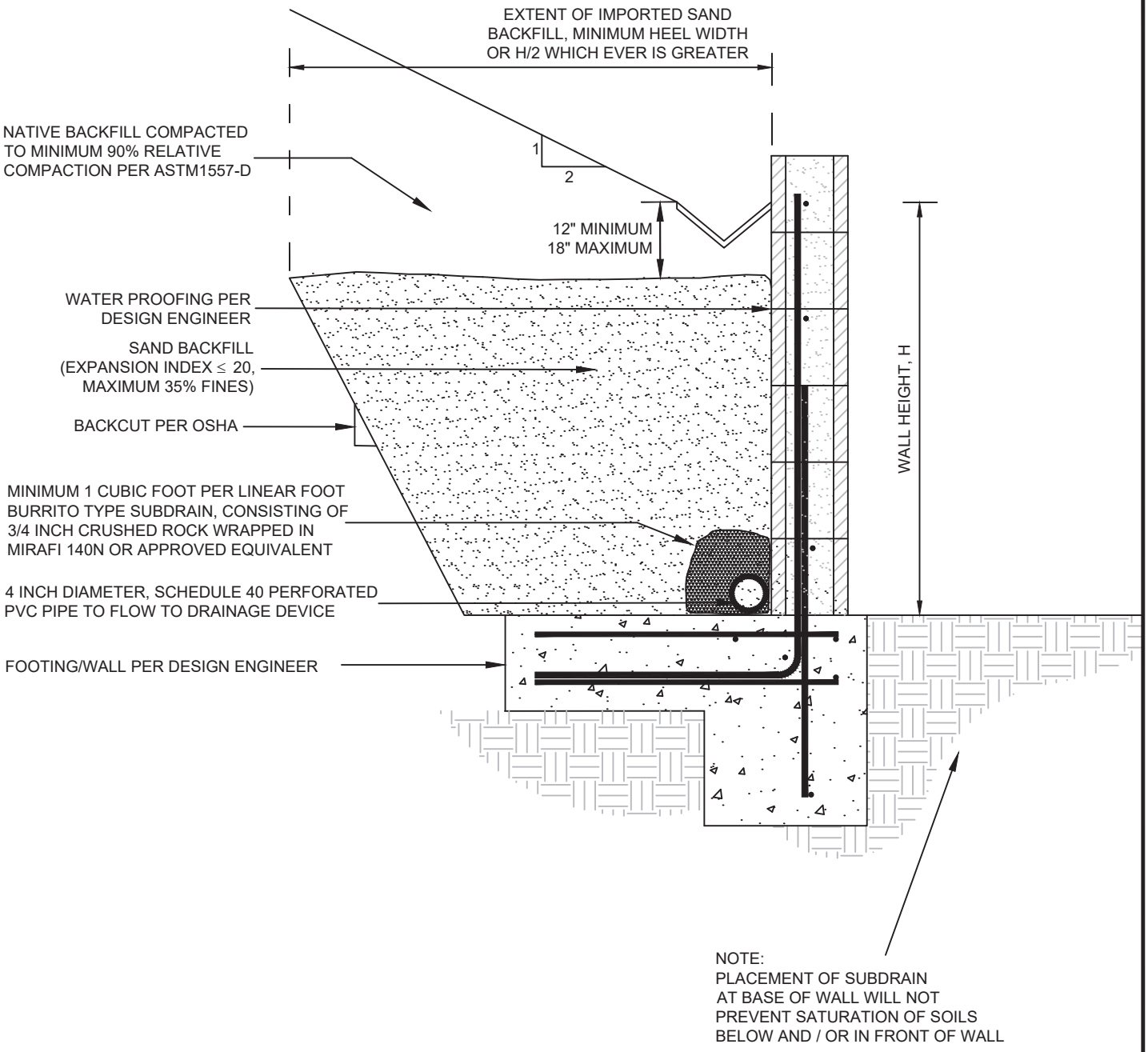

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FIGURE 2B

Retaining Wall Backfill Detail

2:1 Backfill

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	Not to Scale
DATE	January 2024

Appendix A
References

APPENDIX A

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Appendix B
Boring and Test Pit Logs

Geotechnical Boring Log Borehole HS-1

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1282' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1280	0	B-1	R-1	10 24 50/5"	112.3	13.0	ML	@ 0' - Dry vegetation/Topsoil: cobbles and gravels **@ 2.5' to TD - Tertiary Silverado Formation (Tsi)** @ 2.5' - Sandy SILT: yellowish brown, moist, hard	
1275	5		R-2	25 50/4"	104.6	18.8	SC	@ 5' - Clayey SAND: yellowish brown, very moist, very dense	
1270	10		R-3	25 50/3"	115.9	10.4	SM	@ 7.5' - Silty SAND: yellowish brown, moist, very dense	
1265	15		R-4	25 50/4"	112.1	10.2	SM/ML	@ 10' - Silty SAND/Sandy SILT: yellowish brown, moist, very dense/hard	
1260	20		SPT-1	11 22 34				@ 15' - No Recovery	
1255	25							Total Depth = 16.5' Groundwater Not Encountered Backfilled with Cuttings on 9/25/2023	
	30								

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-2

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1266' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1265	0						**@ 0 to 10' - Alluvium (Qal)**	
		R-1	28 16 16				@ 0' - Dry vegetation/Topsoil: cobbles and gravels @ 2.5' - No Recovery	
	5	R-2	10 12 13		23.3	CL	@ 5' - Sandy CLAY: grayish brown, very moist, very stiff	
1260		R-3	8 10 14	92.8	23.4	CH	@ 7.5' - Sandy FAT CLAY: reddish brown, very moist, very stiff	AL CN
	10	R-4	8 17 42	106.7	20.0	SC	**@ 10' to TD - Tertiary Silverado Formation (Tsi)** @ 10' - Clayey SAND: light yellowish brown, very moist, hard	
1255								
	15	R-5	17 27 29	99.8	23.6	CL	@ 15' - CLAY with Sand: pale brown, very moist, hard	
1250								
	20	SPT-1	14 50/5"		15.1		@ 20' - CLAY: gray, moist, hard	
1245								
	25	R-6	36 50/4"	105.2	21.4	SM	@ 25' - Silty SAND: light olive, wet, very dense	
1240								
	30							

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-2

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1266' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1235	30		SPT-2	16 23 50/5"		17.0	CL	@ 30' - Sandy CLAY: gray, wet, hard	
1230	35		R-7	12 15 50/5"	108.1	18.9	SM	@ 35' - Silty SAND: gray, wet, very dense	
1225	40		SPT-3	16 29 50/5"		20.7	ML	@ 40' - Sandy SILT: gray, wet, hard	
1220	45		R-8	24 50/4"	104.7	22.7	SM	@ 45' - Silty SAND: gray, wet, very dense	
1215	50		SPT-4	26 50/5"		25.2		@ 50' - Silty SAND: dark gray, wet, very dense	
1210	55							Total Depth = 50.9' Groundwater Encountered at Approximately 23' Backfilled with Cuttings on 9/25/2023	
	60								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-3

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1266' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1265	0							**@ 0 to 7.5' - Alluvium (Qal)**	
								@ 0' - Vegetation/Topsoil	
			R-1	7 12 22				@ 2.5' - No Recovery	
	5	B-1	R-2	7 11 13	105.7	16.7	CL	@ 5' - Sandy CLAY: yellowish brown, moist, very stiff	
1260								**@ 7.5' to TD - Tertiary Silverado Formation (Tsi)**	
			R-3	20 50/5"	123.8	8.2	SM	@ 7.5' - Silty SAND: light brown, moist, very dense	
	10		R-4	23 50/5"	115.6	11.7		@ 10' - Silty SAND: light reddish brown, moist, very dense	
1255									
	15		R-5	50/3"		13.9		@ 15' - Silty SAND: yellowish brown, very moist, very dense	
1250									
	20		SPT-1	8 13 20		17.0	SC	@ 20' - Clayey SAND: light yellowish brown, very moist, dense	
1245									
								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 9/25/2023	
1240	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-4

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1275' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map |

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0 to 5' - Alluvium (Qal)**	
								@ 0' - Vegetation/Topsoil	
			R-1	8 11 13	108.1	8.0	CL	@ 2.5' - Sandy CLAY: reddish brown, slightly moist, very stiff	
1270	5	B-1	R-2	50/4"	88.6	10.0	CL	**@ 5' to TD - Tertiary Silverado Formation (Tsi)** @ 5' - Sandy CLAY: light brown, slightly moist, hard, weathered	
			R-3	26 50/6"	113.2	9.0	SC	@ 7.5' - Clayey SAND: light brown, moist, very dense	
1265	10		R-4	25 50/5"	106.2	7.9	SM	@ 10' - Silty SAND: light yellowish brown, moist, very dense	
1260	15		R-5	24 50/5"	111.7	15.9	ML	@ 15' - Sandy SILT: olive brown, very moist, hard	
1255	20		R-6	32 50/4"	102.0	10.2	SM	@ 20' - Silty SAND: yellowish brown, moist, very dense	
1250	25							Total Depth = 20.8' Groundwater Not Encountered Backfilled with Cuttings on 9/25/2023	
1245	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
⏚	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-5

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1277' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0 to 7.5' - Alluvium (Qal)**	
1275								@ 0' - SILT with SAND: brown, dry, vegetation/topsoil	
			R-1	6 12 22	121.7	10.0	SC	@ 2.5' - Clayey SAND: pale brown, moist, medium dense	
	5		R-2	12 15 17	107.1	2.7	SP-SM/CL	@ 5' - SAND with Silt to Sandy CLAY: light brown, dry, medium dense/very stiff	
1270								**@ 7.5' to TD - Tertiary Silverado Formation (Tsi)**	
			R-3	26 50/5"	113.4	11.9	SM	@ 7.5' - Silty SAND: yellowish gray, moist, very dense	
	10		R-4	28 50/5"	114.6	10.1	SC	@ 10' - Clayey SAND: yellowish brown, moist, very dense	
1265									
	15		SPT-1	22 32 34		10.9		@ 15' - Clayey SAND: light brown, moist, very dense	
1260									
	20		R-5	28 50/3"	121.5	12.4	CL	@ 20' - Sandy CLAY: light gray, moist, hard	
1255									
	25		SPT-2	14 30 36		12.7	ML	@ 25' - SILT: grayish brown, moist, hard	
1250									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-5

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~1277' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1245	30		R-6	10 50/5"	119.1	14.4	CL	@ 30' - Sandy CLAY: grayish olive, moist, hard	
1240	35		SPT-3	13 24 50/5"		12.4	SC	@ 35' - Clayey SAND: olive gray, moist, very dense	
1235	40		R-7	42 50/5"	115.7	14.1	SM	@ 40' - Silty SAND: light gray, very moist, very dense	
1230	45	▽	SPT-4	50/3"		14.1	SC	@ 45' - Clayey SAND: yellowish gray, very moist, very dense	
1225	50		R-8	50/5"				@ 50' - No Recovery	
1220	55							Total Depth = 50.4' Groundwater Encountered at Approximately 45' Backfilled with Cuttings on 9/26/2023	
	60								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-6

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1281' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1280	0							**@ 0 to 2.5' - Alluvium (Qal)**	CR EI -#200 RV
								@ 0' - Sandy SILT: pale brown, dry	
								@ 2.5' to TD - Tertiary Silverado Formation (Tsi)	
			R-1	5 11 18	97.1	20.2	SM	@ 2.5' - Silty SAND: olive brown, very moist, medium dense, weathered	
	5	B-1	R-2	9 13 27	103.7	20.1	ML	@ 5' - Sandy SILT: grayish brown, very moist, hard	
1275			R-3	22 50/5"	104.3	19.5		@ 7.5' - Sandy SILT: grayish brown, very moist, hard	
	10		R-4	22 44 50/4"	113.2	14.5	SM	@ 10' - Silty SAND: grayish brown, very moist, very dense	
1270									
	15		R-5	15 23 50/6"	93.6	25.4		@ 15' - Silty SAND: brown, very moist, very dense	
1265									
	20		SPT-1	11 21 34		22.3		@ 20' - Silty SAND: brown, very moist, very dense	
1260									
								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 9/26/2023	
1255	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-7

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1295' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map |

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@ 0 to 2.5' - Alluvium (Qal)** @ 0' - Silty SAND: dark brown, dry, vegetation/topsoil **@ 2.5' to TD - Tertiary Silverado Formation (Tsi)**	MD
		B-1	R-1	4 13 10	108.8	12.6	SC	@ 2.5' - Clayey SAND: gray, moist, medium dense, weathered	
1290	5		R-2	9 27 50/4"	101.0	17.8	CL	@ 5' - Sandy CLAY: light yellowish gray, moist, hard	
			R-3	25 50/4"	110.0	13.3	ML	@ 7.5' - Sandy SILT: light yellowish gray, moist, hard	
1285	10		R-4	30 50/5"	108.0	16.4	SM	@ 10' - Silty SAND: grayish yellow, very moist, very dense	
1280	15		SPT-1	10 18 30		14.7	CL	@ 15' - Sandy CLAY: gray, moist, hard	
1275	20		R-5	47 50/5"	114.5	7.1	SM	@ 20' - Silty SAND: gray, slightly moist, very dense	
1270	25							Total Depth = 20.9' Groundwater Not Encountered Backfilled with Cuttings on 9/26/2023	
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole HS-8

Date: 9/26/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~1282' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map |

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1280	0	B-1	R-1	8 8 15	112.5	15.1	CL	**@ 0 to 15' - Colluvium (Qcol)** @ 0' - Silty SAND: brown, dry, vegetation/topsoil, cobbles and gravels visible on surface @ 2.5' - Sandy CLAY: dark brown, moist, very stiff	
1275	5		R-2	8 11 15	111.6	15.3		@ 5' - Sandy CLAY: brown, moist, very stiff	
1270	10		R-3	7 14 19	105.4	19.0		@ 7.5' - Sandy CLAY: brown, very moist, very stiff	
			R-4	7 12 16	101.1	22.9		@ 10' - Sandy CLAY: grayish brown, very moist, very stiff	
1265	15		R-5	10 20 29	109.8	15.0	CL	**@ 15' to TD - Tertiary Silverado Formation (Tsi)** @ 15' - CLAY with Sand: dark brown, moist, hard	-#200 DS
1260	20							Total Depth = 16.5' Groundwater Not Encountered Backfilled with Cuttings on 9/26/2023	
1255	25								
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-1

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)** @ 0' - Vegetation/topsoil	
	5	B-1	SPT-1	8 4 6		13.0	SC	@ 5' - Clayey SAND: dark brown, moist, medium dense	
1255									
	10		SPT-2	7 11 16		17.3	CL	@ 10' - Sandy CLAY: yellowish brown, moist, hard	
1250								Total Depth = 12' Groundwater Encountered at Approximately 11', percolation test could not be run Backfilled with Cuttings on 9/25/2023	
	15								
1245									
	20								
1240									
	25								
1235									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-2

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	Logged By JMN Sampled By JMN Checked By RLD DESCRIPTION	Type of Test
	0							**@ 0' to TD - Alluvium (Qal)** @ 0' - Vegetation/topsoil	
1260									
	5							Total Depth = 3' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/27/2023	
1255									
	10								
1250									
	15								
1245									
	20								
1240									
	25								
1235									
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-3

Date: 9/25/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1262' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	Logged By JMN Sampled By JMN Checked By RLD DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)** @ 0' - SILT: dry, vegetation/topsoil	
1255	5		SPT-1	4 5 7		16.0	CL	@ 8' - Sandy CLAY: brown, moist, stiff	
1250	10							Total Depth = 10' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/27/2023	
1245	15								
1240	20								
1235	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-4

Date: 9/25/2023 | **Drilling Company:** 2R Drilling

Project Name: Lake Elsinore | **Type of Rig:** Limited Access Rig

Project Number: 23160-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~1263' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0	B-1						**@ 0' to TD - Alluvium (Qal)** @ 0' - SILT: brown, dry, vegetation/topsoil	
1255	5							Total Depth = 3' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/27/2023	
1250	10								
1245	15								
1240	20								
1235	25								
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
⏚	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-5

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)**	
								@ 0' - Silty SAND: brown, dry, vegetation/topsoil	
	5	B-1	SPT-1	6 12 8		12.2	SP-SC	@ 5' - SAND with Clay: grayish brown, moist, medium dense	
1255									
	10		SPT-2	5 5 8		16.1	CL	@ 10' - Sandy CLAY: grayish brown, moist, very stiff	
1250								Total Depth = 12' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/28/2023	
	15								
1245									
	20								
1240									
	25								
1235									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log Borehole I-6

Date: 9/26/2023	**Drilling Company:** 2R Drilling
Project Name: Lake Elsinore	**Type of Rig:** Limited Access Rig
Project Number: 23160-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1260	0							**@ 0' to TD - Alluvium (Qal)** @ 0' - Silty SAND: brown, dry, topsoil	
1255	5							Total Depth = 3' Groundwater Not Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 9/28/2023	
1250	10								
1245	15								
1240	20								
1235	25								
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/24/2023

Geotechnical Boring Log LGC-BA-1

Date : 9/28/23 Page 1 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St. - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							SM	**Quaternary Pauba Formation (Fanglomerate) - Qpf** @ 0-5' - Silty SANDSTONE: light to medium brown, dry to slightly moist, weathered, many cobbles to 6"diameter, some angular, some sub-rounded, metamorphic origin	
1380	5	B-1		R-1	12/10"	117.0	11.1		**Tertiary Silverado Formation - Tsi** @ 5' - Silty SANDSTONE: gray to olive green, slightly moist, dense, fine grained, oxidation staining throughout, mostly sub-horizontal, few vertical caliche stringers to 15' deep	
1375	10			R-2	16/12"	120.9	10.9		@ 10' - Silty SANDSTONE: gray to olive, slightly moist, dense to very dense, fine grained, some mottled dry white chalky Silt, caliche staining	
1370	15								@ 15' - increase in coarse Sand & gravel, massive, less staining, very dense	
1365	20		GB: @22' N60E, 8SE	R-3	12/10"	124.4	5.3		@ 20' - Silty SANDSTONE: gray to olive green, some brown & white mottling, slightly moist, very dense @ 22' - 1" thick red brown Sandy gravel lense, general bedding attitude around hole, hard white indurated, Silty SANDSTONE layer above, non-continous	
1360	25								@ 26-29' - Few infilled joints, white chalky infill	
1355	30									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
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RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1

Date : 9/28/23 Page 2 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" | **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		GB@31' N10E, 5W	R-4	13	121.3	10.7	SM	@ 30' - SANDSTONE: gray, olive, white & black mottled, slightly moist to dry, very dense, medium to coarse grained	
									@ 33' - 6-8" diameter white oval shaped concretionary nodule, laying on side(sub-horizontal), hard	
1350	35								@ 35' - Very dense, indurated	
1345	40			R-5	14	120.6	10.7		@ 40' - SANDSTONE: olive green to gray/white, slightly moist, very dense	
1340	45									
1335	50			R-6	22	111.6	16.5	ML	@ 50' - Clayey SILTSTONE: dark gray, slightly moist, very stiff, some fine sand, some polished surfaces	
			@ 52' B: N60E, 20 NW	G-1 @ 52'			15.2	MH	@ 52' to 54' - Very stiff to hard SILT/CLAYSTONE zone, with fine bedding attitude at upper transition, internally sheared with some polished surfaces, bedding attitudes	AL
1330	55		GB @54': N55E, 3-5 NW						@ 54' - Transitions to Clayey SAND, with fine undulatory sand beds, GB Attitude	
									@ 57' - Grades to massive SANDSTONE, olive green to gray/white, slightly moist, very dense, indistinct contact	
1325	60									

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RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1

Date : 9/28/23 Page 3 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
36	60			R-7	17	119.5	6.0	SM	@ 60' - SANDSTONE: gray to olive green, slightly moist, dense to very dense	DS -#200
									@ 62' - Concretionary nodule, white, hard, oval shaped, 6-8" (laying flat), subhorizontal, massive SANDSTONE below	
31	65									
	70			R-8	27	113.2	14.0		@ 70' - SANDSTONE: gray to olive green, slightly moist, very dense, fine to medium grained	
26									**Total Depth = 71'** **Backfilled with Cuttings on 9/28/2023**	
	75									
21										
	80									
16										
	85									
11										
	90									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

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R	RING SAMPLE
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TEST TYPES:

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CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 1 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St. - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1380	0 / 5	See Geotechnical Boring log LGC-BA-1 for Graphic Log							**Tertiary Santiago Formation (Tsi)** SANDSTONE: gray to olive green and white, slightly moist, medium grained, dense, thickly bedded to massive, primary logging begins at approximately 33', see Geotechnical Boring Log LGC-BA-1 for more information	
1375	10									
1370	15									
1365	20									
1360	25									
1355	30									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
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CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 2 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30								@ 33' - concretionary layer continuous around hole, concretions up to 8"	
1350	35		@36' B: N60E 9SE						@ 36' - finer grained SANDSTONE, distinct red/brown stained contact with coarser sandstone above, bedding attitude	
1345	40								@ 43' to 44' - SILTSTONE rip-up clast, ~1' thick and 1' wide, clayey and very dense, sandstone above & below	
1340	45		@47' B: N70E 20NW						@ 47 to 48.5' - faint zone of crossbedding, general bedding attitude taken	
			@48.5' C: N48E 12SE						@ 48.5' - SILTSTONE: dark gray, slightly moist, very stiff, fine gravel and cobble bed at contact with sandstone above, Siltstone is internally sheared, weathered, some polished surfaces, coarsens to 56'	
1335	50									
1330	55								@ 56' - SANDSTONE: gray to olive green, slightly moist, very dense, thickly bedded to massive	
1325	60									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
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TEST TYPES:

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RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 3 of 4 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	60									
1323									@ 62' to 64' - concretionary nodules around hole, erratic, 3"-8" in size	
	65		@66.5' GB: N15E 9NW						@ 66.5' - general bedding attitude on fine gravel bed, continuous, 1"-2" thick	
1318										
	70		@69.5' B: N20E 10SE						@ 69.5' - Well defined transition to Sandy SILTSTONE, medium brown, rip up clast just above contact, general bedding attitude, coarsens to white to light brown sandstone by 72'	
1313			@72' B: N51W 9N						@ 72' - Another well defined transition to Sandy SILTSTONE, gray brown, coarsens to silty SANDSTONE by 75'	
	75									
1308			@77.5' CB: N40E 20SE						@ 77.5' - Claybed, 1/8-1/4" thick in Silty SANDSTONE, continuous around hole, dark gray, slightly plastic	
	80			R-9	20	118.9	93.9	20	@ 79' - medium gray SANDSTONE to clayey SANDSTONE, some $\frac{1}{4}$" white coarse sandstone inclusions, red oxide stains throughout @ 80' - Clayey SANDSTONE: grayish brown, slightly moist to dry, very dense/stiff	
1303										
	85								@ 86' - Zone of crossbedding visible to 90', small scale, barely discernable	
1298										
	90								@ 90' - white to light brown coarse sandstone, generally massive	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
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TEST TYPES:

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RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-1B

Date : 1/09/24 Page 4 of 4

Drilling Company : Big Johnny's

Project Name : Baker St - Lake Elsinore

Type of Rig : Bucket Auger

Project Number : 23160-01

Drop : 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1385 ' MSL

Drive Weight : 0'-25' - 3300 lbs.
25'-50' - 2200 lbs.
50'-80' - 1100 lbs.
80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1293	90									
	95									
1288									@97.5' - End Visual Log	
	100								**Total Depth = 100'** **Backfilled with Cuttings on 1/09/2024**	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-2

Date : 9/29/23 Page 1 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St. - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1338 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**Quaternary Colluvium - Qcol** @ 0-2.5' - Clayey SAND: dark gray, dry/desiccated, roots	
1335									**Teritary Silverado Formation - Tsi** @ 2.5' - Highly weathered SILTSTONE, fractured,soft to medium stiff, slightly moist to dry, caliche stringers throughout	
	5			R-1	6	100.5	5.4		@ 5' - Silty Fine SANDSTONE to Sandy SILTSTONE: mottled gray, olive, white, reddish brown, slightly moist, dense to medium dense, very weathered	
1330									@ 8' - SILTSTONE: gray to reddish brown, dry to slightly moist, very stiff, highly weathered/fractured	
	10		GB: N80E, 19SE	R-2	8	121.6	4.9		@ 10' - Silty SANDSTONE: yellow brown to light olive green, slightly moist, dense, less weathered, medium to coarse grained Gradational contact to medium grained SANDSTONE: some gypsum or caliche lined joints(fine white powder) to 13', moderately well-cemented	
1325										
	15									
1320									@ 18' - 6-8" SILTSTONE rip up clasts	
	20			R-3	8	123.9	7.8		@ 20' - Interbedded SANDSTONE/SILTSTONE: olive green to gray and yellow brown, slightly moist, dense to very dense, gypsium filled joints	
			@ 23' GB: N75E, 17SW						@ 23' - General bedding attitude, along aligned rip up clasts, gradation to finer grained Sand	
1315										
	25									
			@ 27' B: N55W, 30SW						@ 27' - Bedding attitude on indurated SANDSTONE bed	
1310			@ 28' GB: N45W 28SW						@ 28' - SILTSTONE, dark gray, very stiff, slightly weathered/jointed, FeO staining, general bedding attitude	
	30									

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-2

Date : 9/28/23 Page 2 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1338 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-4	10	108.5	16.4	SC-ML	@ 30' - SANDSTONE: gray, olive, white, black mottled, slightly moist to dry, very dense, medium to coarse grained, Clayey	
1305								@ 32' - SANDSTONE, less stiff, massive	
	35							@ 35' - Pisolitic Zone, very stiff SILTSTONE to 36'	
1300									
	40	GB @39' N45W, 30SW	R-5	8	87.2	24.1	SC	@ 39' - Some internal polished surfaces, general bedding attitude @ 40' - Clayey SANDSTONE: olive gray to dark gray, slightly moist, very stiff to stiff, polished surfaces, fractured	
		CB @42' N28W, 15SW	GB-1 @ 42'				CH	@ 42' - Clay Bed: dark gray, slightly moist, slightly plastic, around hole, pinches and swells from 1-3" thick	AL
1295								@ 44' - CLAY bed: dark gray, slightly moist, approximately 1" thick around hole, very stiff to hard below	
	45	CB @44' N50W, 26SW	GB-2 @ 44'					@ 45' - very hard drilling	
1290									
	50		R-6	31	111.6	6.4	SM	@ 50' - Silty SANDSTONE: light brown to olive gray, slightly moist, hard	DS -#200
1285								@ 55' - Silty SANDSTONE: very dense, massive	
	55							@ 56' - Transtion from SANDSTONE to SILTSTONE, bedding attitude	
1280		@ 56' B: N70W, 31S J: N20E, S75 J: N20W, 79S J: N45W, 50N						@ 57' - Joints along polished surfaces, belled out along jointing on north side of hole up to 18", unsafe below, SILTSTONE to 60', very stiff to hard	
	60								

B-1

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Geotechnical Boring Log LGC-BA-2

Date : 9/28/23 Page 3 of 3 | **Drilling Company :** Big Johnny's

Project Name : Baker St - Lake Elsinore | **Type of Rig :** Bucket Auger

Project Number : 23160-01 | **Drop :** 30" **Hole Diameter :** 24"

Elevation of Top of Hole : ~ 1338 ' MSL | **Drive Weight :** 0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.

Hole Location : See Geotechnical Map

Logged by BPG

Sampled by BPG

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	60			R-7	17	102.4	19.8	ML	@ 60' - Clayey SILTSTONE: dark gray, slightly moist, very stiff, fractured	
1275										
	65									
1270										
	70			R-8	27	100.1	15.9	SM-ML	@ 70' - Sandy SILTSTONE: light brown to gray brown, dry to slightly moist, very stiff	
1265										
	75									
1260										
	80			R-8	27	120.3	13.7		@ 80' - Sandy SILTSTONE: olive green to gray, dry to slightly moist, very stiff	
1255									**Total Depth = 80'** **Backfilled with Cuttings on 9/29/2023**	
	85									
1250										
	90									

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
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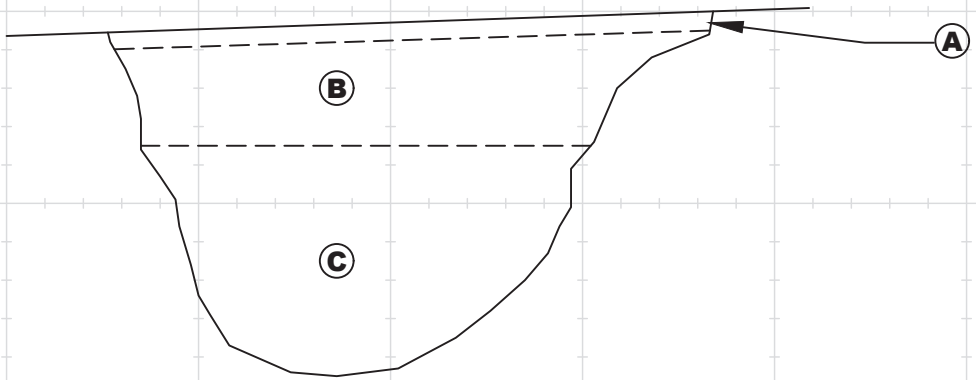
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 9/8/2021

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-1	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: light brown, dry, loose to medium dense, dead vegetation, desiccated	Qal				
	B	@ 0.5' to 3.5' - Silty CLAY: dark brown, dry to slightly moist, med dense					
		Tertiary Silverado Formation (Tsi)					
@ 4' GB: S50E 20SW	C	@ 3.5' to T.D. - Interbedded SILTSTONE and SANDSTONE, gray and mottled light brown, dry, medium dense to dense, general bedding attitude taken	Tsi				

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1274 ' MSL** **Surface Slope: 2 deg.** **Trend: S34W**



Total Depth: 9.5'
Groundwater: None
Backfilled: 9/26/2023

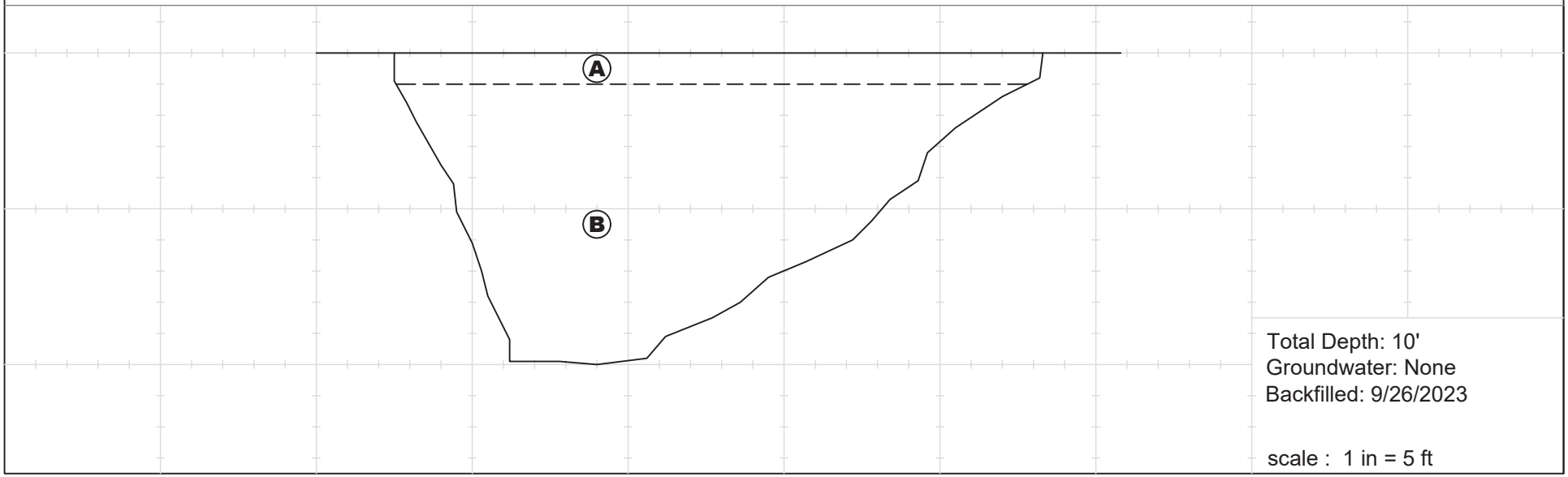
scale : 1 in = 5 ft

Last Edited: 10/11/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-2	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A B	**Quaternary Young Alluvial Channel Deposits (Qal)** @ 0' to 1' - SILT: light brown to gray, dry, loose to medium dense, dead vegetation, @ 1' to T.D. - Clayey SAND: brownish gray overall, dry and indurated to 3.5', then slightly moist and medium dense from 3.5' to 10'.	Qal				

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1268 ' MSL** **Surface Slope: 0 deg.** **Trend: E-W**

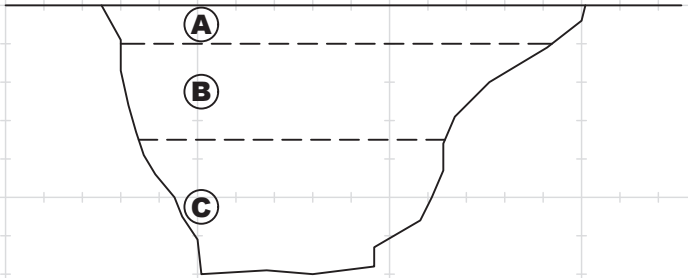


Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-3	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Artificial Fill, Undocumented (afu)					
	A	@ 0' to 1' - SILT: dark brown to gray, loose, moist, vegetation at surface	afu		B-1 @ 0'-5'		
	B	@ 1' to 3.5' - Sandy CLAY: dark brown, moist, medium dense					
		Quaternary Young Alluvial Channel Deposits (Qal)					
	C	@ 3.5' to T.D. - Silty SAND: gray to brown, dry, very dense, indurated	Qal				

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1270 ' MSL** **Surface Slope: 0 deg.** **Trend: N45E**



Total Depth: 7'
Groundwater: None
Backfilled: 9/26/2023

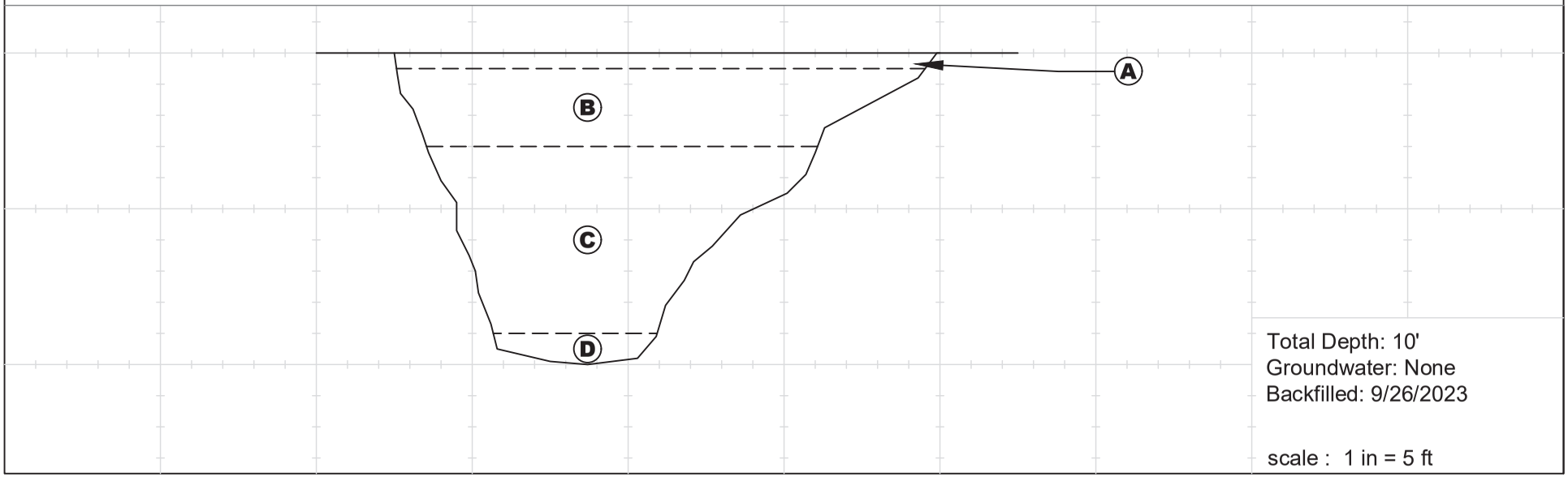
scale : 1 in = 5 ft

Last Edited: 10/12/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-4	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: dark gray to brown, dry, loose to medium dense, dead vegetation at surface	Qal				
	B	@ 0.5' to 3' - Sandy CLAY: dark brown, gray, dense, slightly moist					
		Tertiary Silverado Formation (Tsi)					
	C	@ 3' to 9'- SANDSTONE: white to light brown with red mottle, dry, dense	Tsi				
	D	@ 9' to T.D. - SILTSTONE: olive gray, dry, medium dense to dense					

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1274 ' MSL** **Surface Slope: 0 deg.** **Trend: S75E**

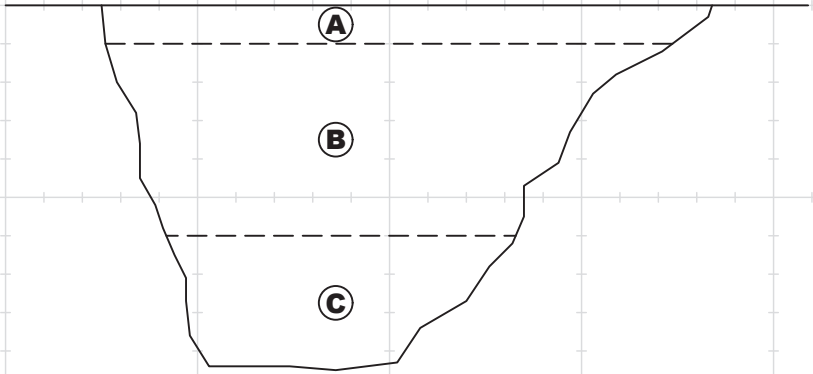


Last Edited: 10/12/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-5	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 1' - SILT: dark brown and gray, slightly moist to dry, loose	Qal		B-1 @ 0'-9.5'		
	B	@ 1' to 6' - SILT/CLAY: dark brown, slightly moist dense					
		Tertiary Silverado Formation (Tsi)					
	C	@ 6' to T.D. - SILTSTONE: gray, mottled, slightly moist, medium dense to dense, weathered	Tsi				

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1271 ' MSL** **Surface Slope: 0 deg.** **Trend: S55E**



Total Depth: 9.5'
Groundwater: None
Backfilled: 9/26/2023

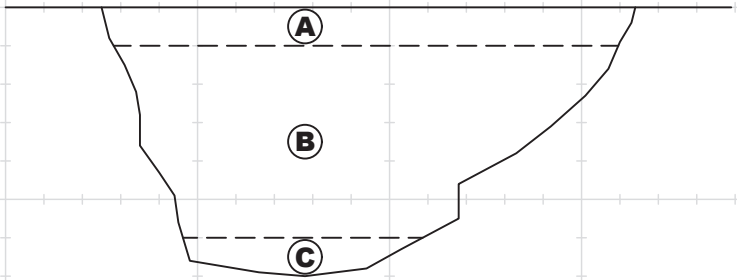
scale : 1 in = 5 ft

Last Edited: 10/12/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-6	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary young alluvial channel deposits (Qal)					
	A	@ 0' to 1' - SILT: light brown, dry, medium dense, some 1" to 6" cobbles (subrounded to angular)	Qal				
	B	@ 1' to 6' - Silty SAND: dark reddish brown, dry, dense to very dense, indurated					
		Tertiary Silverado Formation (Tsi)					
	C	@ 6' to T.D. - SANDSTONE: white, dry, dense, some iron oxide	Tsi				

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1289 ' MSL** **Surface Slope: 0 deg.** **Trend: E-W**



Total Depth: 7'
Groundwater: None
Backfilled: 9/26/2023

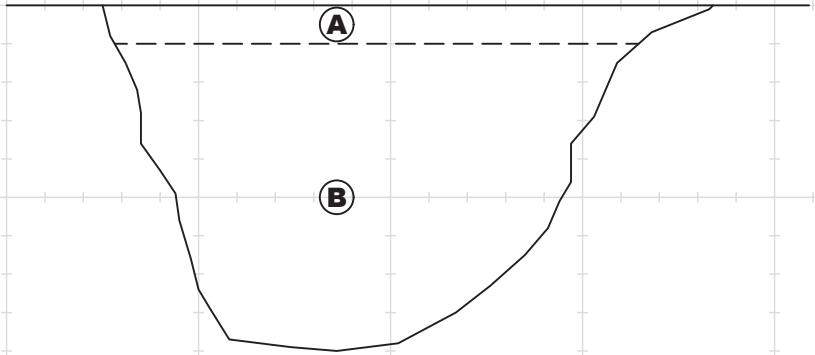
scale : 1 in = 5 ft

Last Edited: 10/13/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-7	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A B	**Artificial Fill, Undocumented (afu)** @ 0' to 1' - SILT: light grayish brown, loose, dry, dead grass, some trash, rounded cobbles 2"-6" in diameter @ 1' to 9' - SILT: grayish brown, dry, trash (roof tiles) random rounded cobbles (some are nested, creating voids), krotovina, medium dense, tan sandy layer from 3'-4' than back to brown gray silt	afu				

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1270 ' MSL** **Surface Slope: 0 deg.** **Trend: S50E**



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

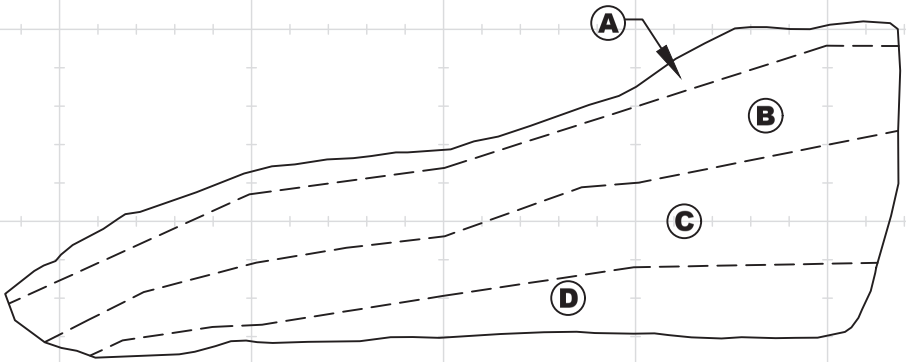
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-8	LGC Geotechnical, Inc.
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)	Qal				
	A	@ 0' to 0.5 - SILT: light brown to gray, dry, loose, dry grass, some 2"-3" sub rounded cobbles					
	B	@ 0.5' to 4' - Sandy CLAY/Clayey SAND: dark brown, slightly moist to dry, dense					
		Tertiary Silverado Formation (Tsi)	Tsi				
	C	@ 4' to 6' - SANDSTONE: white, slightly moist, medium dense, some iron oxide					
B:S75E 25S	D	@ 6' to 8' - SILTSTONE: mottled gray, medium dense to dense, dry to slightly moist, heavily weathered					

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1313 ' MSL** **Surface Slope: 35 deg.** **Trend: S34W**



Total Depth: 8'
Groundwater: None
Backfilled: 9/26/2023

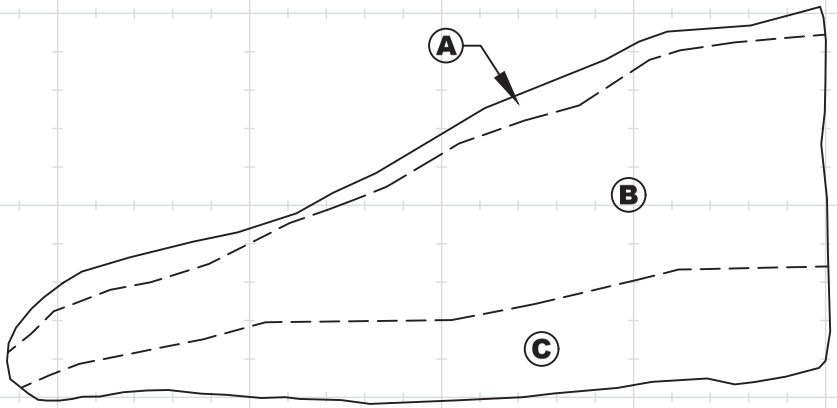
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-9	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	**Quaternary Young Alluvial Channel Deposits (Qal)** @ 0' to 0.5' - SILT: gray, loose, dry, dead grass	Qal				
	B	@ 0.5' to 5' - Sandy CLAY/Clayey SAND: brown to dark brown, dry, very dense, indurated **Tertiary Silverado Formation (Tsi)**					
S35E 50SW	C	@ 5' to 9' - mottled SANDSTONE and SILTSTONE: gray overall, dry, dense, some rip up clasts of siltstone within sandstone areas, contact blends with unit B, intact contact between sandstone and siltstone beds in rear of trench, attitude taken	Tsi				

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1311 ' MSL** **Surface Slope: 25 deg.** **Trend: S46W**



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

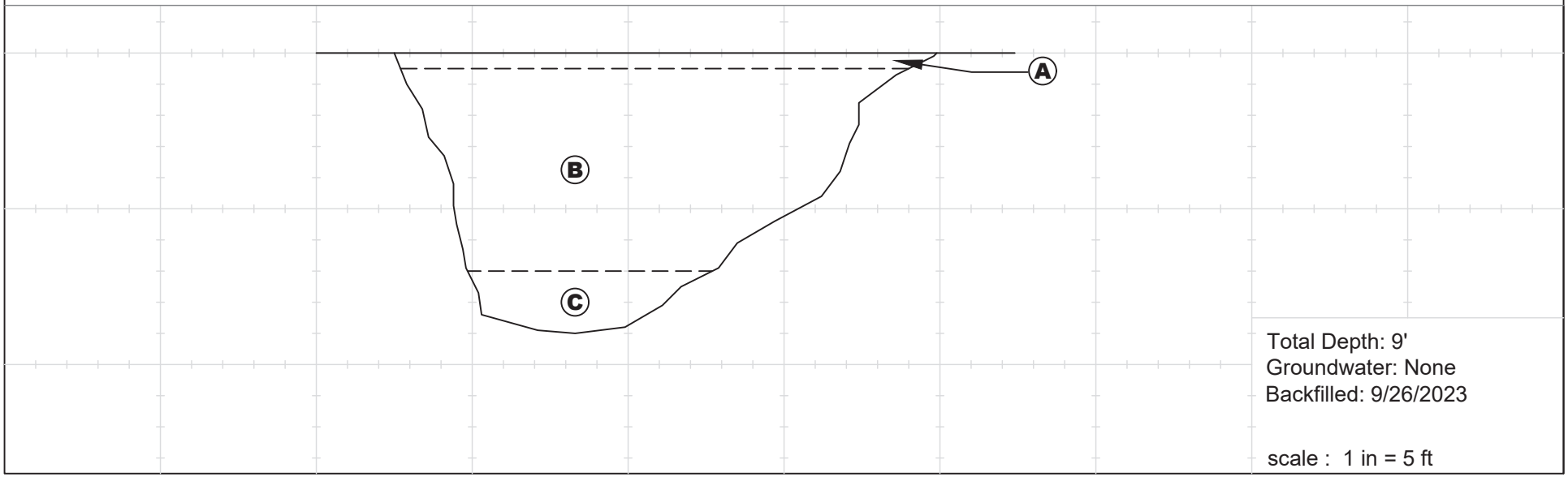
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-10	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	**Quaternary Young Alluvial Channel Deposits (Qal)** @ 0' to 0.5' - SILT: light gray, dry, loose to medium dense, dead grass	Qal				
	B	@ 0.5' to 7' - Clayey SAND: brownish gray, slightly moist, dense, indurated, 2" to 3" subrounded cobbles					
	C	@ 7' to 9' - SAND with trace CLAY, brownish gray, slightly moist, medium dense, 2" to 3" subrounded cobbles					

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1291 ' MSL** **Surface Slope: 0 deg.** **Trend: N-S**

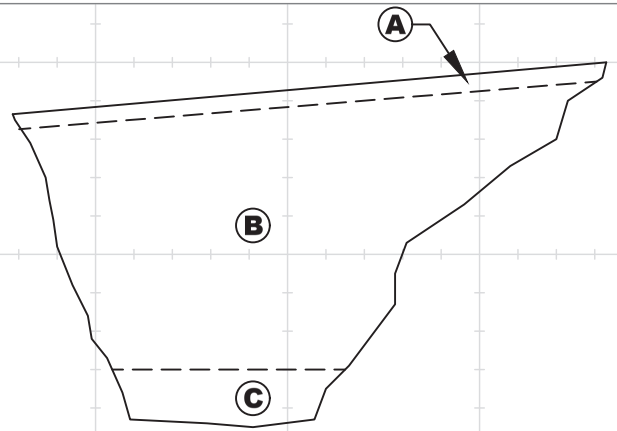


Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-11	LGC Geotechnical, Inc.
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Young Alluvial Channel Deposits (Qal)					
	A	@ 0' to 0.5' - SILT: light gray overall, dry, medium dense	Qal				
	B	@ 0.5' to 8' - Clayey SAND/Sandy CLAY: dark brownish gray, dry, dense, rootlets, indurated					
	C	@ 8' to 9' - Clayey SAND: olive gray, slightly moist, medium dense to dense					

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1273 ' MSL** **Surface Slope: 5 deg.** **Trend: N60W**



Total Depth: 9.5'
Groundwater: None
Backfilled: 9/26/2023

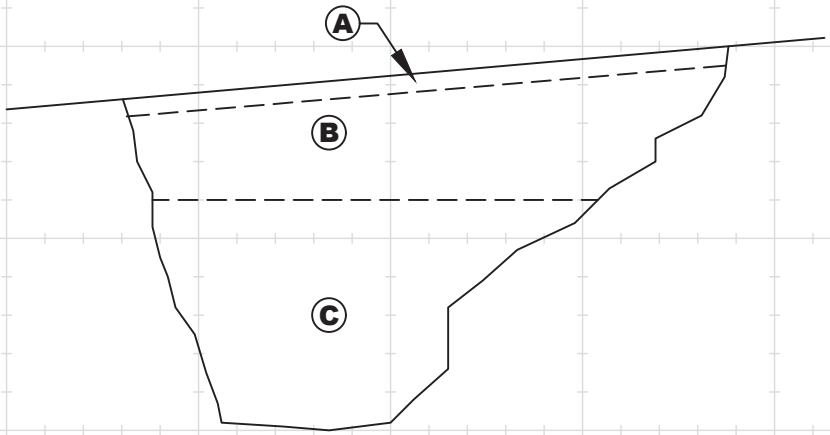
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-12	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
		Quaternary Colluvium (Qcol)					
	A	@ 0' to 0.5' - SILT and Sandy CLAY: brownish gray, dry, medium dense to dense, dead grass, rounded 2"-3" cobbles	Qcol				
	B	@ 0.5' to 4' - Clayey SAND: light brown, dry, dense, cracked/desiccated			B-1 @ 4'-10'		
		Tertiary Silverado Formation (Tsi)					
	C	@ 4' to 10' - SANDSTONE: white, dense, dry, some minor root fractures, krotovina, some iron oxide	Tsi				

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1310 ' MSL** **Surface Slope: 5 deg.** **Trend: N50W**



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

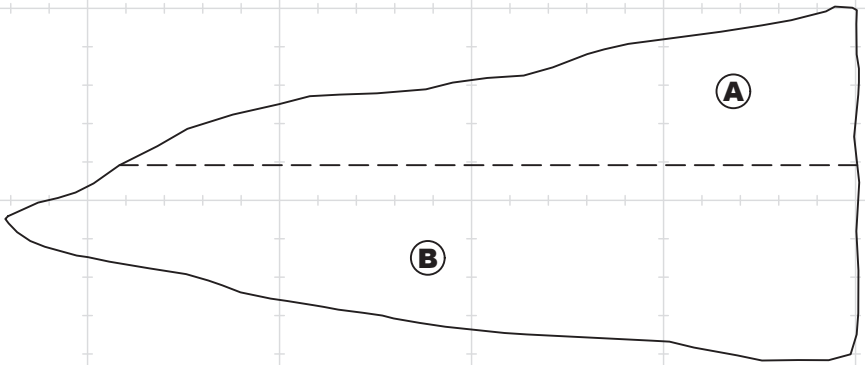
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-13	LGC Geotechnical, Inc.
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	Quaternary Colluvium (Qcol) @ 0' to 4' - Clayey SAND: brownish gray, dry, medium dense, 2"-1' rounded clasts, some angular clasts as well	Qcol				
	B	Tertiary Silverado Formation (Tsi) @ 4' to 9' - Clayey SAND: olive gray to light brown, around 7' changes to heavily fractured claystone/siltstone, contact is undulatory, both units oxidized and very mottled, rip up clasts of siltstone present in clayey sand, all units dense and slightly moist	Tsi		B-1 @ 4' - 9'		

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1304 ' MSL** **Surface Slope: 25 deg.** **Trend: S15E**



Total Depth: 9'
Groundwater: None
Backfilled: 9/26/2023

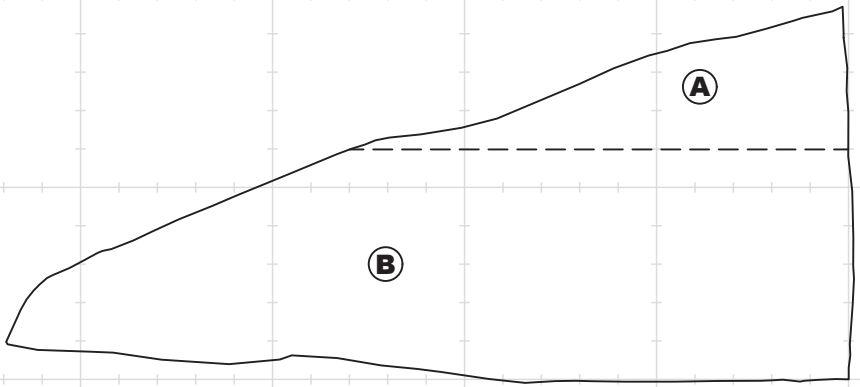
scale : 1 in = 5 ft

Last Edited: 10/25/2023

Project Name: EIP - Lake Elsinore	**Logged By: MJG**	**Trench No: TP-14**	
Project Number : 23160-01	**Date : 9/26/2023**	**Engineering Properties:**	
Equipment: Backhoe	**Location: See Geotechnical Map**		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	**Quaternary Colluvium (Qcol)** **@ 0' to 4' - Clayey SAND: grayish brown, medium dense, dry, 2"-3" cobbles**	Qcol				
N69E 5SE	B	**Tertiary Silverado Formation (Tsi)** **@ 4' to 10' - SILTSTONE: gray overall with red and black mottle, dense, dry to slightly moist, red banding seems to vaguely outline bedding, bands are not continuous, some sandy patches with gray and red mottle, general bedding attitude**	Tsi				

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1333 ' MSL** **Surface Slope: 25 deg.** **Trend: S10E**



Total Depth: 10'
Groundwater: None
Backfilled: 9/26/2023

scale : 1 in = 5 ft

Last Edited: 10/25/2023

Appendix C
Laboratory Test Results

APPENDIX C

Laboratory Testing Procedures and Test Results

The laboratory testing program was formulated towards providing data relating to the relevant engineering properties of the soils with respect to residential construction. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on relatively undisturbed samples obtained from the test borings and/or trenches. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined from undisturbed or disturbed samples.

Expansion Index: The expansion potential of selected samples was evaluated by the Expansion Index Test, Standard ASTM D4829. Specimens are molded under a given compactive energy to approximately the optimum moisture content and approximately 50 percent saturation or approximately 90 percent relative compaction. The prepared 1-inch-thick by 4-inch-diameter specimens are loaded to an equivalent 144 psf surcharge and are inundated with tap water until volumetric equilibrium is reached. The results of these tests are presented in the table below.

Sample Location	Expansion Index	Expansion Potential*
HS-6 @ 0-5 feet	99	High
TP-3 @ 0-5 feet	71	Medium

* ASTM D4829

Grain Size Distibution/Fines Content: Representative samples were dried, weighed and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve (ASTM D1140). Where applicable, the portion retained on the No. 200 sieve and dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D6913 (sieve).

Sample Location	Description	% Passing # 200 Sieve
HS-6 @ 0-5 feet	Sandy Silt	51
HS-8 @ 15 feet	Clay with Sand	73
TP-3 @ 0-5 feet	Sandy Clay	59
BA-1 @ 60 feet	Silty/Clayey Sand	27
BA-2 @ 50 feet	Silty Sand	44

Laboratory Testing Procedures and Test Results

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined in accordance with ASTM Test Method D4318 for engineering classification of fine-grained material and presented in the table below. The USCS soil classification indicated in the table below is based on the portion of sample passing the No. 40 sieve and may not necessarily be representative of the entire sample. The plot is provided in this Appendix.

Sample Location	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Soil Classification
HS-2, R-3 @ 7.5 ft	62	30	32	CH
TP-11, B-1 @ 0-5 ft	41	19	22	CL
BA-1, GB-1 @ 52 ft	53	31	22	MH
BA-2, GB-1 @ 42 ft	74	33	41	CH
BA-1B, GB-1 @ 77.5'	62	30	32	CH

Direct Shear: Four direct shear tests were performed on remolded and relatively undisturbed samples, which was soaked for a minimum of 24 hours prior to testing. The samples were tested under various normal loads using a motor-driven, strain-controlled, direct-shear testing apparatus (ASTM D3080). The plot is provided in this Appendix.

Consolidation: One consolidation test was performed per ASTM D2435. A sample (2.4 inches in diameter and 1 inch in height) was placed in a consolidometer and increasing loads were applied. The sample was allowed to consolidate under "double drainage" and total deformation for each loading step was recorded. The percent consolidation for each load step was recorded as the ration of the amount of vertical compression to the original sample height. The consolidation pressure curves are provided in this Appendix.

Maximum Density Tests: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557. The results of these tests are presented in the table below:

Sample Location	Sample Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
HS-7 @ 0-5 feet	Grayish Brown Sandy Clay	113.5	14.0
TP-3 @ 0-5 feet	Grayish Brown Sandy Clay	116.5	12.0

Laboratory Testing Procedures and Test Results

R-value Test: R-value test was performed in general accordance with California Test Method 301. The plot is included in the Appendix.

Sample Location	R-value
HS-6 @ 0-5 ft	<5

Chloride Content: Chloride content was tested in accordance with Caltrans Test Method (CTM) 422. The results are presented below.

Sample Location	Chloride Content, ppm
HS-6 @ 0-5 feet	180
TP-3 @ 0-5 feet	220

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (CTM 417). The soluble sulfate content is used to determine the appropriate cement type and maximum water-cement ratios. The test results are presented in the table below.

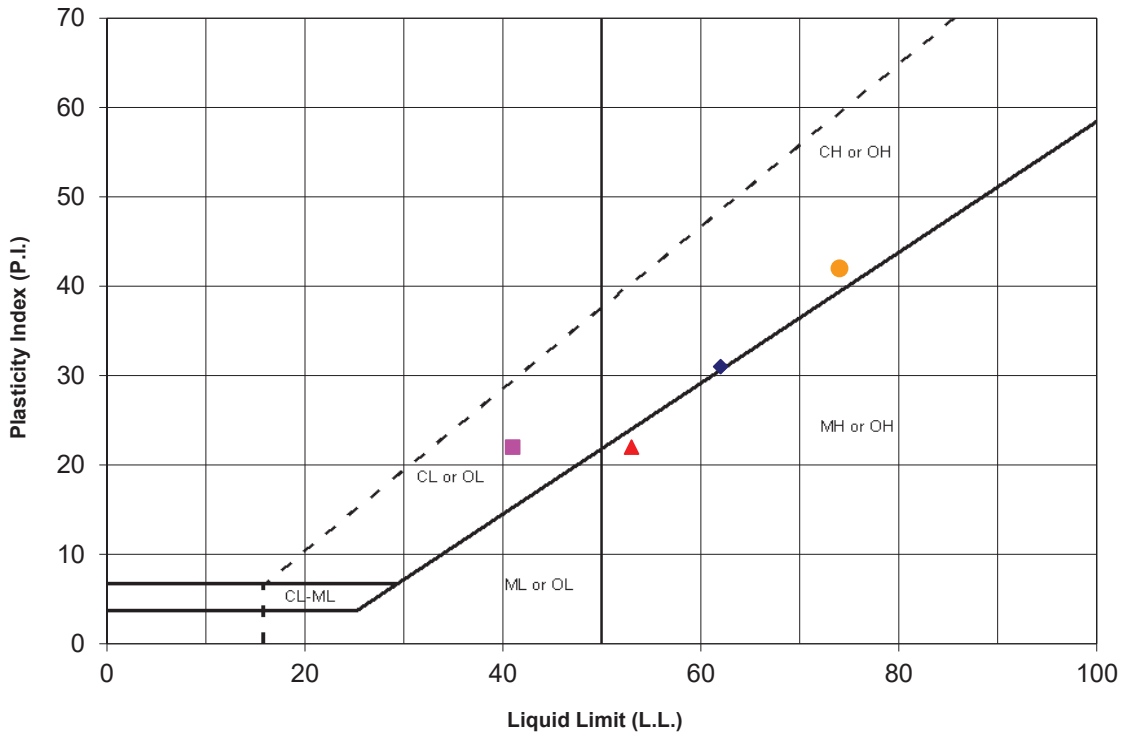
Sample Location	Sulfate Content (ppm)	Sulfate Exposure Class *
HS-6 @ 0-5 feet	86	S0
TP-3 @ 0-5 feet	226	S0

*Based on ACI 318R-14, Table 19.3.1.1

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with CTM 643 and standard geochemical methods. The results are presented in the table below.

Sample Location	pH	Minimum Resistivity (ohms-cm)
HS-6 @ 0-5 feet	7.91	735
TP-3 @ 0-5 feet	6.57	1240

PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	HS-2	R-3	7.5'	-	62	30	32	CH
■	TP-11	B-1	0-5'	-	41	19	22	CL
▲	BA-1	GB-1	52'	-	53	31	22	MH
●	BA-2	GB-1	42'	-	74	33	41	CH

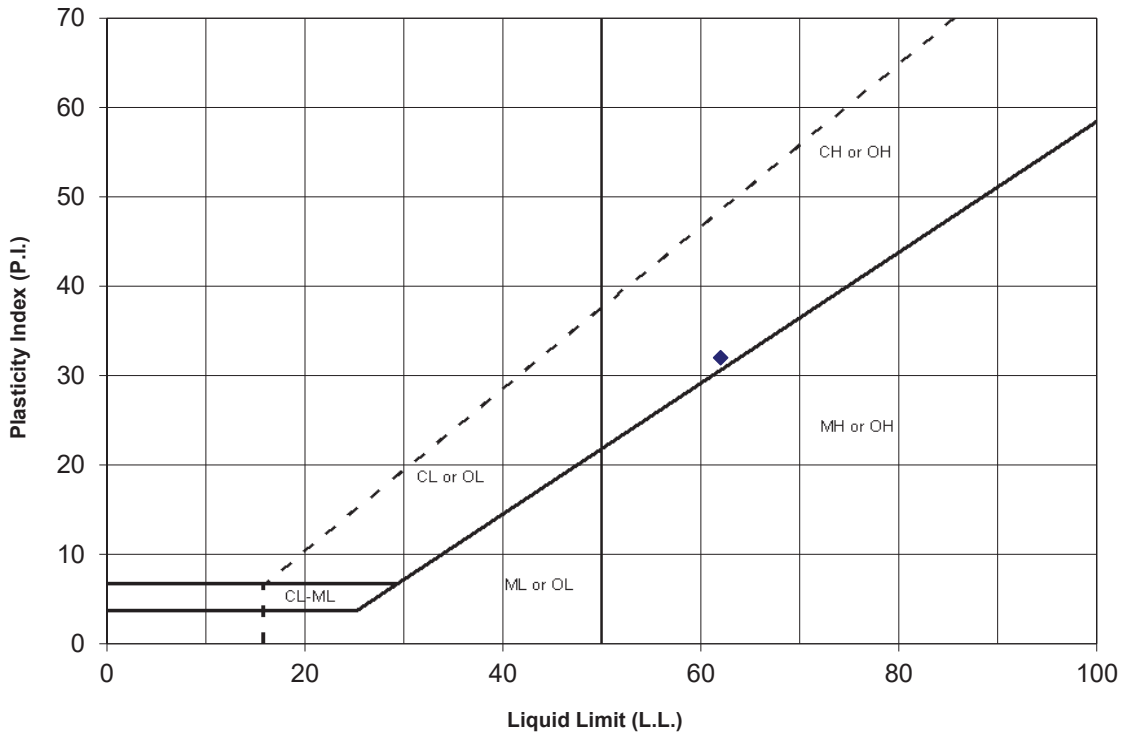
LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 23160-01
Date: Oct-23

EIP Lake Elsinore

PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	BA-1B	GB-1	77.5'	-	62	30	32	CH

LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 23160-01
Date: Jan-24

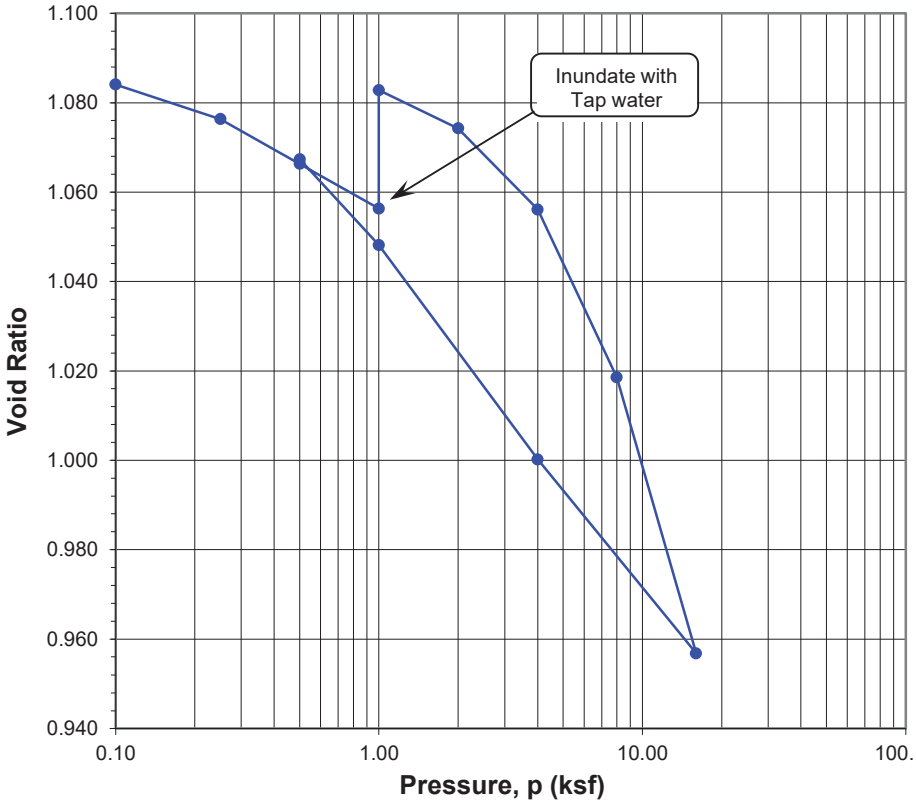
Baker St, Lake Elsinore

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name:	EIP Lake Elsinore	Tested By: GB/JD	Date: 10/11/23
Project No.:	23160-01	Checked By: J. Ward	Date: 10/20/23
Boring No.:	HS-2	Depth (ft.): 7.5	
Sample No.:	R-3	Sample Type: Ring	
Soil Identification:	Yellowish brown lean clay (CL)		

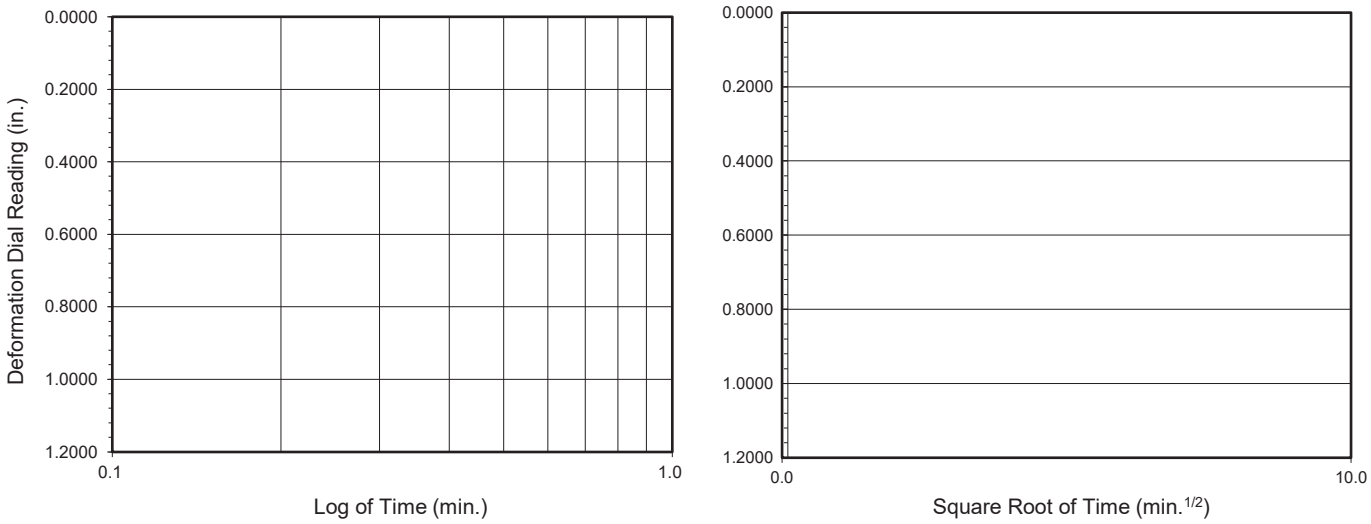
Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	178.31
Weight of Ring (g):	45.07
Height after consol. (in.):	0.9913
Before Test	
Wt. of Wet Sample+Cont. (g):	155.80
Wt. of Dry Sample+Cont. (g):	129.30
Weight of Container (g):	57.87
Initial Moisture Content (%)	37.1
Initial Dry Density (pcf)	80.8
Initial Saturation (%):	92
Initial Vertical Reading (in.)	0.0781
After Test	
Wt. of Wet Sample+Cont. (g):	236.81
Wt. of Dry Sample+Cont. (g):	199.10
Weight of Container (g):	57.18
Final Moisture Content (%)	38.94
Final Dry Density (pcf):	81.3
Final Saturation (%):	98
Final Vertical Reading (in.)	0.0905
Specific Gravity (assumed):	2.70
Water Density (pcf):	62.43

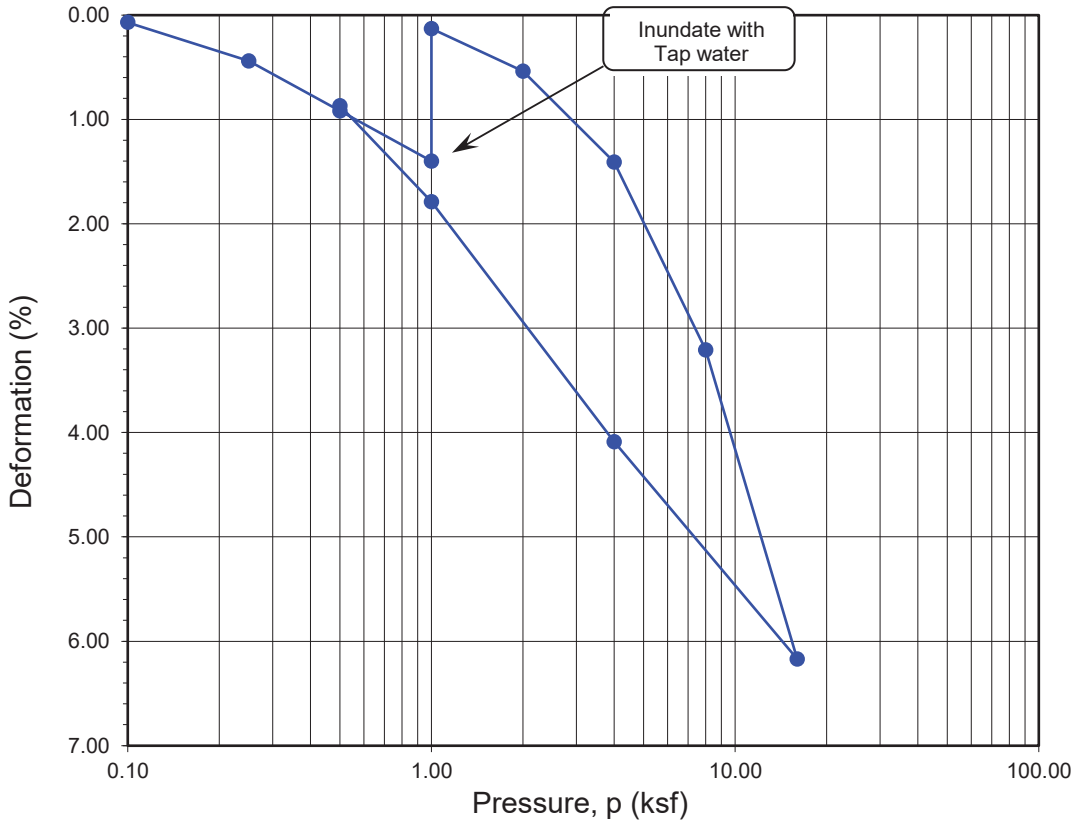


Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.10	0.0788	0.9993	0.00	0.07	1.084	0.07
0.25	0.0829	0.9952	0.04	0.48	1.076	0.44
0.50	0.0882	0.9899	0.09	1.01	1.066	0.92
1.00	0.0937	0.9844	0.16	1.56	1.056	1.40
1.00	0.0810	0.9971	0.16	0.29	1.083	0.13
2.00	0.0859	0.9922	0.24	0.78	1.074	0.54
4.00	0.0955	0.9826	0.33	1.74	1.056	1.41
8.00	0.1147	0.9634	0.45	3.66	1.019	3.21
16.00	0.1455	0.9326	0.57	6.74	0.957	6.17
4.00	0.1237	0.9544	0.47	4.56	1.000	4.09
1.00	0.1000	0.9781	0.40	2.19	1.048	1.79
0.50	0.0905	0.9876	0.37	1.24	1.067	0.87

Time Readings				
Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)

Time Readings





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-2	**R-3**	**7.5**	**37.1**	**38.9**	**80.8**	**81.3**	**1.086**	**1.067**	**92**	**98**

Soil Identification: Yellowish brown lean clay (CL)

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 23160-01

EIP Lake Elsinore

10-23

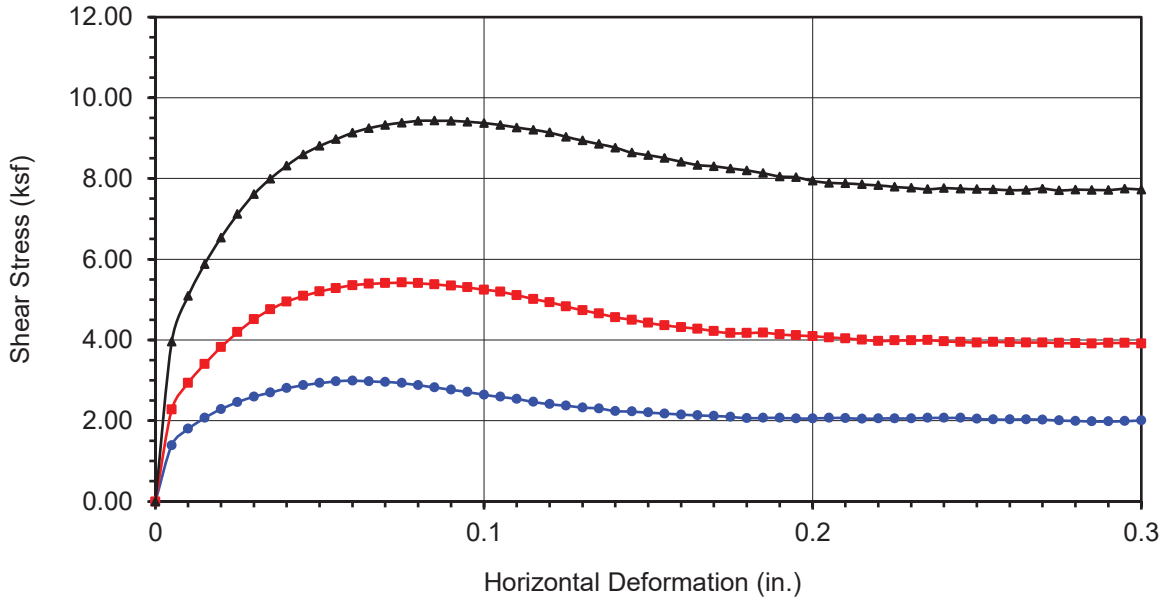
DIRECT SHEAR TEST

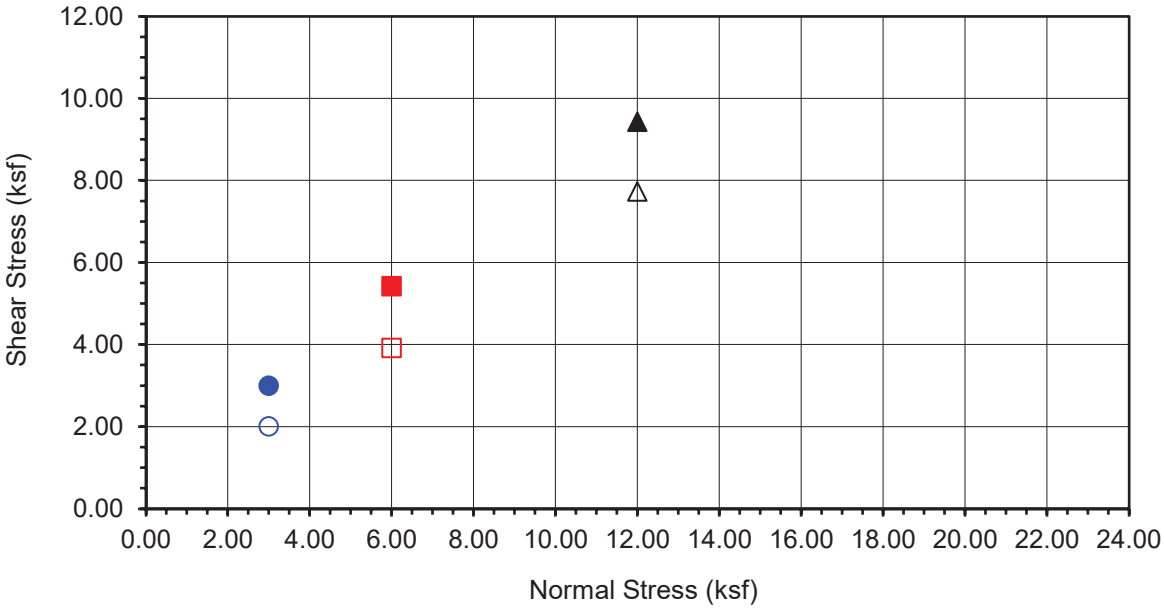
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/17/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	BA-1	Sample Type:	Ring		
Sample No.:	R-7	Depth (ft.):	60.0		

Soil Identification: Olive gray silty, clayey sand (SC-SM)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	199.94	202.18	207.73
Weight of Ring(gm):	44.67	45.19	44.54
Before Shearing			
Weight of Wet Sample+Cont.(gm):	198.81	198.81	198.81
Weight of Dry Sample+Cont.(gm):	187.08	187.08	187.08
Weight of Container(gm):	38.30	38.30	38.30
Vertical Rdg.(in): Initial	0.2501	0.2473	0.0000
Vertical Rdg.(in): Final	0.2607	0.2660	-0.0308
After Shearing			
Weight of Wet Sample+Cont.(gm):	201.66	225.21	224.54
Weight of Dry Sample+Cont.(gm):	180.76	204.98	205.31
Weight of Container(gm):	39.72	61.47	58.54
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**BA-1**
Sample No.	**R-7**
Depth (ft)	**60**
Sample Type: Ring	
Soil Identification: Olive gray silty, clayey sand (SC-SM)	

Normal Stress (kip/ft²)	3.000	6.000	12.000
Peak Shear Stress (kip/ft²)	● 2.993	■ 5.423	▲ 9.434
Shear Stress @ End of Test (ksf)	○ 2.009	□ 3.914	△ 7.727
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	7.88	7.88	7.88
Dry Density (pcf)	119.7	121.0	125.8
Saturation (%)	52.1	54.2	62.6
Soil Height Before Shearing (in.)	0.9894	0.9813	0.9692
Final Moisture Content (%)	14.8	14.1	13.1

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

DS BA-1, R-7 @ 60

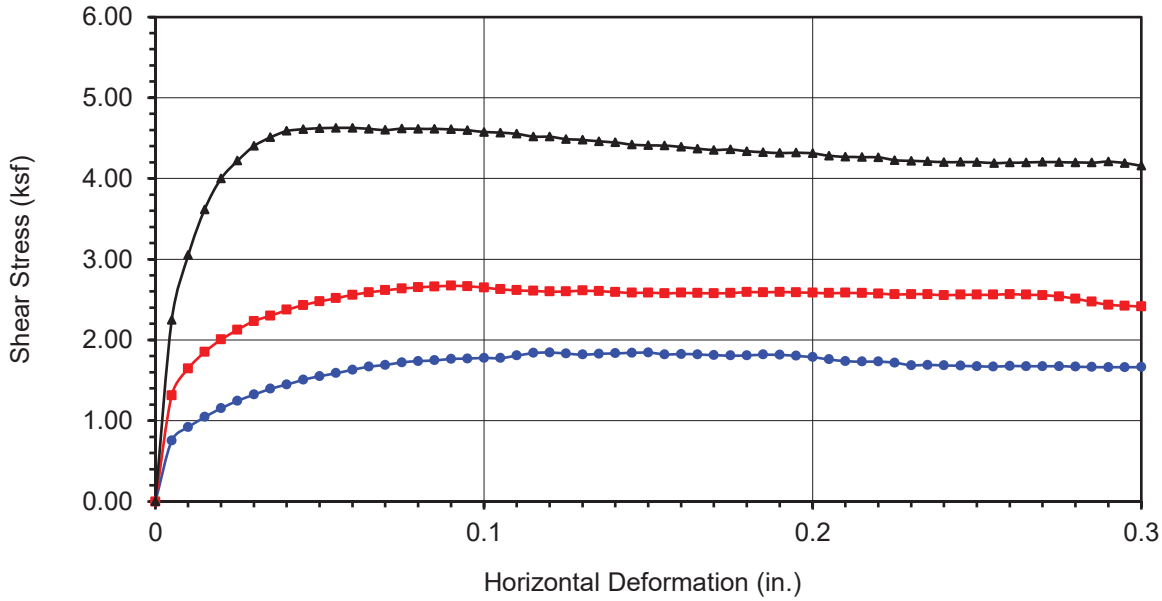
DIRECT SHEAR TEST

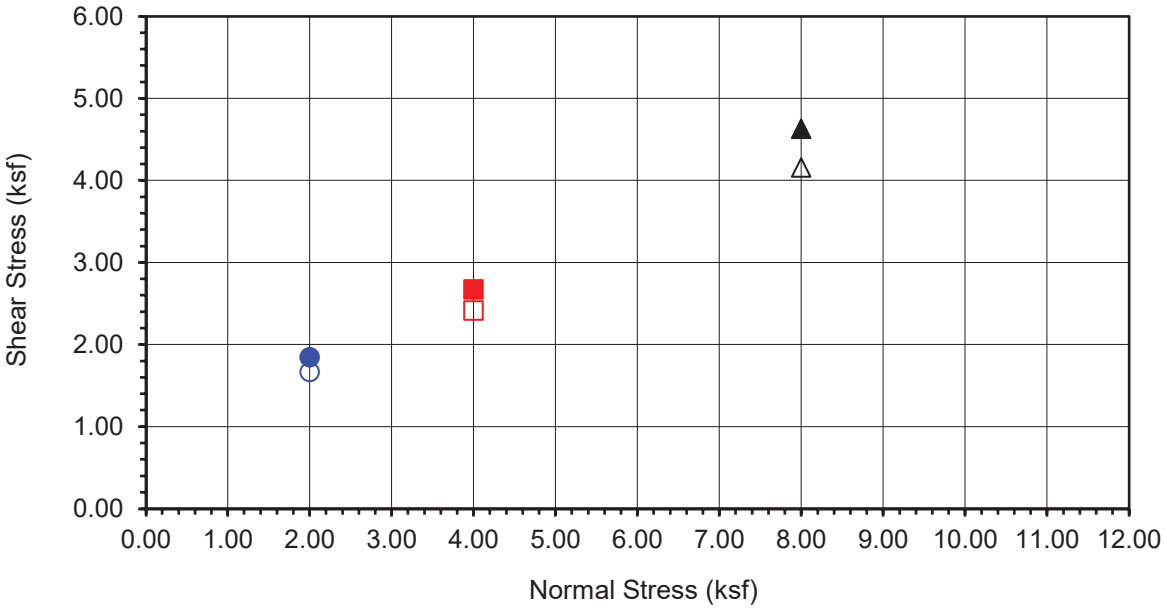
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/18/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	BA-2	Sample Type:	Ring		
Sample No.:	R-6	Depth (ft.):	50.0		

Soil Identification: Olive lean clay with sand (CL)s

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	187.72	196.06	200.28
Weight of Ring(gm):	43.30	45.54	45.73
Before Shearing			
Weight of Wet Sample+Cont.(gm):	158.08	158.08	158.08
Weight of Dry Sample+Cont.(gm):	149.98	149.98	149.98
Weight of Container(gm):	60.38	60.38	60.38
Vertical Rdg.(in): Initial	0.0000	0.2446	0.2771
Vertical Rdg.(in): Final	-0.0124	0.2644	0.3048
After Shearing			
Weight of Wet Sample+Cont.(gm):	223.40	220.51	191.08
Weight of Dry Sample+Cont.(gm):	202.49	198.99	169.49
Weight of Container(gm):	72.44	64.76	36.58
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**BA-2**
Sample No.	**R-6**
Depth (ft)	**50**
Sample Type:	
Ring	
Soil Identification:	
Olive lean clay with sand (CL)s	

Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.845	■ 2.672	▲ 4.628
Shear Stress @ End of Test (ksf)	○ 1.666	□ 2.414	△ 4.159
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	9.04	9.04	9.04
Dry Density (pcf)	110.2	114.8	117.9
Saturation (%)	46.0	52.1	56.8
Soil Height Before Shearing (in.)	0.9876	0.9802	0.9723
Final Moisture Content (%)	16.1	16.0	16.2

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

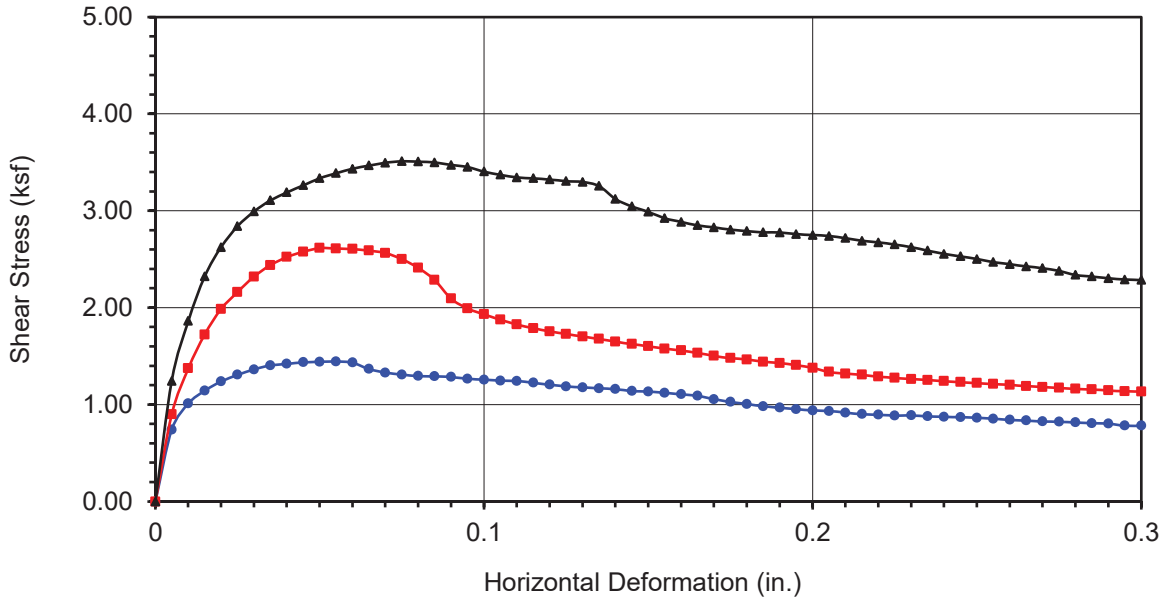
DIRECT SHEAR TEST

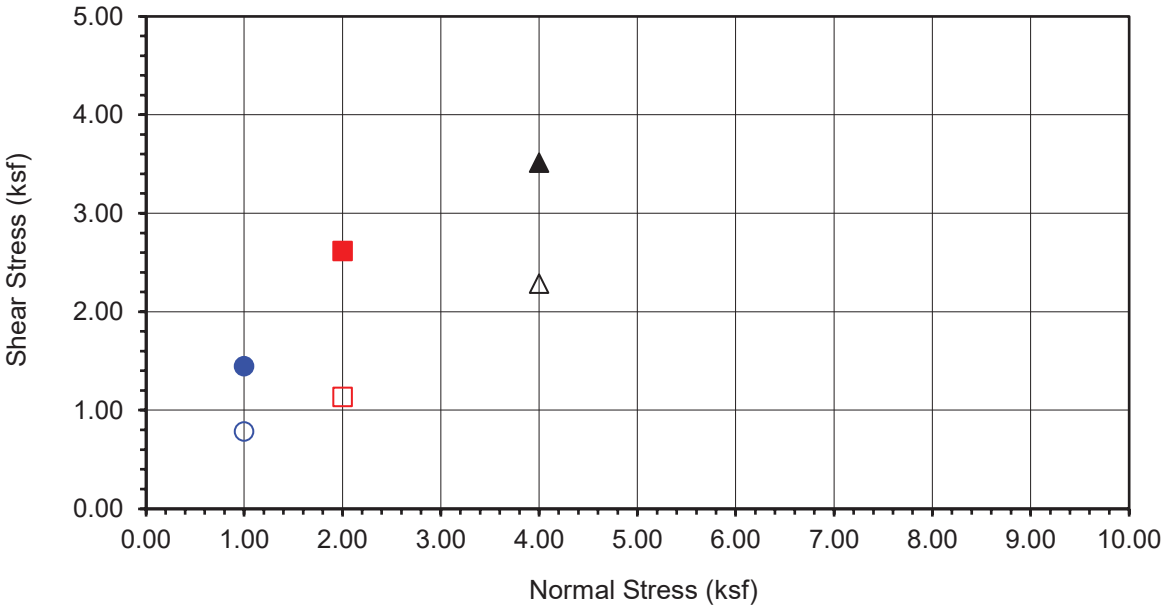
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/17/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	HS-8	Sample Type:	Ring		
Sample No.:	R-5	Depth (ft.):	15.0		

Soil Identification: Strong brown lean clay (CL)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	191.30	193.56	199.29
Weight of Ring(gm):	45.11	43.65	46.57
Before Shearing			
Weight of Wet Sample+Cont.(gm):	171.02	171.02	171.02
Weight of Dry Sample+Cont.(gm):	148.22	148.22	148.22
Weight of Container(gm):	38.48	38.48	38.48
Vertical Rdg.(in): Initial	0.0000	0.2387	0.2494
Vertical Rdg.(in): Final	0.0079	0.2342	0.2566
After Shearing			
Weight of Wet Sample+Cont.(gm):	206.19	217.29	222.68
Weight of Dry Sample+Cont.(gm):	175.08	187.36	192.76
Weight of Container(gm):	55.99	64.16	68.09
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**HS-8**
Sample No.	**R-5**
Depth (ft)	**15**
Sample Type:	
Ring	
Soil Identification:	
Strong brown lean clay (CL)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.446	■ 2.616	▲ 3.512
Shear Stress @ End of Test (ksf)	○ 0.783	□ 1.135	△ 2.286
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	20.78	20.78	20.78
Dry Density (pcf)	100.7	103.2	105.2
Saturation (%)	83.2	88.6	93.0
Soil Height Before Shearing (in.)	1.0079	1.0045	0.9928
Final Moisture Content (%)	26.1	24.3	24.0

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

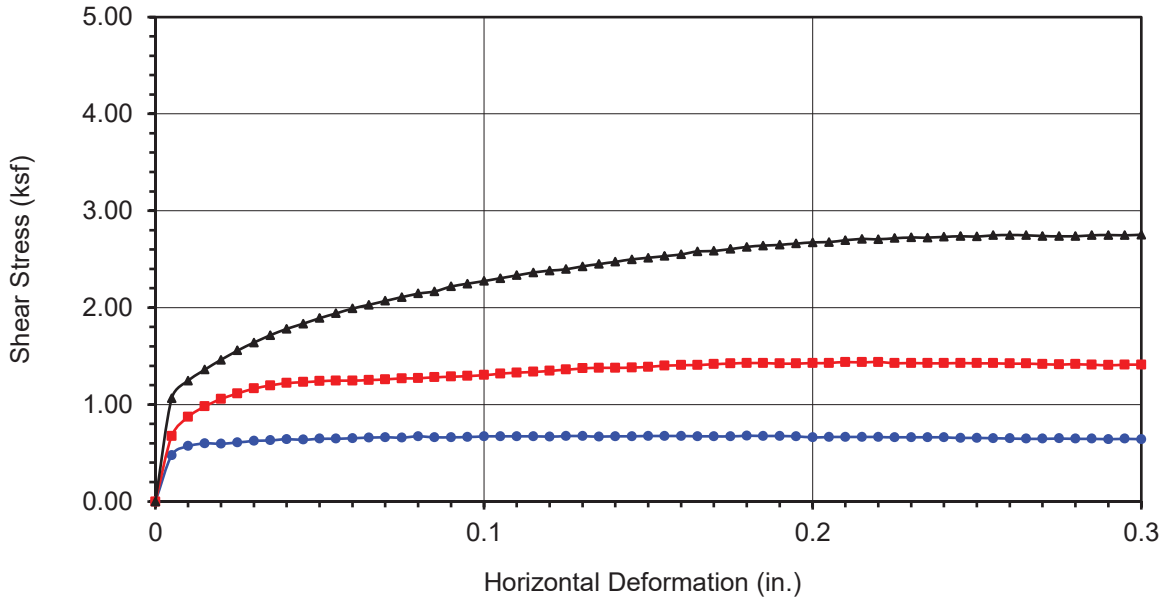
DIRECT SHEAR TEST

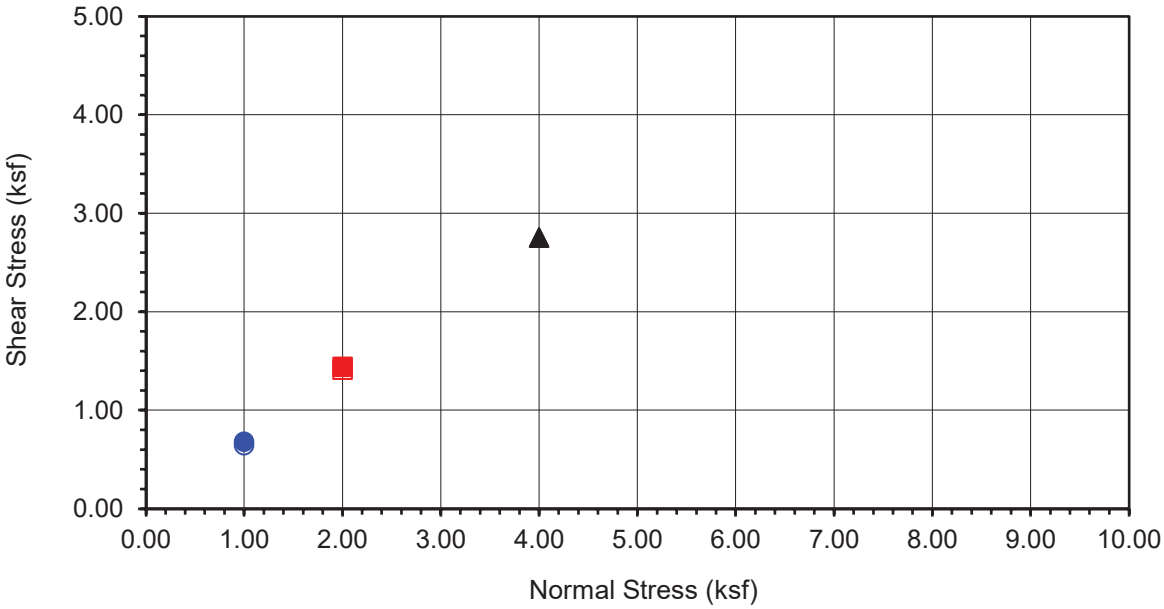
Consolidated Drained - ASTM D 3080

Project Name:	EIP Lake Elsinore	Tested By:	G. Bathala	Date:	10/16/23
Project No.:	23160-01	Checked By:	J. Ward	Date:	10/20/23
Boring No.:	TP-3	Sample Type:	90% Remold		
Sample No.:	B-1	Depth (ft.):	0-5		

Soil Identification: Grayish brown sandy lean clay s(CL)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	187.13	187.27	186.75
Weight of Ring(gm):	45.47	45.31	44.53
Before Shearing			
Weight of Wet Sample+Cont.(gm):	167.70	167.70	167.70
Weight of Dry Sample+Cont.(gm):	155.43	155.43	155.43
Weight of Container(gm):	55.15	55.15	55.15
Vertical Rdg.(in): Initial	0.2666	0.2294	0.0000
Vertical Rdg.(in): Final	0.2597	0.2287	-0.0232
After Shearing			
Weight of Wet Sample+Cont.(gm):	211.00	208.20	209.21
Weight of Dry Sample+Cont.(gm):	184.84	184.00	187.16
Weight of Container(gm):	59.18	59.15	61.49
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**TP-3**
Sample No.	**B-1**
Depth (ft)	**0-5**
Sample Type: 90% Remold	
Soil Identification: Grayish brown sandy lean clay s(CL)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.679	■ 1.440	▲ 2.754
Shear Stress @ End of Test (ksf)	○ 0.644	□ 1.412	△ 2.754
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	12.24	12.24	12.24
Dry Density (pcf)	105.0	105.2	105.4
Saturation (%)	54.5	54.8	55.1
Soil Height Before Shearing (in.)	1.0069	1.0007	0.9768
Final Moisture Content (%)	20.8	19.4	17.5

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23160-01

EIP Lake Elsinore

10-23

DS TP-3, B-1 @ 0-5

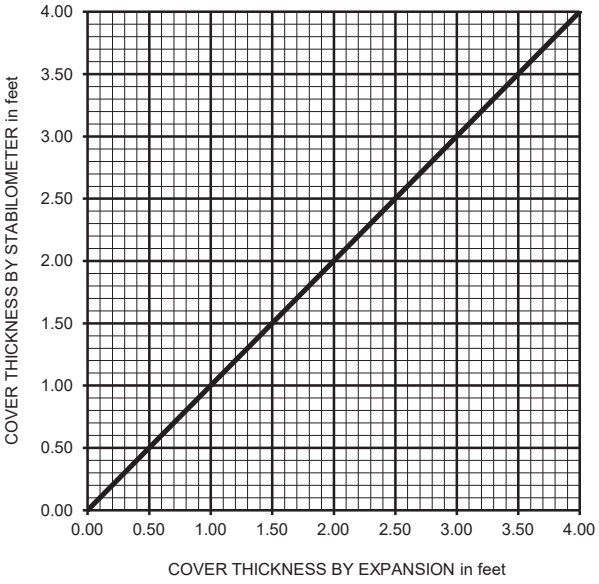
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	EIP Lake Elsinore	PROJECT NUMBER:	23160-01
BORING NUMBER:	HS-6	DEPTH (FT.):	0-5
SAMPLE NUMBER:	B-1	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Olive brown lean clay (CL)	DATE COMPLETED:	10/12/2023

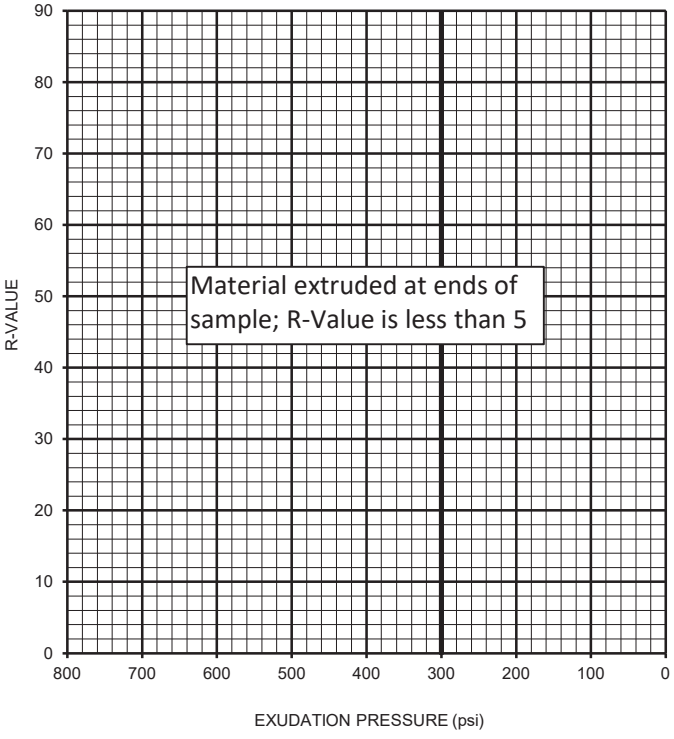
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %			
HEIGHT OF SAMPLE, Inches			
DRY DENSITY, pcf			
COMPACTOR PRESSURE, psi			
EXUDATION PRESSURE, psi			
EXPANSION, Inches x 10exp-4			
STABILITY Ph 2,000 lbs (160 psi)			
TURNS DISPLACEMENT			
R-VALUE UNCORRECTED	N/A	N/A	N/A
R-VALUE CORRECTED	N/A	N/A	N/A

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	N/A	N/A	N/A
EXPANSION PRESSURE THICKNESS, ft.	N/A	N/A	N/A

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	N/A
R-VALUE BY EXUDATION:	N/A
EQUILIBRIUM R-VALUE:	< 5

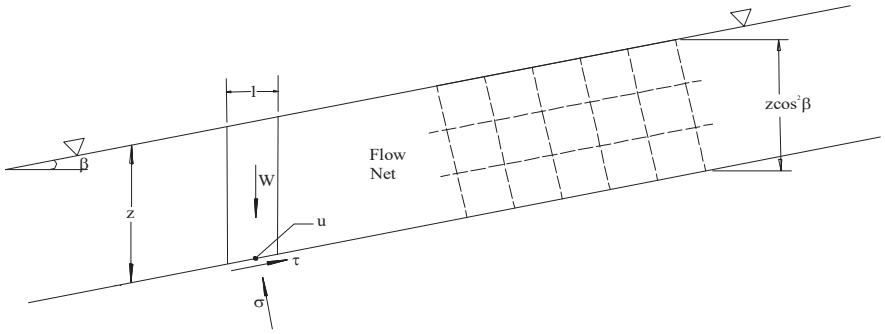
Appendix D
Slope Stability Analysis

Summary of Slope Stability Analysis

Cross-Section	Factor of Safety	Description
A-A'	2.13	Static (Rotational)
	1.37	Seismic - 117A (Rotational)
B-B'	1.94	Static (Block)
	1.05	Seismic - 117A (Block)
	1.76	Static (Rotational)
	1.22	Seismic - 117A (Rotational)
C-C'	1.92	Static (Block)
	1.04	Seismic-117A (Block)

MANUFACTURED 3H:1V FILL SLOPE

INFINITE SLOPE CONDITION



ASSUMPTION

Depth of Saturation (ft), z (and steady seepage parallel to slope face)	4

SOIL PARAMETERS

Angle of Internal Friction, ϕ	33
Cohesion (psf), c	350
Saturated Unit Weight of Soil (pcf), γ_{sat}	120
Unit Weight of Water (pcf), γ_w	62.4
Slope Angle (2H:1V), β	26.6

CALCULATIONS

Normal Stress Along Failure Plane

$$\sigma = \gamma_{sat} * z * \cos^2 \beta \qquad \sigma = 383.766 \text{ lb/ft}^2$$

Shear Stress Along Failure Plane

$$\tau_d = \gamma_{sat} * z * \sin \beta * \cos \beta \qquad \tau_d = 192.176 \text{ lb/ft}^2$$

Pore Pressure Along Failure Plane

$$u = \gamma_w * z * \cos^2 \beta \qquad u = 199.558 \text{ lb/ft}^2$$

Resisting Shear Stress Along Failure Plane

$$\tau_r = c + (\sigma - u) \tan \phi \qquad \tau_r = 469.626 \text{ lb/ft}^2$$

FACTOR OF SAFETY

$$\mathbf{FS} = \frac{\tau_r}{\tau_d}$$

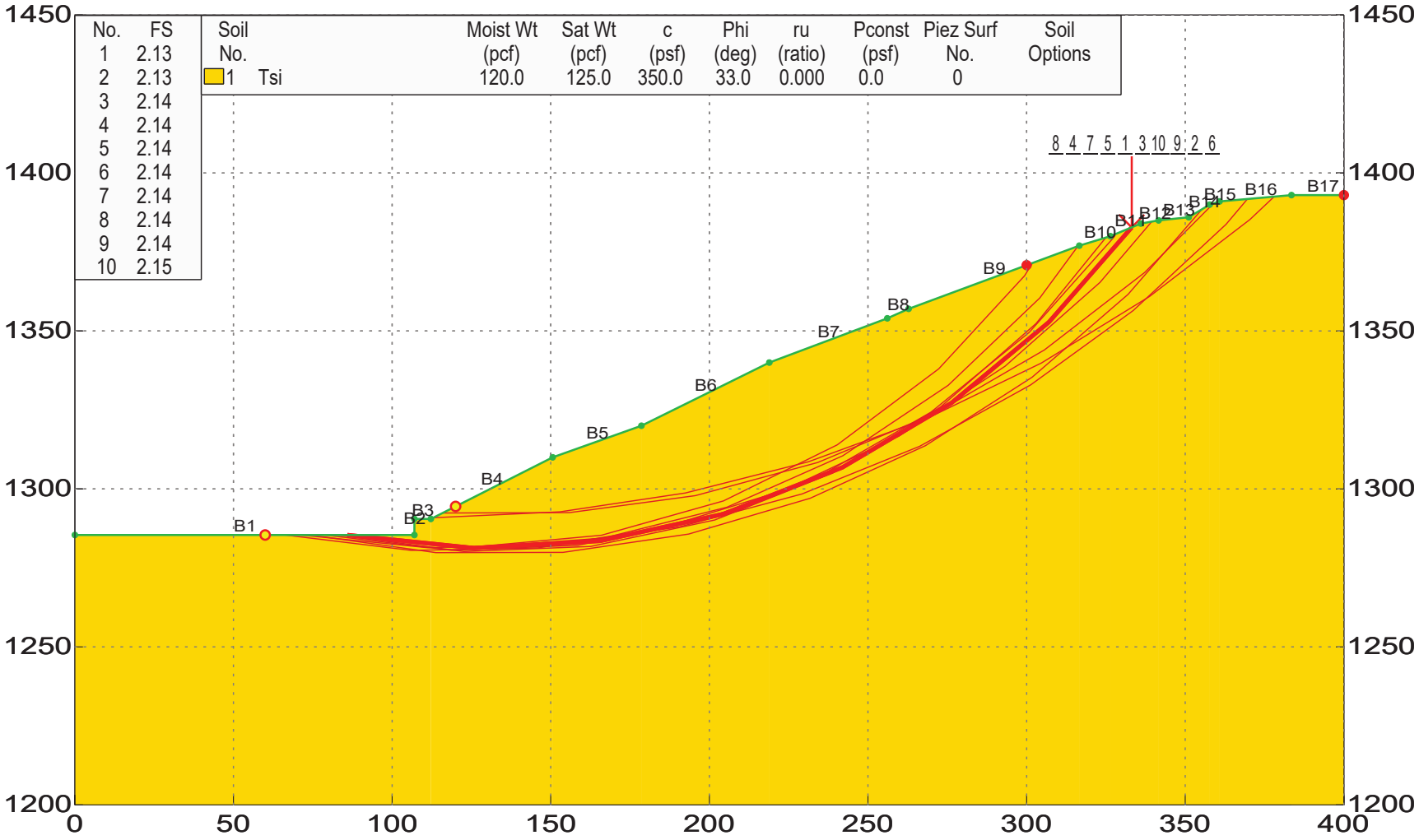
FS = 2.44

LGC Geotechnical, Inc.	SURFICIAL STABILITY	Project Name : Project Number : Designed/Checked : Date:	Baker Street 23160-01 RLD November 2023

EIP - Lake Elsinore
Section A-A' - Rotational (Static)

LGC Geotechnical / BPP

\Section A - Static - Rotational.gsd



GEOSTASE FS = 2.13

Simplified Bishop Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Static - Rotational.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Static - Rotational.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section A-A' - Rotational (Static)

BOUNDARY DATA

17 Surface Boundaries

17 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1285.400	107.000	1285.400	1
2	107.000	1285.400	107.000	1290.500	1
3	107.000	1290.500	112.200	1290.500	1
4	112.200	1290.500	150.600	1310.000	1
5	150.600	1310.000	178.600	1320.000	1
6	178.600	1320.000	218.900	1340.000	1
7	218.900	1340.000	256.100	1354.000	1
8	256.100	1354.000	262.800	1357.000	1
9	262.800	1357.000	316.600	1377.000	1
10	316.600	1377.000	326.400	1380.000	1
11	326.400	1380.000	336.000	1384.000	1
12	336.000	1384.000	341.600	1385.000	1
13	341.600	1385.000	351.100	1386.000	1
14	351.100	1386.000	357.700	1390.000	1
15	357.700	1390.000	360.800	1391.000	1
16	360.800	1391.000	383.500	1393.000	1
17	383.500	1393.000	400.000	1393.000	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1200.000(ft)

MOHR-COULOMB SOIL PARAMETERS

1 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 Tsi	120.0	125.0	350.00	33.00	0.000	0.0	0	0

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load Stress No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress Deflection (psf) (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000 0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 60.00(ft)
and X = 120.00(ft)

Each Surface Enters within a Range Between X = 300.00(ft)
and X = 400.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1200.00(ft)

Specified Maximum Radius = 10000.000(ft)

40.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 4.084 FS Min = 2.130 FS Ave = 2.805

Standard Deviation = 0.455 Coefficient of Variation = 16.22 %

Critical Surface is Sequence Number 432 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 131.553149(ft) ; Y = 1532.002283(ft); and Radius = 250.795106(ft)

Circular Trial Failure Surface Generated With 8 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	85.886	1285.400
2	125.673	1281.276
3	165.609	1283.530
4	204.679	1292.105
5	241.889	1306.782
6	276.292	1327.188
7	307.014	1352.805
8	333.113	1382.797

Factor Of Safety For The Critical or Specified Surface = 2.130

Table 1 - Geometry Data on the 53 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	5.28	0.27	88.53	1285.13	1285.40	-5.92	0.00	5.31
2	5.28	0.82	93.80	1284.58	1285.40	-5.92	0.00	5.31
3	5.28	1.37	99.08	1284.03	1285.40	-5.92	0.00	5.31
4	5.28	1.91	104.36	1283.49	1285.40	-5.92	0.00	5.31
5	2.60	7.42	108.30	1283.08	1290.50	-5.92	0.00	

2.61							
6	2.60	7.69	110.90	1282.81	1290.50	-5.92	0.00
2.61							
7	4.49	9.20	114.45	1282.44	1291.64	-5.92	26.92
4.51							
8	4.49	11.95	118.94	1281.97	1293.92	-5.92	26.92
4.51							
9	4.49	14.69	123.43	1281.51	1296.20	-5.92	26.92
4.51							
10	4.99	17.19	128.17	1281.42	1298.61	3.23	26.92
4.99							
11	4.99	19.44	133.15	1281.70	1301.14	3.23	26.92
4.99							
12	4.99	21.69	138.14	1281.98	1303.67	3.23	26.92
4.99							
13	4.99	23.94	143.12	1282.26	1306.20	3.23	26.92
4.99							
14	4.99	26.19	148.11	1282.54	1308.73	3.23	26.92
4.99							
15	5.00	28.07	153.10	1282.82	1310.89	3.23	19.65
5.01							
16	5.00	29.57	158.10	1283.11	1312.68	3.23	19.65
5.01							
17	5.00	31.08	163.11	1283.39	1314.47	3.23	19.65
5.01							
18	4.33	32.13	167.77	1284.01	1316.13	12.38	19.65
4.43							
19	4.33	32.72	172.10	1284.96	1317.68	12.38	19.65
4.43							
20	4.33	33.32	176.43	1285.91	1319.23	12.38	19.65
4.43							
21	5.22	34.34	181.21	1286.95	1321.29	12.38	26.39
5.34							
22	5.22	35.78	186.42	1288.10	1323.88	12.38	26.39
5.34							
23	5.22	37.23	191.64	1289.24	1326.47	12.38	26.39
5.34							
24	5.22	38.67	196.86	1290.39	1329.06	12.38	26.39
5.34							
25	5.22	40.12	202.07	1291.53	1331.65	12.38	26.39
5.34							
26	4.74	41.08	207.05	1293.04	1334.12	21.53	26.39
5.10							
27	4.74	41.56	211.79	1294.91	1336.47	21.53	26.39
5.10							
28	4.74	42.04	216.53	1296.78	1338.82	21.53	26.39
5.10							
29	2.90	42.26	220.35	1298.29	1340.55	21.53	20.62
3.12							
30	2.90	42.21	223.25	1299.43	1341.64	21.53	20.62

3.12							
31	5.73	42.13	227.56	1301.13	1343.26	21.53	20.62
6.16							
32	5.73	42.03	233.29	1303.39	1345.42	21.53	20.62
6.16							
33	5.73	41.92	239.02	1305.65	1347.57	21.53	20.62
6.16							
34	4.74	41.36	244.26	1308.19	1349.54	30.67	20.62
5.51							
35	4.74	40.33	248.99	1311.00	1351.33	30.67	20.62
5.51							
36	4.74	39.30	253.73	1313.81	1353.11	30.67	20.62
5.51							
37	3.35	38.55	257.78	1316.20	1354.75	30.67	24.12
3.89							
38	3.35	38.06	261.12	1318.19	1356.25	30.67	24.12
3.89							
39	4.50	37.32	265.05	1320.52	1357.84	30.67	20.39
5.23							
40	4.50	36.32	269.55	1323.19	1359.51	30.67	20.39
5.23							
41	4.50	35.33	274.04	1325.85	1361.18	30.67	20.39
5.23							
42	4.61	33.76	278.60	1329.11	1362.87	39.82	20.39
6.00							
43	5.22	31.49	283.51	1333.21	1364.70	39.82	20.39
6.80							
44	5.22	29.08	288.73	1337.56	1366.64	39.82	20.39
6.80							
45	5.22	26.66	293.96	1341.92	1368.58	39.82	20.39
6.80							
46	5.22	24.25	299.18	1346.27	1370.52	39.82	20.39
6.80							
47	5.22	21.84	304.40	1350.63	1372.47	39.82	20.39
6.80							
48	4.79	18.77	309.41	1355.56	1374.33	48.97	20.39
7.30							
49	4.79	15.04	314.20	1361.07	1376.11	48.97	20.39
7.30							
50	4.90	11.11	319.05	1366.64	1377.75	48.97	17.02
7.46							
51	4.90	6.98	323.95	1372.27	1379.25	48.97	17.02
7.46							
52	3.36	3.69	328.08	1377.01	1380.70	48.97	22.62
5.11							
53	3.36	1.23	331.43	1380.87	1382.10	48.97	22.62
5.11							

Table 2 - Force Data On The 53 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	173.3	0.0	0.0	0.0	0.0	0.0
2	519.8	0.0	0.0	0.0	0.0	0.0
3	866.4	0.0	0.0	0.0	0.0	0.0
4	1212.9	0.0	0.0	0.0	0.0	0.0
5	2316.0	0.0	0.0	0.0	0.0	0.0
6	2400.1	0.0	0.0	0.0	0.0	0.0
7	4958.2	0.0	0.0	0.0	0.0	0.0
8	6438.1	0.0	0.0	0.0	0.0	0.0
9	7917.9	0.0	0.0	0.0	0.0	0.0
10	10284.4	0.0	0.0	0.0	0.0	0.0
11	11630.6	0.0	0.0	0.0	0.0	0.0
12	12976.9	0.0	0.0	0.0	0.0	0.0
13	14323.1	0.0	0.0	0.0	0.0	0.0
14	15669.4	0.0	0.0	0.0	0.0	0.0
15	16851.8	0.0	0.0	0.0	0.0	0.0
16	17755.0	0.0	0.0	0.0	0.0	0.0
17	18658.2	0.0	0.0	0.0	0.0	0.0
18	16694.9	0.0	0.0	0.0	0.0	0.0
19	17004.7	0.0	0.0	0.0	0.0	0.0
20	17314.5	0.0	0.0	0.0	0.0	0.0
21	21493.9	0.0	0.0	0.0	0.0	0.0
22	22397.6	0.0	0.0	0.0	0.0	0.0
23	23301.2	0.0	0.0	0.0	0.0	0.0
24	24204.9	0.0	0.0	0.0	0.0	0.0
25	25108.6	0.0	0.0	0.0	0.0	0.0
26	23366.9	0.0	0.0	0.0	0.0	0.0
27	23641.5	0.0	0.0	0.0	0.0	0.0
28	23916.1	0.0	0.0	0.0	0.0	0.0
29	14706.3	0.0	0.0	0.0	0.0	0.0
30	14688.1	0.0	0.0	0.0	0.0	0.0
31	28966.6	0.0	0.0	0.0	0.0	0.0
32	28895.3	0.0	0.0	0.0	0.0	0.0
33	28824.0	0.0	0.0	0.0	0.0	0.0
34	23508.1	0.0	0.0	0.0	0.0	0.0
35	22924.4	0.0	0.0	0.0	0.0	0.0
36	22340.6	0.0	0.0	0.0	0.0	0.0
37	15495.2	0.0	0.0	0.0	0.0	0.0
38	15299.4	0.0	0.0	0.0	0.0	0.0
39	20139.8	0.0	0.0	0.0	0.0	0.0
40	19602.4	0.0	0.0	0.0	0.0	0.0
41	19065.0	0.0	0.0	0.0	0.0	0.0
42	18667.6	0.0	0.0	0.0	0.0	0.0
43	19736.8	0.0	0.0	0.0	0.0	0.0

44	18224.3	0.0	0.0	0.0	0.0	0.0
45	16711.8	0.0	0.0	0.0	0.0	0.0
46	15199.2	0.0	0.0	0.0	0.0	0.0
47	13686.7	0.0	0.0	0.0	0.0	0.0
48	10795.1	0.0	0.0	0.0	0.0	0.0
49	8651.8	0.0	0.0	0.0	0.0	0.0
50	6534.8	0.0	0.0	0.0	0.0	0.0
51	4105.8	0.0	0.0	0.0	0.0	0.0
52	1485.4	0.0	0.0	0.0	0.0	0.0
53	495.1	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 792146.76(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 792146.76(lbs)

TOTAL AREA OF SLIDING MASS = 6601.22(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 53 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	350.00	33.00	
2	1	350.00	33.00	
3	1	350.00	33.00	
4	1	350.00	33.00	
5	1	350.00	33.00	
6	1	350.00	33.00	
7	1	350.00	33.00	
8	1	350.00	33.00	
9	1	350.00	33.00	
10	1	350.00	33.00	
11	1	350.00	33.00	
12	1	350.00	33.00	
13	1	350.00	33.00	
14	1	350.00	33.00	
15	1	350.00	33.00	
16	1	350.00	33.00	
17	1	350.00	33.00	
18	1	350.00	33.00	
19	1	350.00	33.00	
20	1	350.00	33.00	
21	1	350.00	33.00	
22	1	350.00	33.00	
23	1	350.00	33.00	
24	1	350.00	33.00	
25	1	350.00	33.00	
26	1	350.00	33.00	
27	1	350.00	33.00	
28	1	350.00	33.00	

29	1	350.00	33.00
30	1	350.00	33.00
31	1	350.00	33.00
32	1	350.00	33.00
33	1	350.00	33.00
34	1	350.00	33.00
35	1	350.00	33.00
36	1	350.00	33.00
37	1	350.00	33.00
38	1	350.00	33.00
39	1	350.00	33.00
40	1	350.00	33.00
41	1	350.00	33.00
42	1	350.00	33.00
43	1	350.00	33.00
44	1	350.00	33.00
45	1	350.00	33.00
46	1	350.00	33.00
47	1	350.00	33.00
48	1	350.00	33.00
49	1	350.00	33.00
50	1	350.00	33.00
51	1	350.00	33.00
52	1	350.00	33.00
53	1	350.00	33.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 53 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-5.92	88.53	5.31	51.49	383.44	180.01
1	-5.92	88.53	5.31	51.49	383.44	180.01
2	-5.92	93.80	5.31	119.29	427.47	200.68
2	-5.92	93.80	5.31	119.29	427.47	

200.68
   3   -5.92   99.08   5.31   187.09   471.50
221.35
   3   -5.92   99.08   5.31   187.09   471.50
221.35
   4   -5.92   104.36   5.31   254.88   515.52
242.02
   4   -5.92   104.36   5.31   254.88   515.52
242.02
   5   -5.92   108.30   2.61   937.46   958.79
450.12
   5   -5.92   108.30   2.61   937.46   958.79
450.12
   6   -5.92   110.90   2.61   970.85   980.48
460.30
   6   -5.92   110.90   2.61   970.85   980.48
460.30
   7   -5.92   114.45   4.51   1157.69   1101.81
517.26
   7   -5.92   114.45   4.51   1157.69   1101.81
517.26
   8   -5.92   118.94   4.51   1497.97   1322.79
621.00
   8   -5.92   118.94   4.51   1497.97   1322.79
621.00
   9   -5.92   123.43   4.51   1838.25   1543.77
724.75
   9   -5.92   123.43   4.51   1838.25   1543.77
724.75
  10   3.23   128.17   4.99   2018.84   1661.05
779.80
  10   3.23   128.17   4.99   2018.84   1661.05
779.80
  11   3.23   133.15   4.99   2284.31   1833.45
860.74
  11   3.23   133.15   4.99   2284.31   1833.45
860.74
  12   3.23   138.14   4.99   2549.77   2005.84
941.67
  12   3.23   138.14   4.99   2549.77   2005.84
941.67
  13   3.23   143.12   4.99   2815.24   2178.24
1022.60
  13   3.23   143.12   4.99   2815.24   2178.24
1022.60
  14   3.23   148.11   4.99   3080.70   2350.63
1103.54
  14   3.23   148.11   4.99   3080.70   2350.63
1103.54
  15   3.23   153.10   5.01   3302.17   2494.45

1171.06					
15	3.23	153.10	5.01	3302.17	2494.45
1171.06					
16	3.23	158.10	5.01	3479.65	2609.71
1225.16					
16	3.23	158.10	5.01	3479.65	2609.71
1225.16					
17	3.23	163.11	5.01	3657.12	2724.96
1279.27					
17	3.23	163.11	5.01	3657.12	2724.96
1279.27					
18	12.38	167.77	4.43	3579.69	2674.68
1255.66					
18	12.38	167.77	4.43	3579.69	2674.68
1255.66					
19	12.38	172.10	4.43	3646.74	2718.22
1276.11					
19	12.38	172.10	4.43	3646.74	2718.22
1276.11					
20	12.38	176.43	4.43	3713.79	2761.76
1296.55					
20	12.38	176.43	4.43	3713.79	2761.76
1296.55					
21	12.38	181.21	5.34	3828.51	2836.26
1331.52					
21	12.38	181.21	5.34	3828.51	2836.26
1331.52					
22	12.38	186.42	5.34	3990.90	2941.72
1381.03					
22	12.38	186.42	5.34	3990.90	2941.72
1381.03					
23	12.38	191.64	5.34	4153.28	3047.17
1430.54					
23	12.38	191.64	5.34	4153.28	3047.17
1430.54					
24	12.38	196.86	5.34	4315.67	3152.63
1480.04					
24	12.38	196.86	5.34	4315.67	3152.63
1480.04					
25	12.38	202.07	5.34	4478.05	3258.08
1529.55					
25	12.38	202.07	5.34	4478.05	3258.08
1529.55					
26	21.53	207.05	5.10	4342.23	3169.88
1488.14					
26	21.53	207.05	5.10	4342.23	3169.88
1488.14					
27	21.53	211.79	5.10	4393.94	3203.46
1503.90					
27	21.53	211.79	5.10	4393.94	3203.46

1503.90					
28	21.53	216.53	5.10	4445.64	3237.03
1519.67					
28	21.53	216.53	5.10	4445.64	3237.03
1519.67					
29	21.53	220.35	3.12	4468.68	3252.00
1526.69					
29	21.53	220.35	3.12	4468.68	3252.00
1526.69					
30	21.53	223.25	3.12	4463.06	3248.35
1524.98					
30	21.53	223.25	3.12	4463.06	3248.35
1524.98					
31	21.53	227.56	6.16	4454.70	3242.91
1522.43					
31	21.53	227.56	6.16	4454.70	3242.91
1522.43					
32	21.53	233.29	6.16	4443.59	3235.70
1519.04					
32	21.53	233.29	6.16	4443.59	3235.70
1519.04					
33	21.53	239.02	6.16	4432.48	3228.49
1515.66					
33	21.53	239.02	6.16	4432.48	3228.49
1515.66					
34	30.67	244.26	5.51	4119.88	3025.48
1420.35					
34	30.67	244.26	5.51	4119.88	3025.48
1420.35					
35	30.67	248.99	5.51	4015.52	2957.71
1388.54					
35	30.67	248.99	5.51	4015.52	2957.71
1388.54					
36	30.67	253.73	5.51	3911.16	2889.94
1356.72					
36	30.67	253.73	5.51	3911.16	2889.94
1356.72					
37	30.67	257.78	3.89	3834.24	2839.98
1333.27					
37	30.67	257.78	3.89	3834.24	2839.98
1333.27					
38	30.67	261.12	3.89	3784.74	2807.84
1318.18					
38	30.67	261.12	3.89	3784.74	2807.84
1318.18					
39	30.67	265.05	5.23	3709.41	2758.92
1295.21					
39	30.67	265.05	5.23	3709.41	2758.92
1295.21					
40	30.67	269.55	5.23	3608.22	2693.21

1264.36					
40	30.67	269.55	5.23	3608.22	2693.21
1264.36					
41	30.67	274.04	5.23	3507.03	2627.49
1233.51					
41	30.67	274.04	5.23	3507.03	2627.49
1233.51					
42	39.82	278.60	6.00	3120.77	2376.65
1115.75					
42	39.82	278.60	6.00	3120.77	2376.65
1115.75					
43	39.82	283.51	6.80	2903.49	2235.55
1049.51					
43	39.82	283.51	6.80	2903.49	2235.55
1049.51					
44	39.82	288.73	6.80	2672.60	2085.61
979.12					
44	39.82	288.73	6.80	2672.60	2085.61
979.12					
45	39.82	293.96	6.80	2441.72	1935.67
908.73					
45	39.82	293.96	6.80	2441.72	1935.67
908.73					
46	39.82	299.18	6.80	2210.84	1785.74
838.34					
46	39.82	299.18	6.80	2210.84	1785.74
838.34					
47	39.82	304.40	6.80	1979.96	1635.80
767.95					
47	39.82	304.40	6.80	1979.96	1635.80
767.95					
48	48.97	309.41	7.30	1527.80	1342.16
630.10					
48	48.97	309.41	7.30	1527.80	1342.16
630.10					
49	48.97	314.20	7.30	1196.70	1127.15
529.15					
49	48.97	314.20	7.30	1196.70	1127.15
529.15					
50	48.97	319.05	7.46	847.63	900.46
422.73					
50	48.97	319.05	7.46	847.63	900.46
422.73					
51	48.97	323.95	7.46	480.57	662.09
310.83					
51	48.97	323.95	7.46	480.57	662.09
310.83					
52	48.97	328.08	5.11	187.82	471.97
221.57					
52	48.97	328.08	5.11	187.82	471.97

221.57
  53   48.97   331.43   5.11   109.23   70.94
33.30
  53   48.97   331.43   5.11   109.23   70.94
33.30

Table 4 - Base Force Data on the   53 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.92	88.53	5.31	273.27	2034.84	955.28
1	-5.92	88.53	5.31	273.27	2034.84	955.28
2	-5.92	93.80	5.31	633.05	2268.49	1064.97
2	-5.92	93.80	5.31	633.05	2268.49	1064.97
3	-5.92	99.08	5.31	992.84	2502.14	1174.66
3	-5.92	99.08	5.31	992.84	2502.14	1174.66
4	-5.92	104.36	5.31	1352.62	2735.79	1284.35
4	-5.92	104.36	5.31	1352.62	2735.79	1284.35
5	-5.92	108.30	2.61	2450.45	2506.22	1176.58
5	-5.92	108.30	2.61	2450.45	2506.22	1176.58
6	-5.92	110.90	2.61	2537.74	2562.91	1203.19
6	-5.92	110.90	2.61	2537.74	2562.91	1203.19
7	-5.92	114.45	4.51	5226.95	4974.66	2335.42
7	-5.92	114.45	4.51	5226.95	4974.66	2335.42
8	-5.92	118.94	4.51	6763.30	5972.38	2803.81
8	-5.92	118.94	4.51	6763.30	5972.38	2803.81
9	-5.92	123.43	4.51	8299.66	6970.10	

3272.21					
9	-5.92	123.43	4.51	8299.66	6970.10
3272.21					
10	3.23	128.17	4.99	10080.87	8294.28
3893.86					
10	3.23	128.17	4.99	10080.87	8294.28
3893.86					
11	3.23	133.15	4.99	11406.43	9155.11
4297.99					
11	3.23	133.15	4.99	11406.43	9155.11
4297.99					
12	3.23	138.14	4.99	12732.00	10015.94
4702.12					
12	3.23	138.14	4.99	12732.00	10015.94
4702.12					
13	3.23	143.12	4.99	14057.57	10876.78
5106.25					
13	3.23	143.12	4.99	14057.57	10876.78
5106.25					
14	3.23	148.11	4.99	15383.13	11737.61
5510.38					
14	3.23	148.11	4.99	15383.13	11737.61
5510.38					
15	3.23	153.10	5.01	16547.25	12499.77
5868.18					
15	3.23	153.10	5.01	16547.25	12499.77
5868.18					
16	3.23	158.10	5.01	17436.59	13077.31
6139.32					
16	3.23	158.10	5.01	17436.59	13077.31
6139.32					
17	3.23	163.11	5.01	18325.92	13654.85
6410.45					
17	3.23	163.11	5.01	18325.92	13654.85
6410.45					
18	12.38	167.77	4.43	15869.97	11857.74
5566.78					
18	12.38	167.77	4.43	15869.97	11857.74
5566.78					
19	12.38	172.10	4.43	16167.23	12050.79
5657.40					
19	12.38	172.10	4.43	16167.23	12050.79
5657.40					
20	12.38	176.43	4.43	16464.49	12243.83
5748.03					
20	12.38	176.43	4.43	16464.49	12243.83
5748.03					
21	12.38	181.21	5.34	20444.24	15145.64
7110.33					
21	12.38	181.21	5.34	20444.24	15145.64

7110.33					
22	12.38	186.42	5.34	21311.37	15708.77
7374.69					
22	12.38	186.42	5.34	21311.37	15708.77
7374.69					
23	12.38	191.64	5.34	22178.51	16271.89
7639.06					
23	12.38	191.64	5.34	22178.51	16271.89
7639.06					
24	12.38	196.86	5.34	23045.65	16835.02
7903.42					
24	12.38	196.86	5.34	23045.65	16835.02
7903.42					
25	12.38	202.07	5.34	23912.78	17398.14
8167.79					
25	12.38	202.07	5.34	23912.78	17398.14
8167.79					
26	21.53	207.05	5.10	22126.54	16152.62
7583.07					
26	21.53	207.05	5.10	22126.54	16152.62
7583.07					
27	21.53	211.79	5.10	22390.01	16323.73
7663.39					
27	21.53	211.79	5.10	22390.01	16323.73
7663.39					
28	21.53	216.53	5.10	22653.49	16494.83
7743.72					
28	21.53	216.53	5.10	22653.49	16494.83
7743.72					
29	21.53	220.35	3.12	13930.88	10137.93
4759.38					
29	21.53	220.35	3.12	13930.88	10137.93
4759.38					
30	21.53	223.25	3.12	13913.35	10126.54
4754.04					
30	21.53	223.25	3.12	13913.35	10126.54
4754.04					
31	21.53	227.56	6.16	27438.14	19974.32
9377.21					
31	21.53	227.56	6.16	27438.14	19974.32
9377.21					
32	21.53	233.29	6.16	27369.72	19929.89
9356.35					
32	21.53	233.29	6.16	27369.72	19929.89
9356.35					
33	21.53	239.02	6.16	27301.31	19885.46
9335.49					
33	21.53	239.02	6.16	27301.31	19885.46
9335.49					
34	30.67	244.26	5.51	22690.37	16662.93

7822.64					
34	30.67	244.26	5.51	22690.37	16662.93
7822.64					
35	30.67	248.99	5.51	22115.61	16289.68
7647.41					
35	30.67	248.99	5.51	22115.61	16289.68
7647.41					
36	30.67	253.73	5.51	21540.84	15916.42
7472.18					
36	30.67	253.73	5.51	21540.84	15916.42
7472.18					
37	30.67	257.78	3.89	14934.29	11061.69
5193.06					
37	30.67	257.78	3.89	14934.29	11061.69
5193.06					
38	30.67	261.12	3.89	14741.52	10936.50
5134.29					
38	30.67	261.12	3.89	14741.52	10936.50
5134.29					
39	30.67	265.05	5.23	19397.03	14426.78
6772.85					
39	30.67	265.05	5.23	19397.03	14426.78
6772.85					
40	30.67	269.55	5.23	18867.92	14083.17
6611.53					
40	30.67	269.55	5.23	18867.92	14083.17
6611.53					
41	30.67	274.04	5.23	18338.81	13739.56
6450.22					
41	30.67	274.04	5.23	18338.81	13739.56
6450.22					
42	39.82	278.60	6.00	18721.89	14257.83
6693.53					
42	39.82	278.60	6.00	18721.89	14257.83
6693.53					
43	39.82	283.51	6.80	19744.21	15202.10
7136.83					
43	39.82	283.51	6.80	19744.21	15202.10
7136.83					
44	39.82	288.73	6.80	18174.17	14182.51
6658.17					
44	39.82	288.73	6.80	18174.17	14182.51
6658.17					
45	39.82	293.96	6.80	16604.14	13162.91
6179.51					
45	39.82	293.96	6.80	16604.14	13162.91
6179.51					
46	39.82	299.18	6.80	15034.10	12143.32
5700.84					
46	39.82	299.18	6.80	15034.10	12143.32

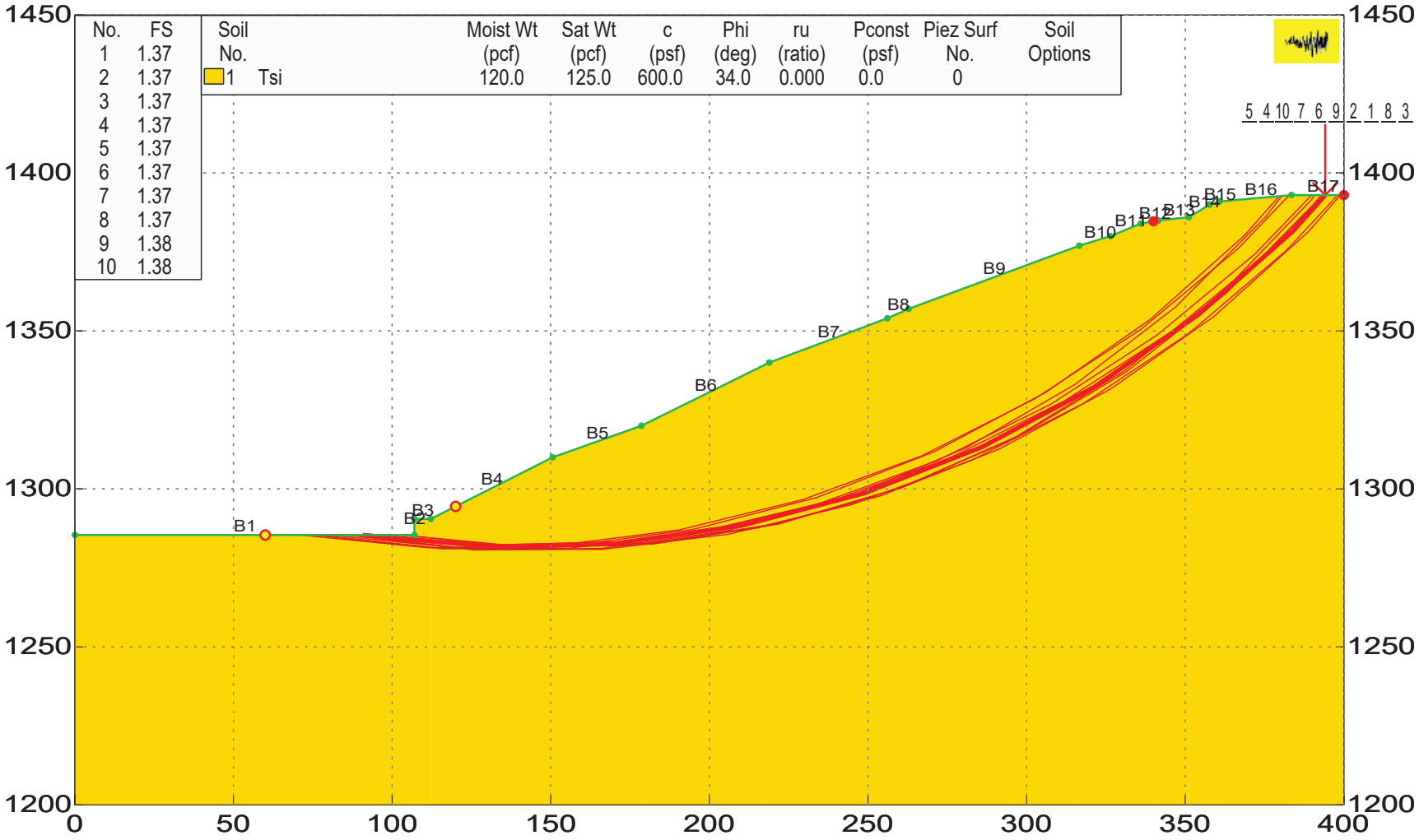
```
5700.84
  47      39.82     304.40       6.80        13464.06        11123.72
5222.18
  47      39.82     304.40       6.80        13464.06        11123.72
5222.18
  48      48.97     309.41       7.30        11155.26         9799.85
4600.67
  48      48.97     309.41       7.30        11155.26         9799.85
4600.67
  49      48.97     314.20       7.30         8737.75         8229.90
3863.64
  49      48.97     314.20       7.30         8737.75         8229.90
3863.64
  50      48.97     319.05       7.46         6327.02         6721.35
3155.43
  50      48.97     319.05       7.46         6327.02         6721.35
3155.43
  51      48.97     323.95       7.46         3587.19         4942.08
2320.13
  51      48.97     323.95       7.46         3587.19         4942.08
2320.13
  52      48.97     328.08       5.11          960.32         2413.23
1132.92
  52      48.97     328.08       5.11          960.32         2413.23
1132.92
  53      48.97     331.43       5.11          558.51          362.70
170.28
  53      48.97     331.43       5.11          558.51          362.70
170.28

     SUM OF MOMENTS =  -0.956843E+00 (ft/lbs);Imbalance (Fraction of Total Weight)
=  -0.1207912E-05

     Sum of the Resisting Forces =  594034.52 (lbs)

     Average Available Shear Strength =   2123.39(psf)

     Sum of the Driving Forces =   278877.47 (lbs)

     Average Mobilized Shear Stress =     996.85(psf)

     Total length of the failure surface =     279.76(ft)


     Factor of Safety Balance Check: FS =  2.13009


           CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop
                     Method. This Method Is Valid Only If The Failure Surface
                     Approximates A Circular Arc.
```

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section A-A' - Rotational (Seismic (117A))

LGC Geotechnical / BPP

\Section A - Seismic (117A)- Rotational.gsd



GEOSTASE FS = 1.37

Simplified Bishop Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Seismic (117A)- Rotational.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section A\2024_01_30\Section A - Seismic (117A)- Rotational.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section A-A' - Rotational (Seismic (117A))

BOUNDARY DATA

17 Surface Boundaries

17 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1285.400	107.000	1285.400	1
2	107.000	1285.400	107.000	1290.500	1
3	107.000	1290.500	112.200	1290.500	1
4	112.200	1290.500	150.600	1310.000	1
5	150.600	1310.000	178.600	1320.000	1
6	178.600	1320.000	218.900	1340.000	1
7	218.900	1340.000	256.100	1354.000	1
8	256.100	1354.000	262.800	1357.000	1
9	262.800	1357.000	316.600	1377.000	1
10	316.600	1377.000	326.400	1380.000	1
11	326.400	1380.000	336.000	1384.000	1
12	336.000	1384.000	341.600	1385.000	1
13	341.600	1385.000	351.100	1386.000	1
14	351.100	1386.000	357.700	1390.000	1
15	357.700	1390.000	360.800	1391.000	1
16	360.800	1391.000	383.500	1393.000	1
17	383.500	1393.000	400.000	1393.000	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1200.000(ft)

MOHR-COULOMB SOIL PARAMETERS

1 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 Tsi	120.0	125.0	600.00	34.00	0.000	0.0	0	0

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load Stress No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Load Stress (psf)	Deflection (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000	0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 60.00(ft)
and X = 120.00(ft)

Each Surface Enters within a Range Between X = 340.00(ft)
and X = 400.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1200.00(ft)

Specified Maximum Radius = 10000.000(ft)

40.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 3.071 FS Min = 1.368 FS Ave = 1.776
Standard Deviation = 0.299 Coefficient of Variation = 16.84 %

Critical Surface is Sequence Number 513 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 141.933613(ft) ; Y = 1624.295962(ft); and Radius = 342.739199(ft)

Circular Trial Failure Surface Generated With 10 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	90.751	1285.400
2	130.583	1281.745
3	170.571	1282.755
4	210.168	1288.418
5	248.836	1298.655
6	286.047	1313.327
7	321.296	1332.236
8	354.102	1355.122
9	384.018	1381.674
10	394.115	1393.000

Factor Of Safety For The Critical or Specified Surface = 1.368

Table 1 - Geometry Data on the 70 Slices

Slice	Width	Height	X-Cntr	Y-Cntr-Base	Y-Cntr-Top	Alpha	Beta	Base

Length No.	(ft)	(ft)	(ft)	(ft)	(ft)	(deg)	(deg)	(ft)
1	5.42	0.25	93.46	1285.15	1285.40	-5.24	0.00	5.44
2	5.42	0.75	98.88	1284.65	1285.40	-5.24	0.00	5.44
3	5.42	1.24	104.29	1284.16	1285.40	-5.24	0.00	5.44
4	2.60	6.71	108.30	1283.79	1290.50	-5.24	0.00	2.61
5	2.60	6.95	110.90	1283.55	1290.50	-5.24	0.00	2.61
6	4.60	8.45	114.50	1283.22	1291.67	-5.24	26.92	4.62
7	4.60	11.20	119.09	1282.80	1294.00	-5.24	26.92	4.62
8	4.60	13.96	123.69	1282.38	1296.33	-5.24	26.92	4.62
9	4.60	16.71	128.29	1281.96	1298.67	-5.24	26.92	4.62
10	5.00	19.30	133.09	1281.81	1301.11	1.45	26.92	5.01
11	5.00	21.71	138.09	1281.93	1303.65	1.45	26.92	5.01
12	5.00	24.13	143.09	1282.06	1306.19	1.45	26.92	5.01
13	5.00	26.54	148.10	1282.19	1308.73	1.45	26.92	5.01
14	4.99	28.58	153.10	1282.31	1310.89	1.45	19.65	4.99
15	4.99	30.23	158.09	1282.44	1312.67	1.45	19.65	4.99
16	4.99	31.89	163.08	1282.57	1314.46	1.45	19.65	4.99
17	4.99	33.55	168.07	1282.69	1316.24	1.45	19.65	4.99
18	4.01	34.81	172.58	1283.04	1317.85	8.14	19.65	4.06
19	4.01	35.67	176.59	1283.62	1319.28	8.14	19.65	4.06
20	5.26	37.03	181.23	1284.28	1321.31	8.14	26.39	5.31
21	5.26	38.88	186.49	1285.03	1323.92	8.14	26.39	5.31
22	5.26	40.74	191.75	1285.78	1326.53	8.14	26.39	5.31
23	5.26	42.60	197.01	1286.54	1329.14	8.14	26.39	5.31

24	5.26	44.46	202.28	1287.29	1331.75	8.14	26.39
5.31							
25	5.26	46.32	207.54	1288.04	1334.36	8.14	26.39
5.31							
26	4.37	47.75	212.35	1289.00	1336.75	14.83	26.39
4.52							
27	4.37	48.77	216.72	1290.15	1338.92	14.83	26.39
4.52							
28	2.90	49.43	220.35	1291.11	1340.55	14.83	20.62
3.00							
29	2.90	49.76	223.25	1291.88	1341.64	14.83	20.62
3.00							
30	4.83	50.19	227.11	1292.90	1343.09	14.83	20.62
4.99							
31	4.83	50.73	231.94	1294.18	1344.91	14.83	20.62
4.99							
32	4.83	51.26	236.77	1295.46	1346.72	14.83	20.62
4.99							
33	4.83	51.80	241.59	1296.74	1348.54	14.83	20.62
4.99							
34	4.83	52.34	246.42	1298.02	1350.36	14.83	20.62
4.99							
35	3.63	52.58	250.65	1299.37	1351.95	21.52	20.62
3.90							
36	3.63	52.51	254.28	1300.80	1353.32	21.52	20.62
3.90							
37	3.35	52.57	257.78	1302.18	1354.75	21.52	24.12
3.60							
38	3.35	52.75	261.12	1303.50	1356.25	21.52	24.12
3.60							
39	4.52	52.79	265.06	1305.05	1357.84	21.52	20.39
4.86							
40	4.53	52.69	269.59	1306.84	1359.52	21.52	20.39
4.86							
41	4.52	52.58	274.11	1308.62	1361.21	21.52	20.39
4.86							
42	4.52	52.48	278.64	1310.41	1362.89	21.52	20.39
4.86							
43	2.57	52.40	282.19	1311.81	1364.21	21.52	20.39
2.77							
44	2.57	52.34	284.76	1312.82	1365.16	21.52	20.39
2.77							
45	5.09	51.90	288.59	1314.69	1366.59	28.21	20.39
5.78							
46	5.09	51.06	293.69	1317.42	1368.48	28.21	20.39
5.78							
47	5.09	50.22	298.78	1320.16	1370.37	28.21	20.39
5.78							
48	5.09	49.38	303.87	1322.89	1372.27	28.21	20.39
5.78							

49	5.09	48.54	308.96	1325.62	1374.16	28.21	20.39 5.78
50	5.09	47.70	314.05	1328.35	1376.05	28.21	20.39 5.78
51	4.70	46.74	318.95	1330.98	1377.72	28.21	17.02 5.33
52	2.55	45.70	322.57	1333.13	1378.83	34.90	17.02 3.11
53	2.55	44.70	325.12	1334.91	1379.61	34.90	17.02 3.11
54	4.80	43.53	328.80	1337.47	1381.00	34.90	22.62 5.85
55	4.80	42.18	333.60	1340.82	1383.00	34.90	22.62 5.85
56	2.80	40.78	337.40	1343.47	1384.25	34.90	10.12 3.41
57	2.80	39.33	340.20	1345.42	1384.75	34.90	10.12 3.41
58	4.75	37.19	343.98	1348.06	1385.25	34.90	6.01 5.79
59	4.75	34.38	348.73	1351.37	1385.75	34.90	6.01 5.79
60	3.00	32.84	352.60	1354.07	1386.91	34.90	31.22 3.66
61	3.60	32.19	355.90	1356.72	1388.91	41.59	31.22 4.81
62	3.10	30.81	359.25	1359.69	1390.50	41.59	17.88 4.14
63	4.54	28.12	363.07	1363.08	1391.20	41.59	5.04 6.07
64	4.54	24.49	367.61	1367.11	1391.60	41.59	5.04 6.07
65	4.54	20.86	372.15	1371.14	1392.00	41.59	5.04 6.07
66	4.54	17.23	376.69	1375.17	1392.40	41.59	5.04 6.07
67	4.54	13.60	381.23	1379.20	1392.80	41.59	5.04 6.07
68	0.52	11.56	383.76	1381.44	1393.00	41.59	0.00 0.69
69	5.05	8.49	386.54	1384.51	1393.00	48.28	0.00 7.59
70	5.05	2.83	391.59	1390.17	1393.00	48.28	0.00 7.59

Table 2 - Force Data On The 70 Slices (Excluding Reinforcement)

	Ubeta	Ualpha	Earthquake

Slice No.	Weight (lbs)	Force Top (lbs)	Force Bot (lbs)	Force Hor (lbs)	Force Ver (lbs)	Distributed Load (lbs)
1	161.5	0.0	0.0	42.0	0.0	0.0
2	484.6	0.0	0.0	126.0	0.0	0.0
3	807.6	0.0	0.0	210.0	0.0	0.0
4	2093.6	0.0	0.0	544.3	0.0	0.0
5	2168.1	0.0	0.0	563.7	0.0	0.0
6	4658.0	0.0	0.0	1211.1	0.0	0.0
7	6177.7	0.0	0.0	1606.2	0.0	0.0
8	7697.4	0.0	0.0	2001.3	0.0	0.0
9	9217.1	0.0	0.0	2396.5	0.0	0.0
10	11588.4	0.0	0.0	3013.0	0.0	0.0
11	13038.4	0.0	0.0	3390.0	0.0	0.0
12	14488.4	0.0	0.0	3767.0	0.0	0.0
13	15938.5	0.0	0.0	4144.0	0.0	0.0
14	17121.6	0.0	0.0	4451.6	0.0	0.0
15	18114.3	0.0	0.0	4709.7	0.0	0.0
16	19106.9	0.0	0.0	4967.8	0.0	0.0
17	20099.6	0.0	0.0	5225.9	0.0	0.0
18	16768.7	0.0	0.0	4359.9	0.0	0.0
19	17182.9	0.0	0.0	4467.6	0.0	0.0
20	23376.5	0.0	0.0	6077.9	0.0	0.0
21	24550.1	0.0	0.0	6383.0	0.0	0.0
22	25723.6	0.0	0.0	6688.1	0.0	0.0
23	26897.1	0.0	0.0	6993.2	0.0	0.0
24	28070.6	0.0	0.0	7298.3	0.0	0.0
25	29244.1	0.0	0.0	7603.5	0.0	0.0
26	25019.9	0.0	0.0	6505.2	0.0	0.0
27	25549.6	0.0	0.0	6642.9	0.0	0.0
28	17202.5	0.0	0.0	4472.6	0.0	0.0
29	17315.1	0.0	0.0	4501.9	0.0	0.0
30	29071.1	0.0	0.0	7558.5	0.0	0.0
31	29383.2	0.0	0.0	7639.6	0.0	0.0
32	29695.2	0.0	0.0	7720.8	0.0	0.0
33	30007.2	0.0	0.0	7801.9	0.0	0.0
34	30319.3	0.0	0.0	7883.0	0.0	0.0
35	22917.1	0.0	0.0	5958.4	0.0	0.0
36	22888.7	0.0	0.0	5951.1	0.0	0.0
37	21133.3	0.0	0.0	5494.6	0.0	0.0
38	21205.3	0.0	0.0	5513.4	0.0	0.0
39	28663.8	0.0	0.0	7452.6	0.0	0.0
40	28608.4	0.0	0.0	7438.2	0.0	0.0
41	28553.0	0.0	0.0	7423.8	0.0	0.0
42	28497.6	0.0	0.0	7409.4	0.0	0.0
43	16183.8	0.0	0.0	4207.8	0.0	0.0
44	16165.9	0.0	0.0	4203.1	0.0	0.0
45	31710.8	0.0	0.0	8244.8	0.0	0.0
46	31198.4	0.0	0.0	8111.6	0.0	0.0

47	30686.0	0.0	0.0	7978.4	0.0	0.0
48	30173.7	0.0	0.0	7845.2	0.0	0.0
49	29661.3	0.0	0.0	7711.9	0.0	0.0
50	29148.9	0.0	0.0	7578.7	0.0	0.0
51	26341.6	0.0	0.0	6848.8	0.0	0.0
52	13995.3	0.0	0.0	3638.8	0.0	0.0
53	13689.4	0.0	0.0	3559.2	0.0	0.0
54	25073.0	0.0	0.0	6519.0	0.0	0.0
55	24296.2	0.0	0.0	6317.0	0.0	0.0
56	13702.1	0.0	0.0	3562.5	0.0	0.0
57	13213.7	0.0	0.0	3435.6	0.0	0.0
58	21200.0	0.0	0.0	5512.0	0.0	0.0
59	19596.2	0.0	0.0	5095.0	0.0	0.0
60	11828.7	0.0	0.0	3075.5	0.0	0.0
61	13898.7	0.0	0.0	3613.7	0.0	0.0
62	11461.0	0.0	0.0	2979.8	0.0	0.0
63	15319.0	0.0	0.0	3982.9	0.0	0.0
64	13341.6	0.0	0.0	3468.8	0.0	0.0
65	11364.2	0.0	0.0	2954.7	0.0	0.0
66	9386.8	0.0	0.0	2440.6	0.0	0.0
67	7409.4	0.0	0.0	1926.5	0.0	0.0
68	718.4	0.0	0.0	186.8	0.0	0.0
69	5146.2	0.0	0.0	1338.0	0.0	0.0
70	1715.4	0.0	0.0	446.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1278431.25(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1278431.25(lbs)

TOTAL AREA OF SLIDING MASS = 10653.59(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 70 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	600.00	34.00	
2	1	600.00	34.00	
3	1	600.00	34.00	
4	1	600.00	34.00	
5	1	600.00	34.00	
6	1	600.00	34.00	
7	1	600.00	34.00	
8	1	600.00	34.00	
9	1	600.00	34.00	
10	1	600.00	34.00	
11	1	600.00	34.00	
12	1	600.00	34.00	
13	1	600.00	34.00	
14	1	600.00	34.00	

15	1	600.00	34.00
16	1	600.00	34.00
17	1	600.00	34.00
18	1	600.00	34.00
19	1	600.00	34.00
20	1	600.00	34.00
21	1	600.00	34.00
22	1	600.00	34.00
23	1	600.00	34.00
24	1	600.00	34.00
25	1	600.00	34.00
26	1	600.00	34.00
27	1	600.00	34.00
28	1	600.00	34.00
29	1	600.00	34.00
30	1	600.00	34.00
31	1	600.00	34.00
32	1	600.00	34.00
33	1	600.00	34.00
34	1	600.00	34.00
35	1	600.00	34.00
36	1	600.00	34.00
37	1	600.00	34.00
38	1	600.00	34.00
39	1	600.00	34.00
40	1	600.00	34.00
41	1	600.00	34.00
42	1	600.00	34.00
43	1	600.00	34.00
44	1	600.00	34.00
45	1	600.00	34.00
46	1	600.00	34.00
47	1	600.00	34.00
48	1	600.00	34.00
49	1	600.00	34.00
50	1	600.00	34.00
51	1	600.00	34.00
52	1	600.00	34.00
53	1	600.00	34.00
54	1	600.00	34.00
55	1	600.00	34.00
56	1	600.00	34.00
57	1	600.00	34.00
58	1	600.00	34.00
59	1	600.00	34.00
60	1	600.00	34.00
61	1	600.00	34.00
62	1	600.00	34.00
63	1	600.00	34.00
64	1	600.00	34.00

65	1	600.00	34.00
66	1	600.00	34.00
67	1	600.00	34.00
68	1	600.00	34.00
69	1	600.00	34.00
70	1	600.00	34.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 70 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-5.24	93.46	5.44	71.47	648.21	473.97
1	-5.24	93.46	5.44	71.47	648.21	473.97
2	-5.24	98.88	5.44	133.81	690.26	504.72
2	-5.24	98.88	5.44	133.81	690.26	504.72
3	-5.24	104.29	5.44	196.16	732.31	535.47
3	-5.24	104.29	5.44	196.16	732.31	535.47
4	-5.24	108.30	2.61	882.02	1194.93	873.74
4	-5.24	108.30	2.61	882.02	1194.93	873.74
5	-5.24	110.90	2.61	911.95	1215.12	888.50
5	-5.24	110.90	2.61	911.95	1215.12	888.50
6	-5.24	114.50	4.62	1099.73	1341.78	981.12
6	-5.24	114.50	4.62	1099.73	1341.78	981.12
7	-5.24	119.09	4.62	1445.38	1574.92	1151.59

7	-5.24	119.09	4.62	1445.38	1574.92
1151.59					
8	-5.24	123.69	4.62	1791.03	1808.06
1322.07					
8	-5.24	123.69	4.62	1791.03	1808.06
1322.07					
9	-5.24	128.29	4.62	2136.67	2041.21
1492.54					
9	-5.24	128.29	4.62	2136.67	2041.21
1492.54					
10	1.45	133.09	5.01	2277.95	2136.50
1562.22					
10	1.45	133.09	5.01	2277.95	2136.50
1562.22					
11	1.45	138.09	5.01	2564.30	2329.64
1703.45					
11	1.45	138.09	5.01	2564.30	2329.64
1703.45					
12	1.45	143.09	5.01	2850.65	2522.79
1844.68					
12	1.45	143.09	5.01	2850.65	2522.79
1844.68					
13	1.45	148.10	5.01	3137.00	2715.93
1985.91					
13	1.45	148.10	5.01	3137.00	2715.93
1985.91					
14	1.45	153.10	4.99	3378.42	2878.77
2104.97					
14	1.45	153.10	4.99	3378.42	2878.77
2104.97					
15	1.45	158.09	4.99	3574.90	3011.30
2201.88					
15	1.45	158.09	4.99	3574.90	3011.30
2201.88					
16	1.45	163.08	4.99	3771.39	3143.83
2298.79					
16	1.45	163.08	4.99	3771.39	3143.83
2298.79					
17	1.45	168.07	4.99	3967.88	3276.37
2395.70					
17	1.45	168.07	4.99	3967.88	3276.37
2395.70					
18	8.14	172.58	4.06	3856.35	3201.14
2340.69					
18	8.14	172.58	4.06	3856.35	3201.14
2340.69					
19	8.14	176.59	4.06	3952.99	3266.32
2388.36					
19	8.14	176.59	4.06	3952.99	3266.32
2388.36					

20	8.14	181.23	5.31	4105.78	3369.38
2463.71					
20	8.14	181.23	5.31	4105.78	3369.38
2463.71					
21	8.14	186.49	5.31	4314.71	3510.31
2566.76					
21	8.14	186.49	5.31	4314.71	3510.31
2566.76					
22	8.14	191.75	5.31	4523.65	3651.24
2669.81					
22	8.14	191.75	5.31	4523.65	3651.24
2669.81					
23	8.14	197.01	5.31	4732.58	3792.17
2772.85					
23	8.14	197.01	5.31	4732.58	3792.17
2772.85					
24	8.14	202.28	5.31	4941.51	3933.09
2875.90					
24	8.14	202.28	5.31	4941.51	3933.09
2875.90					
25	8.14	207.54	5.31	5150.45	4074.02
2978.95					
25	8.14	207.54	5.31	5150.45	4074.02
2978.95					
26	14.83	212.35	4.52	4994.82	3969.05
2902.19					
26	14.83	212.35	4.52	4994.82	3969.05
2902.19					
27	14.83	216.72	4.52	5102.64	4041.78
2955.37					
27	14.83	216.72	4.52	5102.64	4041.78
2955.37					
28	14.83	220.35	3.00	5173.81	4089.78
2990.47					
28	14.83	220.35	3.00	5173.81	4089.78
2990.47					
29	14.83	223.25	3.00	5208.33	4113.07
3007.50					
29	14.83	223.25	3.00	5208.33	4113.07
3007.50					
30	14.83	227.11	4.99	5254.32	4144.09
3030.18					
30	14.83	227.11	4.99	5254.32	4144.09
3030.18					
31	14.83	231.94	4.99	5311.78	4182.84
3058.52					
31	14.83	231.94	4.99	5311.78	4182.84
3058.52					
32	14.83	236.77	4.99	5369.24	4221.60
3086.86					

32	14.83	236.77	4.99	5369.24	4221.60
3086.86					
33	14.83	241.59	4.99	5426.70	4260.35
3115.20					
33	14.83	241.59	4.99	5426.70	4260.35
3115.20					
34	14.83	246.42	4.99	5484.16	4299.11
3143.54					
34	14.83	246.42	4.99	5484.16	4299.11
3143.54					
35	21.52	250.65	3.90	5179.38	4093.53
2993.22					
35	21.52	250.65	3.90	5179.38	4093.53
2993.22					
36	21.52	254.28	3.90	5172.78	4089.08
2989.96					
36	21.52	254.28	3.90	5172.78	4089.08
2989.96					
37	21.52	257.78	3.60	5178.54	4092.97
2992.80					
37	21.52	257.78	3.60	5178.54	4092.97
2992.80					
38	21.52	261.12	3.60	5196.66	4105.19
3001.74					
38	21.52	261.12	3.60	5196.66	4105.19
3001.74					
39	21.52	265.06	4.86	5200.55	4107.82
3003.66					
39	21.52	265.06	4.86	5200.55	4107.82
3003.66					
40	21.52	269.59	4.86	5190.23	4100.85
2998.57					
40	21.52	269.59	4.86	5190.23	4100.85
2998.57					
41	21.52	274.11	4.86	5179.90	4093.89
2993.48					
41	21.52	274.11	4.86	5179.90	4093.89
2993.48					
42	21.52	278.64	4.86	5169.58	4086.93
2988.38					
42	21.52	278.64	4.86	5169.58	4086.93
2988.38					
43	21.52	282.19	2.77	5161.48	4081.46
2984.39					
43	21.52	282.19	2.77	5161.48	4081.46
2984.39					
44	21.52	284.76	2.77	5155.61	4077.50
2981.49					
44	21.52	284.76	2.77	5155.61	4077.50
2981.49					

45	28.21	288.59	5.78	4788.98	3830.21
2800.67					
45	28.21	288.59	5.78	4788.98	3830.21
2800.67					
46	28.21	293.69	5.78	4708.69	3776.05
2761.07					
46	28.21	293.69	5.78	4708.69	3776.05
2761.07					
47	28.21	298.78	5.78	4628.41	3721.90
2721.47					
47	28.21	298.78	5.78	4628.41	3721.90
2721.47					
48	28.21	303.87	5.78	4548.12	3667.75
2681.88					
48	28.21	303.87	5.78	4548.12	3667.75
2681.88					
49	28.21	308.96	5.78	4467.83	3613.59
2642.28					
49	28.21	308.96	5.78	4467.83	3613.59
2642.28					
50	28.21	314.05	5.78	4387.55	3559.44
2602.68					
50	28.21	314.05	5.78	4387.55	3559.44
2602.68					
51	28.21	318.95	5.33	4295.63	3497.44
2557.35					
51	28.21	318.95	5.33	4295.63	3497.44
2557.35					
52	34.90	322.57	3.11	3904.81	3233.83
2364.60					
52	34.90	322.57	3.11	3904.81	3233.83
2364.60					
53	34.90	325.12	3.11	3814.63	3173.00
2320.12					
53	34.90	325.12	3.11	3814.63	3173.00
2320.12					
54	34.90	328.80	5.85	3708.68	3101.54
2267.86					
54	34.90	328.80	5.85	3708.68	3101.54
2267.86					
55	34.90	333.60	5.85	3586.95	3019.43
2207.82					
55	34.90	333.60	5.85	3586.95	3019.43
2207.82					
56	34.90	337.40	3.41	3460.49	2934.13
2145.46					
56	34.90	337.40	3.41	3460.49	2934.13
2145.46					
57	34.90	340.20	3.41	3329.31	2845.65
2080.76					

57	34.90	340.20	3.41	3329.31	2845.65	2080.76
58	34.90	343.98	5.79	3136.73	2715.75	1985.77
58	34.90	343.98	5.79	3136.73	2715.75	1985.77
59	34.90	348.73	5.79	2882.76	2544.44	1860.51
59	34.90	348.73	5.79	2882.76	2544.44	1860.51
60	34.90	352.60	3.66	2743.36	2450.42	1791.76
60	34.90	352.60	3.66	2743.36	2450.42	1791.76
61	41.59	355.90	4.81	2459.30	2258.82	1651.66
61	41.59	355.90	4.81	2459.30	2258.82	1651.66
62	41.59	359.25	4.14	2342.43	2179.99	1594.02
62	41.59	359.25	4.14	2342.43	2179.99	1594.02
63	41.59	363.07	6.07	2114.92	2026.53	1481.81
63	41.59	363.07	6.07	2114.92	2026.53	1481.81
64	41.59	367.61	6.07	1808.02	1819.52	1330.45
64	41.59	367.61	6.07	1808.02	1819.52	1330.45
65	41.59	372.15	6.07	1501.11	1612.51	1179.08
65	41.59	372.15	6.07	1501.11	1612.51	1179.08
66	41.59	376.69	6.07	1194.20	1405.50	1027.71
66	41.59	376.69	6.07	1194.20	1405.50	1027.71
67	41.59	381.23	6.07	887.29	1198.49	876.34
67	41.59	381.23	6.07	887.29	1198.49	876.34
68	41.59	383.76	0.69	714.40	1081.87	791.07
68	41.59	383.76	0.69	714.40	1081.87	791.07
69	48.28	386.54	7.59	358.33	841.70	615.45
69	48.28	386.54	7.59	358.33	841.70	615.45

70	48.28	391.59	7.59	222.12	149.82	109.55
70	48.28	391.59	7.59	222.12	149.82	109.55

Table 4 - Base Force Data on the 70 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.24	93.46	5.44	388.72	3525.70	2578.01
1	-5.24	93.46	5.44	388.72	3525.70	2578.01
2	-5.24	98.88	5.44	727.84	3754.44	2745.27
2	-5.24	98.88	5.44	727.84	3754.44	2745.27
3	-5.24	104.29	5.44	1066.95	3983.17	2912.52
3	-5.24	104.29	5.44	1066.95	3983.17	2912.52
4	-5.24	108.30	2.61	2302.89	3119.87	2281.27
4	-5.24	108.30	2.61	2302.89	3119.87	2281.27
5	-5.24	110.90	2.61	2381.02	3172.58	2319.81
5	-5.24	110.90	2.61	2381.02	3172.58	2319.81
6	-5.24	114.50	4.62	5075.45	6192.53	4528.01
6	-5.24	114.50	4.62	5075.45	6192.53	4528.01
7	-5.24	119.09	4.62	6670.66	7268.51	5314.78
7	-5.24	119.09	4.62	6670.66	7268.51	5314.78
8	-5.24	123.69	4.62	8265.87	8344.50	6101.55
8	-5.24	123.69	4.62	8265.87	8344.50	6101.55
9	-5.24	128.29	4.62	9861.09	9420.48	6888.31

9	-5.24	128.29	4.62	9861.09	9420.48
6888.31					
10	1.45	133.09	5.01	11402.86	10694.77
7820.08					
10	1.45	133.09	5.01	11402.86	10694.77
7820.08					
11	1.45	138.09	5.01	12836.25	11661.61
8527.04					
11	1.45	138.09	5.01	12836.25	11661.61
8527.04					
12	1.45	143.09	5.01	14269.64	12628.44
9234.00					
12	1.45	143.09	5.01	14269.64	12628.44
9234.00					
13	1.45	148.10	5.01	15703.03	13595.28
9940.95					
13	1.45	148.10	5.01	15703.03	13595.28
9940.95					
14	1.45	153.10	4.99	16872.66	14377.30
10512.77					
14	1.45	153.10	4.99	16872.66	14377.30
10512.77					
15	1.45	158.09	4.99	17853.96	15039.20
10996.75					
15	1.45	158.09	4.99	17853.96	15039.20
10996.75					
16	1.45	163.08	4.99	18835.27	15701.10
11480.74					
16	1.45	163.08	4.99	18835.27	15701.10
11480.74					
17	1.45	168.07	4.99	19816.57	16362.99
11964.72					
17	1.45	168.07	4.99	19816.57	16362.99
11964.72					
18	8.14	172.58	4.06	15639.53	12982.32
9492.75					
18	8.14	172.58	4.06	15639.53	12982.32
9492.75					
19	8.14	176.59	4.06	16031.46	13246.67
9686.05					
19	8.14	176.59	4.06	16031.46	13246.67
9686.05					
20	8.14	181.23	5.31	21821.48	17907.67
13094.20					
20	8.14	181.23	5.31	21821.48	17907.67
13094.20					
21	8.14	186.49	5.31	22931.93	18656.67
13641.87					
21	8.14	186.49	5.31	22931.93	18656.67
13641.87					

22	8.14	191.75	5.31	24042.38	19405.68
14189.55					
22	8.14	191.75	5.31	24042.38	19405.68
14189.55					
23	8.14	197.01	5.31	25152.83	20154.69
14737.23					
23	8.14	197.01	5.31	25152.83	20154.69
14737.23					
24	8.14	202.28	5.31	26263.28	20903.70
15284.91					
24	8.14	202.28	5.31	26263.28	20903.70
15284.91					
25	8.14	207.54	5.31	27373.73	21652.71
15832.59					
25	8.14	207.54	5.31	27373.73	21652.71
15832.59					
26	14.83	212.35	4.52	22559.18	17926.27
13107.80					
26	14.83	212.35	4.52	22559.18	17926.27
13107.80					
27	14.83	216.72	4.52	23046.17	18254.75
13347.98					
27	14.83	216.72	4.52	23046.17	18254.75
13347.98					
28	14.83	220.35	3.00	15520.99	12268.99
8971.16					
28	14.83	220.35	3.00	15520.99	12268.99
8971.16					
29	14.83	223.25	3.00	15624.54	12338.84
9022.23					
29	14.83	223.25	3.00	15624.54	12338.84
9022.23					
30	14.83	227.11	4.99	26237.09	20693.20
15130.99					
30	14.83	227.11	4.99	26237.09	20693.20
15130.99					
31	14.83	231.94	4.99	26524.00	20886.72
15272.50					
31	14.83	231.94	4.99	26524.00	20886.72
15272.50					
32	14.83	236.77	4.99	26810.92	21080.25
15414.01					
32	14.83	236.77	4.99	26810.92	21080.25
15414.01					
33	14.83	241.59	4.99	27097.83	21273.78
15555.52					
33	14.83	241.59	4.99	27097.83	21273.78
15555.52					
34	14.83	246.42	4.99	27384.75	21467.30
15697.02					

34	14.83	246.42	4.99	27384.75	21467.30
15697.02					
35	21.52	250.65	3.90	20222.11	15982.59
11686.57					
35	21.52	250.65	3.90	20222.11	15982.59
11686.57					
36	21.52	254.28	3.90	20196.35	15965.22
11673.86					
36	21.52	254.28	3.90	20196.35	15965.22
11673.86					
37	21.52	257.78	3.60	18647.99	14738.83
10777.12					
37	21.52	257.78	3.60	18647.99	14738.83
10777.12					
38	21.52	261.12	3.60	18713.23	14782.84
10809.30					
38	21.52	261.12	3.60	18713.23	14782.84
10809.30					
39	21.52	265.06	4.86	25295.77	19980.65
14609.97					
39	21.52	265.06	4.86	25295.77	19980.65
14609.97					
40	21.52	269.59	4.86	25245.56	19946.78
14585.20					
40	21.52	269.59	4.86	25245.56	19946.78
14585.20					
41	21.52	274.11	4.86	25195.34	19912.90
14560.44					
41	21.52	274.11	4.86	25195.34	19912.90
14560.44					
42	21.52	278.64	4.86	25145.12	19879.03
14535.67					
42	21.52	278.64	4.86	25145.12	19879.03
14535.67					
43	21.52	282.19	2.77	14279.36	11291.46
8256.39					
43	21.52	282.19	2.77	14279.36	11291.46
8256.39					
44	21.52	284.76	2.77	14263.11	11280.51
8248.37					
44	21.52	284.76	2.77	14263.11	11280.51
8248.37					
45	28.21	288.59	5.78	27672.94	22132.71
16183.57					
45	28.21	288.59	5.78	27672.94	22132.71
16183.57					
46	28.21	293.69	5.78	27209.01	21819.79
15954.76					
46	28.21	293.69	5.78	27209.01	21819.79
15954.76					

47	28.21	298.78	5.78	26745.08	21506.87
15725.95					
47	28.21	298.78	5.78	26745.08	21506.87
15725.95					
48	28.21	303.87	5.78	26281.15	21193.94
15497.14					
48	28.21	303.87	5.78	26281.15	21193.94
15497.14					
49	28.21	308.96	5.78	25817.23	20881.02
15268.33					
49	28.21	308.96	5.78	25817.23	20881.02
15268.33					
50	28.21	314.05	5.78	25353.30	20568.10
15039.52					
50	28.21	314.05	5.78	25353.30	20568.10
15039.52					
51	28.21	318.95	5.33	22892.28	18638.56
13628.63					
51	28.21	318.95	5.33	22892.28	18638.56
13628.63					
52	34.90	322.57	3.11	12149.89	10062.11
7357.48					
52	34.90	322.57	3.11	12149.89	10062.11
7357.48					
53	34.90	325.12	3.11	11869.29	9872.85
7219.09					
53	34.90	325.12	3.11	11869.29	9872.85
7219.09					
54	34.90	328.80	5.85	21705.48	18152.10
13272.93					
54	34.90	328.80	5.85	21705.48	18152.10
13272.93					
55	34.90	333.60	5.85	20993.05	17671.56
12921.55					
55	34.90	333.60	5.85	20993.05	17671.56
12921.55					
56	34.90	337.40	3.41	11814.22	10017.21
7324.64					
56	34.90	337.40	3.41	11814.22	10017.21
7324.64					
57	34.90	340.20	3.41	11366.35	9715.12
7103.75					
57	34.90	340.20	3.41	11366.35	9715.12
7103.75					
58	34.90	343.98	5.79	18166.85	15728.69
11500.91					
58	34.90	343.98	5.79	18166.85	15728.69
11500.91					
59	34.90	348.73	5.79	16695.92	14736.53
10775.44					

59	34.90	348.73	5.79	16695.92	14736.53	10775.44
60	34.90	352.60	3.66	10041.76	8969.48	6558.54
60	34.90	352.60	3.66	10041.76	8969.48	6558.54
61	41.59	355.90	4.81	11831.04	10866.58	7945.71
61	41.59	355.90	4.81	11831.04	10866.58	7945.71
62	41.59	359.25	4.14	9709.21	9035.91	6607.11
62	41.59	359.25	4.14	9709.21	9035.91	6607.11
63	41.59	363.07	6.07	12838.28	12301.73	8995.10
63	41.59	363.07	6.07	12838.28	12301.73	8995.10
64	41.59	367.61	6.07	10975.25	11045.09	8076.24
64	41.59	367.61	6.07	10975.25	11045.09	8076.24
65	41.59	372.15	6.07	9112.21	9788.46	7157.38
65	41.59	372.15	6.07	9112.21	9788.46	7157.38
66	41.59	376.69	6.07	7249.18	8531.83	6238.53
66	41.59	376.69	6.07	7249.18	8531.83	6238.53
67	41.59	381.23	6.07	5386.15	7275.20	5319.67
67	41.59	381.23	6.07	5386.15	7275.20	5319.67
68	41.59	383.76	0.69	494.85	749.39	547.96
68	41.59	383.76	0.69	494.85	749.39	547.96
69	48.28	386.54	7.59	2718.53	6385.64	4669.22
69	48.28	386.54	7.59	2718.53	6385.64	4669.22
70	48.28	391.59	7.59	1685.13	1136.63	831.11
70	48.28	391.59	7.59	1685.13	1136.63	831.11

SUM OF MOMENTS = 0.290472E+01 (ft/lbs);Imbalance (Fraction of Total Weight) = 0.2272097E-05

Sum of the Resisting Forces = 972486.56 (lbs)

Average Available Shear Strength = 2901.44(psf)

Sum of the Driving Forces = 711088.12 (lbs)

Average Mobilized Shear Stress = 2121.55(psf)

Total length of the failure surface = 335.17(ft)

Factor of Safety Balance Check: FS = 1.36760

CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.49891(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 1330.136(ft)

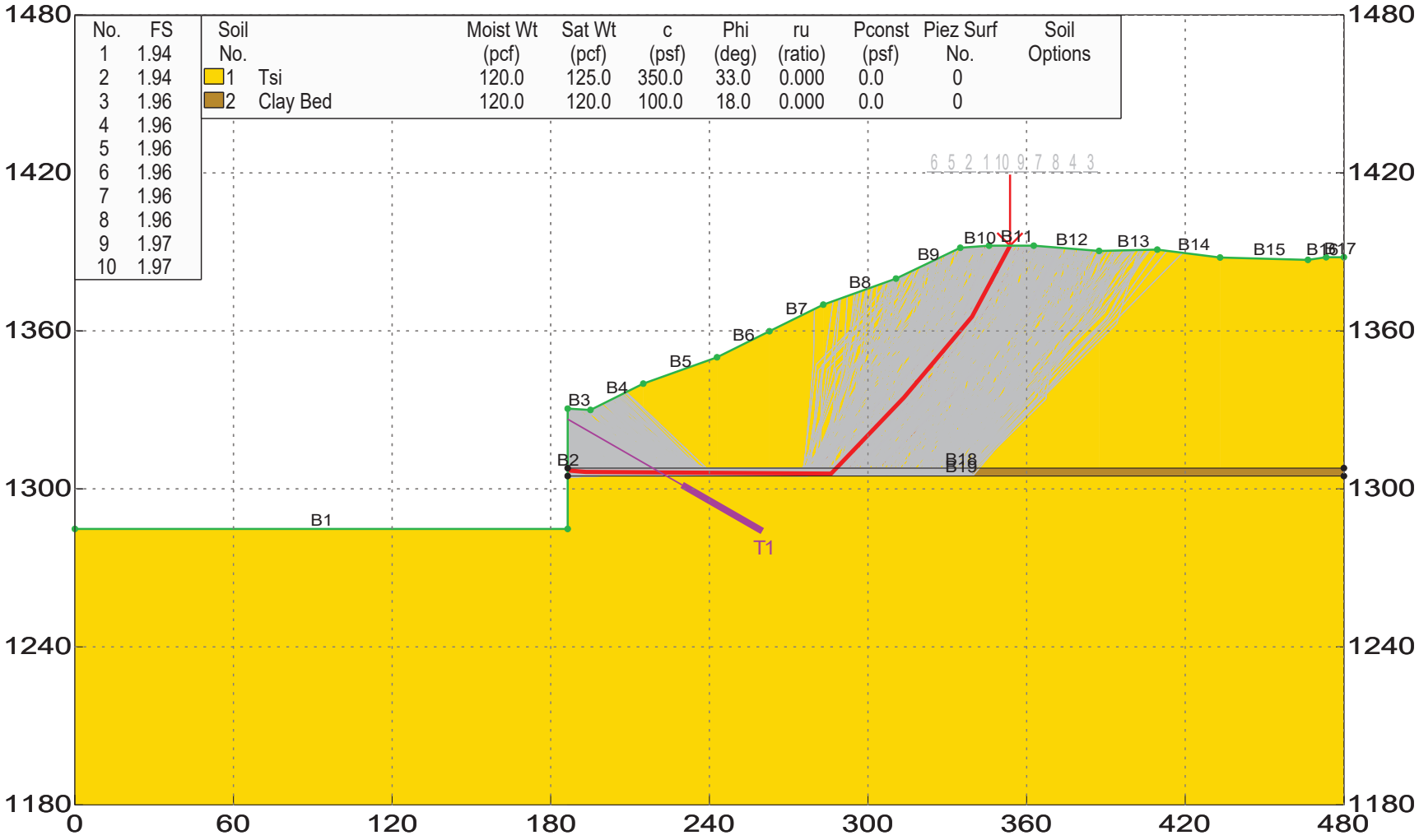
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Block (Static)

LGC Geotechnical / BPP

\Section B - Static - Block - Tieback.gsd



GEOSTASE FS = 1.94

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Block - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Block - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Block (Static)

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface No.	Water Option
1 Tsi	120.0	125.0	350.00	33.00	0.000	0.0	0
2 Clay Bed	120.0	120.0	100.00	18.00	0.000	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of
Non-Circular Zone Search = 40.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	186.50	1306.40	240.00	1306.40	3.00
2	275.00	1306.40	340.00	1306.40	3.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 263

Number of Trial Surfaces With Valid FS = 737

Percentage of Trial Surfaces With Non-Converged and/or

Non-Valid FS Solutions of the Total Attempted = 26.3 %

Statistical Data On All Valid FS Values:
FS Max = 8.492 FS Min = 1.943 FS Ave = 2.720
Standard Deviation = 0.581 Coefficient of Variation = 21.35 %

Critical Surface is Sequence Number 193 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	221.46	1306.26

Factor Of Safety For The Critical or Specified Surface = 1.943

Table 1 - Geometry Data on the 38 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.45	23.49	188.13	1306.91	1330.40	-5.02	-3.33	3.46
2	3.45	23.59	191.58	1306.61	1330.20	-5.02	-3.33	3.46
3	1.70	23.60	194.15	1306.45	1330.05	-0.40	-3.33	1.70
4	5.00	24.82	197.50	1306.43	1331.25	-0.40	26.57	5.00
5	5.00	27.36	202.50	1306.39	1333.75	-0.40	26.57	5.00
6	5.00	29.89	207.50	1306.36	1336.25	-0.40	26.57	5.00
7	5.00	32.43	212.50	1306.32	1338.75	-0.40	26.57	5.00
8	4.65	34.55	217.32	1306.29	1340.83	-0.40	19.72	4.65
9	4.65	36.24	221.98	1306.26	1342.50	-0.40	19.72	4.65

10	4.65	37.94	226.62	1306.22	1344.17	-0.40	19.72
4.65							
11	4.65	39.64	231.27	1306.19	1345.83	-0.40	19.72
4.65							
12	4.65	41.34	235.93	1306.16	1347.50	-0.40	19.72
4.65							
13	4.65	43.04	240.57	1306.13	1349.17	-0.40	19.72
4.65							
14	4.95	45.14	245.38	1306.09	1351.24	-0.40	26.57
4.95							
15	4.95	47.65	250.32	1306.06	1353.71	-0.40	26.57
4.95							
16	4.95	50.16	255.28	1306.03	1356.19	-0.40	26.57
4.95							
17	4.95	52.67	260.23	1305.99	1358.66	-0.40	26.57
4.95							
18	5.10	55.21	265.25	1305.96	1361.16	-0.40	26.34
5.10							
19	5.10	57.77	270.35	1305.92	1363.69	-0.40	26.34
5.10							
20	5.10	60.33	275.45	1305.89	1366.21	-0.40	26.34
5.10							
21	5.10	62.89	280.55	1305.85	1368.74	-0.40	26.34
5.10							
22	2.93	64.70	284.56	1305.82	1370.53	-0.40	19.80
2.93							
23	1.99	64.55	287.02	1306.86	1371.41	46.35	19.80
2.88							
24	4.52	62.32	290.27	1310.27	1372.58	46.35	19.80
6.54							
25	4.52	59.21	294.79	1315.00	1374.21	46.35	19.80
6.54							
26	4.52	56.10	299.31	1319.74	1375.83	46.35	19.80
6.54							
27	4.52	52.99	303.82	1324.47	1377.46	46.35	19.80
6.54							
28	4.52	49.88	308.34	1329.21	1379.09	46.35	19.80
6.54							
29	3.04	47.47	312.12	1333.16	1380.63	46.35	25.71
4.40							
30	5.32	44.72	316.29	1337.92	1382.64	50.00	25.71
8.27							
31	5.32	40.94	321.61	1344.26	1385.20	50.00	25.71
8.27							
32	5.32	37.17	326.93	1350.60	1387.76	50.00	25.71
8.27							
33	5.32	33.39	332.24	1356.93	1390.32	50.00	25.71
8.27							
34	4.45	29.01	337.12	1362.75	1391.76	50.00	4.20
6.92							

35	3.23	23.62	340.96	1368.43	1392.04	61.96	4.20
6.86							
36	3.23	17.79	344.19	1374.49	1392.28	61.96	4.20
6.86							
37	3.96	11.16	347.78	1381.24	1392.40	61.96	0.00
8.43							
38	3.96	3.72	351.74	1388.68	1392.40	61.96	0.00
8.43							

Table 2 - Force Data On The 38 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	9727.8	0.0	0.0	0.0	0.0	0.0
2	9770.2	0.0	0.0	0.0	0.0	0.0
3	4809.6	0.0	0.0	0.0	0.0	0.0
4	14895.0	0.0	0.0	0.0	0.0	0.0
5	16415.7	0.0	0.0	0.0	0.0	0.0
6	17936.4	0.0	0.0	0.0	0.0	0.0
7	19457.1	0.0	0.0	0.0	0.0	0.0
8	19276.2	0.0	0.0	0.0	0.0	0.0
9	20224.1	0.0	0.0	0.0	0.0	0.0
10	21172.0	0.0	0.0	0.0	0.0	0.0
11	22119.9	0.0	0.0	0.0	0.0	0.0
12	23067.9	0.0	0.0	0.0	0.0	0.0
13	24015.8	0.0	0.0	0.0	0.0	0.0
14	26814.9	0.0	0.0	0.0	0.0	0.0
15	28305.4	0.0	0.0	0.0	0.0	0.0
16	29795.8	0.0	0.0	0.0	0.0	0.0
17	31286.3	0.0	0.0	0.0	0.0	0.0
18	33785.6	0.0	0.0	0.0	0.0	0.0
19	35352.4	0.0	0.0	0.0	0.0	0.0
20	36919.3	0.0	0.0	0.0	0.0	0.0
21	38486.1	0.0	0.0	0.0	0.0	0.0
22	22711.3	0.0	0.0	0.0	0.0	0.0
23	15417.5	0.0	0.0	0.0	0.0	0.0
24	33776.9	0.0	0.0	0.0	0.0	0.0
25	32092.0	0.0	0.0	0.0	0.0	0.0
26	30407.2	0.0	0.0	0.0	0.0	0.0
27	28722.3	0.0	0.0	0.0	0.0	0.0
28	27037.4	0.0	0.0	0.0	0.0	0.0
29	17295.9	0.0	0.0	0.0	0.0	0.0
30	28526.1	0.0	0.0	0.0	0.0	0.0
31	26117.1	0.0	0.0	0.0	0.0	0.0
32	23708.1	0.0	0.0	0.0	0.0	0.0

33	21299.2	0.0	0.0	0.0	0.0	0.0
34	15481.0	0.0	0.0	0.0	0.0	0.0
35	9144.8	0.0	0.0	0.0	0.0	0.0
36	6890.3	0.0	0.0	0.0	0.0	0.0
37	5308.5	0.0	0.0	0.0	0.0	0.0
38	1769.5	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 829338.52(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 829338.52(lbs)

TOTAL AREA OF SLIDING MASS = 6911.15(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 38 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	100.00	18.00	
2	2	100.00	18.00	
3	2	100.00	18.00	
4	2	100.00	18.00	
5	2	100.00	18.00	
6	2	100.00	18.00	
7	2	100.00	18.00	
8	2	100.00	18.00	
9	2	100.00	18.00	
10	2	100.00	18.00	
11	2	100.00	18.00	
12	2	100.00	18.00	
13	2	100.00	18.00	
14	2	100.00	18.00	
15	2	100.00	18.00	
16	2	100.00	18.00	
17	2	100.00	18.00	
18	2	100.00	18.00	
19	2	100.00	18.00	
20	2	100.00	18.00	
21	2	100.00	18.00	
22	2	100.00	18.00	
23	2	100.00	18.00	
24	1	350.00	33.00	
25	1	350.00	33.00	
26	1	350.00	33.00	
27	1	350.00	33.00	
28	1	350.00	33.00	
29	1	350.00	33.00	
30	1	350.00	33.00	
31	1	350.00	33.00	
32	1	350.00	33.00	

33	1	350.00	33.00
34	1	350.00	33.00
35	1	350.00	33.00
36	1	350.00	33.00
37	1	350.00	33.00
38	1	350.00	33.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 38 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-5.02	188.13	3.46	2869.29	1032.29	530.27
1	-5.02	188.13	3.46	2869.29	1032.29	530.27
2	-5.02	191.58	3.46	2881.79	1036.35	532.36
2	-5.02	191.58	3.46	2881.79	1036.35	532.36
3	-0.40	194.15	1.70	2836.06	1021.49	524.73
3	-0.40	194.15	1.70	2836.06	1021.49	524.73
4	-0.40	197.50	5.00	2983.10	1069.27	549.27
4	-0.40	197.50	5.00	2983.10	1069.27	549.27
5	-0.40	202.50	5.00	3287.62	1168.21	600.10
5	-0.40	202.50	5.00	3287.62	1168.21	600.10
6	-0.40	207.50	5.00	3592.14	1267.16	650.92
6	-0.40	207.50	5.00	3592.14	1267.16	650.92
7	-0.40	212.50	5.00	3896.66	1366.10	701.75

7	-0.40	212.50	5.00	3896.66	1366.10	701.75
8	-0.40	217.32	4.65	4150.98	1448.73	744.20
8	-0.40	217.32	4.65	4150.98	1448.73	744.20
9	-0.40	221.98	4.65	10814.74	3613.92	1856.43
9	-0.40	221.98	4.65	10814.74	3613.92	1856.43
10	-0.40	226.62	4.65	4559.19	1581.37	812.33
10	-0.40	226.62	4.65	4559.19	1581.37	812.33
11	-0.40	231.27	4.65	4763.30	1647.69	846.40
11	-0.40	231.27	4.65	4763.30	1647.69	846.40
12	-0.40	235.93	4.65	4967.40	1714.01	880.47
12	-0.40	235.93	4.65	4967.40	1714.01	880.47
13	-0.40	240.57	4.65	5171.51	1780.33	914.53
13	-0.40	240.57	4.65	5171.51	1780.33	914.53
14	-0.40	245.38	4.95	5424.30	1862.46	956.73
14	-0.40	245.38	4.95	5424.30	1862.46	956.73
15	-0.40	250.32	4.95	5725.78	1960.42	1007.05
15	-0.40	250.32	4.95	5725.78	1960.42	1007.05
16	-0.40	255.28	4.95	6027.25	2058.37	1057.36
16	-0.40	255.28	4.95	6027.25	2058.37	1057.36
17	-0.40	260.23	4.95	6328.73	2156.33	1107.68
17	-0.40	260.23	4.95	6328.73	2156.33	1107.68
18	-0.40	265.25	5.10	6633.27	2255.28	1158.51
18	-0.40	265.25	5.10	6633.27	2255.28	1158.51
19	-0.40	270.35	5.10	6940.88	2355.23	1209.86
19	-0.40	270.35	5.10	6940.88	2355.23	1209.86

20	-0.40	275.45	5.10	7248.49	2455.18
1261.20					
20	-0.40	275.45	5.10	7248.49	2455.18
1261.20					
21	-0.40	280.55	5.10	7556.10	2555.12
1312.54					
21	-0.40	280.55	5.10	7556.10	2555.12
1312.54					
22	-0.40	284.56	2.93	7774.38	2626.05
1348.97					
22	-0.40	284.56	2.93	7774.38	2626.05
1348.97					
23	46.35	287.02	2.88	6465.18	2200.67
1130.46					
23	46.35	287.02	2.88	6465.18	2200.67
1130.46					
24	46.35	290.27	6.54	5278.25	3777.74
1940.58					
24	46.35	290.27	6.54	5278.25	3777.74
1940.58					
25	46.35	294.79	6.54	5007.59	3601.96
1850.29					
25	46.35	294.79	6.54	5007.59	3601.96
1850.29					
26	46.35	299.31	6.54	4736.92	3426.19
1760.00					
26	46.35	299.31	6.54	4736.92	3426.19
1760.00					
27	46.35	303.82	6.54	4466.25	3250.42
1669.70					
27	46.35	303.82	6.54	4466.25	3250.42
1669.70					
28	46.35	308.34	6.54	4195.58	3074.64
1579.41					
28	46.35	308.34	6.54	4195.58	3074.64
1579.41					
29	46.35	312.12	4.40	3985.33	2938.10
1509.27					
29	46.35	312.12	4.40	3985.33	2938.10
1509.27					
30	50.00	316.29	8.27	3590.65	2681.80
1377.61					
30	50.00	316.29	8.27	3590.65	2681.80
1377.61					
31	50.00	321.61	8.27	3273.74	2475.99
1271.89					
31	50.00	321.61	8.27	3273.74	2475.99
1271.89					
32	50.00	326.93	8.27	2956.83	2270.19
1166.17					

32	50.00	326.93	8.27	2956.83	2270.19	1166.17
33	50.00	332.24	8.27	2639.92	2064.38	1060.45
33	50.00	332.24	8.27	2639.92	2064.38	1060.45
34	50.00	337.12	6.92	2272.79	1825.97	937.98
34	50.00	337.12	6.92	2272.79	1825.97	937.98
35	61.96	340.96	6.86	1471.90	1305.86	670.81
35	61.96	340.96	6.86	1471.90	1305.86	670.81
36	61.96	344.19	6.86	1055.37	1035.37	531.86
36	61.96	344.19	6.86	1055.37	1035.37	531.86
37	61.96	347.78	8.43	580.92	727.25	373.58
37	61.96	347.78	8.43	580.92	727.25	373.58
38	61.96	351.74	8.43	48.54	381.52	195.98
38	61.96	351.74	8.43	48.54	381.52	195.98

Table 4 - Base Force Data on the 38 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.02	188.13	3.46	9939.74	3576.04	1836.97
1	-5.02	188.13	3.46	9939.74	3576.04	1836.97
2	-5.02	191.58	3.46	9983.05	3590.11	1844.20
2	-5.02	191.58	3.46	9983.05	3590.11	1844.20
3	-0.40	194.15	1.70	4816.35	1734.75	891.12
3	-0.40	194.15	1.70	4816.35	1734.75	891.12

4	-0.40	197.50	5.00	14915.84	5346.46
2746.42					
4	-0.40	197.50	5.00	14915.84	5346.46
2746.42					
5	-0.40	202.50	5.00	16438.48	5841.20
3000.56					
5	-0.40	202.50	5.00	16438.48	5841.20
3000.56					
6	-0.40	207.50	5.00	17961.13	6335.94
3254.70					
6	-0.40	207.50	5.00	17961.13	6335.94
3254.70					
7	-0.40	212.50	5.00	19483.77	6830.67
3508.84					
7	-0.40	212.50	5.00	19483.77	6830.67
3508.84					
8	-0.40	217.32	4.65	19302.50	6736.77
3460.61					
8	-0.40	217.32	4.65	19302.50	6736.77
3460.61					
9	-0.40	221.98	4.65	50289.76	16805.14
8632.62					
9	-0.40	221.98	4.65	50289.76	16805.14
8632.62					
10	-0.40	226.62	4.65	21200.73	7353.55
3777.44					
10	-0.40	226.62	4.65	21200.73	7353.55
3777.44					
11	-0.40	231.27	4.65	22149.85	7661.93
3935.85					
11	-0.40	231.27	4.65	22149.85	7661.93
3935.85					
12	-0.40	235.93	4.65	23098.97	7970.32
4094.27					
12	-0.40	235.93	4.65	23098.97	7970.32
4094.27					
13	-0.40	240.57	4.65	24048.09	8278.71
4252.68					
13	-0.40	240.57	4.65	24048.09	8278.71
4252.68					
14	-0.40	245.38	4.95	26850.93	9219.41
4735.91					
14	-0.40	245.38	4.95	26850.93	9219.41
4735.91					
15	-0.40	250.32	4.95	28343.27	9704.30
4984.99					
15	-0.40	250.32	4.95	28343.27	9704.30
4984.99					
16	-0.40	255.28	4.95	29835.62	10189.19
5234.08					

16	-0.40	255.28	4.95	29835.62	10189.19
5234.08					
17	-0.40	260.23	4.95	31327.96	10674.08
5483.16					
17	-0.40	260.23	4.95	31327.96	10674.08
5483.16					
18	-0.40	265.25	5.10	33830.49	11502.21
5908.56					
18	-0.40	265.25	5.10	33830.49	11502.21
5908.56					
19	-0.40	270.35	5.10	35399.33	12011.95
6170.41					
19	-0.40	270.35	5.10	35399.33	12011.95
6170.41					
20	-0.40	275.45	5.10	36968.18	12521.70
6432.26					
20	-0.40	275.45	5.10	36968.18	12521.70
6432.26					
21	-0.40	280.55	5.10	38537.02	13031.45
6694.11					
21	-0.40	280.55	5.10	38537.02	13031.45
6694.11					
22	-0.40	284.56	2.93	22741.25	7681.60
3945.95					
22	-0.40	284.56	2.93	22741.25	7681.60
3945.95					
23	46.35	287.02	2.88	18640.57	6345.01
3259.36					
23	46.35	287.02	2.88	18640.57	6345.01
3259.36					
24	46.35	290.27	6.54	34538.67	24719.93
12698.36					
24	46.35	290.27	6.54	34538.67	24719.93
12698.36					
25	46.35	294.79	6.54	32767.54	23569.74
12107.52					
25	46.35	294.79	6.54	32767.54	23569.74
12107.52					
26	46.35	299.31	6.54	30996.40	22419.55
11516.68					
26	46.35	299.31	6.54	30996.40	22419.55
11516.68					
27	46.35	303.82	6.54	29225.26	21269.36
10925.84					
27	46.35	303.82	6.54	29225.26	21269.36
10925.84					
28	46.35	308.34	6.54	27454.13	20119.17
10335.00					
28	46.35	308.34	6.54	27454.13	20119.17
10335.00					

29	46.35	312.12	4.40	17530.97	12924.35 6639.10
29	46.35	312.12	4.40	17530.97	12924.35 6639.10
30	50.00	316.29	8.27	29696.72	22179.97 11393.61
30	50.00	316.29	8.27	29696.72	22179.97 11393.61
31	50.00	321.61	8.27	27075.69	20477.86 10519.25
31	50.00	321.61	8.27	27075.69	20477.86 10519.25
32	50.00	326.93	8.27	24454.66	18775.74 9644.90
32	50.00	326.93	8.27	24454.66	18775.74 9644.90
33	50.00	332.24	8.27	21833.63	17073.63 8770.54
33	50.00	332.24	8.27	21833.63	17073.63 8770.54
34	50.00	337.12	6.92	15722.57	12631.56 6488.70
34	50.00	337.12	6.92	15722.57	12631.56 6488.70
35	61.96	340.96	6.86	10104.30	8964.49 4604.96
35	61.96	340.96	6.86	10104.30	8964.49 4604.96
36	61.96	344.19	6.86	7244.91	7107.58 3651.08
36	61.96	344.19	6.86	7244.91	7107.58 3651.08
37	61.96	347.78	8.43	4897.77	6131.53 3149.70
37	61.96	347.78	8.43	4897.77	6131.53 3149.70
38	61.96	351.74	8.43	409.27	3216.66 1652.37
38	61.96	351.74	8.43	409.27	3216.66 1652.37

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 38 Slices (Only Applicable Slices Listed)

Slice	Horiz Force	Vert Force	Result Force	Inclin(deg)	Moment@Base Cntr

No.	(lbs)	(lbs)	(lbs)		(ft/lbs)
9	51961.5	30000.0	60000.0	30.00	0.153442E+05

Sum of the Resisting Forces = 345774.51 (lbs)

Average Available Shear Strength = 1644.62(psf)

Sum of the Driving Forces = 192023.48 (lbs)

Average Mobilized Shear Stress = 913.33(psf)

Total length of the failure surface = 210.25(ft)

Factor of Safety Balance Check: FS = 1.80069

Janbu's Correction Factor (fo) = 1.0790

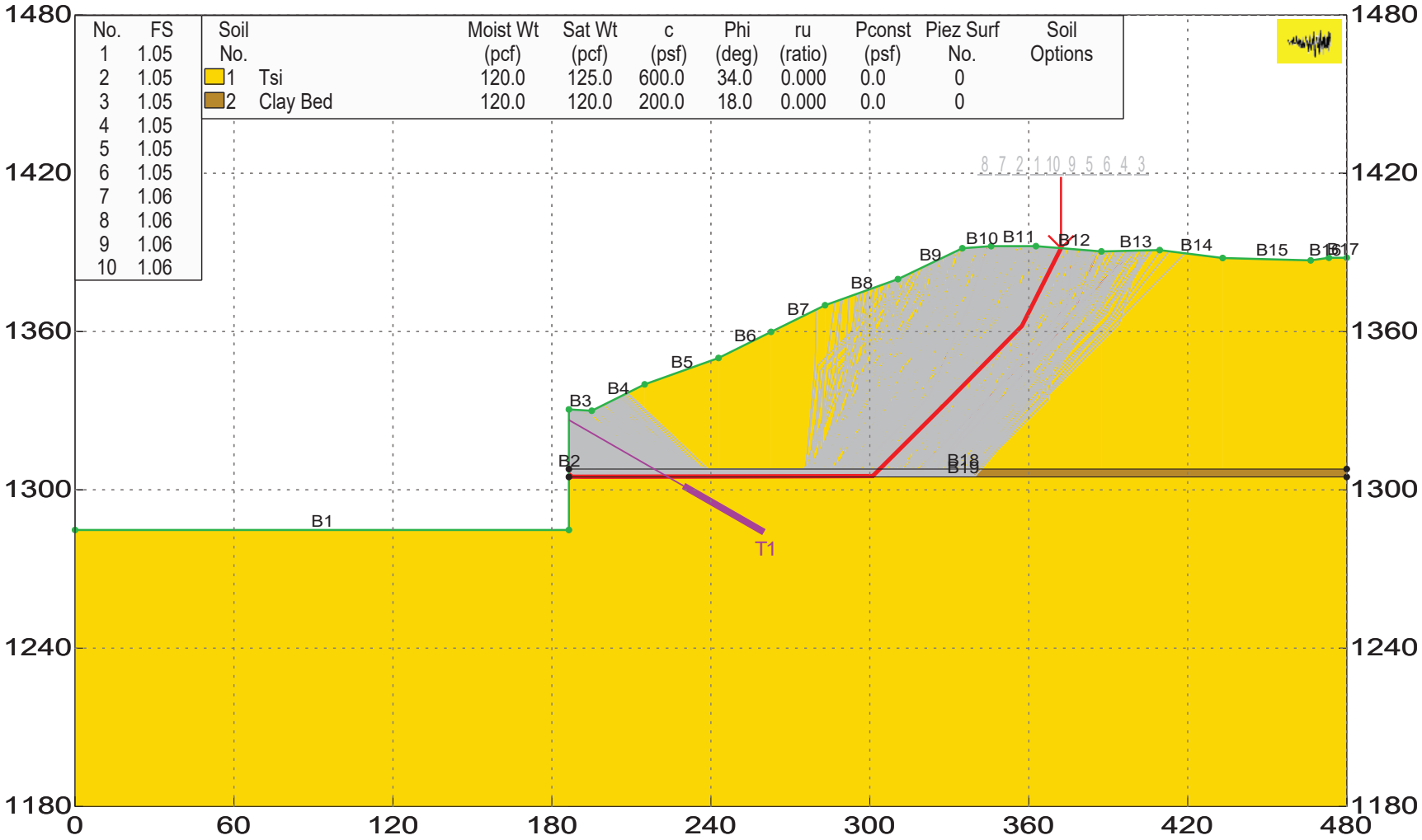
Janub's FS Corrected = 1.94290

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Block (Seismic (117A))

LGC Geotechnical / BPP

\Section B - Seismic (117A) - Block - Tieback.gsd



GEOSTASE FS = 1.05

Simplified Janbu (Corrected) Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Block - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Block - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Block (Seismic (117A))

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface No.	Water Pressure Constant (psf)	Water Surface Option
1 Tsi	120.0	125.0	600.00	34.00	0.000	0	0.0	0
2 Clay Bed	120.0	120.0	200.00	18.00	0.000	0	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of
Non-Circular Zone Search = 40.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	186.50	1306.40	240.00	1306.40	3.00
2	275.00	1306.40	340.00	1306.40	3.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 105

Number of Trial Surfaces With Valid FS = 895

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 10.5 %

Statistical Data On All Valid FS Values:
FS Max = 4.074 FS Min = 1.047 FS Ave = 1.525
Standard Deviation = 0.367 Coefficient of Variation = 24.08 %

Critical Surface is Sequence Number 333 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	223.49	1305.09

Factor Of Safety For The Critical or Specified Surface = 1.047

Table 1 - Geometry Data on the 42 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	1.13	25.00	186.96	1305.47	1330.47	-39.23	-3.33	1.46
2	3.74	25.31	189.40	1305.02	1330.33	0.12	-3.33	3.74
3	3.74	25.09	193.13	1305.02	1330.11	0.12	-3.33	3.74
4	5.00	26.22	197.50	1305.03	1331.25	0.12	26.57	5.00
5	5.00	28.71	202.50	1305.04	1333.75	0.12	26.57	5.00
6	5.00	31.20	207.50	1305.05	1336.25	0.12	26.57	5.00
7	5.00	33.69	212.50	1305.06	1338.75	0.12	26.57	5.00
8	4.65	35.76	217.32	1305.07	1340.83	0.12	19.72	4.65
9	4.65	37.42	221.98	1305.08	1342.50	0.12	19.72	4.65
10	4.65	39.07	226.62	1305.09	1344.17	0.12	19.72	4.65

11	4.65	40.73	231.27	1305.10	1345.83	0.12	19.72
4.65							
12	4.65	42.39	235.93	1305.11	1347.50	0.12	19.72
4.65							
13	4.65	44.04	240.57	1305.12	1349.17	0.12	19.72
4.65							
14	4.95	46.10	245.38	1305.13	1351.24	0.12	26.57
4.95							
15	4.95	48.57	250.32	1305.14	1353.71	0.12	26.57
4.95							
16	4.95	51.03	255.28	1305.15	1356.19	0.12	26.57
4.95							
17	4.95	53.50	260.23	1305.16	1358.66	0.12	26.57
4.95							
18	5.10	55.99	265.25	1305.17	1361.16	0.12	26.34
5.10							
19	5.10	58.50	270.35	1305.19	1363.69	0.12	26.34
5.10							
20	5.10	61.02	275.45	1305.20	1366.21	0.12	26.34
5.10							
21	5.10	63.53	280.55	1305.21	1368.74	0.12	26.34
5.10							
22	4.50	65.59	285.35	1305.22	1370.81	0.12	19.80
4.50							
23	4.50	67.20	289.85	1305.23	1372.43	0.12	19.80
4.50							
24	4.50	68.81	294.35	1305.24	1374.05	0.12	19.80
4.50							
25	4.50	70.43	298.85	1305.25	1375.67	0.12	19.80
4.50							
26	2.64	70.38	302.42	1306.57	1376.96	45.06	19.80
3.74							
27	3.43	68.43	305.46	1309.62	1378.05	45.06	19.80
4.85							
28	3.43	66.23	308.89	1313.05	1379.28	45.06	19.80
4.85							
29	4.69	63.91	312.94	1317.12	1381.03	45.06	25.71
6.64							
30	4.69	61.47	317.63	1321.82	1383.29	45.06	25.71
6.64							
31	4.69	59.03	322.32	1326.52	1385.54	45.06	25.71
6.64							
32	4.69	56.59	327.01	1331.21	1387.80	45.06	25.71
6.64							
33	2.77	54.62	330.74	1334.97	1389.60	45.52	25.71
3.96							
34	2.77	53.14	333.51	1337.80	1390.93	45.52	25.71
3.96							
35	5.45	49.82	337.62	1341.98	1391.80	45.52	4.20
7.78							

36	5.45	44.67	343.08	1347.53	1392.20	45.52	4.20
7.78							
37	5.79	39.14	348.70	1353.26	1392.40	45.52	0.00
8.27							
38	5.79	33.25	354.49	1359.15	1392.40	45.52	0.00
8.27							
39	2.66	27.64	358.71	1364.76	1392.40	63.38	0.00
5.93							
40	2.66	22.34	361.37	1370.06	1392.40	63.38	0.00
5.93							
41	4.74	14.76	365.07	1377.44	1392.21	63.38	-4.63
10.58							
42	4.74	4.92	369.81	1386.90	1391.82	63.38	-4.63
10.58							

Table 2 - Force Data On The 42 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	3385.2	0.0	0.0	880.1	0.0	0.0
2	11346.4	0.0	0.0	2950.1	0.0	0.0
3	11245.5	0.0	0.0	2923.8	0.0	0.0
4	15730.7	0.0	0.0	4090.0	0.0	0.0
5	17224.4	0.0	0.0	4478.4	0.0	0.0
6	18718.1	0.0	0.0	4866.7	0.0	0.0
7	20211.8	0.0	0.0	5255.1	0.0	0.0
8	19953.8	0.0	0.0	5188.0	0.0	0.0
9	20878.4	0.0	0.0	5428.4	0.0	0.0
10	21802.9	0.0	0.0	5668.8	0.0	0.0
11	22727.5	0.0	0.0	5909.1	0.0	0.0
12	23652.0	0.0	0.0	6149.5	0.0	0.0
13	24576.6	0.0	0.0	6389.9	0.0	0.0
14	27386.2	0.0	0.0	7120.4	0.0	0.0
15	28850.2	0.0	0.0	7501.0	0.0	0.0
16	30314.2	0.0	0.0	7881.7	0.0	0.0
17	31778.1	0.0	0.0	8262.3	0.0	0.0
18	34264.6	0.0	0.0	8908.8	0.0	0.0
19	35803.4	0.0	0.0	9308.9	0.0	0.0
20	37342.1	0.0	0.0	9708.9	0.0	0.0
21	38880.8	0.0	0.0	10109.0	0.0	0.0
22	35421.9	0.0	0.0	9209.7	0.0	0.0
23	36291.6	0.0	0.0	9435.8	0.0	0.0
24	37161.4	0.0	0.0	9662.0	0.0	0.0
25	38031.2	0.0	0.0	9888.1	0.0	0.0
26	22336.3	0.0	0.0	5807.4	0.0	0.0

27	28144.3	0.0	0.0	7317.5	0.0	0.0
28	27239.3	0.0	0.0	7082.2	0.0	0.0
29	35961.6	0.0	0.0	9350.0	0.0	0.0
30	34588.2	0.0	0.0	8992.9	0.0	0.0
31	33214.7	0.0	0.0	8635.8	0.0	0.0
32	31841.2	0.0	0.0	8278.7	0.0	0.0
33	18169.6	0.0	0.0	4724.1	0.0	0.0
34	17674.6	0.0	0.0	4595.4	0.0	0.0
35	32579.8	0.0	0.0	8470.8	0.0	0.0
36	29211.7	0.0	0.0	7595.0	0.0	0.0
37	27201.0	0.0	0.0	7072.3	0.0	0.0
38	23102.8	0.0	0.0	6006.7	0.0	0.0
39	8820.6	0.0	0.0	2293.4	0.0	0.0
40	7127.8	0.0	0.0	1853.2	0.0	0.0
41	8399.6	0.0	0.0	2183.9	0.0	0.0
42	2799.9	0.0	0.0	728.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1031391.96(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1031391.96(lbs)

TOTAL AREA OF SLIDING MASS = 8594.93(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 42 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	200.00	18.00	
2	2	200.00	18.00	
3	2	200.00	18.00	
4	2	200.00	18.00	
5	2	200.00	18.00	
6	2	200.00	18.00	
7	2	200.00	18.00	
8	2	200.00	18.00	
9	2	200.00	18.00	
10	2	200.00	18.00	
11	2	200.00	18.00	
12	2	200.00	18.00	
13	2	200.00	18.00	
14	2	200.00	18.00	
15	2	200.00	18.00	
16	2	200.00	18.00	
17	2	200.00	18.00	
18	2	200.00	18.00	
19	2	200.00	18.00	
20	2	200.00	18.00	
21	2	200.00	18.00	
22	2	200.00	18.00	

23	2	200.00	18.00
24	2	200.00	18.00
25	2	200.00	18.00
26	2	200.00	18.00
27	1	600.00	34.00
28	1	600.00	34.00
29	1	600.00	34.00
30	1	600.00	34.00
31	1	600.00	34.00
32	1	600.00	34.00
33	1	600.00	34.00
34	1	600.00	34.00
35	1	600.00	34.00
36	1	600.00	34.00
37	1	600.00	34.00
38	1	600.00	34.00
39	1	600.00	34.00
40	1	600.00	34.00
41	1	600.00	34.00
42	1	600.00	34.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 42 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-39.23	186.96	1.46	4358.74	1616.24	1539.27
1	-39.23	186.96	1.46	4358.74	1616.24	1539.27
2	0.12	189.40	3.74	3034.72	1186.04	1129.56
2	0.12	189.40	3.74	3034.72	1186.04	1129.56
3	0.12	193.13	3.74	3007.73	1177.27	1121.20
3	0.12	193.13	3.74	3007.73	1177.27	1121.20

4	0.12	197.50	5.00	3143.50	1221.39
1163.22					
4	0.12	197.50	5.00	3143.50	1221.39
1163.22					
5	0.12	202.50	5.00	3442.03	1318.38
1255.60					
5	0.12	202.50	5.00	3442.03	1318.38
1255.60					
6	0.12	207.50	5.00	3740.56	1415.38
1347.97					
6	0.12	207.50	5.00	3740.56	1415.38
1347.97					
7	0.12	212.50	5.00	4039.09	1512.38
1440.35					
7	0.12	212.50	5.00	4039.09	1512.38
1440.35					
8	0.12	217.32	4.65	4287.70	1593.16
1517.28					
8	0.12	217.32	4.65	4287.70	1593.16
1517.28					
9	0.12	221.98	4.65	10933.46	3752.50
3573.79					
9	0.12	221.98	4.65	10933.46	3752.50
3573.79					
10	0.12	226.62	4.65	4685.07	1722.27
1640.25					
10	0.12	226.62	4.65	4685.07	1722.27
1640.25					
11	0.12	231.27	4.65	4883.76	1786.83
1701.73					
11	0.12	231.27	4.65	4883.76	1786.83
1701.73					
12	0.12	235.93	4.65	5082.44	1851.39
1763.22					
12	0.12	235.93	4.65	5082.44	1851.39
1763.22					
13	0.12	240.57	4.65	5281.13	1915.94
1824.70					
13	0.12	240.57	4.65	5281.13	1915.94
1824.70					
14	0.12	245.38	4.95	5528.25	1996.24
1901.17					
14	0.12	245.38	4.95	5528.25	1996.24
1901.17					
15	0.12	250.32	4.95	5823.79	2092.26
1992.62					
15	0.12	250.32	4.95	5823.79	2092.26
1992.62					
16	0.12	255.28	4.95	6119.33	2188.29
2084.08					

16	0.12	255.28	4.95	6119.33	2188.29	2084.08
17	0.12	260.23	4.95	6414.88	2284.32	2175.53
17	0.12	260.23	4.95	6414.88	2284.32	2175.53
18	0.12	265.25	5.10	6713.40	2381.32	2267.91
18	0.12	265.25	5.10	6713.40	2381.32	2267.91
19	0.12	270.35	5.10	7014.90	2479.28	2361.21
19	0.12	270.35	5.10	7014.90	2479.28	2361.21
20	0.12	275.45	5.10	7316.40	2577.24	2454.50
20	0.12	275.45	5.10	7316.40	2577.24	2454.50
21	0.12	280.55	5.10	7617.90	2675.21	2547.80
21	0.12	280.55	5.10	7617.90	2675.21	2547.80
22	0.12	285.35	4.50	7865.22	2755.56	2624.33
22	0.12	285.35	4.50	7865.22	2755.56	2624.33
23	0.12	289.85	4.50	8058.36	2818.32	2684.10
23	0.12	289.85	4.50	8058.36	2818.32	2684.10
24	0.12	294.35	4.50	8251.49	2881.07	2743.86
24	0.12	294.35	4.50	8251.49	2881.07	2743.86
25	0.12	298.85	4.50	8444.63	2943.83	2803.63
25	0.12	298.85	4.50	8444.63	2943.83	2803.63
26	45.06	302.42	3.74	6169.98	2204.75	2099.75
26	45.06	302.42	3.74	6169.98	2204.75	2099.75
27	45.06	305.46	4.85	4476.09	3619.16	3446.80
27	45.06	305.46	4.85	4476.09	3619.16	3446.80
28	45.06	308.89	4.85	4320.41	3514.16	3346.80
28	45.06	308.89	4.85	4320.41	3514.16	3346.80

29	45.06	312.94	6.64	4156.24	3403.42
3241.33					
29	45.06	312.94	6.64	4156.24	3403.42
3241.33					
30	45.06	317.63	6.64	3983.55	3286.94
3130.40					
30	45.06	317.63	6.64	3983.55	3286.94
3130.40					
31	45.06	322.32	6.64	3810.87	3170.46
3019.47					
31	45.06	322.32	6.64	3810.87	3170.46
3019.47					
32	45.06	327.01	6.64	3638.19	3053.99
2908.54					
32	45.06	327.01	6.64	3638.19	3053.99
2908.54					
33	45.52	330.74	3.96	3470.08	2940.60
2800.55					
33	45.52	330.74	3.96	3470.08	2940.60
2800.55					
34	45.52	333.51	3.96	3365.50	2870.06
2733.37					
34	45.52	333.51	3.96	3365.50	2870.06
2733.37					
35	45.52	337.62	7.78	3132.24	2712.73
2583.53					
35	45.52	337.62	7.78	3132.24	2712.73
2583.53					
36	45.52	343.08	7.78	2770.32	2468.61
2351.04					
36	45.52	343.08	7.78	2770.32	2468.61
2351.04					
37	45.52	348.70	8.27	2382.15	2206.78
2101.68					
37	45.52	348.70	8.27	2382.15	2206.78
2101.68					
38	45.52	354.49	8.27	1967.71	1927.24
1835.46					
38	45.52	354.49	8.27	1967.71	1927.24
1835.46					
39	63.38	358.71	5.93	873.35	1189.08
1132.45					
39	63.38	358.71	5.93	873.35	1189.08
1132.45					
40	63.38	361.37	5.93	606.56	1009.13
961.07					
40	63.38	361.37	5.93	606.56	1009.13
961.07					
41	63.38	365.07	10.58	225.68	752.23
716.40					

41	63.38	365.07	10.58	225.68	752.23	716.40
42	63.38	369.81	10.58	247.49	166.93	158.98
42	63.38	369.81	10.58	247.49	166.93	158.98

Table 4 - Base Force Data on the 42 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-39.23	186.96	1.46	6350.56	2354.82	2242.67
1	-39.23	186.96	1.46	6350.56	2354.82	2242.67
2	0.12	189.40	3.74	11336.83	4430.70	4219.69
2	0.12	189.40	3.74	11336.83	4430.70	4219.69
3	0.12	193.13	3.74	11236.01	4397.94	4188.50
3	0.12	193.13	3.74	11236.01	4397.94	4188.50
4	0.12	197.50	5.00	15717.54	6106.94	5816.10
4	0.12	197.50	5.00	15717.54	6106.94	5816.10
5	0.12	202.50	5.00	17210.19	6591.93	6278.00
5	0.12	202.50	5.00	17210.19	6591.93	6278.00
6	0.12	207.50	5.00	18702.84	7076.92	6739.89
6	0.12	207.50	5.00	18702.84	7076.92	6739.89
7	0.12	212.50	5.00	20195.48	7561.91	7201.78
7	0.12	212.50	5.00	20195.48	7561.91	7201.78
8	0.12	217.32	4.65	19937.83	7408.19	7055.39
8	0.12	217.32	4.65	19937.83	7408.19	7055.39

9	0.12	221.98	4.65	50840.69	17449.14
16618.14					
9	0.12	221.98	4.65	50840.69	17449.14
16618.14					
10	0.12	226.62	4.65	21785.62	8008.58
7627.18					
10	0.12	226.62	4.65	21785.62	8008.58
7627.18					
11	0.12	231.27	4.65	22709.52	8308.77
7913.07					
11	0.12	231.27	4.65	22709.52	8308.77
7913.07					
12	0.12	235.93	4.65	23633.41	8608.96
8198.97					
12	0.12	235.93	4.65	23633.41	8608.96
8198.97					
13	0.12	240.57	4.65	24557.31	8909.16
8484.87					
13	0.12	240.57	4.65	24557.31	8909.16
8484.87					
14	0.12	245.38	4.95	27364.88	9881.39
9410.80					
14	0.12	245.38	4.95	27364.88	9881.39
9410.80					
15	0.12	250.32	4.95	28827.82	10356.73
9863.50					
15	0.12	250.32	4.95	28827.82	10356.73
9863.50					
16	0.12	255.28	4.95	30290.76	10832.07
10316.20					
16	0.12	255.28	4.95	30290.76	10832.07
10316.20					
17	0.12	260.23	4.95	31753.70	11307.41
10768.90					
17	0.12	260.23	4.95	31753.70	11307.41
10768.90					
18	0.12	265.25	5.10	34238.40	12144.73
11566.35					
18	0.12	265.25	5.10	34238.40	12144.73
11566.35					
19	0.12	270.35	5.10	35776.06	12644.35
12042.17					
19	0.12	270.35	5.10	35776.06	12644.35
12042.17					
20	0.12	275.45	5.10	37313.72	13143.97
12518.00					
20	0.12	275.45	5.10	37313.72	13143.97
12518.00					
21	0.12	280.55	5.10	38851.38	13643.58
12993.82					

21	0.12	280.55	5.10	38851.38	13643.58	12993.82
22	0.12	285.35	4.50	35395.08	12400.60	11810.03
22	0.12	285.35	4.50	35395.08	12400.60	11810.03
23	0.12	289.85	4.50	36264.24	12683.01	12078.99
23	0.12	289.85	4.50	36264.24	12683.01	12078.99
24	0.12	294.35	4.50	37133.39	12965.41	12347.94
24	0.12	294.35	4.50	37133.39	12965.41	12347.94
25	0.12	298.85	4.50	38002.55	13247.82	12616.90
25	0.12	298.85	4.50	38002.55	13247.82	12616.90
26	45.06	302.42	3.74	23100.16	8254.49	7861.38
26	45.06	302.42	3.74	23100.16	8254.49	7861.38
27	45.06	305.46	4.85	21717.36	17559.66	16723.40
27	45.06	305.46	4.85	21717.36	17559.66	16723.40
28	45.06	308.89	4.85	20962.06	17050.21	16238.20
28	45.06	308.89	4.85	20962.06	17050.21	16238.20
29	45.06	312.94	6.64	27589.42	22592.14	21516.21
29	45.06	312.94	6.64	27589.42	22592.14	21516.21
30	45.06	317.63	6.64	26443.13	21818.96	20779.85
30	45.06	317.63	6.64	26443.13	21818.96	20779.85
31	45.06	322.32	6.64	25296.84	21045.78	20043.49
31	45.06	322.32	6.64	25296.84	21045.78	20043.49
32	45.06	327.01	6.64	24150.56	20272.60	19307.14
32	45.06	327.01	6.64	24150.56	20272.60	19307.14
33	45.52	330.74	3.96	13728.51	11633.75	11079.71
33	45.52	330.74	3.96	13728.51	11633.75	11079.71

34	45.52	333.51	3.96	13314.76	11354.67
10813.92					
34	45.52	333.51	3.96	13314.76	11354.67
10813.92					
35	45.52	337.62	7.78	24364.23	21101.00
20096.08					
35	45.52	337.62	7.78	24364.23	21101.00
20096.08					
36	45.52	343.08	7.78	21549.03	19202.12
18287.64					
36	45.52	343.08	7.78	21549.03	19202.12
18287.64					
37	45.52	348.70	8.27	19688.98	18239.52
17370.88					
37	45.52	348.70	8.27	19688.98	18239.52
17370.88					
38	45.52	354.49	8.27	16263.60	15929.07
15170.46					
38	45.52	354.49	8.27	16263.60	15929.07
15170.46					
39	63.38	358.71	5.93	5182.74	7056.41
6720.36					
39	63.38	358.71	5.93	5182.74	7056.41
6720.36					
40	63.38	361.37	5.93	3599.55	5988.53
5703.33					
40	63.38	361.37	5.93	3599.55	5988.53
5703.33					
41	63.38	365.07	10.58	2387.89	7959.07
7580.03					
41	63.38	365.07	10.58	2387.89	7959.07
7580.03					
42	63.38	369.81	10.58	2618.57	1766.25
1682.13					
42	63.38	369.81	10.58	2618.57	1766.25
1682.13					

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 42 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
9	51961.5	30000.0	60000.0	30.00	-0.455807E+05

Sum of the Resisting Forces = 411258.18 (lbs)

Average Available Shear Strength = 1803.29(psf)

Sum of the Driving Forces = 423432.20 (lbs)

Average Mobilized Shear Stress = 1856.67(psf)

Total length of the failure surface = 228.06(ft)

Factor of Safety Balance Check: FS = 0.97125

Janbu's Correction Factor (fo) = 1.0777

Janub's FS Corrected = 1.04669

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.28253(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 1319.722(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Rotational (Static)

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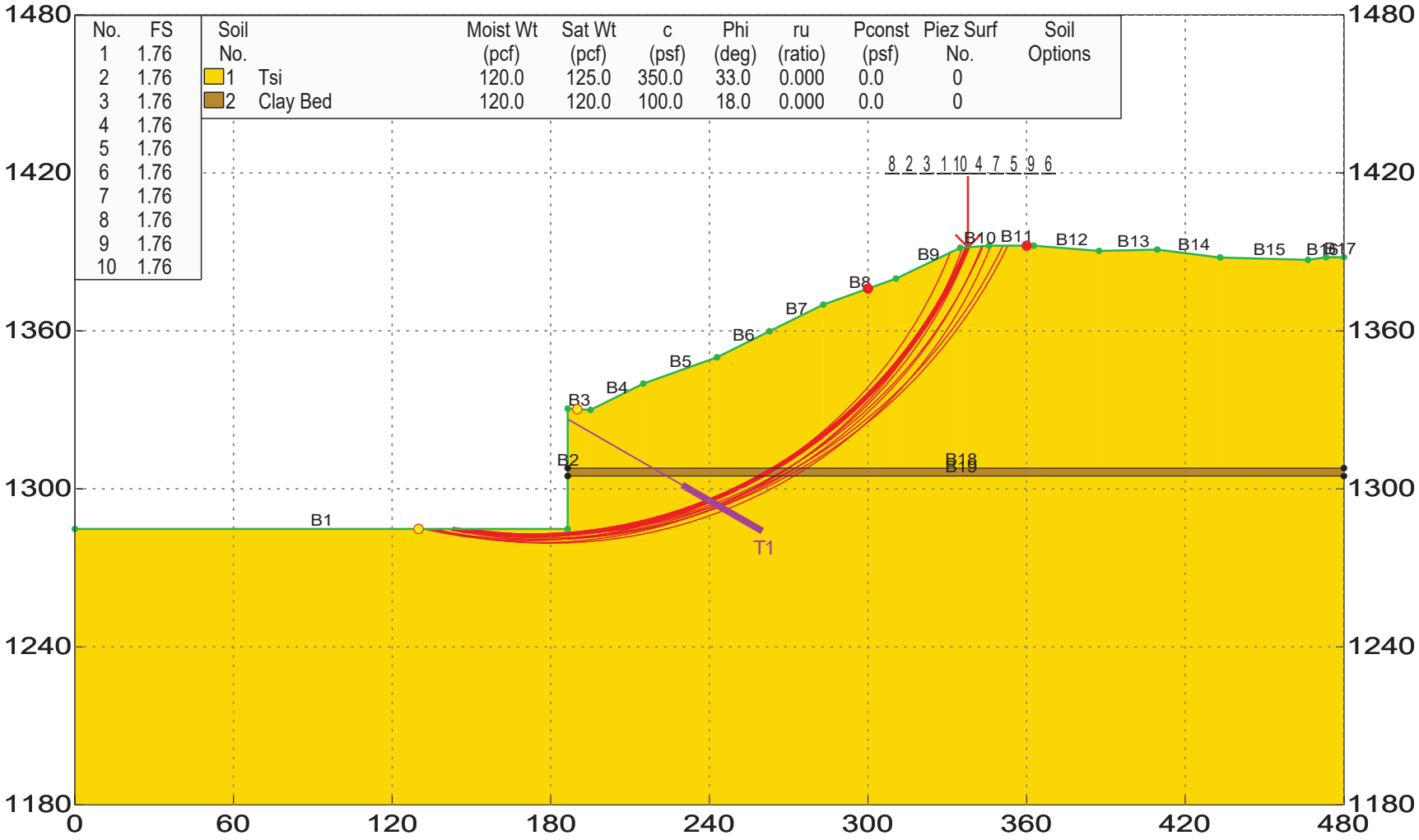
\Section B - Static - Rotational - Tieback.gsd



GEOSTASE FS = 1.76

Simplified Bishop Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Rotational - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Static - Rotational - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Rotational (Static)

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface No.	Water Option
1 Tsi	120.0	125.0	350.00	33.00	0.000	0.0	0
2 Clay Bed	120.0	120.0	100.00	18.00	0.000	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 130.00(ft)
and X = 190.00(ft)

Each Surface Enters within a Range Between X = 300.00(ft)
and X = 360.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1180.00(ft)

Specified Maximum Radius = 10000.000(ft)

3.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 3.252 FS Min = 1.756 FS Ave = 2.115
Standard Deviation = 0.299 Coefficient of Variation = 14.15 %

Critical Surface is Sequence Number 215 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 172.573835(ft) ; Y = 1461.728997(ft); and Radius = 179.407934(ft)

Circular Trial Failure Surface Generated With 81 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	142.853	1284.800
2	145.815	1284.328
3	148.786	1283.905
4	151.762	1283.532
5	154.745	1283.209
6	157.732	1282.936
7	160.724	1282.713
8	163.719	1282.540
9	166.717	1282.417
10	169.716	1282.344
11	172.716	1282.321
12	175.715	1282.349
13	178.714	1282.426
14	181.712	1282.554
15	184.706	1282.732
16	187.698	1282.960
17	190.685	1283.238
18	193.667	1283.565
19	196.643	1283.943
20	199.612	1284.370
21	202.574	1284.847
22	205.528	1285.374
23	208.472	1285.949
24	211.406	1286.574
25	214.330	1287.248
26	217.241	1287.970
27	220.140	1288.742
28	223.026	1289.561
29	225.898	1290.429
30	228.755	1291.344
31	231.596	1292.308
32	234.421	1293.318

33	237.228	1294.376
34	240.017	1295.480
35	242.788	1296.631
36	245.539	1297.829
37	248.269	1299.072
38	250.978	1300.360
39	253.666	1301.694
40	256.330	1303.072
41	258.971	1304.495
42	261.588	1305.961
43	264.181	1307.471
44	266.747	1309.025
45	269.287	1310.621
46	271.801	1312.259
47	274.286	1313.939
48	276.743	1315.661
49	279.171	1317.423
50	281.569	1319.225
51	283.936	1321.068
52	286.273	1322.950
53	288.578	1324.870
54	290.850	1326.829
55	293.089	1328.826
56	295.294	1330.859
57	297.465	1332.930
58	299.602	1335.036
59	301.702	1337.178
60	303.767	1339.354
61	305.795	1341.565
62	307.785	1343.809
63	309.738	1346.087
64	311.653	1348.397
65	313.528	1350.738
66	315.365	1353.110
67	317.161	1355.513
68	318.917	1357.946
69	320.632	1360.407
70	322.305	1362.897
71	323.937	1365.415
72	325.526	1367.959
73	327.073	1370.530
74	328.576	1373.126
75	330.036	1375.747
76	331.451	1378.392
77	332.823	1381.060
78	334.149	1383.751
79	335.430	1386.463
80	336.666	1389.197
81	337.796	1391.813

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	240.08	1295.51

Factor Of Safety For The Critical or Specified Surface = 1.756

Table 1 - Geometry Data on the 90 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.96	0.24	144.33	1284.56	1284.80	-9.06	0.00	3.00
2	2.97	0.68	147.30	1284.12	1284.80	-8.10	0.00	3.00
3	2.98	1.08	150.27	1283.72	1284.80	-7.14	0.00	3.00
4	2.98	1.43	153.25	1283.37	1284.80	-6.18	0.00	3.00
5	2.99	1.73	156.24	1283.07	1284.80	-5.22	0.00	3.00
6	2.99	1.98	159.23	1282.82	1284.80	-4.27	0.00	3.00
7	3.00	2.17	162.22	1282.63	1284.80	-3.31	0.00	3.00
8	3.00	2.32	165.22	1282.48	1284.80	-2.35	0.00	3.00
9	3.00	2.42	168.22	1282.38	1284.80	-1.39	0.00	3.00
10	3.00	2.47	171.22	1282.33	1284.80	-0.43	0.00	3.00
11	3.00	2.47	174.22	1282.33	1284.80	0.52	0.00	3.00
12	3.00	2.41	177.21	1282.39	1284.80	1.48	0.00	3.00
13	3.00	2.31	180.21	1282.49	1284.80	2.44	0.00	3.00
14	2.99	2.16	183.21	1282.64	1284.80	3.40	0.00	3.00
15	1.69	2.00	185.55	1282.80	1284.80	4.36	0.00	1.70
16	1.30	47.55	187.05	1282.91	1330.46	4.36	-3.33	

1.30
17 2.99 47.24 189.19 1283.10 1330.34 5.31 -3.33
3.00
18 2.98 46.76 192.18 1283.40 1330.16 6.27 -3.33
3.00
19 1.33 46.39 194.33 1283.65 1330.04 7.23 -3.33
1.34
20 1.64 46.57 195.82 1283.84 1330.41 7.23 26.57
1.66
21 2.97 47.41 198.13 1284.16 1331.56 8.19 26.57
3.00
22 2.96 48.44 201.09 1284.61 1333.05 9.15 26.57
3.00
23 2.95 49.42 204.05 1285.11 1334.53 10.11 26.57
3.00
24 2.94 50.34 207.00 1285.66 1336.00 11.06 26.57
3.00
25 2.93 51.21 209.94 1286.26 1337.47 12.02 26.57
3.00
26 2.92 52.02 212.87 1286.91 1338.93 12.98 26.57
3.00
27 0.67 52.50 214.66 1287.33 1339.83 13.94 26.57
0.69
28 2.24 52.71 216.12 1287.69 1340.40 13.94 19.72
2.31
29 2.90 52.97 218.69 1288.36 1341.32 14.90 19.72
3.00
30 2.89 53.21 221.58 1289.15 1342.36 15.85 19.72
3.00
31 2.87 53.40 224.46 1290.00 1343.39 16.81 19.72
3.00
32 2.86 53.53 227.33 1290.89 1344.42 17.77 19.72
3.00
33 2.84 53.61 230.18 1291.83 1345.44 18.73 19.72
3.00
34 2.82 53.64 233.01 1292.81 1346.45 19.69 19.72
3.00
35 2.81 53.62 235.82 1293.85 1347.46 20.64 19.72
3.00
36 2.79 53.54 238.62 1294.93 1348.47 21.60 19.72
3.00
37 2.77 53.41 241.40 1296.06 1349.46 22.56 19.72
3.00
38 0.11 53.32 242.84 1296.66 1349.98 23.52 19.72
0.12
39 2.64 53.41 244.22 1297.25 1350.66 23.52 26.57
2.88
40 2.73 53.55 246.90 1298.45 1352.00 24.48 26.57
3.00
41 2.71 53.65 249.62 1299.72 1353.36 25.43 26.57

3.00
42 2.69 53.68 252.32 1301.03 1354.71 26.39 26.57
3.00
43 2.66 53.67 255.00 1302.38 1356.05 27.35 26.57
3.00
44 2.64 53.59 257.65 1303.78 1357.38 28.31 26.57
3.00
45 0.72 53.52 259.33 1304.70 1358.22 29.27 26.57
0.83
46 1.89 53.44 260.64 1305.43 1358.87 29.27 26.57
2.17
47 1.11 53.34 262.14 1306.29 1359.62 30.23 26.57
1.29
48 1.48 53.23 263.44 1307.04 1360.27 30.23 26.34
1.71
49 0.71 53.12 264.53 1307.69 1360.81 31.18 26.34
0.83
50 1.86 52.98 265.82 1308.46 1361.44 31.18 26.34
2.17
51 2.54 52.71 268.02 1309.82 1362.53 32.14 26.34
3.00
52 2.51 52.34 270.54 1311.44 1363.78 33.10 26.34
3.00
53 2.49 51.92 273.04 1313.10 1365.02 34.06 26.34
3.00
54 2.46 51.44 275.51 1314.80 1366.24 35.02 26.34
3.00
55 2.43 50.91 277.96 1316.54 1367.45 35.97 26.34
3.00
56 2.40 50.32 280.37 1318.32 1368.65 36.93 26.34
3.00
57 1.53 49.80 282.33 1319.82 1369.62 37.89 26.34
1.94
58 0.84 49.41 283.52 1320.74 1370.15 37.89 19.80
1.06
59 2.34 48.71 285.10 1322.01 1370.72 38.85 19.80
3.00
60 2.30 47.65 287.43 1323.91 1371.56 39.81 19.80
3.00
61 2.27 46.53 289.71 1325.85 1372.38 40.76 19.80
3.00
62 2.24 45.37 291.97 1327.83 1373.19 41.72 19.80
3.00
63 2.21 44.15 294.19 1329.84 1373.99 42.68 19.80
3.00
64 2.17 42.89 296.38 1331.89 1374.78 43.64 19.80
3.00
65 2.14 41.57 298.53 1333.98 1375.56 44.60 19.80
3.00
66 2.10 40.21 300.65 1336.11 1376.32 45.55 19.80

3.00
67 2.06 38.80 302.73 1338.27 1377.07 46.51 19.80
3.00
68 2.03 37.35 304.78 1340.46 1377.81 47.47 19.80
3.00
69 1.99 35.84 306.79 1342.69 1378.53 48.43 19.80
3.00
70 1.95 34.29 308.76 1344.95 1379.24 49.39 19.80
3.00
71 0.86 33.14 310.17 1346.61 1379.74 50.35 19.80
1.35
72 1.05 32.39 311.13 1347.76 1380.15 50.35 25.71
1.65
73 1.88 31.29 312.59 1349.57 1380.86 51.30 25.71
3.00
74 1.84 29.83 314.45 1351.92 1381.75 52.26 25.71
3.00
75 1.80 28.31 316.26 1354.31 1382.63 53.22 25.71
3.00
76 1.76 26.75 318.04 1356.73 1383.48 54.18 25.71
3.00
77 1.71 25.14 319.77 1359.18 1384.32 55.14 25.71
3.00
78 1.67 23.48 321.47 1361.65 1385.13 56.09 25.71
3.00
79 1.63 21.77 323.12 1364.16 1385.93 57.05 25.71
3.00
80 1.59 20.02 324.73 1366.69 1386.70 58.01 25.71
3.00
81 1.55 18.21 326.30 1369.24 1387.46 58.97 25.71
3.00
82 1.50 16.37 327.82 1371.83 1388.19 59.93 25.71
3.00
83 1.46 14.47 329.31 1374.44 1388.91 60.88 25.71
3.00
84 1.42 12.53 330.74 1377.07 1389.60 61.84 25.71
3.00
85 1.37 10.54 332.14 1379.73 1390.27 62.80 25.71
3.00
86 1.33 8.51 333.49 1382.41 1390.92 63.76 25.71
3.00
87 0.75 6.87 334.52 1384.55 1391.42 64.72 25.71
1.76
88 0.53 5.72 335.17 1385.90 1391.62 64.72 4.20
1.24
89 1.24 3.85 336.05 1387.83 1391.68 65.67 4.20
3.00
90 1.13 1.27 337.23 1390.50 1391.77 66.63 4.20
2.85

Table 2 - Force Data On The 90 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	83.9	0.0	0.0	0.0	0.0	0.0
2	243.6	0.0	0.0	0.0	0.0	0.0
3	386.3	0.0	0.0	0.0	0.0	0.0
4	511.6	0.0	0.0	0.0	0.0	0.0
5	619.3	0.0	0.0	0.0	0.0	0.0
6	709.2	0.0	0.0	0.0	0.0	0.0
7	781.2	0.0	0.0	0.0	0.0	0.0
8	835.1	0.0	0.0	0.0	0.0	0.0
9	870.8	0.0	0.0	0.0	0.0	0.0
10	888.3	0.0	0.0	0.0	0.0	0.0
11	887.4	0.0	0.0	0.0	0.0	0.0
12	868.3	0.0	0.0	0.0	0.0	0.0
13	830.8	0.0	0.0	0.0	0.0	0.0
14	775.2	0.0	0.0	0.0	0.0	0.0
15	407.2	0.0	0.0	0.0	0.0	0.0
16	7405.3	0.0	0.0	0.0	0.0	0.0
17	16933.0	0.0	0.0	0.0	0.0	0.0
18	16733.8	0.0	0.0	0.0	0.0	0.0
19	7420.9	0.0	0.0	0.0	0.0	0.0
20	9182.4	0.0	0.0	0.0	0.0	0.0
21	16892.6	0.0	0.0	0.0	0.0	0.0
22	17215.9	0.0	0.0	0.0	0.0	0.0
23	17513.5	0.0	0.0	0.0	0.0	0.0
24	17785.1	0.0	0.0	0.0	0.0	0.0
25	18030.6	0.0	0.0	0.0	0.0	0.0
26	18249.8	0.0	0.0	0.0	0.0	0.0
27	4223.8	0.0	0.0	0.0	0.0	0.0
28	14176.1	0.0	0.0	0.0	0.0	0.0
29	18427.3	0.0	0.0	0.0	0.0	0.0
30	18426.3	0.0	0.0	0.0	0.0	0.0
31	18401.1	0.0	0.0	0.0	0.0	0.0
32	18351.9	0.0	0.0	0.0	0.0	0.0
33	18278.8	0.0	0.0	0.0	0.0	0.0
34	18182.3	0.0	0.0	0.0	0.0	0.0
35	18062.6	0.0	0.0	0.0	0.0	0.0
36	17920.2	0.0	0.0	0.0	0.0	0.0
37	17755.3	0.0	0.0	0.0	0.0	0.0
38	717.6	0.0	0.0	0.0	0.0	0.0
39	16910.1	0.0	0.0	0.0	0.0	0.0
40	17546.1	0.0	0.0	0.0	0.0	0.0
41	17440.7	0.0	0.0	0.0	0.0	0.0

42	17311.9	0.0	0.0	0.0	0.0	0.0
43	17160.1	0.0	0.0	0.0	0.0	0.0
44	16985.8	0.0	0.0	0.0	0.0	0.0
45	4646.2	0.0	0.0	0.0	0.0	0.0
46	12143.3	0.0	0.0	0.0	0.0	0.0
47	7114.4	0.0	0.0	0.0	0.0	0.0
48	9457.0	0.0	0.0	0.0	0.0	0.0
49	4514.3	0.0	0.0	0.0	0.0	0.0
50	11815.2	0.0	0.0	0.0	0.0	0.0
51	16067.3	0.0	0.0	0.0	0.0	0.0
52	15785.8	0.0	0.0	0.0	0.0	0.0
53	15485.8	0.0	0.0	0.0	0.0	0.0
54	15167.8	0.0	0.0	0.0	0.0	0.0
55	14832.9	0.0	0.0	0.0	0.0	0.0
56	14481.6	0.0	0.0	0.0	0.0	0.0
57	9150.0	0.0	0.0	0.0	0.0	0.0
58	4959.3	0.0	0.0	0.0	0.0	0.0
59	13657.8	0.0	0.0	0.0	0.0	0.0
60	13177.2	0.0	0.0	0.0	0.0	0.0
61	12687.5	0.0	0.0	0.0	0.0	0.0
62	12189.6	0.0	0.0	0.0	0.0	0.0
63	11684.6	0.0	0.0	0.0	0.0	0.0
64	11173.4	0.0	0.0	0.0	0.0	0.0
65	10657.1	0.0	0.0	0.0	0.0	0.0
66	10136.7	0.0	0.0	0.0	0.0	0.0
67	9613.3	0.0	0.0	0.0	0.0	0.0
68	9087.9	0.0	0.0	0.0	0.0	0.0
69	8561.7	0.0	0.0	0.0	0.0	0.0
70	8035.6	0.0	0.0	0.0	0.0	0.0
71	3426.6	0.0	0.0	0.0	0.0	0.0
72	4092.3	0.0	0.0	0.0	0.0	0.0
73	7042.8	0.0	0.0	0.0	0.0	0.0
74	6572.3	0.0	0.0	0.0	0.0	0.0
75	6103.3	0.0	0.0	0.0	0.0	0.0
76	5636.7	0.0	0.0	0.0	0.0	0.0
77	5173.7	0.0	0.0	0.0	0.0	0.0
78	4715.4	0.0	0.0	0.0	0.0	0.0
79	4263.1	0.0	0.0	0.0	0.0	0.0
80	3817.7	0.0	0.0	0.0	0.0	0.0
81	3380.4	0.0	0.0	0.0	0.0	0.0
82	2952.4	0.0	0.0	0.0	0.0	0.0
83	2534.7	0.0	0.0	0.0	0.0	0.0
84	2128.6	0.0	0.0	0.0	0.0	0.0
85	1735.1	0.0	0.0	0.0	0.0	0.0
86	1355.2	0.0	0.0	0.0	0.0	0.0
87	619.3	0.0	0.0	0.0	0.0	0.0
88	364.0	0.0	0.0	0.0	0.0	0.0
89	571.5	0.0	0.0	0.0	0.0	0.0
90	171.7	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 812279.25(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 812279.25(lbs)

TOTAL AREA OF SLIDING MASS = 6768.99(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 90 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	350.00	33.00	
2	1	350.00	33.00	
3	1	350.00	33.00	
4	1	350.00	33.00	
5	1	350.00	33.00	
6	1	350.00	33.00	
7	1	350.00	33.00	
8	1	350.00	33.00	
9	1	350.00	33.00	
10	1	350.00	33.00	
11	1	350.00	33.00	
12	1	350.00	33.00	
13	1	350.00	33.00	
14	1	350.00	33.00	
15	1	350.00	33.00	
16	1	350.00	33.00	
17	1	350.00	33.00	
18	1	350.00	33.00	
19	1	350.00	33.00	
20	1	350.00	33.00	
21	1	350.00	33.00	
22	1	350.00	33.00	
23	1	350.00	33.00	
24	1	350.00	33.00	
25	1	350.00	33.00	
26	1	350.00	33.00	
27	1	350.00	33.00	
28	1	350.00	33.00	
29	1	350.00	33.00	
30	1	350.00	33.00	
31	1	350.00	33.00	
32	1	350.00	33.00	
33	1	350.00	33.00	
34	1	350.00	33.00	
35	1	350.00	33.00	
36	1	350.00	33.00	
37	1	350.00	33.00	
38	1	350.00	33.00	
39	1	350.00	33.00	

40	1	350.00	33.00
41	1	350.00	33.00
42	1	350.00	33.00
43	1	350.00	33.00
44	1	350.00	33.00
45	1	350.00	33.00
46	2	100.00	18.00
47	2	100.00	18.00
48	2	100.00	18.00
49	2	100.00	18.00
50	1	350.00	33.00
51	1	350.00	33.00
52	1	350.00	33.00
53	1	350.00	33.00
54	1	350.00	33.00
55	1	350.00	33.00
56	1	350.00	33.00
57	1	350.00	33.00
58	1	350.00	33.00
59	1	350.00	33.00
60	1	350.00	33.00
61	1	350.00	33.00
62	1	350.00	33.00
63	1	350.00	33.00
64	1	350.00	33.00
65	1	350.00	33.00
66	1	350.00	33.00
67	1	350.00	33.00
68	1	350.00	33.00
69	1	350.00	33.00
70	1	350.00	33.00
71	1	350.00	33.00
72	1	350.00	33.00
73	1	350.00	33.00
74	1	350.00	33.00
75	1	350.00	33.00
76	1	350.00	33.00
77	1	350.00	33.00
78	1	350.00	33.00
79	1	350.00	33.00
80	1	350.00	33.00
81	1	350.00	33.00
82	1	350.00	33.00
83	1	350.00	33.00
84	1	350.00	33.00
85	1	350.00	33.00
86	1	350.00	33.00
87	1	350.00	33.00
88	1	350.00	33.00
89	1	350.00	33.00

90 1 350.00 33.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 90 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-9.06	144.33	3.00	63.87	391.48	222.91
1	-9.06	144.33	3.00	63.87	391.48	222.91
2	-8.10	147.30	3.00	116.52	425.67	242.38
2	-8.10	147.30	3.00	116.52	425.67	242.38
3	-7.14	150.27	3.00	162.24	455.36	259.29
3	-7.14	150.27	3.00	162.24	455.36	259.29
4	-6.18	153.25	3.00	201.17	480.64	273.68
4	-6.18	153.25	3.00	201.17	480.64	273.68
5	-5.22	156.24	3.00	233.41	501.58	285.61
5	-5.22	156.24	3.00	233.41	501.58	285.61
6	-4.27	159.23	3.00	259.09	518.25	295.10
6	-4.27	159.23	3.00	259.09	518.25	295.10
7	-3.31	162.22	3.00	278.32	530.74	302.21
7	-3.31	162.22	3.00	278.32	530.74	302.21
8	-2.35	165.22	3.00	291.21	539.12	306.98
8	-2.35	165.22	3.00	291.21	539.12	

306.98
9 -1.39 168.22 3.00 297.89 543.45
309.45
9 -1.39 168.22 3.00 297.89 543.45
309.45
10 -0.43 171.22 3.00 298.45 543.81
309.66
10 -0.43 171.22 3.00 298.45 543.81
309.66
11 0.52 174.22 3.00 293.00 540.28
307.64
11 0.52 174.22 3.00 293.00 540.28
307.64
12 1.48 177.21 3.00 281.66 532.91
303.45
12 1.48 177.21 3.00 281.66 532.91
303.45
13 2.44 180.21 3.00 264.53 521.79
297.11
13 2.44 180.21 3.00 264.53 521.79
297.11
14 3.40 183.21 3.00 241.71 506.97
288.68
14 3.40 183.21 3.00 241.71 506.97
288.68
15 4.36 185.55 1.70 219.09 492.28
280.31
15 4.36 185.55 1.70 219.09 492.28
280.31
16 4.36 187.05 1.30 5535.11 3944.54
2246.08
16 4.36 187.05 1.30 5535.11 3944.54
2246.08
17 5.31 189.19 3.00 5462.23 3897.21
2219.14
17 5.31 189.19 3.00 5462.23 3897.21
2219.14
18 6.27 192.18 3.00 5371.27 3838.14
2185.50
18 6.27 192.18 3.00 5371.27 3838.14
2185.50
19 7.23 194.33 1.34 5293.01 3787.32
2156.56
19 7.23 194.33 1.34 5293.01 3787.32
2156.56
20 7.23 195.82 1.66 5314.01 3800.96
2164.33
20 7.23 195.82 1.66 5314.01 3800.96
2164.33
21 8.19 198.13 3.00 5374.18 3840.03

2186.57					
21	8.19	198.13	3.00	5374.18	3840.03
2186.57					
22	9.15	201.09	3.00	5455.59	3892.90
2216.68					
22	9.15	201.09	3.00	5455.59	3892.90
2216.68					
23	10.11	204.05	3.00	5529.83	3941.11
2244.13					
23	10.11	204.05	3.00	5529.83	3941.11
2244.13					
24	11.06	207.00	3.00	5596.94	3984.69
2268.95					
24	11.06	207.00	3.00	5596.94	3984.69
2268.95					
25	12.02	209.94	3.00	5657.00	4023.70
2291.16					
25	12.02	209.94	3.00	5657.00	4023.70
2291.16					
26	12.98	212.87	3.00	5710.09	4058.17
2310.79					
26	12.98	212.87	3.00	5710.09	4058.17
2310.79					
27	13.94	214.66	0.69	5725.24	4068.01
2316.39					
27	13.94	214.66	0.69	5725.24	4068.01
2316.39					
28	13.94	216.12	2.31	5748.10	4082.86
2324.84					
28	13.94	216.12	2.31	5748.10	4082.86
2324.84					
29	14.90	218.69	3.00	5738.49	4076.62
2321.29					
29	14.90	218.69	3.00	5738.49	4076.62
2321.29					
30	15.85	221.58	3.00	5726.92	4069.11
2317.01					
30	15.85	221.58	3.00	5726.92	4069.11
2317.01					
31	16.81	224.46	3.00	5709.39	4057.72
2310.53					
31	16.81	224.46	3.00	5709.39	4057.72
2310.53					
32	17.77	227.33	3.00	5685.98	4042.52
2301.87					
32	17.77	227.33	3.00	5685.98	4042.52
2301.87					
33	18.73	230.18	3.00	5656.77	4023.55
2291.07					
33	18.73	230.18	3.00	5656.77	4023.55

2291.07					
34	19.69	233.01	3.00	5621.84	4000.86
2278.15					
34	19.69	233.01	3.00	5621.84	4000.86
2278.15					
35	20.64	235.82	3.00	5581.27	3974.52
2263.15					
35	20.64	235.82	3.00	5581.27	3974.52
2263.15					
36	21.60	238.62	3.00	5535.15	3944.57
2246.10					
36	21.60	238.62	3.00	5535.15	3944.57
2246.10					
37	22.56	241.40	3.00	11655.62	7919.25
4509.34					
37	22.56	241.40	3.00	11655.62	7919.25
4509.34					
38	23.52	242.84	0.12	5437.07	3880.88
2209.83					
38	23.52	242.84	0.12	5437.07	3880.88
2209.83					
39	23.52	244.22	2.88	5445.47	3886.33
2212.94					
39	23.52	244.22	2.88	5445.47	3886.33
2212.94					
40	24.48	246.90	3.00	5422.57	3871.46
2204.47					
40	24.48	246.90	3.00	5422.57	3871.46
2204.47					
41	25.43	249.62	3.00	5394.04	3852.93
2193.92					
41	25.43	249.62	3.00	5394.04	3852.93
2193.92					
42	26.39	252.32	3.00	5359.58	3830.55
2181.18					
42	26.39	252.32	3.00	5359.58	3830.55
2181.18					
43	27.35	255.00	3.00	5319.29	3804.39
2166.28					
43	27.35	255.00	3.00	5319.29	3804.39
2166.28					
44	28.31	257.65	3.00	5273.25	3774.49
2149.25					
44	28.31	257.65	3.00	5273.25	3774.49
2149.25					
45	29.27	259.33	0.83	5227.24	3744.61
2132.24					
45	29.27	259.33	0.83	5227.24	3744.61
2132.24					
46	29.27	260.64	2.17	5781.40	1978.49

1126.58

46	29.27	260.64	2.17	5781.40	1978.49

1126.58

47	30.23	262.14	1.29	5747.67	1967.53

1120.34

47	30.23	262.14	1.29	5747.67	1967.53

1120.34

48	30.23	263.44	1.71	5735.68	1963.64

1118.13

48	30.23	263.44	1.71	5735.68	1963.64

1118.13

49	31.18	264.53	0.83	5701.74	1952.61

1111.84

49	31.18	264.53	0.83	5701.74	1952.61

1111.84

50	31.18	265.82	2.17	5096.43	3659.66

2083.87

50	31.18	265.82	2.17	5096.43	3659.66

2083.87

51	32.14	268.02	3.00	5030.95	3617.14

2059.66

51	32.14	268.02	3.00	5030.95	3617.14

2059.66

52	33.10	270.54	3.00	4956.42	3568.74

2032.09

52	33.10	270.54	3.00	4956.42	3568.74

2032.09

53	34.06	273.04	3.00	4876.76	3517.00

2002.64

53	34.06	273.04	3.00	4876.76	3517.00

2002.64

54	35.02	275.51	3.00	4792.07	3462.01

1971.32

54	35.02	275.51	3.00	4792.07	3462.01

1971.32

55	35.97	277.96	3.00	4702.48	3403.82

1938.19

55	35.97	277.96	3.00	4702.48	3403.82

1938.19

56	36.93	280.37	3.00	4608.08	3342.52

1903.29

56	36.93	280.37	3.00	4608.08	3342.52

1903.29

57	37.89	282.33	1.94	4520.04	3285.35

1870.73

57	37.89	282.33	1.94	4520.04	3285.35

1870.73

58	37.89	283.52	1.06	4483.55	3261.65

1857.23

58	37.89	283.52	1.06	4483.55	3261.65

1857.23					
59	38.85	285.10	3.00	4380.33	3194.62
1819.07					
59	38.85	285.10	3.00	4380.33	3194.62
1819.07					
60	39.81	287.43	3.00	4243.70	3105.89
1768.54					
60	39.81	287.43	3.00	4243.70	3105.89
1768.54					
61	40.76	289.71	3.00	4103.63	3014.93
1716.75					
61	40.76	289.71	3.00	4103.63	3014.93
1716.75					
62	41.72	291.97	3.00	3960.24	2921.81
1663.73					
62	41.72	291.97	3.00	3960.24	2921.81
1663.73					
63	42.68	294.19	3.00	3813.70	2826.64
1609.54					
63	42.68	294.19	3.00	3813.70	2826.64
1609.54					
64	43.64	296.38	3.00	3664.14	2729.52
1554.23					
64	43.64	296.38	3.00	3664.14	2729.52
1554.23					
65	44.60	298.53	3.00	3511.72	2630.54
1497.87					
65	44.60	298.53	3.00	3511.72	2630.54
1497.87					
66	45.55	300.65	3.00	3356.61	2529.81
1440.51					
66	45.55	300.65	3.00	3356.61	2529.81
1440.51					
67	46.51	302.73	3.00	3198.95	2427.42
1382.21					
67	46.51	302.73	3.00	3198.95	2427.42
1382.21					
68	47.47	304.78	3.00	3038.93	2323.51
1323.04					
68	47.47	304.78	3.00	3038.93	2323.51
1323.04					
69	48.43	306.79	3.00	2876.73	2218.17
1263.06					
69	48.43	306.79	3.00	2876.73	2218.17
1263.06					
70	49.39	308.76	3.00	2712.52	2111.53
1202.34					
70	49.39	308.76	3.00	2712.52	2111.53
1202.34					
71	50.35	310.17	1.35	2583.47	2027.73

1154.62					
71	50.35	310.17	1.35	2583.47	2027.73
1154.62					
72	50.35	311.13	1.65	2521.55	1987.51
1131.72					
72	50.35	311.13	1.65	2521.55	1987.51
1131.72					
73	51.30	312.59	3.00	2398.72	1907.75
1086.30					
73	51.30	312.59	3.00	2398.72	1907.75
1086.30					
74	52.26	314.45	3.00	2247.78	1809.72
1030.48					
74	52.26	314.45	3.00	2247.78	1809.72
1030.48					
75	53.22	316.26	3.00	2094.84	1710.40
973.93					
75	53.22	316.26	3.00	2094.84	1710.40
973.93					
76	54.18	318.04	3.00	1940.12	1609.93
916.72					
76	54.18	318.04	3.00	1940.12	1609.93
916.72					
77	55.14	319.77	3.00	1783.87	1508.46
858.94					
77	55.14	319.77	3.00	1783.87	1508.46
858.94					
78	56.09	321.47	3.00	1626.32	1406.14
800.68					
78	56.09	321.47	3.00	1626.32	1406.14
800.68					
79	57.05	323.12	3.00	1467.72	1303.15
742.03					
79	57.05	323.12	3.00	1467.72	1303.15
742.03					
80	58.01	324.73	3.00	1308.35	1199.65
683.10					
80	58.01	324.73	3.00	1308.35	1199.65
683.10					
81	58.97	326.30	3.00	1148.48	1095.83
623.99					
81	58.97	326.30	3.00	1148.48	1095.83
623.99					
82	59.93	327.82	3.00	988.42	991.89
564.80					
82	59.93	327.82	3.00	988.42	991.89
564.80					
83	60.88	329.31	3.00	828.47	888.01
505.65					
83	60.88	329.31	3.00	828.47	888.01

505.65
  84 61.84 330.74 3.00 668.96 784.43
446.67
  84 61.84 330.74 3.00 668.96 784.43
446.67
  85 62.80 332.14 3.00 510.26 681.37
387.98
  85 62.80 332.14 3.00 510.26 681.37
387.98
  86 63.76 333.49 3.00 352.73 579.07
329.73
  86 63.76 333.49 3.00 352.73 579.07
329.73
  87 64.72 334.52 1.76 225.97 496.74
282.85
  87 64.72 334.52 1.76 225.97 496.74
282.85
  88 64.72 335.17 1.24 148.16 446.21
254.08
  88 64.72 335.17 1.24 148.16 446.21
254.08
  89 65.67 336.05 3.00 254.39 165.20
94.07
  89 65.67 336.05 3.00 254.39 165.20
94.07
  90 66.63 337.23 2.85 81.88 53.17
30.28
  90 66.63 337.23 2.85 81.88 53.17
30.28

Table 4 - Base Force Data on the 90 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-9.06	144.33	3.00	191.61	1174.43	668.74
1	-9.06	144.33	3.00	191.61	1174.43	668.74
2	-8.10	147.30	3.00	349.56	1277.00	727.15
2	-8.10	147.30	3.00	349.56	1277.00	727.15
3	-7.14	150.27	3.00	486.73	1366.09	

777.87					
3	-7.14	150.27	3.00	486.73	1366.09
777.87					
4	-6.18	153.25	3.00	603.50	1441.92
821.05					
4	-6.18	153.25	3.00	603.50	1441.92
821.05					
5	-5.22	156.24	3.00	700.22	1504.73
856.82					
5	-5.22	156.24	3.00	700.22	1504.73
856.82					
6	-4.27	159.23	3.00	777.26	1554.76
885.30					
6	-4.27	159.23	3.00	777.26	1554.76
885.30					
7	-3.31	162.22	3.00	834.95	1592.22
906.64					
7	-3.31	162.22	3.00	834.95	1592.22
906.64					
8	-2.35	165.22	3.00	873.64	1617.35
920.94					
8	-2.35	165.22	3.00	873.64	1617.35
920.94					
9	-1.39	168.22	3.00	893.66	1630.35
928.35					
9	-1.39	168.22	3.00	893.66	1630.35
928.35					
10	-0.43	171.22	3.00	895.34	1631.44
928.97					
10	-0.43	171.22	3.00	895.34	1631.44
928.97					
11	0.52	174.22	3.00	879.01	1620.84
922.93					
11	0.52	174.22	3.00	879.01	1620.84
922.93					
12	1.48	177.21	3.00	844.98	1598.74
910.35					
12	1.48	177.21	3.00	844.98	1598.74
910.35					
13	2.44	180.21	3.00	793.59	1565.36
891.34					
13	2.44	180.21	3.00	793.59	1565.36
891.34					
14	3.40	183.21	3.00	725.14	1520.91
866.03					
14	3.40	183.21	3.00	725.14	1520.91
866.03					
15	4.36	185.55	1.70	372.12	836.12
476.10					
15	4.36	185.55	1.70	372.12	836.12

476.10
  16   4.36   187.05   1.30   7204.05   5133.89
2923.32
  16   4.36   187.05   1.30   7204.05   5133.89
2923.32
  17   5.31   189.19   3.00   16386.70   11691.64
6657.41
  17   5.31   189.19   3.00   16386.70   11691.64
6657.41
  18   6.27   192.18   3.00   16113.81   11514.43
6556.50
  18   6.27   192.18   3.00   16113.81   11514.43
6556.50
  19   7.23   194.33   1.34   7112.69   5089.36
2897.96
  19   7.23   194.33   1.34   7112.69   5089.36
2897.96
  20   7.23   195.82   1.66   8801.13   6295.19
3584.58
  20   7.23   195.82   1.66   8801.13   6295.19
3584.58
  21   8.19   198.13   3.00   16122.53   11520.09
6559.72
  21   8.19   198.13   3.00   16122.53   11520.09
6559.72
  22   9.15   201.09   3.00   16366.78   11678.71
6650.04
  22   9.15   201.09   3.00   16366.78   11678.71
6650.04
  23   10.11   204.05   3.00   16589.48   11823.33
6732.39
  23   10.11   204.05   3.00   16589.48   11823.33
6732.39
  24   11.06   207.00   3.00   16790.82   11954.08
6806.84
  24   11.06   207.00   3.00   16790.82   11954.08
6806.84
  25   12.02   209.94   3.00   16971.01   12071.10
6873.48
  25   12.02   209.94   3.00   16971.01   12071.10
6873.48
  26   12.98   212.87   3.00   17130.26   12174.52
6932.36
  26   12.98   212.87   3.00   17130.26   12174.52
6932.36
  27   13.94   214.66   0.69   3954.81   2810.05
1600.09
  27   13.94   214.66   0.69   3954.81   2810.05
1600.09
  28   13.94   216.12   2.31   13273.69   9428.27

5368.60
  28   13.94   216.12   2.31   13273.69   9428.27
5368.60
  29   14.90   218.69   3.00   17215.48   12229.87
6963.88
  29   14.90   218.69   3.00   17215.48   12229.87
6963.88
  30   15.85   221.58   3.00   17180.76   12207.32
6951.04
  30   15.85   221.58   3.00   17180.76   12207.32
6951.04
  31   16.81   224.46   3.00   17128.16   12173.16
6931.59
  31   16.81   224.46   3.00   17128.16   12173.16
6931.59
  32   17.77   227.33   3.00   17057.93   12127.55
6905.62
  32   17.77   227.33   3.00   17057.93   12127.55
6905.62
  33   18.73   230.18   3.00   16970.30   12070.64
6873.21
  33   18.73   230.18   3.00   16970.30   12070.64
6873.21
  34   19.69   233.01   3.00   16865.51   12002.59
6834.46
  34   19.69   233.01   3.00   16865.51   12002.59
6834.46
  35   20.64   235.82   3.00   16743.81   11923.56
6789.46
  35   20.64   235.82   3.00   16743.81   11923.56
6789.46
  36   21.60   238.62   3.00   16605.46   11833.71
6738.30
  36   21.60   238.62   3.00   16605.46   11833.71
6738.30
  37   22.56   241.40   3.00   34966.85   23757.74
13528.03
  37   22.56   241.40   3.00   34966.85   23757.74
13528.03
  38   23.52   242.84   0.12   664.99   474.65
270.28
  38   23.52   242.84   0.12   664.99   474.65
270.28
  39   23.52   244.22   2.88   15670.39   11183.66
6368.15
  39   23.52   244.22   2.88   15670.39   11183.66
6368.15
  40   24.48   246.90   3.00   16267.71   11614.37
6613.41
  40   24.48   246.90   3.00   16267.71   11614.37

6613.41
41 25.43 249.62 3.00 16182.12 11558.79
6581.76
41 25.43 249.62 3.00 16182.12 11558.79
6581.76
42 26.39 252.32 3.00 16078.75 11491.66
6543.53
42 26.39 252.32 3.00 16078.75 11491.66
6543.53
43 27.35 255.00 3.00 15957.88 11413.17
6498.84
43 27.35 255.00 3.00 15957.88 11413.17
6498.84
44 28.31 257.65 3.00 15819.76 11323.47
6447.76
44 28.31 257.65 3.00 15819.76 11323.47
6447.76
45 29.27 259.33 0.83 4335.01 3105.45
1768.29
45 29.27 259.33 0.83 4335.01 3105.45
1768.29
46 29.27 260.64 2.17 12549.63 4294.69
2445.46
46 29.27 260.64 2.17 12549.63 4294.69
2445.46
47 30.23 262.14 1.29 7393.97 2531.09
1441.24
47 30.23 262.14 1.29 7393.97 2531.09
1441.24
48 30.23 263.44 1.71 9828.50 3364.83
1915.99
48 30.23 263.44 1.71 9828.50 3364.83
1915.99
49 31.18 264.53 0.83 4719.64 1616.28
920.34
49 31.18 264.53 0.83 4719.64 1616.28
920.34
50 31.18 265.82 2.17 11070.69 7949.67
4526.67
50 31.18 265.82 2.17 11070.69 7949.67
4526.67
51 32.14 268.02 3.00 15092.86 10851.42
6178.97
51 32.14 268.02 3.00 15092.86 10851.42
6178.97
52 33.10 270.54 3.00 14869.26 10706.21
6096.28
52 33.10 270.54 3.00 14869.26 10706.21
6096.28
53 34.06 273.04 3.00 14630.27 10551.01

6007.91
  53 34.06 273.04 3.00 14630.27 10551.01
6007.91
  54 35.02 275.51 3.00 14376.22 10386.02
5913.97
  54 35.02 275.51 3.00 14376.22 10386.02
5913.97
  55 35.97 277.96 3.00 14107.43 10211.47
5814.57
  55 35.97 277.96 3.00 14107.43 10211.47
5814.57
  56 36.93 280.37 3.00 13824.24 10027.57
5709.86
  56 36.93 280.37 3.00 13824.24 10027.57
5709.86
  57 37.89 282.33 1.94 8769.38 6373.94
3629.42
  57 37.89 282.33 1.94 8769.38 6373.94
3629.42
  58 37.89 283.52 1.06 4752.06 3456.98
1968.46
  58 37.89 283.52 1.06 4752.06 3456.98
1968.46
  59 38.85 285.10 3.00 13140.99 9583.86
5457.20
  59 38.85 285.10 3.00 13140.99 9583.86
5457.20
  60 39.81 287.43 3.00 12731.10 9317.67
5305.63
  60 39.81 287.43 3.00 12731.10 9317.67
5305.63
  61 40.76 289.71 3.00 12310.88 9044.78
5150.24
  61 40.76 289.71 3.00 12310.88 9044.78
5150.24
  62 41.72 291.97 3.00 11880.73 8765.44
4991.18
  62 41.72 291.97 3.00 11880.73 8765.44
4991.18
  63 42.68 294.19 3.00 11441.10 8479.93
4828.61
  63 42.68 294.19 3.00 11441.10 8479.93
4828.61
  64 43.64 296.38 3.00 10992.42 8188.56
4662.70
  64 43.64 296.38 3.00 10992.42 8188.56
4662.70
  65 44.60 298.53 3.00 10535.17 7891.62
4493.61
  65 44.60 298.53 3.00 10535.17 7891.62

4493.61

66	45.55	300.65	3.00	10069.82	7589.42

4321.53

66	45.55	300.65	3.00	10069.82	7589.42

4321.53

67	46.51	302.73	3.00	9596.86	7282.27

4146.64

67	46.51	302.73	3.00	9596.86	7282.27

4146.64

68	47.47	304.78	3.00	9116.80	6970.52

3969.12

68	47.47	304.78	3.00	9116.80	6970.52

3969.12

69	48.43	306.79	3.00	8630.19	6654.51

3789.18

69	48.43	306.79	3.00	8630.19	6654.51

3789.18

70	49.39	308.76	3.00	8137.57	6334.60

3607.02

70	49.39	308.76	3.00	8137.57	6334.60

3607.02

71	50.35	310.17	1.35	3488.38	2737.97

1559.04

71	50.35	310.17	1.35	3488.38	2737.97

1559.04

72	50.35	311.13	1.65	4159.88	3278.87

1867.04

72	50.35	311.13	1.65	4159.88	3278.87

1867.04

73	51.30	312.59	3.00	7196.17	5723.25

3258.91

73	51.30	312.59	3.00	7196.17	5723.25

3258.91

74	52.26	314.45	3.00	6743.33	5429.17

3091.45

74	52.26	314.45	3.00	6743.33	5429.17

3091.45

75	53.22	316.26	3.00	6284.51	5131.21

2921.79

75	53.22	316.26	3.00	6284.51	5131.21

2921.79

76	54.18	318.04	3.00	5820.37	4829.79

2750.16

76	54.18	318.04	3.00	5820.37	4829.79

2750.16

77	55.14	319.77	3.00	5351.61	4525.38

2576.82

77	55.14	319.77	3.00	5351.61	4525.38

2576.82

78	56.09	321.47	3.00	4878.96	4218.43

2402.04					
78	56.09	321.47	3.00	4878.96	4218.43
2402.04					
79	57.05	323.12	3.00	4403.17	3909.45
2226.10					
79	57.05	323.12	3.00	4403.17	3909.45
2226.10					
80	58.01	324.73	3.00	3925.05	3598.96
2049.30					
80	58.01	324.73	3.00	3925.05	3598.96
2049.30					
81	58.97	326.30	3.00	3445.45	3287.50
1871.96					
81	58.97	326.30	3.00	3445.45	3287.50
1871.96					
82	59.93	327.82	3.00	2965.26	2975.66
1694.39					
82	59.93	327.82	3.00	2965.26	2975.66
1694.39					
83	60.88	329.31	3.00	2485.40	2664.04
1516.95					
83	60.88	329.31	3.00	2485.40	2664.04
1516.95					
84	61.84	330.74	3.00	2006.89	2353.29
1340.00					
84	61.84	330.74	3.00	2006.89	2353.29
1340.00					
85	62.80	332.14	3.00	1530.78	2044.10
1163.94					
85	62.80	332.14	3.00	1530.78	2044.10
1163.94					
86	63.76	333.49	3.00	1058.19	1737.20
989.19					
86	63.76	333.49	3.00	1058.19	1737.20
989.19					
87	64.72	334.52	1.76	397.25	873.29
497.26					
87	64.72	334.52	1.76	397.25	873.29
497.26					
88	64.72	335.17	1.24	184.01	554.18
315.56					
88	64.72	335.17	1.24	184.01	554.18
315.56					
89	65.67	336.05	3.00	763.17	495.61
282.21					
89	65.67	336.05	3.00	763.17	495.61
282.21					
90	66.63	337.23	2.85	233.30	151.51
86.27					
90	66.63	337.23	2.85	233.30	151.51

86.27

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 90 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
37	34167.1	19726.4	39452.7	30.00	0.000000E+00

SUM OF MOMENTS = -0.364769E+00 (ft/lbs);Imbalance (Fraction of Total Weight) = -0.4490679E-06

Sum of the Resisting Forces = 586551.51 (lbs)

Average Available Shear Strength = 2445.50(psf)

Sum of the Driving Forces = 333991.66 (lbs)

Average Mobilized Shear Stress = 1392.51(psf)

Total length of the failure surface = 239.85(ft)

Factor of Safety Balance Check: FS = 1.75619

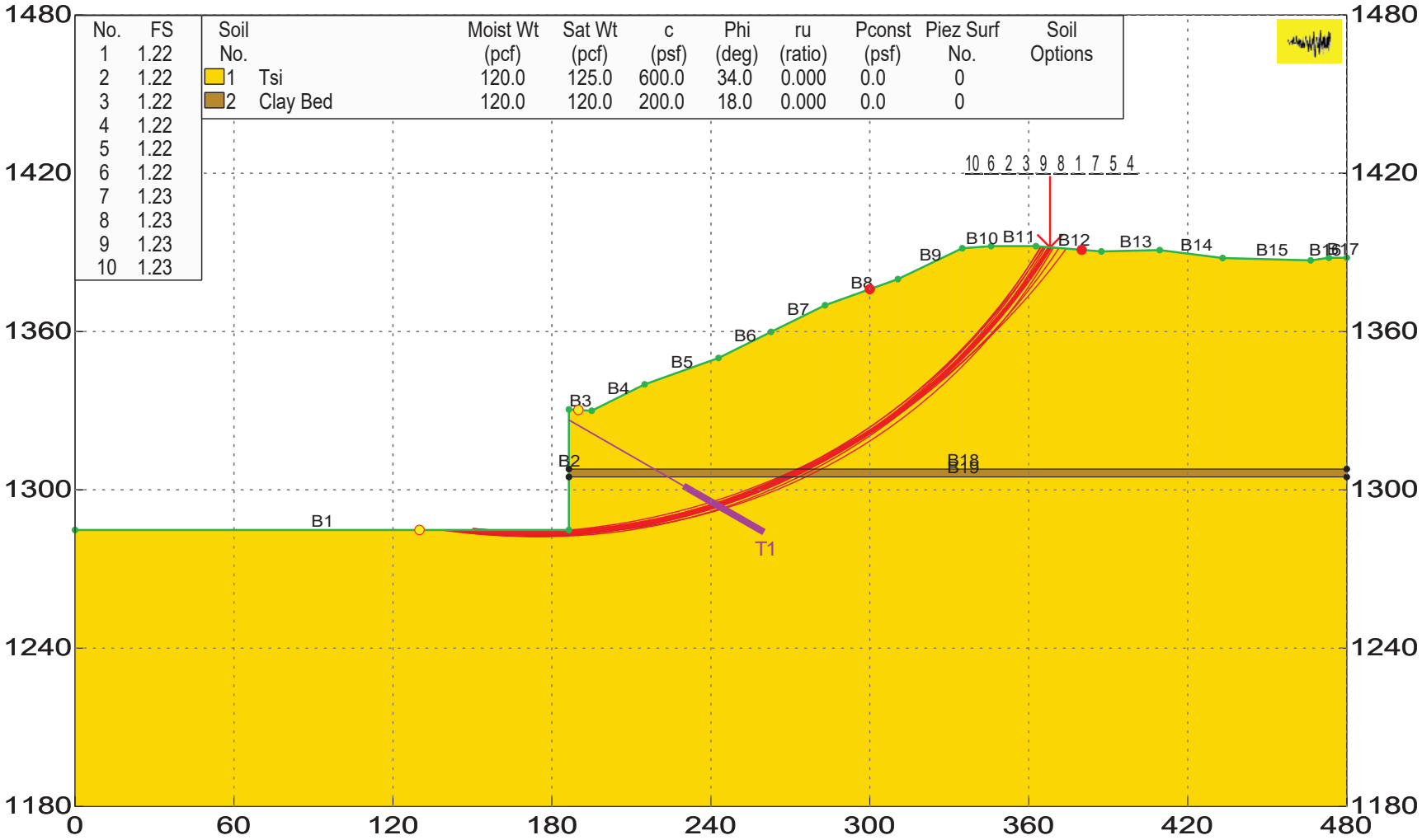
CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section B-B' - Tieback Wall - Rotational (Seismic (117A))

LGC Geotechnical / BPP

\Section B - Seismic (117A) - Rotational - Tieback.gsd



GEOSTASE FS = 1.22

Simplified Bishop Method

kh = 0.26000

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

Appendix D

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Rotational - Tieback.gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section B\2024_01_30\Section B - Seismic (117A) - Rotational - Tieback.OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section B-B' - Tieback Wall - Rotational (Seismic (117A))

BOUNDARY DATA

17 Surface Boundaries

19 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1284.800	186.400	1284.800	1
2	186.400	1284.800	186.400	1330.500	1
3	186.400	1330.500	195.000	1330.000	1
4	195.000	1330.000	215.000	1340.000	1
5	215.000	1340.000	242.900	1350.000	1
6	242.900	1350.000	262.700	1359.900	1
7	262.700	1359.900	283.100	1370.000	1
8	283.100	1370.000	310.600	1379.900	1
9	310.600	1379.900	334.900	1391.600	1
10	334.900	1391.600	345.800	1392.400	1
11	345.800	1392.400	362.700	1392.400	1
12	362.700	1392.400	387.400	1390.400	1
13	387.400	1390.400	409.400	1390.900	1
14	409.400	1390.900	433.200	1387.900	1
15	433.200	1387.900	466.400	1387.000	1
16	466.400	1387.000	473.300	1388.000	1
17	473.300	1388.000	480.000	1388.000	1
18	186.400	1307.900	480.000	1307.900	2
19	186.400	1304.900	480.000	1304.900	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface No.	Water Pressure Constant (psf)	Water Surface Option
1 Tsi	120.0	125.0	600.00	34.00	0.000	0	0.0	0
2 Clay Bed	120.0	120.0	200.00	18.00	0.000	0	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-5.0	600.00	34.00
2	5.0	200.00	18.00
3	90.0	600.00	34.00

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	186.40	1326.50	300000.0	5.0	30.00	50.0	35.0

METHOD A Selected: Tieback capacity subtracted from Driving Forces/Moments.

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming a Uniform Distribution of Load Horizontally Between Individual
Tiebacks.
ULength = Unbonded Length, BLength = Bonded Length.

TRIAL FAILURE SURFACE DATA

Circular Trial Failure Surfaces Have Been Generated Using A Random Procedure.

1000 Trial Surfaces Have Been Generated.

1000 Surfaces Generated at Increments of 0.7207(in) Equally Spaced Within the Start Range

Along The Specified Surface Between X = 130.00(ft)
and X = 190.00(ft)

Each Surface Enters within a Range Between X = 300.00(ft)
and X = 380.00(ft)

Unless XCLUDE Lines Were Specified, The Minimum Elevation
To Which A Surface Extends Is Y = 1180.00(ft)

Specified Maximum Radius = 10000.000(ft)

3.000(ft) Line Segments Were Used For Each Trial Failure Surface.

The Simplified Bishop Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

Number of Trial Surfaces With Valid FS = 1000

Statistical Data On All Valid FS Values:
FS Max = 3.988 FS Min = 1.220 FS Ave = 1.613
Standard Deviation = 0.337 Coefficient of Variation = 20.91 %

Critical Surface is Sequence Number 334 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:

Circle Center At X = 172.877784(ft) ; Y = 1513.603127(ft); and Radius = 229.944045(ft)

Circular Trial Failure Surface Generated With 87 Coordinate Points

Point No.	X-Coord. (ft)	Y-Coord. (ft)
1	150.000	1284.800
2	152.987	1284.521
3	155.977	1284.281
4	158.971	1284.080
5	161.966	1283.918
6	164.964	1283.795
7	167.963	1283.712
8	170.962	1283.667
9	173.962	1283.662
10	176.962	1283.695
11	179.961	1283.768
12	182.959	1283.880
13	185.955	1284.031
14	188.949	1284.221
15	191.940	1284.451
16	194.928	1284.719
17	197.913	1285.026
18	200.893	1285.372
19	203.868	1285.757
20	206.838	1286.181
21	209.802	1286.643
22	212.760	1287.144
23	215.711	1287.684
24	218.655	1288.262
25	221.591	1288.878
26	224.518	1289.533
27	227.437	1290.226
28	230.347	1290.956
29	233.247	1291.725
30	236.136	1292.532
31	239.015	1293.376
32	241.883	1294.257
33	244.738	1295.176
34	247.582	1296.132

35	250.413	1297.125
36	253.231	1298.155
37	256.034	1299.222
38	258.824	1300.325
39	261.599	1301.465
40	264.360	1302.640
41	267.104	1303.852
42	269.833	1305.099
43	272.545	1306.382
44	275.240	1307.699
45	277.917	1309.052
46	280.577	1310.440
47	283.218	1311.863
48	285.841	1313.319
49	288.444	1314.810
50	291.028	1316.335
51	293.591	1317.893
52	296.134	1319.484
53	298.657	1321.109
54	301.157	1322.766
55	303.636	1324.456
56	306.093	1326.178
57	308.526	1327.932
58	310.937	1329.718
59	313.324	1331.535
60	315.688	1333.382
61	318.027	1335.261
62	320.341	1337.170
63	322.631	1339.109
64	324.894	1341.077
65	327.132	1343.075
66	329.344	1345.102
67	331.529	1347.158
68	333.687	1349.242
69	335.818	1351.354
70	337.920	1353.493
71	339.995	1355.660
72	342.042	1357.854
73	344.059	1360.074
74	346.048	1362.320
75	348.007	1364.592
76	349.936	1366.890
77	351.835	1369.212
78	353.703	1371.559
79	355.541	1373.931
80	357.348	1376.326
81	359.123	1378.744
82	360.867	1381.185
83	362.578	1383.649
84	364.257	1386.135

85	365.904	1388.643
86	367.518	1391.172
87	368.013	1391.970

COORDINATES OF INTERSECTION OF TIEBACK(S) WITH FAILURE SURFACE

TIEBACK No.	X-Int.	Y-Int.
1	242.12	1294.33

Factor Of Safety For The Critical or Specified Surface = 1.220

Table 1 - Geometry Data on the 98 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.99	0.14	151.49	1284.66	1284.80	-5.34	0.00	3.00
2	2.99	0.40	154.48	1284.40	1284.80	-4.59	0.00	3.00
3	2.99	0.62	157.47	1284.18	1284.80	-3.84	0.00	3.00
4	3.00	0.80	160.47	1284.00	1284.80	-3.09	0.00	3.00
5	3.00	0.94	163.47	1283.86	1284.80	-2.35	0.00	3.00
6	3.00	1.05	166.46	1283.75	1284.80	-1.60	0.00	3.00
7	3.00	1.11	169.46	1283.69	1284.80	-0.85	0.00	3.00
8	3.00	1.14	172.46	1283.66	1284.80	-0.10	0.00	3.00
9	3.00	1.12	175.46	1283.68	1284.80	0.64	0.00	3.00
10	3.00	1.07	178.46	1283.73	1284.80	1.39	0.00	3.00
11	3.00	0.98	181.46	1283.82	1284.80	2.14	0.00	3.00
12	3.00	0.84	184.46	1283.96	1284.80	2.89	0.00	3.00
13	0.44	0.75	186.18	1284.05	1284.80	3.63	0.00	0.45
14	2.55	46.29	187.67	1284.14	1330.43	3.63	-3.33	

2.55

15	2.99	45.93	190.44	1284.34	1330.26	4.38	-3.33

3.00

16	2.99	45.51	193.43	1284.58	1330.09	5.13	-3.33

3.00

17	0.07	45.28	194.96	1284.72	1330.00	5.88	-3.33

0.07

18	2.91	45.85	196.46	1284.88	1330.73	5.88	26.57

2.93

19	2.98	47.00	199.40	1285.20	1332.20	6.62	26.57

3.00

20	2.98	48.13	202.38	1285.56	1333.69	7.37	26.57

3.00

21	2.97	49.21	205.35	1285.97	1335.18	8.12	26.57

3.00

22	2.96	50.25	208.32	1286.41	1336.66	8.87	26.57

3.00

23	2.96	51.25	211.28	1286.89	1338.14	9.61	26.57

3.00

24	2.24	52.09	213.88	1287.35	1339.44	10.36	26.57

2.28

25	0.71	52.51	215.36	1287.62	1340.13	10.36	19.72

0.72

26	2.94	52.81	217.18	1287.97	1340.78	11.11	19.72

3.00

27	2.94	53.27	220.12	1288.57	1341.84	11.86	19.72

3.00

28	2.93	53.68	223.05	1289.21	1342.89	12.60	19.72

3.00

29	2.92	54.06	225.98	1289.88	1343.93	13.35	19.72

3.00

30	2.91	54.39	228.89	1290.59	1344.98	14.10	19.72

3.00

31	2.90	54.68	231.80	1291.34	1346.02	14.85	19.72

3.00

32	2.89	54.93	234.69	1292.13	1347.06	15.59	19.72

3.00

33	2.88	55.14	237.58	1292.95	1348.09	16.34	19.72

3.00

34	2.87	55.30	240.45	1293.82	1349.12	17.09	19.72

3.00

35	1.02	55.40	242.39	1294.42	1349.82	17.84	19.72

1.07

36	1.84	55.58	243.82	1294.88	1350.46	17.84	26.57

1.93

37	2.84	55.98	246.16	1295.65	1351.63	18.58	26.57

3.00

38	2.83	56.42	249.00	1296.63	1353.05	19.33	26.57

3.00

39	2.82	56.82	251.82	1297.64	1354.46	20.08	26.57

3.00
40 2.80 57.18 254.63 1298.69 1355.87 20.83 26.57
3.00
41 2.79 57.49 257.43 1299.77 1357.26 21.57 26.57
3.00
42 2.78 57.76 260.21 1300.89 1358.66 22.32 26.57
3.00
43 1.10 57.93 262.15 1301.70 1359.62 23.07 26.57
1.20
44 1.66 58.02 263.53 1302.29 1360.31 23.07 26.34
1.80
45 2.74 58.16 265.73 1303.25 1361.40 23.82 26.34
3.00
46 2.29 58.27 268.25 1304.38 1362.65 24.56 26.34
2.52
47 0.44 58.32 269.62 1305.00 1363.32 24.56 26.34
0.48
48 2.71 58.36 271.19 1305.74 1364.10 25.31 26.34
3.00
49 2.70 58.40 273.89 1307.04 1365.44 26.06 26.34
3.00
50 0.40 58.41 275.44 1307.80 1366.21 26.81 26.34
0.44
51 2.28 58.39 276.78 1308.48 1366.87 26.81 26.34
2.56
52 2.66 58.35 279.25 1309.75 1368.09 27.55 26.34
3.00
53 2.52 58.26 281.84 1311.12 1369.38 28.30 26.34
2.87
54 0.12 58.19 283.16 1311.83 1370.02 28.30 19.80
0.13
55 2.62 57.92 284.53 1312.59 1370.51 29.05 19.80
3.00
56 2.60 57.39 287.14 1314.06 1371.46 29.80 19.80
3.00
57 2.58 56.82 289.74 1315.57 1372.39 30.54 19.80
3.00
58 2.56 56.20 292.31 1317.11 1373.32 31.29 19.80
3.00
59 2.54 55.55 294.86 1318.69 1374.23 32.04 19.80
3.00
60 2.52 54.85 297.40 1320.30 1375.15 32.79 19.80
3.00
61 2.50 54.11 299.91 1321.94 1376.05 33.54 19.80
3.00
62 2.48 53.34 302.40 1323.61 1376.95 34.28 19.80
3.00
63 2.46 52.52 304.86 1325.32 1377.84 35.03 19.80
3.00
64 2.43 51.66 307.31 1327.06 1378.72 35.78 19.80

3.00
65 2.07 50.83 309.56 1328.70 1379.53 36.53 19.80
2.58
66 0.34 50.39 310.77 1329.59 1379.98 36.53 25.71
0.42
67 2.39 50.01 312.13 1330.63 1380.64 37.27 25.71
3.00
68 2.36 49.32 314.51 1332.46 1381.78 38.02 25.71
3.00
69 2.34 48.59 316.86 1334.32 1382.91 38.77 25.71
3.00
70 2.31 47.82 319.18 1336.22 1384.03 39.52 25.71
3.00
71 2.29 47.00 321.49 1338.14 1385.14 40.26 25.71
3.00
72 2.26 46.14 323.76 1340.09 1386.24 41.01 25.71
3.00
73 2.24 45.25 326.01 1342.08 1387.32 41.76 25.71
3.00
74 2.21 44.30 328.24 1344.09 1388.39 42.51 25.71
3.00
75 2.19 43.32 330.44 1346.13 1389.45 43.25 25.71
3.00
76 2.16 42.30 332.61 1348.20 1390.50 44.00 25.71
3.00
77 1.21 41.47 334.29 1349.84 1391.31 44.75 25.71
1.71
78 0.92 40.73 335.36 1350.90 1391.63 44.75 4.20
1.29
79 2.10 39.32 336.87 1352.42 1391.74 45.50 4.20
3.00
80 2.07 37.32 338.96 1354.58 1391.90 46.24 4.20
3.00
81 2.05 35.29 341.02 1356.76 1392.05 46.99 4.20
3.00
82 2.02 33.23 343.05 1358.96 1392.20 47.74 4.20
3.00
83 1.74 31.28 344.93 1361.06 1392.34 48.49 4.20
2.63
84 0.25 30.22 345.92 1362.18 1392.40 48.49 0.00
0.37
85 1.96 28.94 347.03 1363.46 1392.40 49.23 0.00
3.00
86 1.93 26.66 348.97 1365.74 1392.40 49.98 0.00
3.00
87 1.90 24.35 350.89 1368.05 1392.40 50.73 0.00
3.00
88 1.87 22.01 352.77 1370.39 1392.40 51.48 0.00
3.00
89 1.84 19.65 354.62 1372.75 1392.40 52.22 0.00

3.00							
90	1.81	17.27	356.44	1375.13	1392.40	52.97	0.00
3.00							
91	1.78	14.87	358.24	1377.53	1392.40	53.72	0.00
3.00							
92	1.74	12.44	359.99	1379.96	1392.40	54.47	0.00
3.00							
93	1.71	9.98	361.72	1382.42	1392.40	55.21	0.00
3.00							
94	0.12	8.66	362.64	1383.74	1392.40	55.96	0.00
0.22							
95	1.56	7.35	363.48	1384.98	1392.34	55.96	-4.63
2.78							
96	1.65	4.82	365.08	1387.39	1392.21	56.71	-4.63
3.00							
97	1.61	2.17	366.71	1389.91	1392.08	57.46	-4.63
3.00							
98	0.49	0.42	367.77	1391.57	1391.99	58.20	-4.63
0.94							

Table 2 - Force Data On The 98 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	50.0	0.0	0.0	13.0	0.0	0.0
2	143.2	0.0	0.0	37.2	0.0	0.0
3	222.5	0.0	0.0	57.9	0.0	0.0
4	287.9	0.0	0.0	74.9	0.0	0.0
5	339.3	0.0	0.0	88.2	0.0	0.0
6	376.6	0.0	0.0	97.9	0.0	0.0
7	399.8	0.0	0.0	103.9	0.0	0.0
8	408.8	0.0	0.0	106.3	0.0	0.0
9	403.7	0.0	0.0	105.0	0.0	0.0
10	384.4	0.0	0.0	100.0	0.0	0.0
11	351.0	0.0	0.0	91.3	0.0	0.0
12	303.6	0.0	0.0	78.9	0.0	0.0
13	40.3	0.0	0.0	10.5	0.0	0.0
14	14159.2	0.0	0.0	3681.4	0.0	0.0
15	16486.1	0.0	0.0	4286.4	0.0	0.0
16	16316.7	0.0	0.0	4242.3	0.0	0.0
17	388.7	0.0	0.0	101.1	0.0	0.0
18	16026.4	0.0	0.0	4166.9	0.0	0.0
19	16807.9	0.0	0.0	4370.0	0.0	0.0
20	17182.0	0.0	0.0	4467.3	0.0	0.0
21	17537.2	0.0	0.0	4559.7	0.0	0.0

22	17873.1	0.0	0.0	4647.0	0.0	0.0
23	18189.7	0.0	0.0	4729.3	0.0	0.0
24	14003.2	0.0	0.0	3640.8	0.0	0.0
25	4479.4	0.0	0.0	1164.6	0.0	0.0
26	18655.2	0.0	0.0	4850.4	0.0	0.0
27	18766.7	0.0	0.0	4879.3	0.0	0.0
28	18859.6	0.0	0.0	4903.5	0.0	0.0
29	18934.0	0.0	0.0	4922.8	0.0	0.0
30	18989.9	0.0	0.0	4937.4	0.0	0.0
31	19027.5	0.0	0.0	4947.1	0.0	0.0
32	19046.7	0.0	0.0	4952.1	0.0	0.0
33	19047.7	0.0	0.0	4952.4	0.0	0.0
34	19030.7	0.0	0.0	4948.0	0.0	0.0
35	6762.9	0.0	0.0	1758.4	0.0	0.0
36	12261.5	0.0	0.0	3188.0	0.0	0.0
37	19100.5	0.0	0.0	4966.1	0.0	0.0
38	19165.9	0.0	0.0	4983.1	0.0	0.0
39	19212.0	0.0	0.0	4995.1	0.0	0.0
40	19238.9	0.0	0.0	5002.1	0.0	0.0
41	19246.7	0.0	0.0	5004.2	0.0	0.0
42	19235.7	0.0	0.0	5001.3	0.0	0.0
43	7649.8	0.0	0.0	1988.9	0.0	0.0
44	11555.4	0.0	0.0	3004.4	0.0	0.0
45	19152.9	0.0	0.0	4979.8	0.0	0.0
46	16037.3	0.0	0.0	4169.7	0.0	0.0
47	3044.7	0.0	0.0	791.6	0.0	0.0
48	18993.3	0.0	0.0	4938.3	0.0	0.0
49	18886.8	0.0	0.0	4910.6	0.0	0.0
50	2782.1	0.0	0.0	723.3	0.0	0.0
51	15980.9	0.0	0.0	4155.0	0.0	0.0
52	18622.0	0.0	0.0	4841.7	0.0	0.0
53	17638.7	0.0	0.0	4586.1	0.0	0.0
54	825.5	0.0	0.0	214.6	0.0	0.0
55	18229.2	0.0	0.0	4739.6	0.0	0.0
56	17929.0	0.0	0.0	4661.6	0.0	0.0
57	17615.6	0.0	0.0	4580.1	0.0	0.0
58	17289.3	0.0	0.0	4495.2	0.0	0.0
59	16950.6	0.0	0.0	4407.2	0.0	0.0
60	16600.0	0.0	0.0	4316.0	0.0	0.0
61	16238.0	0.0	0.0	4221.9	0.0	0.0
62	15865.0	0.0	0.0	4124.9	0.0	0.0
63	15481.6	0.0	0.0	4025.2	0.0	0.0
64	15088.2	0.0	0.0	3922.9	0.0	0.0
65	12647.2	0.0	0.0	3288.3	0.0	0.0
66	2039.0	0.0	0.0	530.1	0.0	0.0
67	14326.9	0.0	0.0	3725.0	0.0	0.0
68	13988.1	0.0	0.0	3636.9	0.0	0.0
69	13639.0	0.0	0.0	3546.1	0.0	0.0
70	13280.2	0.0	0.0	3452.8	0.0	0.0
71	12912.1	0.0	0.0	3357.1	0.0	0.0

72	12535.3	0.0	0.0	3259.2	0.0	0.0
73	12150.5	0.0	0.0	3159.1	0.0	0.0
74	11758.1	0.0	0.0	3057.1	0.0	0.0
75	11358.8	0.0	0.0	2953.3	0.0	0.0
76	10953.2	0.0	0.0	2847.8	0.0	0.0
77	6036.0	0.0	0.0	1569.4	0.0	0.0
78	4485.2	0.0	0.0	1166.2	0.0	0.0
79	9922.6	0.0	0.0	2579.9	0.0	0.0
80	9292.1	0.0	0.0	2415.9	0.0	0.0
81	8666.5	0.0	0.0	2253.3	0.0	0.0
82	8046.3	0.0	0.0	2092.0	0.0	0.0
83	6534.0	0.0	0.0	1698.8	0.0	0.0
84	898.0	0.0	0.0	233.5	0.0	0.0
85	6803.9	0.0	0.0	1769.0	0.0	0.0
86	6171.4	0.0	0.0	1604.6	0.0	0.0
87	5548.6	0.0	0.0	1442.6	0.0	0.0
88	4936.1	0.0	0.0	1283.4	0.0	0.0
89	4334.5	0.0	0.0	1127.0	0.0	0.0
90	3744.6	0.0	0.0	973.6	0.0	0.0
91	3166.8	0.0	0.0	823.4	0.0	0.0
92	2601.8	0.0	0.0	676.5	0.0	0.0
93	2050.4	0.0	0.0	533.1	0.0	0.0
94	126.7	0.0	0.0	32.9	0.0	0.0
95	1374.5	0.0	0.0	357.4	0.0	0.0
96	952.1	0.0	0.0	247.6	0.0	0.0
97	419.9	0.0	0.0	109.2	0.0	0.0
98	24.9	0.0	0.0	6.5	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1033924.20(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1033924.20(lbs)

TOTAL AREA OF SLIDING MASS = 8616.03(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 98 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	600.00	34.00	
2	1	600.00	34.00	
3	1	600.00	34.00	
4	1	600.00	34.00	
5	1	600.00	34.00	
6	1	600.00	34.00	
7	1	600.00	34.00	
8	1	600.00	34.00	
9	1	600.00	34.00	
10	1	600.00	34.00	
11	1	600.00	34.00	

12	1	600.00	34.00
13	1	600.00	34.00
14	1	600.00	34.00
15	1	600.00	34.00
16	1	600.00	34.00
17	1	600.00	34.00
18	1	600.00	34.00
19	1	600.00	34.00
20	1	600.00	34.00
21	1	600.00	34.00
22	1	600.00	34.00
23	1	600.00	34.00
24	1	600.00	34.00
25	1	600.00	34.00
26	1	600.00	34.00
27	1	600.00	34.00
28	1	600.00	34.00
29	1	600.00	34.00
30	1	600.00	34.00
31	1	600.00	34.00
32	1	600.00	34.00
33	1	600.00	34.00
34	1	600.00	34.00
35	1	600.00	34.00
36	1	600.00	34.00
37	1	600.00	34.00
38	1	600.00	34.00
39	1	600.00	34.00
40	1	600.00	34.00
41	1	600.00	34.00
42	1	600.00	34.00
43	1	600.00	34.00
44	1	600.00	34.00
45	1	600.00	34.00
46	1	600.00	34.00
47	2	200.00	18.00
48	2	200.00	18.00
49	2	200.00	18.00
50	2	200.00	18.00
51	1	600.00	34.00
52	1	600.00	34.00
53	1	600.00	34.00
54	1	600.00	34.00
55	1	600.00	34.00
56	1	600.00	34.00
57	1	600.00	34.00
58	1	600.00	34.00
59	1	600.00	34.00
60	1	600.00	34.00
61	1	600.00	34.00

62	1	600.00	34.00
63	1	600.00	34.00
64	1	600.00	34.00
65	1	600.00	34.00
66	1	600.00	34.00
67	1	600.00	34.00
68	1	600.00	34.00
69	1	600.00	34.00
70	1	600.00	34.00
71	1	600.00	34.00
72	1	600.00	34.00
73	1	600.00	34.00
74	1	600.00	34.00
75	1	600.00	34.00
76	1	600.00	34.00
77	1	600.00	34.00
78	1	600.00	34.00
79	1	600.00	34.00
80	1	600.00	34.00
81	1	600.00	34.00
82	1	600.00	34.00
83	1	600.00	34.00
84	1	600.00	34.00
85	1	600.00	34.00
86	1	600.00	34.00
87	1	600.00	34.00
88	1	600.00	34.00
89	1	600.00	34.00
90	1	600.00	34.00
91	1	600.00	34.00
92	1	600.00	34.00
93	1	600.00	34.00
94	1	600.00	34.00
95	1	600.00	34.00
96	1	600.00	34.00
97	1	600.00	34.00
98	1	600.00	34.00

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 98 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available	Mobilized

No.	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Stress (psf)	Shear Strength (psf)	Shear Stress * (psf)
1	-5.34	151.49	3.00	63.80	643.03	527.08
1	-5.34	151.49	3.00	63.80	643.03	527.08
2	-4.59	154.48	3.00	89.40	660.30	541.23
2	-4.59	154.48	3.00	89.40	660.30	541.23
3	-3.84	157.47	3.00	109.80	674.06	552.51
3	-3.84	157.47	3.00	109.80	674.06	552.51
4	-3.09	160.47	3.00	125.09	684.37	560.97
4	-3.09	160.47	3.00	125.09	684.37	560.97
5	-2.35	163.47	3.00	135.38	691.32	566.66
5	-2.35	163.47	3.00	135.38	691.32	566.66
6	-1.60	166.46	3.00	140.78	694.96	569.64
6	-1.60	166.46	3.00	140.78	694.96	569.64
7	-0.85	169.46	3.00	141.37	695.36	569.97
7	-0.85	169.46	3.00	141.37	695.36	569.97
8	-0.10	172.46	3.00	137.26	692.58	567.69
8	-0.10	172.46	3.00	137.26	692.58	567.69
9	0.64	175.46	3.00	128.53	686.70	562.87
9	0.64	175.46	3.00	128.53	686.70	562.87
10	1.39	178.46	3.00	115.29	677.76	555.55
10	1.39	178.46	3.00	115.29	677.76	555.55
11	2.14	181.46	3.00	97.61	665.84	545.77
11	2.14	181.46	3.00	97.61	665.84	545.77
12	2.89	184.46	3.00	75.60	650.99	

533.60

12	2.89	184.46	3.00	75.60	650.99

533.60

13	3.63	186.18	0.45	58.73	639.61

524.28

13	3.63	186.18	0.45	58.73	639.61

524.28

14	3.63	187.67	2.55	5345.01	4205.25

3446.95

14	3.63	187.67	2.55	5345.01	4205.25

3446.95

15	4.38	190.44	3.00	5262.36	4149.51

3401.26

15	4.38	190.44	3.00	5262.36	4149.51

3401.26

16	5.13	193.43	3.00	5173.18	4089.36

3351.96

16	5.13	193.43	3.00	5173.18	4089.36

3351.96

17	5.88	194.96	0.07	5107.37	4044.96

3315.57

17	5.88	194.96	0.07	5107.37	4044.96

3315.57

18	5.88	196.46	2.93	5172.53	4088.91

3351.59

18	5.88	196.46	2.93	5172.53	4088.91

3351.59

19	6.62	199.40	3.00	5262.72	4149.75

3401.46

19	6.62	199.40	3.00	5262.72	4149.75

3401.46

20	7.37	202.38	3.00	5348.59	4207.67

3448.93

20	7.37	202.38	3.00	5348.59	4207.67

3448.93

21	8.12	205.35	3.00	5428.59	4261.63

3493.17

21	8.12	205.35	3.00	5428.59	4261.63

3493.17

22	8.87	208.32	3.00	5502.80	4311.68

3534.19

22	8.87	208.32	3.00	5502.80	4311.68

3534.19

23	9.61	211.28	3.00	5571.28	4357.88

3572.06

23	9.61	211.28	3.00	5571.28	4357.88

3572.06

24	10.36	213.88	2.28	5621.78	4391.94

3599.97

24	10.36	213.88	2.28	5621.78	4391.94

3599.97

25	10.36	215.36	0.72	5667.48	4422.76

3625.24

25	10.36	215.36	0.72	5667.48	4422.76

3625.24

26	11.11	217.18	3.00	5657.77	4416.21

3619.87

26	11.11	217.18	3.00	5657.77	4416.21

3619.87

27	11.86	220.12	3.00	5664.77	4420.94

3623.74

27	11.86	220.12	3.00	5664.77	4420.94

3623.74

28	12.60	223.05	3.00	5667.03	4422.46

3624.99

28	12.60	223.05	3.00	5667.03	4422.46

3624.99

29	13.35	225.98	3.00	5664.61	4420.83

3623.66

29	13.35	225.98	3.00	5664.61	4420.83

3623.66

30	14.10	228.89	3.00	5657.59	4416.09

3619.77

30	14.10	228.89	3.00	5657.59	4416.09

3619.77

31	14.85	231.80	3.00	5646.02	4408.29

3613.38

31	14.85	231.80	3.00	5646.02	4408.29

3613.38

32	15.59	234.69	3.00	5629.99	4397.47

3604.51

32	15.59	234.69	3.00	5629.99	4397.47

3604.51

33	16.34	237.58	3.00	5609.54	4383.68

3593.21

33	16.34	237.58	3.00	5609.54	4383.68

3593.21

34	17.09	240.45	3.00	5584.75	4366.96

3579.50

34	17.09	240.45	3.00	5584.75	4366.96

3579.50

35	17.84	242.39	1.07	20432.57	14381.94

11788.56

35	17.84	242.39	1.07	20432.57	14381.94

11788.56

36	17.84	243.82	1.93	5570.95	4357.65

3571.87

36	17.84	243.82	1.93	5570.95	4357.65

3571.87

37	18.58	246.16	3.00	5569.45	4356.64

3571.04					
37	18.58	246.16	3.00	5569.45	4356.64
3571.04					
38	19.33	249.00	3.00	5572.40	4358.63
3572.67					
38	19.33	249.00	3.00	5572.40	4358.63
3572.67					
39	20.08	251.82	3.00	5570.55	4357.38
3571.65					
39	20.08	251.82	3.00	5570.55	4357.38
3571.65					
40	20.83	254.63	3.00	5563.99	4352.96
3568.02					
40	20.83	254.63	3.00	5563.99	4352.96
3568.02					
41	21.57	257.43	3.00	5552.77	4345.39
3561.82					
41	21.57	257.43	3.00	5552.77	4345.39
3561.82					
42	22.32	260.21	3.00	5536.96	4334.73
3553.08					
42	22.32	260.21	3.00	5536.96	4334.73
3553.08					
43	23.07	262.15	1.20	5510.62	4316.96
3538.52					
43	23.07	262.15	1.20	5510.62	4316.96
3538.52					
44	23.07	263.53	1.80	5520.23	4323.44
3543.83					
44	23.07	263.53	1.80	5520.23	4323.44
3543.83					
45	23.82	265.73	3.00	5490.42	4303.33
3527.35					
45	23.82	265.73	3.00	5490.42	4303.33
3527.35					
46	24.56	268.25	2.52	5459.17	4282.26
3510.07					
46	24.56	268.25	2.52	5459.17	4282.26
3510.07					
47	24.56	269.62	0.48	6205.26	2216.21
1816.58					
47	24.56	269.62	0.48	6205.26	2216.21
1816.58					
48	25.31	271.19	3.00	6184.77	2209.55
1811.12					
48	25.31	271.19	3.00	6184.77	2209.55
1811.12					
49	26.06	273.89	3.00	6164.12	2202.84
1805.62					
49	26.06	273.89	3.00	6164.12	2202.84

1805.62					
50	26.81	275.44	0.44	6139.89	2194.97
1799.17					
50	26.81	275.44	0.44	6139.89	2194.97
1799.17					
51	26.81	276.78	2.56	5342.97	4203.88
3445.83					
51	26.81	276.78	2.56	5342.97	4203.88
3445.83					
52	27.55	279.25	3.00	5295.98	4172.18
3419.84					
52	27.55	279.25	3.00	5295.98	4172.18
3419.84					
53	28.30	281.84	2.87	5245.02	4137.81
3391.67					
53	28.30	281.84	2.87	5245.02	4137.81
3391.67					
54	28.30	283.16	0.13	5238.92	4133.69
3388.30					
54	28.30	283.16	0.13	5238.92	4133.69
3388.30					
55	29.05	284.53	3.00	5171.72	4088.37
3351.15					
55	29.05	284.53	3.00	5171.72	4088.37
3351.15					
56	29.80	287.14	3.00	5080.33	4026.72
3300.62					
56	29.80	287.14	3.00	5080.33	4026.72
3300.62					
57	30.54	289.74	3.00	4985.84	3962.99
3248.37					
57	30.54	289.74	3.00	4985.84	3962.99
3248.37					
58	31.29	292.31	3.00	4888.33	3897.22
3194.46					
58	31.29	292.31	3.00	4888.33	3897.22
3194.46					
59	32.04	294.86	3.00	4787.87	3829.46
3138.93					
59	32.04	294.86	3.00	4787.87	3829.46
3138.93					
60	32.79	297.40	3.00	4684.56	3759.77
3081.80					
60	32.79	297.40	3.00	4684.56	3759.77
3081.80					
61	33.54	299.91	3.00	4578.45	3688.21
3023.14					
61	33.54	299.91	3.00	4578.45	3688.21
3023.14					
62	34.28	302.40	3.00	4469.64	3614.81

2962.98					
62	34.28	302.40	3.00	4469.64	3614.81
2962.98					
63	35.03	304.86	3.00	4358.21	3539.65
2901.37					
63	35.03	304.86	3.00	4358.21	3539.65
2901.37					
64	35.78	307.31	3.00	4244.23	3462.77
2838.35					
64	35.78	307.31	3.00	4244.23	3462.77
2838.35					
65	36.53	309.56	2.58	4133.32	3387.96
2777.04					
65	36.53	309.56	2.58	4133.32	3387.96
2777.04					
66	36.53	310.77	0.42	4095.52	3362.46
2756.14					
66	36.53	310.77	0.42	4095.52	3362.46
2756.14					
67	37.27	312.13	3.00	4024.89	3314.82
2717.09					
67	37.27	312.13	3.00	4024.89	3314.82
2717.09					
68	38.02	314.51	3.00	3928.17	3249.59
2663.61					
68	38.02	314.51	3.00	3928.17	3249.59
2663.61					
69	38.77	316.86	3.00	3828.62	3182.43
2608.57					
69	38.77	316.86	3.00	3828.62	3182.43
2608.57					
70	39.52	319.18	3.00	3726.32	3113.43
2552.01					
70	39.52	319.18	3.00	3726.32	3113.43
2552.01					
71	40.26	321.49	3.00	3621.36	3042.64
2493.99					
71	40.26	321.49	3.00	3621.36	3042.64
2493.99					
72	41.01	323.76	3.00	3513.85	2970.12
2434.54					
72	41.01	323.76	3.00	3513.85	2970.12
2434.54					
73	41.76	326.01	3.00	3403.86	2895.93
2373.73					
73	41.76	326.01	3.00	3403.86	2895.93
2373.73					
74	42.51	328.24	3.00	3291.50	2820.15
2311.61					
74	42.51	328.24	3.00	3291.50	2820.15

2311.61

75	43.25	330.44	3.00	3176.87	2742.82

2248.23

75	43.25	330.44	3.00	3176.87	2742.82

2248.23

76	44.00	332.61	3.00	3060.05	2664.03

2183.65

76	44.00	332.61	3.00	3060.05	2664.03

2183.65

77	44.75	334.29	1.71	2959.58	2596.26

2128.10

77	44.75	334.29	1.71	2959.58	2596.26

2128.10

78	44.75	335.36	1.29	2902.08	2557.47

2096.31

78	44.75	335.36	1.29	2902.08	2557.47

2096.31

79	45.50	336.87	3.00	2757.60	2460.03

2016.43

79	45.50	336.87	3.00	2757.60	2460.03

2016.43

80	46.24	338.96	3.00	2569.54	2333.17

1912.45

80	46.24	338.96	3.00	2569.54	2333.17

1912.45

81	46.99	341.02	3.00	2381.83	2206.57

1808.67

81	46.99	341.02	3.00	2381.83	2206.57

1808.67

82	47.74	343.05	3.00	2194.61	2080.28

1705.16

82	47.74	343.05	3.00	2194.61	2080.28

1705.16

83	48.49	344.93	2.63	2017.80	1961.02

1607.41

83	48.49	344.93	2.63	2017.80	1961.02

1607.41

84	48.49	345.92	0.37	1938.20	1907.33

1563.40

84	48.49	345.92	0.37	1938.20	1907.33

1563.40

85	49.23	347.03	3.00	1815.35	1824.47

1495.47

85	49.23	347.03	3.00	1815.35	1824.47

1495.47

86	49.98	348.97	3.00	1619.81	1692.58

1387.37

86	49.98	348.97	3.00	1619.81	1692.58

1387.37

87	50.73	350.89	3.00	1425.62	1561.59

1280.00					
87	50.73	350.89	3.00	1425.62	1561.59
1280.00					
88	51.48	352.77	3.00	1232.89	1431.60
1173.45					
88	51.48	352.77	3.00	1232.89	1431.60
1173.45					
89	52.22	354.62	3.00	1041.77	1302.68
1067.78					
89	52.22	354.62	3.00	1041.77	1302.68
1067.78					
90	52.97	356.44	3.00	852.38	1174.93
963.07					
90	52.97	356.44	3.00	852.38	1174.93
963.07					
91	53.72	358.24	3.00	664.86	1048.45
859.40					
91	53.72	358.24	3.00	664.86	1048.45
859.40					
92	54.47	359.99	3.00	479.37	923.34
756.84					
92	54.47	359.99	3.00	479.37	923.34
756.84					
93	55.21	361.72	3.00	296.05	799.69
655.49					
93	55.21	361.72	3.00	296.05	799.69
655.49					
94	55.96	362.64	0.22	192.67	729.96
598.33					
94	55.96	362.64	0.22	192.67	729.96
598.33					
95	55.96	363.48	2.78	104.74	670.65
549.72					
95	55.96	363.48	2.78	104.74	670.65
549.72					
96	56.71	365.08	3.00	320.38	216.10
177.13					
96	56.71	365.08	3.00	320.38	216.10
177.13					
97	57.46	366.71	3.00	142.31	95.99
78.68					
97	57.46	366.71	3.00	142.31	95.99
78.68					
98	58.20	367.77	0.94	27.15	18.31
15.01					
98	58.20	367.77	0.94	27.15	18.31
15.01					

Table 4 - Base Force Data on the 98 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-5.34	151.49	3.00	191.39	1929.09	1581.23
1	-5.34	151.49	3.00	191.39	1929.09	1581.23
2	-4.59	154.48	3.00	268.20	1980.90	1623.70
2	-4.59	154.48	3.00	268.20	1980.90	1623.70
3	-3.84	157.47	3.00	329.39	2022.17	1657.53
3	-3.84	157.47	3.00	329.39	2022.17	1657.53
4	-3.09	160.47	3.00	375.27	2053.12	1682.90
4	-3.09	160.47	3.00	375.27	2053.12	1682.90
5	-2.35	163.47	3.00	406.15	2073.95	1699.97
5	-2.35	163.47	3.00	406.15	2073.95	1699.97
6	-1.60	166.46	3.00	422.34	2084.87	1708.92
6	-1.60	166.46	3.00	422.34	2084.87	1708.92
7	-0.85	169.46	3.00	424.12	2086.07	1709.91
7	-0.85	169.46	3.00	424.12	2086.07	1709.91
8	-0.10	172.46	3.00	411.78	2077.75	1703.08
8	-0.10	172.46	3.00	411.78	2077.75	1703.08
9	0.64	175.46	3.00	385.60	2060.09	1688.61
9	0.64	175.46	3.00	385.60	2060.09	1688.61
10	1.39	178.46	3.00	345.86	2033.29	1666.64
10	1.39	178.46	3.00	345.86	2033.29	1666.64
11	2.14	181.46	3.00	292.84	1997.52	

1637.32
  11 2.14 181.46 3.00 292.84 1997.52
1637.32
  12 2.89 184.46 3.00 226.79 1952.97
1600.81
  12 2.89 184.46 3.00 226.79 1952.97
1600.81
  13 3.63 186.18 0.45 26.17 285.02
233.62
  13 3.63 186.18 0.45 26.17 285.02
233.62
  14 3.63 187.67 2.55 13653.21 10741.84
8804.85
  14 3.63 187.67 2.55 13653.21 10741.84
8804.85
  15 4.38 190.44 3.00 15787.09 12448.53
10203.78
  15 4.38 190.44 3.00 15787.09 12448.53
10203.78
  16 5.13 193.43 3.00 15519.55 12268.07
10055.87
  16 5.13 193.43 3.00 15519.55 12268.07
10055.87
  17 5.88 194.96 0.07 367.26 290.87
238.42
  17 5.88 194.96 0.07 367.26 290.87
238.42
  18 5.88 196.46 2.93 15145.63 11972.71
9813.77
  18 5.88 196.46 2.93 15145.63 11972.71
9813.77
  19 6.62 199.40 3.00 15788.17 12449.25
10204.38
  19 6.62 199.40 3.00 15788.17 12449.25
10204.38
  20 7.37 202.38 3.00 16045.78 12623.01
10346.80
  20 7.37 202.38 3.00 16045.78 12623.01
10346.80
  21 8.12 205.35 3.00 16285.78 12784.90
10479.50
  21 8.12 205.35 3.00 16285.78 12784.90
10479.50
  22 8.87 208.32 3.00 16508.40 12935.05
10602.58
  22 8.87 208.32 3.00 16508.40 12935.05
10602.58
  23 9.61 211.28 3.00 16713.85 13073.63
10716.17
  23 9.61 211.28 3.00 16713.85 13073.63

10716.17
  24   10.36   213.88   2.28   12802.58   10001.84
8198.29
  24   10.36   213.88   2.28   12802.58   10001.84
8198.29
  25   10.36   215.36   0.72   4095.78   3196.25
2619.90
  25   10.36   215.36   0.72   4095.78   3196.25
2619.90
  26   11.11   217.18   3.00   16973.31   13248.64
10859.62
  26   11.11   217.18   3.00   16973.31   13248.64
10859.62
  27   11.86   220.12   3.00   16994.31   13262.81
10871.23
  27   11.86   220.12   3.00   16994.31   13262.81
10871.23
  28   12.60   223.05   3.00   17001.08   13267.38
10874.98
  28   12.60   223.05   3.00   17001.08   13267.38
10874.98
  29   13.35   225.98   3.00   16993.84   13262.49
10870.97
  29   13.35   225.98   3.00   16993.84   13262.49
10870.97
  30   14.10   228.89   3.00   16972.77   13248.28
10859.32
  30   14.10   228.89   3.00   16972.77   13248.28
10859.32
  31   14.85   231.80   3.00   16938.07   13224.87
10840.14
  31   14.85   231.80   3.00   16938.07   13224.87
10840.14
  32   15.59   234.69   3.00   16889.96   13192.42
10813.54
  32   15.59   234.69   3.00   16889.96   13192.42
10813.54
  33   16.34   237.58   3.00   16828.62   13151.05
10779.62
  33   16.34   237.58   3.00   16828.62   13151.05
10779.62
  34   17.09   240.45   3.00   16754.26   13100.89
10738.51
  34   17.09   240.45   3.00   16754.26   13100.89
10738.51
  35   17.84   242.39   1.07   21836.67   15370.25
12598.66
  35   17.84   242.39   1.07   21836.67   15370.25
12598.66
  36   17.84   243.82   1.93   10759.07   8415.85

6898.29
  36 17.84 243.82 1.93 10759.07 8415.85
6898.29
  37 18.58 246.16 3.00 16708.35 13069.92
10713.13
  37 18.58 246.16 3.00 16708.35 13069.92
10713.13
  38 19.33 249.00 3.00 16717.19 13075.88
10718.01
  38 19.33 249.00 3.00 16717.19 13075.88
10718.01
  39 20.08 251.82 3.00 16711.66 13072.15
10714.96
  39 20.08 251.82 3.00 16711.66 13072.15
10714.96
  40 20.83 254.63 3.00 16691.96 13058.87
10704.07
  40 20.83 254.63 3.00 16691.96 13058.87
10704.07
  41 21.57 257.43 3.00 16658.31 13036.17
10685.46
  41 21.57 257.43 3.00 16658.31 13036.17
10685.46
  42 22.32 260.21 3.00 16610.89 13004.19
10659.25
  42 22.32 260.21 3.00 16610.89 13004.19
10659.25
  43 23.07 262.15 1.20 6591.64 5163.82
4232.67
  43 23.07 262.15 1.20 6591.64 5163.82
4232.67
  44 23.07 263.53 1.80 9957.55 7798.75
6392.47
  44 23.07 263.53 1.80 9957.55 7798.75
6392.47
  45 23.82 265.73 3.00 16471.25 12910.00
10582.04
  45 23.82 265.73 3.00 16471.25 12910.00
10582.04
  46 24.56 268.25 2.52 13766.27 10798.47
8851.27
  46 24.56 268.25 2.52 13766.27 10798.47
8851.27
  47 24.56 269.62 0.48 2968.11 1060.06
868.91
  47 24.56 269.62 0.48 2968.11 1060.06
868.91
  48 25.31 271.19 3.00 18554.31 6628.66
5433.37
  48 25.31 271.19 3.00 18554.31 6628.66

5433.37					
49	26.06	273.89	3.00	18492.35	6608.53
5416.86					
49	26.06	273.89	3.00	18492.35	6608.53
5416.86					
50	26.81	275.44	0.44	2730.63	976.18
800.15					
50	26.81	275.44	0.44	2730.63	976.18
800.15					
51	26.81	276.78	2.56	13652.71	10742.03
8805.00					
51	26.81	276.78	2.56	13652.71	10742.03
8805.00					
52	27.55	279.25	3.00	15887.93	12516.54
10259.53					
52	27.55	279.25	3.00	15887.93	12516.54
10259.53					
53	28.30	281.84	2.87	15030.84	11857.87
9719.64					
53	28.30	281.84	2.87	15030.84	11857.87
9719.64					
54	28.30	283.16	0.13	703.39	555.00
454.92					
54	28.30	283.16	0.13	703.39	555.00
454.92					
55	29.05	284.53	3.00	15515.17	12265.12
10053.44					
55	29.05	284.53	3.00	15515.17	12265.12
10053.44					
56	29.80	287.14	3.00	15240.98	12080.17
9901.85					
56	29.80	287.14	3.00	15240.98	12080.17
9901.85					
57	30.54	289.74	3.00	14957.51	11888.97
9745.12					
57	30.54	289.74	3.00	14957.51	11888.97
9745.12					
58	31.29	292.31	3.00	14664.98	11691.65
9583.39					
58	31.29	292.31	3.00	14664.98	11691.65
9583.39					
59	32.04	294.86	3.00	14363.62	11488.38
9416.78					
59	32.04	294.86	3.00	14363.62	11488.38
9416.78					
60	32.79	297.40	3.00	14053.67	11279.32
9245.41					
60	32.79	297.40	3.00	14053.67	11279.32
9245.41					
61	33.54	299.91	3.00	13735.36	11064.62

9069.42					
61	33.54	299.91	3.00	13735.36	11064.62
9069.42					
62	34.28	302.40	3.00	13408.93	10844.44
8888.94					
62	34.28	302.40	3.00	13408.93	10844.44
8888.94					
63	35.03	304.86	3.00	13074.62	10618.94
8704.11					
63	35.03	304.86	3.00	13074.62	10618.94
8704.11					
64	35.78	307.31	3.00	12732.68	10388.30
8515.06					
64	35.78	307.31	3.00	12732.68	10388.30
8515.06					
65	36.53	309.56	2.58	10665.54	8742.22
7165.81					
65	36.53	309.56	2.58	10665.54	8742.22
7165.81					
66	36.53	310.77	0.42	1718.58	1410.97
1156.54					
66	36.53	310.77	0.42	1718.58	1410.97
1156.54					
67	37.27	312.13	3.00	12074.68	9944.47
8151.27					
67	37.27	312.13	3.00	12074.68	9944.47
8151.27					
68	38.02	314.51	3.00	11784.51	9748.76
7990.84					
68	38.02	314.51	3.00	11784.51	9748.76
7990.84					
69	38.77	316.86	3.00	11485.85	9547.30
7825.71					
69	38.77	316.86	3.00	11485.85	9547.30
7825.71					
70	39.52	319.18	3.00	11178.95	9340.30
7656.04					
70	39.52	319.18	3.00	11178.95	9340.30
7656.04					
71	40.26	321.49	3.00	10864.09	9127.92
7481.96					
71	40.26	321.49	3.00	10864.09	9127.92
7481.96					
72	41.01	323.76	3.00	10541.54	8910.36
7303.63					
72	41.01	323.76	3.00	10541.54	8910.36
7303.63					
73	41.76	326.01	3.00	10211.59	8687.80
7121.20					
73	41.76	326.01	3.00	10211.59	8687.80

7121.20
  74   42.51   328.24   3.00   9874.51   8460.44
6934.84
  74   42.51   328.24   3.00   9874.51   8460.44
6934.84
  75   43.25   330.44   3.00   9530.60   8228.47
6744.70
  75   43.25   330.44   3.00   9530.60   8228.47
6744.70
  76   44.00   332.61   3.00   9180.16   7992.10
6550.95
  76   44.00   332.61   3.00   9180.16   7992.10
6550.95
  77   44.75   334.29   1.71   5055.10   4434.53
3634.89
  77   44.75   334.29   1.71   5055.10   4434.53
3634.89
  78   44.75   335.36   1.29   3749.36   3304.15
2708.34
  78   44.75   335.36   1.29   3749.36   3304.15
2708.34
  79   45.50   336.87   3.00   8272.80   7380.08
6049.28
  79   45.50   336.87   3.00   8272.80   7380.08
6049.28
  80   46.24   338.96   3.00   7708.61   6999.52
5737.35
  80   46.24   338.96   3.00   7708.61   6999.52
5737.35
  81   46.99   341.02   3.00   7145.50   6619.70
5426.02
  81   46.99   341.02   3.00   7145.50   6619.70
5426.02
  82   47.74   343.05   3.00   6583.82   6240.84
5115.48
  82   47.74   343.05   3.00   6583.82   6240.84
5115.48
  83   48.49   344.93   2.63   5299.54   5150.42
4221.68
  83   48.49   344.93   2.63   5299.54   5150.42
4221.68
  84   48.49   345.92   0.37   724.12   712.59
584.09
  84   48.49   345.92   0.37   724.12   712.59
584.09
  85   49.23   347.03   3.00   5446.04   5473.40
4486.42
  85   49.23   347.03   3.00   5446.04   5473.40
4486.42
  86   49.98   348.97   3.00   4859.44   5077.74

4162.11					
86	49.98	348.97	3.00	4859.44	5077.74
4162.11					
87	50.73	350.89	3.00	4276.86	4684.78
3840.01					
87	50.73	350.89	3.00	4276.86	4684.78
3840.01					
88	51.48	352.77	3.00	3698.68	4294.79
3520.35					
88	51.48	352.77	3.00	3698.68	4294.79
3520.35					
89	52.22	354.62	3.00	3125.30	3908.04
3203.33					
89	52.22	354.62	3.00	3125.30	3908.04
3203.33					
90	52.97	356.44	3.00	2557.13	3524.80
2889.20					
90	52.97	356.44	3.00	2557.13	3524.80
2889.20					
91	53.72	358.24	3.00	1994.58	3145.36
2578.19					
91	53.72	358.24	3.00	1994.58	3145.36
2578.19					
92	54.47	359.99	3.00	1438.11	2770.02
2270.52					
92	54.47	359.99	3.00	1438.11	2770.02
2270.52					
93	55.21	361.72	3.00	888.15	2399.07
1966.46					
93	55.21	361.72	3.00	888.15	2399.07
1966.46					
94	55.96	362.64	0.22	41.95	158.92
130.26					
94	55.96	362.64	0.22	41.95	158.92
130.26					
95	55.96	363.48	2.78	291.42	1865.94
1529.47					
95	55.96	363.48	2.78	291.42	1865.94
1529.47					
96	56.71	365.08	3.00	961.13	648.29
531.39					
96	56.71	365.08	3.00	961.13	648.29
531.39					
97	57.46	366.71	3.00	426.94	287.97
236.05					
97	57.46	366.71	3.00	426.94	287.97
236.05					
98	58.20	367.77	0.94	25.50	17.20
14.10					
98	58.20	367.77	0.94	25.50	17.20

14.10

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 98 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
35	30679.2	17712.6	35425.3	30.00	0.000000E+00

SUM OF MOMENTS = 0.687089E+00 (ft/lbs);Imbalance (Fraction of Total Weight) = 0.6645447E-06

Sum of the Resisting Forces = 750949.96 (lbs)

Average Available Shear Strength = 2934.10(psf)

Sum of the Driving Forces = 615537.13 (lbs)

Average Mobilized Shear Stress = 2405.01(psf)

Total length of the failure surface = 255.94(ft)

Factor of Safety Balance Check: FS = 1.21999

CAUTION - Factor Of Safety Is Calculated By The Simplified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.43457(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 1337.717(ft)

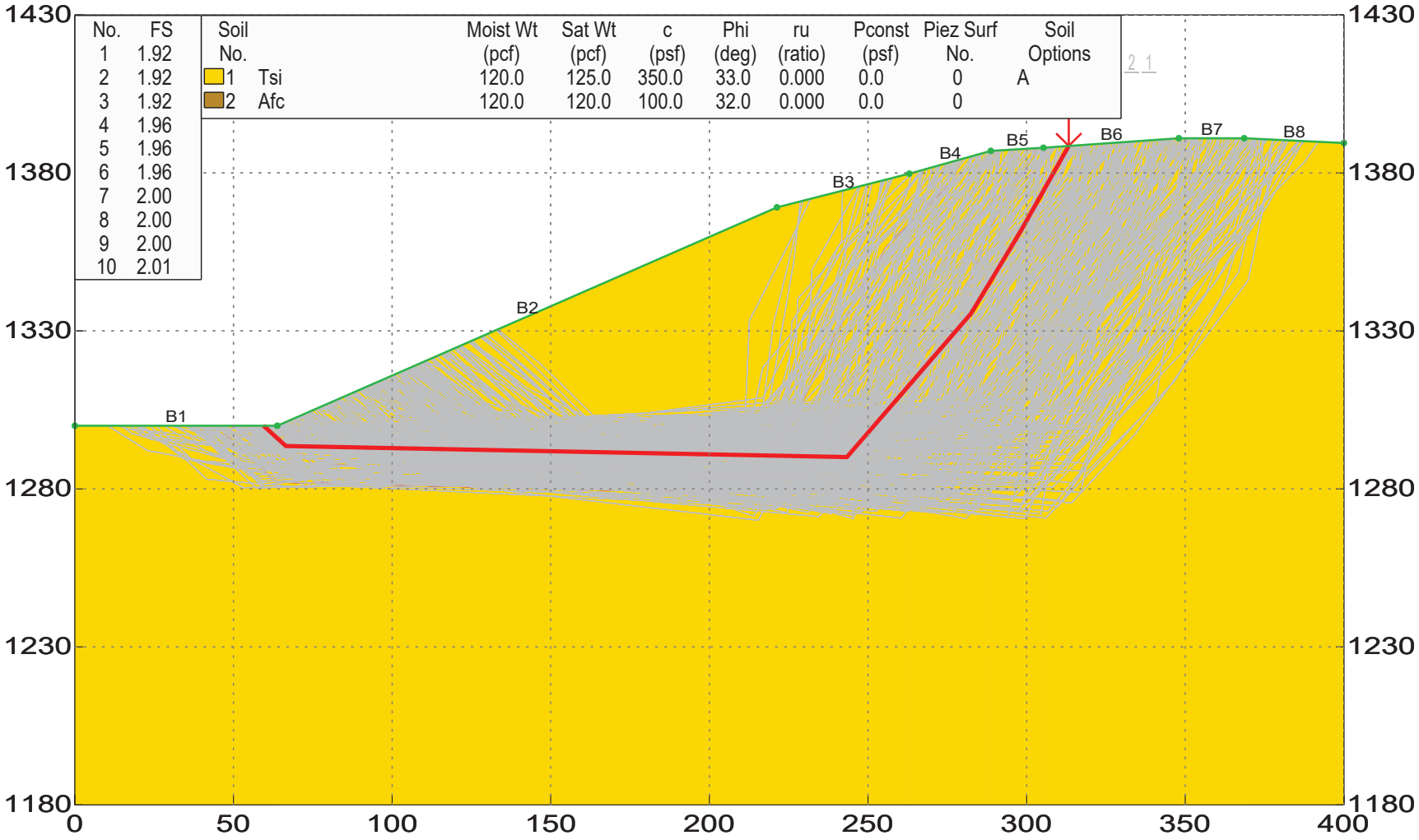
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

**** END OF GEOSTASE OUTPUT ****

EIP - Lake Elsinore
Section C-C' - Block (Static)

LGC Geotechnical / BPP

\Section C - Static - Block (No Keyway).gsd



No.	FS
1	1.92
2	1.92
3	1.92
4	1.96
5	1.96
6	1.96
7	2.00
8	2.00
9	2.00
10	2.01

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	Tsi	120.0	125.0	350.0	33.0	0.000	0.0	0	A
2	Afc	120.0	120.0	100.0	32.0	0.000	0.0	0	

GEOSTASE FS = 1.92

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

** GEOSTASE(R) (c)Copyright by Garry H. Gregory, Ph.D., P.E.,D.GE **

** Current Version 4.30.31-Double Precision, August 2019 **
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****

SLOPE STABILITY ANALYSIS SOFTWARE

Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Static - Block (No Keyway).gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Static - Block (No Keyway).OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section C-C' - Block (Static)

BOUNDARY DATA

8 Surface Boundaries

8 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1300.000	63.800	1300.000	1
2	63.800	1300.000	221.300	1369.100	1
3	221.300	1369.100	263.000	1379.800	1
4	263.000	1379.800	288.700	1387.000	1
5	288.700	1387.000	305.300	1388.000	1
6	305.300	1388.000	348.000	1391.000	1
7	348.000	1391.000	368.600	1391.000	1
8	368.600	1391.000	400.000	1389.500	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface No.	Water Pressure Constant (psf)	Water Pressure Option
1 Tsi	120.0	125.0	350.00	33.00	0.000	0	0.0	0
2 Afc	120.0	120.0	100.00	32.00	0.000	0	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	-5.0	350.00	33.00
2	0.0	100.00	18.00
3	90.0	350.00	33.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load Stress No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Deflection (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000	0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of
Non-Circular Zone Search = 30.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	50.00	1290.00	170.00	1290.00	20.00
2	210.00	1290.00	320.00	1290.00	40.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 41

Number of Trial Surfaces With Valid FS = 959

Percentage of Trial Surfaces With Non-Converged and/or Non-Valid FS Solutions of the Total Attempted = 4.1 %

Statistical Data On All Valid FS Values:
FS Max = 6.826 FS Min = 1.916 FS Ave = 3.308
Standard Deviation = 0.760 Coefficient of Variation = 22.98 %

Critical Surface is Sequence Number 174 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

Factor Of Safety For The Critical or Specified Surface = 1.916

Table 1 - Geometry Data on the 57 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.37	1.99	61.62	1298.01	1300.00	-42.28	0.00	5.90
2	2.72	5.80	65.16	1294.79	1300.60	-42.28	23.69	3.67
3	4.99	8.78	69.01	1293.51	1302.29	-1.13	23.69	4.99
4	4.99	11.07	74.01	1293.41	1304.48	-1.13	23.69	4.99
5	4.99	13.36	79.00	1293.31	1306.67	-1.13	23.69	4.99
6	4.99	15.65	83.99	1293.21	1308.86	-1.13	23.69	4.99

7	4.99	17.93	88.98	1293.11	1311.05	-1.13	23.69
4.99							
8	4.99	20.22	93.98	1293.02	1313.24	-1.13	23.69
4.99							
9	4.99	22.51	98.97	1292.92	1315.43	-1.13	23.69
4.99							
10	4.99	24.80	103.96	1292.82	1317.62	-1.13	23.69
4.99							
11	4.99	27.09	108.96	1292.72	1319.81	-1.13	23.69
4.99							
12	4.99	29.38	113.95	1292.62	1322.00	-1.13	23.69
4.99							
13	4.99	31.67	118.94	1292.52	1324.19	-1.13	23.69
4.99							
14	4.99	33.96	123.94	1292.42	1326.38	-1.13	23.69
4.99							
15	4.99	36.25	128.93	1292.33	1328.57	-1.13	23.69
4.99							
16	4.99	38.54	133.92	1292.23	1330.76	-1.13	23.69
4.99							
17	4.99	40.83	138.92	1292.13	1332.96	-1.13	23.69
4.99							
18	4.99	43.12	143.91	1292.03	1335.15	-1.13	23.69
4.99							
19	4.99	45.41	148.90	1291.93	1337.34	-1.13	23.69
4.99							
20	4.99	47.69	153.89	1291.83	1339.53	-1.13	23.69
4.99							
21	4.99	49.98	158.89	1291.73	1341.72	-1.13	23.69
4.99							
22	4.99	52.27	163.88	1291.64	1343.91	-1.13	23.69
4.99							
23	4.99	54.56	168.87	1291.54	1346.10	-1.13	23.69
4.99							
24	4.99	56.85	173.87	1291.44	1348.29	-1.13	23.69
4.99							
25	4.99	59.14	178.86	1291.34	1350.48	-1.13	23.69
4.99							
26	4.99	61.43	183.85	1291.24	1352.67	-1.13	23.69
4.99							
27	4.99	63.72	188.85	1291.14	1354.86	-1.13	23.69
4.99							
28	4.99	66.01	193.84	1291.04	1357.05	-1.13	23.69
4.99							
29	4.99	68.30	198.83	1290.95	1359.24	-1.13	23.69
4.99							
30	4.99	70.59	203.82	1290.85	1361.43	-1.13	23.69
4.99							
31	4.99	72.88	208.82	1290.75	1363.62	-1.13	23.69
4.99							

32	4.99	75.16	213.81	1290.65	1365.81	-1.13	23.69
4.99							
33	4.99	77.45	218.80	1290.55	1368.00	-1.13	23.69
4.99							
34	3.40	79.07	223.00	1290.47	1369.54	-1.13	14.39
3.40							
35	4.66	80.18	227.03	1290.39	1370.57	-1.13	14.39
4.66							
36	4.66	81.47	231.69	1290.30	1371.77	-1.13	14.39
4.66							
37	4.66	82.76	236.35	1290.20	1372.96	-1.13	14.39
4.66							
38	4.66	84.05	241.02	1290.11	1374.16	-1.13	14.39
4.66							
39	4.90	82.48	245.80	1292.91	1375.39	49.21	14.39
7.50							
40	4.90	78.06	250.70	1298.58	1376.64	49.21	14.39
7.50							
41	4.90	73.64	255.60	1304.26	1377.90	49.21	14.39
7.50							
42	4.90	69.22	260.50	1309.94	1379.16	49.21	14.39
7.50							
43	0.05	66.98	262.97	1312.81	1379.79	49.32	14.39
0.08							
44	4.48	64.98	265.24	1315.44	1380.43	49.32	15.65
6.87							
45	4.47	61.03	269.71	1320.65	1381.68	49.32	15.65
6.87							
46	4.47	57.08	274.19	1325.86	1382.93	49.32	15.65
6.87							
47	4.48	53.12	278.66	1331.07	1384.19	49.32	15.65
6.87							
48	1.60	50.44	281.70	1334.60	1385.04	49.32	15.65
2.45							
49	3.10	47.58	284.05	1338.12	1385.70	59.07	15.65
6.03							
50	3.10	43.27	287.15	1343.29	1386.57	59.07	15.65
6.03							
51	4.61	37.41	291.00	1349.73	1387.14	59.07	3.45
8.97							
52	4.61	30.00	295.61	1357.42	1387.42	59.07	3.45
8.97							
53	3.69	23.12	299.76	1364.54	1387.67	60.60	3.45
7.52							
54	3.69	16.80	303.45	1371.09	1387.89	60.60	3.45
7.52							
55	3.67	10.50	307.14	1377.63	1388.13	60.60	4.02
7.48							
56	3.67	4.24	310.81	1384.14	1388.39	60.60	4.02
7.48							

57 0.63 0.56 312.96 1387.98 1388.54 61.42 4.02
1.32

Table 2 - Force Data On The 57 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1041.3	0.0	0.0	0.0	0.0	0.0
2	1891.3	0.0	0.0	0.0	0.0	0.0
3	5259.4	0.0	0.0	0.0	0.0	0.0
4	6631.0	0.0	0.0	0.0	0.0	0.0
5	8002.6	0.0	0.0	0.0	0.0	0.0
6	9374.2	0.0	0.0	0.0	0.0	0.0
7	10745.8	0.0	0.0	0.0	0.0	0.0
8	12117.4	0.0	0.0	0.0	0.0	0.0
9	13489.0	0.0	0.0	0.0	0.0	0.0
10	14860.6	0.0	0.0	0.0	0.0	0.0
11	16232.3	0.0	0.0	0.0	0.0	0.0
12	17603.9	0.0	0.0	0.0	0.0	0.0
13	18975.5	0.0	0.0	0.0	0.0	0.0
14	20347.1	0.0	0.0	0.0	0.0	0.0
15	21718.7	0.0	0.0	0.0	0.0	0.0
16	23090.3	0.0	0.0	0.0	0.0	0.0
17	24461.9	0.0	0.0	0.0	0.0	0.0
18	25833.5	0.0	0.0	0.0	0.0	0.0
19	27205.1	0.0	0.0	0.0	0.0	0.0
20	28576.7	0.0	0.0	0.0	0.0	0.0
21	29948.3	0.0	0.0	0.0	0.0	0.0
22	31319.9	0.0	0.0	0.0	0.0	0.0
23	32691.5	0.0	0.0	0.0	0.0	0.0
24	34063.2	0.0	0.0	0.0	0.0	0.0
25	35434.8	0.0	0.0	0.0	0.0	0.0
26	36806.4	0.0	0.0	0.0	0.0	0.0
27	38178.0	0.0	0.0	0.0	0.0	0.0
28	39549.6	0.0	0.0	0.0	0.0	0.0
29	40921.2	0.0	0.0	0.0	0.0	0.0
30	42292.8	0.0	0.0	0.0	0.0	0.0
31	43664.4	0.0	0.0	0.0	0.0	0.0
32	45036.0	0.0	0.0	0.0	0.0	0.0
33	46407.6	0.0	0.0	0.0	0.0	0.0
34	32259.9	0.0	0.0	0.0	0.0	0.0
35	44856.7	0.0	0.0	0.0	0.0	0.0
36	45577.4	0.0	0.0	0.0	0.0	0.0
37	46298.1	0.0	0.0	0.0	0.0	0.0
38	47018.8	0.0	0.0	0.0	0.0	0.0

39	48496.0	0.0	0.0	0.0	0.0	0.0
40	45896.6	0.0	0.0	0.0	0.0	0.0
41	43297.2	0.0	0.0	0.0	0.0	0.0
42	40697.8	0.0	0.0	0.0	0.0	0.0
43	428.7	0.0	0.0	0.0	0.0	0.0
44	34895.5	0.0	0.0	0.0	0.0	0.0
45	32772.4	0.0	0.0	0.0	0.0	0.0
46	30649.4	0.0	0.0	0.0	0.0	0.0
47	28526.4	0.0	0.0	0.0	0.0	0.0
48	9683.7	0.0	0.0	0.0	0.0	0.0
49	17699.5	0.0	0.0	0.0	0.0	0.0
50	16097.5	0.0	0.0	0.0	0.0	0.0
51	20690.3	0.0	0.0	0.0	0.0	0.0
52	16589.3	0.0	0.0	0.0	0.0	0.0
53	10243.0	0.0	0.0	0.0	0.0	0.0
54	7439.6	0.0	0.0	0.0	0.0	0.0
55	4627.3	0.0	0.0	0.0	0.0	0.0
56	1869.3	0.0	0.0	0.0	0.0	0.0
57	42.1	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1430423.91(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1430423.91(lbs)

TOTAL AREA OF SLIDING MASS = 11920.20(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 57 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	350.00	33.00	A
2	1	350.00	33.00	A
3	1	100.00	18.00	A
4	1	100.00	18.00	A
5	1	100.00	18.00	A
6	1	100.00	18.00	A
7	1	100.00	18.00	A
8	1	100.00	18.00	A
9	1	100.00	18.00	A
10	1	100.00	18.00	A
11	1	100.00	18.00	A
12	1	100.00	18.00	A
13	1	100.00	18.00	A
14	1	100.00	18.00	A
15	1	100.00	18.00	A
16	1	100.00	18.00	A
17	1	100.00	18.00	A
18	1	100.00	18.00	A
19	1	100.00	18.00	A

20	1	100.00	18.00	A
21	1	100.00	18.00	A
22	1	100.00	18.00	A
23	1	100.00	18.00	A
24	1	100.00	18.00	A
25	1	100.00	18.00	A
26	1	100.00	18.00	A
27	1	100.00	18.00	A
28	1	100.00	18.00	A
29	1	100.00	18.00	A
30	1	100.00	18.00	A
31	1	100.00	18.00	A
32	1	100.00	18.00	A
33	1	100.00	18.00	A
34	1	100.00	18.00	A
35	1	100.00	18.00	A
36	1	100.00	18.00	A
37	1	100.00	18.00	A
38	1	100.00	18.00	A
39	1	350.00	33.00	A
40	1	350.00	33.00	A
41	1	350.00	33.00	A
42	1	350.00	33.00	A
43	1	350.00	33.00	A
44	1	350.00	33.00	A
45	1	350.00	33.00	A
46	1	350.00	33.00	A
47	1	350.00	33.00	A
48	1	350.00	33.00	A
49	1	350.00	33.00	A
50	1	350.00	33.00	A
51	1	350.00	33.00	A
52	1	350.00	33.00	A
53	1	350.00	33.00	A
54	1	350.00	33.00	A
55	1	350.00	33.00	A
56	1	350.00	33.00	A
57	1	350.00	33.00	A

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 57 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available

Slice No.	Base Angle (deg)	Slice Cntr (ft)	Base Leng. (ft)	Normal Stress (psf)	Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-42.28	61.62	5.90	626.71	756.99	397.92
1	-42.28	61.62	5.90	626.71	756.99	397.92
2	-42.28	65.16	3.67	1313.55	1203.03	632.38
2	-42.28	65.16	3.67	1313.55	1203.03	632.38
3	-1.13	69.01	4.99	1058.29	443.86	233.32
3	-1.13	69.01	4.99	1058.29	443.86	233.32
4	-1.13	74.01	4.99	1334.00	533.44	280.41
4	-1.13	74.01	4.99	1334.00	533.44	280.41
5	-1.13	79.00	4.99	1609.70	623.02	327.50
5	-1.13	79.00	4.99	1609.70	623.02	327.50
6	-1.13	83.99	4.99	1885.40	712.60	374.59
6	-1.13	83.99	4.99	1885.40	712.60	374.59
7	-1.13	88.98	4.99	2161.11	802.19	421.68
7	-1.13	88.98	4.99	2161.11	802.19	421.68
8	-1.13	93.98	4.99	2436.81	891.77	468.76
8	-1.13	93.98	4.99	2436.81	891.77	468.76
9	-1.13	98.97	4.99	2712.51	981.35	515.85
9	-1.13	98.97	4.99	2712.51	981.35	515.85
10	-1.13	103.96	4.99	2988.21	1070.93	562.94
10	-1.13	103.96	4.99	2988.21	1070.93	562.94
11	-1.13	108.96	4.99	3263.92	1160.51	610.03
11	-1.13	108.96	4.99	3263.92	1160.51	610.03

12	-1.13	113.95	4.99	3539.62	1250.09
657.12					
12	-1.13	113.95	4.99	3539.62	1250.09
657.12					
13	-1.13	118.94	4.99	3815.32	1339.67
704.21					
13	-1.13	118.94	4.99	3815.32	1339.67
704.21					
14	-1.13	123.94	4.99	4091.03	1429.26
751.30					
14	-1.13	123.94	4.99	4091.03	1429.26
751.30					
15	-1.13	128.93	4.99	4366.73	1518.84
798.39					
15	-1.13	128.93	4.99	4366.73	1518.84
798.39					
16	-1.13	133.92	4.99	4642.43	1608.42
845.48					
16	-1.13	133.92	4.99	4642.43	1608.42
845.48					
17	-1.13	138.92	4.99	4918.14	1698.00
892.57					
17	-1.13	138.92	4.99	4918.14	1698.00
892.57					
18	-1.13	143.91	4.99	5193.84	1787.58
939.66					
18	-1.13	143.91	4.99	5193.84	1787.58
939.66					
19	-1.13	148.90	4.99	5469.54	1877.16
986.75					
19	-1.13	148.90	4.99	5469.54	1877.16
986.75					
20	-1.13	153.89	4.99	5745.24	1966.74
1033.83					
20	-1.13	153.89	4.99	5745.24	1966.74
1033.83					
21	-1.13	158.89	4.99	6020.95	2056.32
1080.92					
21	-1.13	158.89	4.99	6020.95	2056.32
1080.92					
22	-1.13	163.88	4.99	6296.65	2145.91
1128.01					
22	-1.13	163.88	4.99	6296.65	2145.91
1128.01					
23	-1.13	168.87	4.99	6572.35	2235.49
1175.10					
23	-1.13	168.87	4.99	6572.35	2235.49
1175.10					
24	-1.13	173.87	4.99	6848.06	2325.07
1222.19					

24	-1.13	173.87	4.99	6848.06	2325.07
1222.19					
25	-1.13	178.86	4.99	7123.76	2414.65
1269.28					
25	-1.13	178.86	4.99	7123.76	2414.65
1269.28					
26	-1.13	183.85	4.99	7399.46	2504.23
1316.37					
26	-1.13	183.85	4.99	7399.46	2504.23
1316.37					
27	-1.13	188.85	4.99	7675.17	2593.81
1363.46					
27	-1.13	188.85	4.99	7675.17	2593.81
1363.46					
28	-1.13	193.84	4.99	7950.87	2683.39
1410.55					
28	-1.13	193.84	4.99	7950.87	2683.39
1410.55					
29	-1.13	198.83	4.99	8226.57	2772.97
1457.64					
29	-1.13	198.83	4.99	8226.57	2772.97
1457.64					
30	-1.13	203.82	4.99	8502.27	2862.56
1504.73					
30	-1.13	203.82	4.99	8502.27	2862.56
1504.73					
31	-1.13	208.82	4.99	8777.98	2952.14
1551.81					
31	-1.13	208.82	4.99	8777.98	2952.14
1551.81					
32	-1.13	213.81	4.99	9053.68	3041.72
1598.90					
32	-1.13	213.81	4.99	9053.68	3041.72
1598.90					
33	-1.13	218.80	4.99	9329.38	3131.30
1645.99					
33	-1.13	218.80	4.99	9329.38	3131.30
1645.99					
34	-1.13	223.00	3.40	9523.81	3194.47
1679.20					
34	-1.13	223.00	3.40	9523.81	3194.47
1679.20					
35	-1.13	227.03	4.66	9657.97	3238.07
1702.12					
35	-1.13	227.03	4.66	9657.97	3238.07
1702.12					
36	-1.13	231.69	4.66	9813.13	3288.48
1728.62					
36	-1.13	231.69	4.66	9813.13	3288.48
1728.62					

37	-1.13	236.35	4.66	9968.29	3338.89
1755.12					
37	-1.13	236.35	4.66	9968.29	3338.89
1755.12					
38	-1.13	241.02	4.66	10123.45	3389.31
1781.62					
38	-1.13	241.02	4.66	10123.45	3389.31
1781.62					
39	49.21	245.80	7.50	6786.57	4757.25
2500.69					
39	49.21	245.80	7.50	6786.57	4757.25
2500.69					
40	49.21	250.70	7.50	6414.19	4515.42
2373.57					
40	49.21	250.70	7.50	6414.19	4515.42
2373.57					
41	49.21	255.60	7.50	6041.81	4273.60
2246.45					
41	49.21	255.60	7.50	6041.81	4273.60
2246.45					
42	49.21	260.50	7.50	5669.44	4031.78
2119.34					
42	49.21	260.50	7.50	5669.44	4031.78
2119.34					
43	49.32	262.97	0.08	5473.92	3904.81
2052.59					
43	49.32	262.97	0.08	5473.92	3904.81
2052.59					
44	49.32	265.24	6.87	5305.59	3795.49
1995.13					
44	49.32	265.24	6.87	5305.59	3795.49
1995.13					
45	49.32	269.71	6.87	4973.00	3579.51
1881.60					
45	49.32	269.71	6.87	4973.00	3579.51
1881.60					
46	49.32	274.19	6.87	4640.41	3363.52
1768.06					
46	49.32	274.19	6.87	4640.41	3363.52
1768.06					
47	49.32	278.66	6.87	4307.82	3147.53
1654.53					
47	49.32	278.66	6.87	4307.82	3147.53
1654.53					
48	49.32	281.70	2.45	4082.07	3000.93
1577.46					
48	49.32	281.70	2.45	4082.07	3000.93
1577.46					
49	59.07	284.05	6.03	3337.89	2517.65
1323.42					

49	59.07	284.05	6.03	3337.89	2517.65	1323.42
50	59.07	287.15	6.03	3017.28	2309.44	1213.98
50	59.07	287.15	6.03	3017.28	2309.44	1213.98
51	59.07	291.00	8.97	2580.92	2026.07	1065.02
51	59.07	291.00	8.97	2580.92	2026.07	1065.02
52	59.07	295.61	8.97	2028.81	1667.53	876.55
52	59.07	295.61	8.97	2028.81	1667.53	876.55
53	60.60	299.76	7.52	1468.95	1303.95	685.43
53	60.60	299.76	7.52	1468.95	1303.95	685.43
54	60.60	303.45	7.52	1008.77	1005.11	528.34
54	60.60	303.45	7.52	1008.77	1005.11	528.34
55	60.60	307.14	7.48	551.14	707.92	372.12
55	60.60	307.14	7.48	551.14	707.92	372.12
56	60.60	310.81	7.48	96.05	412.38	216.77
56	60.60	310.81	7.48	96.05	412.38	216.77
57	61.42	312.96	1.32	39.91	25.92	13.63
57	61.42	312.96	1.32	39.91	25.92	13.63

Table 4 - Base Force Data on the 57 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force * (lbs)
1	-42.28	61.62	5.90	3700.69	4469.97	2349.68
1	-42.28	61.62	5.90	3700.69	4469.97	2349.68

2	-42.28	65.16	3.67	4821.87	4416.16
2321.39					
2	-42.28	65.16	3.67	4821.87	4416.16
2321.39					
3	-1.13	69.01	4.99	5285.12	2216.64
1165.20					
3	-1.13	69.01	4.99	5285.12	2216.64
1165.20					
4	-1.13	74.01	4.99	6661.98	2664.01
1400.36					
4	-1.13	74.01	4.99	6661.98	2664.01
1400.36					
5	-1.13	79.00	4.99	8038.85	3111.38
1635.52					
5	-1.13	79.00	4.99	8038.85	3111.38
1635.52					
6	-1.13	83.99	4.99	9415.71	3558.75
1870.68					
6	-1.13	83.99	4.99	9415.71	3558.75
1870.68					
7	-1.13	88.98	4.99	10792.57	4006.12
2105.85					
7	-1.13	88.98	4.99	10792.57	4006.12
2105.85					
8	-1.13	93.98	4.99	12169.43	4453.49
2341.01					
8	-1.13	93.98	4.99	12169.43	4453.49
2341.01					
9	-1.13	98.97	4.99	13546.29	4900.86
2576.17					
9	-1.13	98.97	4.99	13546.29	4900.86
2576.17					
10	-1.13	103.96	4.99	14923.15	5348.23
2811.34					
10	-1.13	103.96	4.99	14923.15	5348.23
2811.34					
11	-1.13	108.96	4.99	16300.01	5795.60
3046.50					
11	-1.13	108.96	4.99	16300.01	5795.60
3046.50					
12	-1.13	113.95	4.99	17676.87	6242.96
3281.66					
12	-1.13	113.95	4.99	17676.87	6242.96
3281.66					
13	-1.13	118.94	4.99	19053.74	6690.33
3516.83					
13	-1.13	118.94	4.99	19053.74	6690.33
3516.83					
14	-1.13	123.94	4.99	20430.60	7137.70
3751.99					

14	-1.13	123.94	4.99	20430.60	7137.70	3751.99
15	-1.13	128.93	4.99	21807.46	7585.07	3987.15
15	-1.13	128.93	4.99	21807.46	7585.07	3987.15
16	-1.13	133.92	4.99	23184.32	8032.44	4222.32
16	-1.13	133.92	4.99	23184.32	8032.44	4222.32
17	-1.13	138.92	4.99	24561.18	8479.81	4457.48
17	-1.13	138.92	4.99	24561.18	8479.81	4457.48
18	-1.13	143.91	4.99	25938.04	8927.18	4692.64
18	-1.13	143.91	4.99	25938.04	8927.18	4692.64
19	-1.13	148.90	4.99	27314.90	9374.55	4927.81
19	-1.13	148.90	4.99	27314.90	9374.55	4927.81
20	-1.13	153.89	4.99	28691.76	9821.92	5162.97
20	-1.13	153.89	4.99	28691.76	9821.92	5162.97
21	-1.13	158.89	4.99	30068.63	10269.29	5398.13
21	-1.13	158.89	4.99	30068.63	10269.29	5398.13
22	-1.13	163.88	4.99	31445.49	10716.66	5633.30
22	-1.13	163.88	4.99	31445.49	10716.66	5633.30
23	-1.13	168.87	4.99	32822.35	11164.03	5868.46
23	-1.13	168.87	4.99	32822.35	11164.03	5868.46
24	-1.13	173.87	4.99	34199.21	11611.40	6103.62
24	-1.13	173.87	4.99	34199.21	11611.40	6103.62
25	-1.13	178.86	4.99	35576.07	12058.77	6338.79
25	-1.13	178.86	4.99	35576.07	12058.77	6338.79
26	-1.13	183.85	4.99	36952.93	12506.14	6573.95
26	-1.13	183.85	4.99	36952.93	12506.14	6573.95

27	-1.13	188.85	4.99	38329.79	12953.50
6809.11					
27	-1.13	188.85	4.99	38329.79	12953.50
6809.11					
28	-1.13	193.84	4.99	39706.65	13400.87
7044.28					
28	-1.13	193.84	4.99	39706.65	13400.87
7044.28					
29	-1.13	198.83	4.99	41083.52	13848.24
7279.44					
29	-1.13	198.83	4.99	41083.52	13848.24
7279.44					
30	-1.13	203.82	4.99	42460.38	14295.61
7514.60					
30	-1.13	203.82	4.99	42460.38	14295.61
7514.60					
31	-1.13	208.82	4.99	43837.24	14742.98
7749.77					
31	-1.13	208.82	4.99	43837.24	14742.98
7749.77					
32	-1.13	213.81	4.99	45214.10	15190.35
7984.93					
32	-1.13	213.81	4.99	45214.10	15190.35
7984.93					
33	-1.13	218.80	4.99	46590.96	15637.72
8220.09					
33	-1.13	218.80	4.99	46590.96	15637.72
8220.09					
34	-1.13	223.00	3.40	32387.28	10863.33
5710.40					
34	-1.13	223.00	3.40	32387.28	10863.33
5710.40					
35	-1.13	227.03	4.66	45033.71	15098.62
7936.71					
35	-1.13	227.03	4.66	45033.71	15098.62
7936.71					
36	-1.13	231.69	4.66	45757.19	15333.70
8060.28					
36	-1.13	231.69	4.66	45757.19	15333.70
8060.28					
37	-1.13	236.35	4.66	46480.67	15568.77
8183.85					
37	-1.13	236.35	4.66	46480.67	15568.77
8183.85					
38	-1.13	241.02	4.66	47204.15	15803.84
8307.42					
38	-1.13	241.02	4.66	47204.15	15803.84
8307.42					
39	49.21	245.80	7.50	50899.24	35679.35
18755.14					

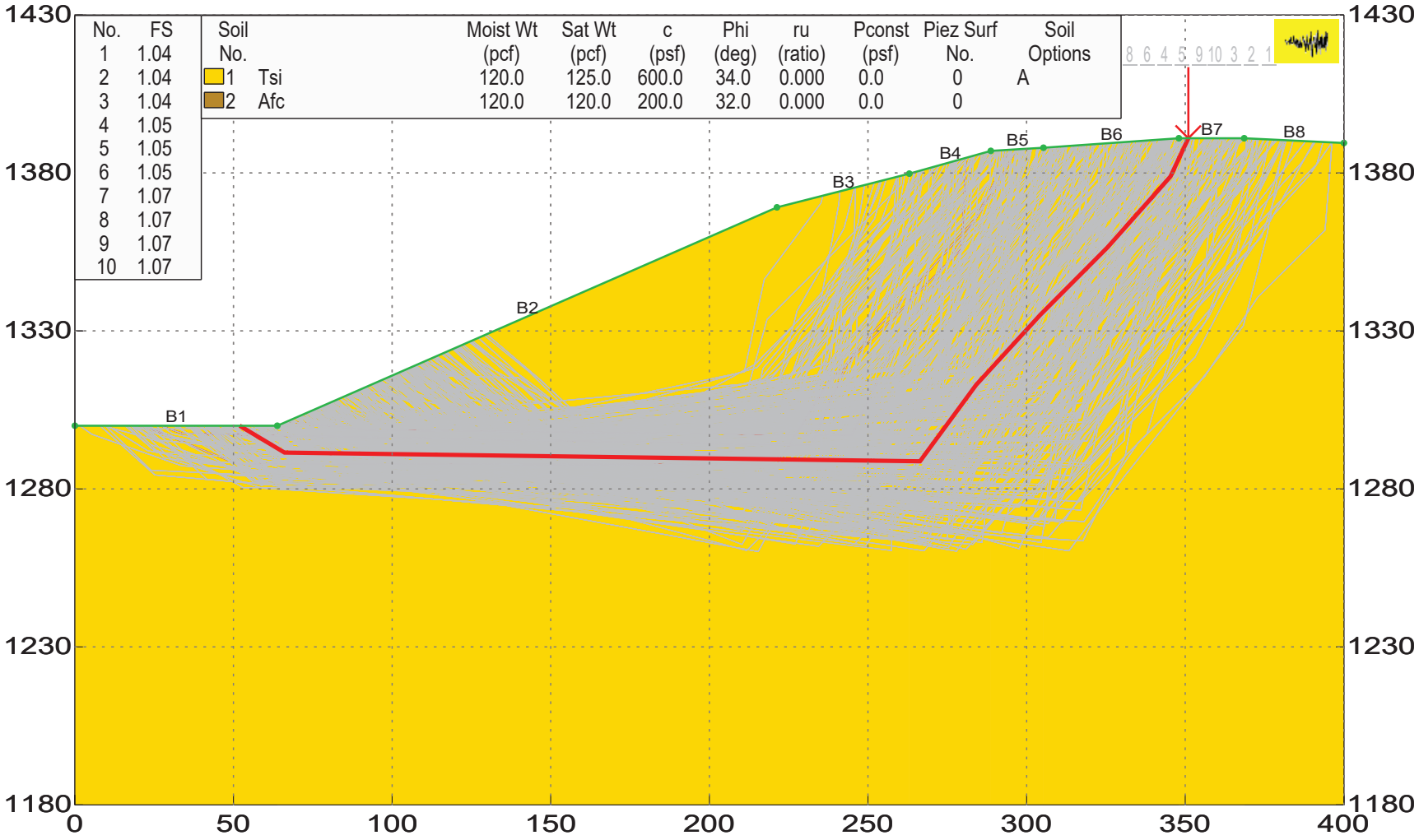
39	49.21	245.80	7.50	50899.24	35679.35	18755.14
40	49.21	250.70	7.50	48106.42	33865.68	17801.77
40	49.21	250.70	7.50	48106.42	33865.68	17801.77
41	49.21	255.60	7.50	45313.61	32052.00	16848.39
41	49.21	255.60	7.50	45313.61	32052.00	16848.39
42	49.21	260.50	7.50	42520.79	30238.33	15895.02
42	49.21	260.50	7.50	42520.79	30238.33	15895.02
43	49.32	262.97	0.08	447.92	319.53	167.96
43	49.32	262.97	0.08	447.92	319.53	167.96
44	49.32	265.24	6.87	36427.48	26059.34	13698.30
44	49.32	265.24	6.87	36427.48	26059.34	13698.30
45	49.32	269.71	6.87	34143.97	24576.40	12918.78
45	49.32	269.71	6.87	34143.97	24576.40	12918.78
46	49.32	274.19	6.87	31860.45	23093.47	12139.27
46	49.32	274.19	6.87	31860.45	23093.47	12139.27
47	49.32	278.66	6.87	29576.93	21610.54	11359.75
47	49.32	278.66	6.87	29576.93	21610.54	11359.75
48	49.32	281.70	2.45	10020.31	7366.41	3872.21
48	49.32	281.70	2.45	10020.31	7366.41	3872.21
49	59.07	284.05	6.03	20134.80	15186.96	7983.15
49	59.07	284.05	6.03	20134.80	15186.96	7983.15
50	59.07	287.15	6.03	18200.79	13931.00	7322.94
50	59.07	287.15	6.03	18200.79	13931.00	7322.94
51	59.07	291.00	8.97	23145.15	18169.37	9550.87
51	59.07	291.00	8.97	23145.15	18169.37	9550.87

```
  52      59.07     295.61       8.97        18193.98        14954.04
7860.71
  52      59.07     295.61       8.97        18193.98        14954.04
7860.71
  53      60.60     299.76       7.52        11046.01         9805.25
5154.21
  53      60.60     299.76       7.52        11046.01         9805.25
5154.21
  54      60.60     303.45       7.52         7585.66         7558.07
3972.96
  54      60.60     303.45       7.52         7585.66         7558.07
3972.96
  55      60.60     307.14       7.48         4122.72         5295.44
2783.59
  55      60.60     307.14       7.48         4122.72         5295.44
2783.59
  56      60.60     310.81       7.48          718.50         3084.71
1621.50
  56      60.60     310.81       7.48          718.50         3084.71
1621.50
  57      61.42     312.96       1.32           52.59           34.15
17.95
  57      61.42     312.96       1.32           52.59           34.15
17.95

     Sum of the Resisting Forces =  553835.09 (lbs)

     Average Available Shear Strength =   1799.57(psf)

     Sum of the Driving Forces =   312465.10 (lbs)

     Average Mobilized Shear Stress =    1015.29(psf)

     Total length of the failure surface =     307.76(ft)


     Factor of Safety Balance Check: FS =  1.77247

     Janbu's Correction Factor (fo) =  1.0808

     Janub's FS Corrected =  1.91564

                         **** END OF GEOSTASE OUTPUT ****
```

EIP - Lake Elsinore
Section C-C' - Block (Seismic (117A))

LGC Geotechnical / BPP

\Section C - Seismic (117A) - Block (No Keyway).gsd



GEOSTASE FS = 1.04

Simplified Janbu (Corrected) Method

kh = 0.26000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

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SLOPE STABILITY ANALYSIS SOFTWARE
Simplified Bishop, Simplified Janbu, or General Equilibrium (GE) Options.
(Spencer, Morgenstern-Price, USACE, and Lowe & Karafiath)
Including Pier/Pile, Planar Reinf, Nail, Tieback, Line Loads
Applied Forces, Fiber-Reinforced Soil (FRS), Distributed Loads
Nonlinear Undrained Shear Strength, Curved Strength Envelope,
Anisotropic Strengths, Water Surfaces, 3-Stage Rapid Drawdown
2- or 3-Stage Pseudo-Static & Simplified Newmark Seismic Analyses.

****

Analysis Date: 1/ 31/ 2024
Analysis Time:
Analysis By: LGC Geotechnical / BPP

Input File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Seismic (117A) - Block (No Keyway).gsd

Output File Name: Z:\2023\23160-01 EIP – Lake Elsinore\Engineering\Slope Stability\Section C\2024_01_30\Section C - Seismic (117A) - Block (No Keyway).OUT

Unit System: English

PROJECT: EIP - Lake Elsinore

DESCRIPTION: Section C-C' - Block (Seismic (117A))

BOUNDARY DATA

8 Surface Boundaries

8 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	1300.000	63.800	1300.000	1
2	63.800	1300.000	221.300	1369.100	1
3	221.300	1369.100	263.000	1379.800	1
4	263.000	1379.800	288.700	1387.000	1
5	288.700	1387.000	305.300	1388.000	1
6	305.300	1388.000	348.000	1391.000	1
7	348.000	1391.000	368.600	1391.000	1
8	368.600	1391.000	400.000	1389.500	1

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 1180.000(ft)

MOHR-COULOMB SOIL PARAMETERS

2 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Water Surface No.	Water Pressure Constant (psf)	Water Pressure Option
1 Tsi	120.0	125.0	600.00	34.00	0.000	0	0.0	0
2 Afc	120.0	120.0	200.00	32.00	0.000	0	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	-5.0	600.00	34.00
2	0.0	200.00	18.00
3	90.0	600.00	34.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	18	224.700	372.600	250.000	280.900	372.700	250.000	0.00

NOTE - Load Stress Varies Linearly Within Specified Range.
For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.26000(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
(NOTE:Input Velocity = 0.0 will result in default Peak
Velocity = 2 times(PGA) times 2.5 fps or 0.762 mps)
Specified Seismic Pore-Pressure Factor = 0.000
Horizontal Seismic Force is Applied at Center of Gravity of Slices

TRIAL FAILURE SURFACE DATA

Janbus Correction Factor is being used for the case of c & phi both > 0

A Non-Circular Zone Search Has Been Selected For Analysis
Using Random Generation Within Specified Zones.

2 Zones Defined For Generation Of Non-Circular Surfaces

1000 Trial Surfaces Have Been Generated.

Length Of Line Segments For Active And Passive Portions Of

Non-Circular Zone Search = 30.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	50.00	1290.00	170.00	1290.00	20.00
2	210.00	1290.00	320.00	1290.00	60.00

The Simplified Janbu (Corrected) Method Was Selected for FS Analysis.

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces Did Not Converge in 0 Iterations.

Number of Trial Surfaces with Non-Converged FS = 8

Number of Trial Surfaces With Valid FS = 992

Percentage of Trial Surfaces With Non-Converged and/or Non-Valid FS Solutions of the Total Attempted = 0.8 %

Statistical Data On All Valid FS Values:
FS Max = 3.488 FS Min = 1.041 FS Ave = 1.845
Standard Deviation = 0.440 Coefficient of Variation = 23.86 %

Critical Surface is Sequence Number 78 of Those Analyzed.

*****BEGINNING OF DETAILED GEOSTASE OUTPUT FOR CRITICAL SURFACE FROM A SEARCH*****

Factor Of Safety For The Critical or Specified Surface = 1.041

Table 1 - Geometry Data on the 63 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	5.94	1.78	54.89	1298.22	1300.00	-30.95	0.00	

6.92
2 5.94 5.34 60.83 1294.66 1300.00 -30.95 0.00
6.92
3 2.28 8.30 64.94 1292.20 1300.50 -30.95 23.69
2.65
4 5.01 10.62 68.58 1291.48 1302.10 -0.79 23.69
5.01
5 5.01 12.88 73.59 1291.41 1304.29 -0.79 23.69
5.01
6 5.01 15.15 78.59 1291.34 1306.49 -0.79 23.69
5.01
7 5.01 17.42 83.60 1291.27 1308.69 -0.79 23.69
5.01
8 5.01 19.68 88.61 1291.20 1310.88 -0.79 23.69
5.01
9 5.01 21.95 93.62 1291.13 1313.08 -0.79 23.69
5.01
10 5.01 24.21 98.62 1291.07 1315.28 -0.79 23.69
5.01
11 5.01 26.48 103.63 1291.00 1317.47 -0.79 23.69
5.01
12 5.01 28.74 108.64 1290.93 1319.67 -0.79 23.69
5.01
13 5.01 31.01 113.65 1290.86 1321.87 -0.79 23.69
5.01
14 5.01 33.27 118.65 1290.79 1324.07 -0.79 23.69
5.01
15 5.01 35.54 123.66 1290.72 1326.26 -0.79 23.69
5.01
16 5.01 37.80 128.67 1290.65 1328.46 -0.79 23.69
5.01
17 5.01 40.07 133.67 1290.59 1330.66 -0.79 23.69
5.01
18 5.01 42.34 138.68 1290.52 1332.85 -0.79 23.69
5.01
19 5.01 44.60 143.69 1290.45 1335.05 -0.79 23.69
5.01
20 5.01 46.87 148.70 1290.38 1337.25 -0.79 23.69
5.01
21 5.01 49.13 153.70 1290.31 1339.44 -0.79 23.69
5.01
22 5.01 51.40 158.71 1290.24 1341.64 -0.79 23.69
5.01
23 5.01 53.66 163.72 1290.17 1343.84 -0.79 23.69
5.01
24 5.01 55.93 168.72 1290.10 1346.03 -0.79 23.69
5.01
25 5.01 58.19 173.73 1290.04 1348.23 -0.79 23.69
5.01
26 5.01 60.46 178.74 1289.97 1350.43 -0.79 23.69

5.01							
27	5.01	62.73	183.75	1289.90	1352.62	-0.79	23.69
5.01							
28	5.01	64.99	188.75	1289.83	1354.82	-0.79	23.69
5.01							
29	5.01	67.26	193.76	1289.76	1357.02	-0.79	23.69
5.01							
30	5.01	69.52	198.77	1289.69	1359.21	-0.79	23.69
5.01							
31	5.01	71.79	203.77	1289.62	1361.41	-0.79	23.69
5.01							
32	5.01	74.05	208.78	1289.56	1363.61	-0.79	23.69
5.01							
33	5.01	76.32	213.79	1289.49	1365.80	-0.79	23.69
5.01							
34	5.01	78.58	218.80	1289.42	1368.00	-0.79	23.69
5.01							
35	3.40	80.18	223.00	1289.36	1369.54	-0.79	14.39
3.40							
36	4.79	81.28	227.09	1289.30	1370.59	-0.79	14.39
4.79							
37	4.79	82.58	231.88	1289.24	1371.82	-0.79	14.39
4.79							
38	4.79	83.87	236.67	1289.17	1373.04	-0.79	14.39
4.79							
39	4.79	85.16	241.46	1289.11	1374.27	-0.79	14.39
4.79							
40	4.79	86.46	246.24	1289.04	1375.50	-0.79	14.39
4.79							
41	4.79	87.75	251.03	1288.98	1376.73	-0.79	14.39
4.79							
42	4.79	89.05	255.82	1288.91	1377.96	-0.79	14.39
4.79							
43	4.79	90.34	260.61	1288.84	1379.19	-0.79	14.39
4.79							
44	3.36	91.48	264.68	1288.79	1380.27	-0.79	15.65
3.36							
45	4.85	89.35	268.79	1292.07	1381.42	53.78	15.65
8.20							
46	4.85	84.09	273.63	1298.69	1382.78	53.78	15.65
8.20							
47	4.85	78.83	278.48	1305.31	1384.14	53.78	15.65
8.20							
48	3.19	74.47	282.49	1310.79	1385.26	53.78	15.65
5.40							
49	4.61	70.86	286.39	1315.50	1386.35	47.63	15.65
6.84							
50	5.20	66.28	291.30	1320.88	1387.16	47.63	3.45
7.72							
51	5.20	60.89	296.50	1326.58	1387.47	47.63	3.45

7.72							
52	5.20	55.50	301.70	1332.28	1387.78	47.63	3.45
7.72							
53	1.00	52.33	304.80	1335.64	1387.97	45.14	3.45
1.41							
54	5.04	49.51	307.82	1338.67	1388.18	45.14	4.02
7.15							
55	5.04	44.80	312.86	1343.74	1388.53	45.14	4.02
7.15							
56	5.04	40.08	317.90	1348.80	1388.89	45.14	4.02
7.15							
57	5.04	35.37	322.94	1353.87	1389.24	45.14	4.02
7.15							
58	4.97	30.38	327.95	1359.21	1389.59	48.54	4.02
7.50							
59	4.97	25.11	332.91	1364.83	1389.94	48.54	4.02
7.50							
60	4.97	19.84	337.88	1370.45	1390.29	48.54	4.02
7.50							
61	4.97	14.56	342.84	1376.07	1390.64	48.54	4.02
7.50							
62	2.67	9.15	346.66	1381.76	1390.91	65.05	4.02
6.34							
63	2.96	3.19	349.48	1387.81	1391.00	65.05	0.00
7.03							

Table 2 - Force Data On The 63 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1268.9	0.0	0.0	329.9	0.0	0.0
2	3806.7	0.0	0.0	989.7	0.0	0.0
3	2268.7	0.0	0.0	589.9	0.0	0.0
4	6380.7	0.0	0.0	1659.0	0.0	0.0
5	7741.9	0.0	0.0	2012.9	0.0	0.0
6	9103.1	0.0	0.0	2366.8	0.0	0.0
7	10464.4	0.0	0.0	2720.7	0.0	0.0
8	11825.6	0.0	0.0	3074.7	0.0	0.0
9	13186.9	0.0	0.0	3428.6	0.0	0.0
10	14548.1	0.0	0.0	3782.5	0.0	0.0
11	15909.4	0.0	0.0	4136.4	0.0	0.0
12	17270.6	0.0	0.0	4490.4	0.0	0.0
13	18631.9	0.0	0.0	4844.3	0.0	0.0
14	19993.1	0.0	0.0	5198.2	0.0	0.0
15	21354.3	0.0	0.0	5552.1	0.0	0.0

16	22715.6	0.0	0.0	5906.1	0.0	0.0
17	24076.8	0.0	0.0	6260.0	0.0	0.0
18	25438.1	0.0	0.0	6613.9	0.0	0.0
19	26799.3	0.0	0.0	6967.8	0.0	0.0
20	28160.6	0.0	0.0	7321.7	0.0	0.0
21	29521.8	0.0	0.0	7675.7	0.0	0.0
22	30883.1	0.0	0.0	8029.6	0.0	0.0
23	32244.3	0.0	0.0	8383.5	0.0	0.0
24	33605.6	0.0	0.0	8737.4	0.0	0.0
25	34966.8	0.0	0.0	9091.4	0.0	0.0
26	36328.0	0.0	0.0	9445.3	0.0	0.0
27	37689.3	0.0	0.0	9799.2	0.0	0.0
28	39050.5	0.0	0.0	10153.1	0.0	0.0
29	40411.8	0.0	0.0	10507.1	0.0	0.0
30	41773.0	0.0	0.0	10861.0	0.0	0.0
31	43134.3	0.0	0.0	11214.9	0.0	0.0
32	44495.5	0.0	0.0	11568.8	0.0	0.0
33	45856.8	0.0	0.0	11922.8	0.0	0.0
34	47218.0	0.0	0.0	12276.7	0.0	0.0
35	32711.7	0.0	0.0	8505.0	0.0	0.0
36	46696.7	0.0	0.0	12141.1	0.0	0.0
37	47440.1	0.0	0.0	12334.4	0.0	0.0
38	48183.6	0.0	0.0	12527.7	0.0	0.0
39	48927.0	0.0	0.0	12721.0	0.0	0.0
40	49670.5	0.0	0.0	12914.3	0.0	0.0
41	50414.0	0.0	0.0	13107.6	0.0	0.0
42	51157.4	0.0	0.0	13300.9	0.0	0.0
43	51900.9	0.0	0.0	13494.2	0.0	0.0
44	36917.6	0.0	0.0	9598.6	0.0	0.0
45	51953.5	0.0	0.0	13507.9	0.0	0.0
46	48895.2	0.0	0.0	12712.7	0.0	0.0
47	45836.8	0.0	0.0	11917.6	0.0	0.0
48	28484.1	0.0	0.0	7405.9	0.0	0.0
49	39218.2	0.0	0.0	10196.7	0.0	0.0
50	41368.0	0.0	0.0	10755.7	0.0	0.0
51	38004.2	0.0	0.0	9881.1	0.0	0.0
52	34640.3	0.0	0.0	9006.5	0.0	0.0
53	6255.6	0.0	0.0	1626.5	0.0	0.0
54	29947.7	0.0	0.0	7786.4	0.0	0.0
55	27097.2	0.0	0.0	7045.3	0.0	0.0
56	24246.8	0.0	0.0	6304.2	0.0	0.0
57	21396.4	0.0	0.0	5563.1	0.0	0.0
58	18102.7	0.0	0.0	4706.7	0.0	0.0
59	14961.3	0.0	0.0	3889.9	0.0	0.0
60	11820.0	0.0	0.0	3073.2	0.0	0.0
61	8678.6	0.0	0.0	2256.4	0.0	0.0
62	2935.1	0.0	0.0	763.1	0.0	0.0
63	1133.5	0.0	0.0	294.7	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1797118.02(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1797118.02(lbs)

TOTAL AREA OF SLIDING MASS = 14975.98(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 63 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	600.00	34.00	A
2	1	600.00	34.00	A
3	1	600.00	34.00	A
4	1	200.00	18.00	A
5	1	200.00	18.00	A
6	1	200.00	18.00	A
7	1	200.00	18.00	A
8	1	200.00	18.00	A
9	1	200.00	18.00	A
10	1	200.00	18.00	A
11	1	200.00	18.00	A
12	1	200.00	18.00	A
13	1	200.00	18.00	A
14	1	200.00	18.00	A
15	1	200.00	18.00	A
16	1	200.00	18.00	A
17	1	200.00	18.00	A
18	1	200.00	18.00	A
19	1	200.00	18.00	A
20	1	200.00	18.00	A
21	1	200.00	18.00	A
22	1	200.00	18.00	A
23	1	200.00	18.00	A
24	1	200.00	18.00	A
25	1	200.00	18.00	A
26	1	200.00	18.00	A
27	1	200.00	18.00	A
28	1	200.00	18.00	A
29	1	200.00	18.00	A
30	1	200.00	18.00	A
31	1	200.00	18.00	A
32	1	200.00	18.00	A
33	1	200.00	18.00	A
34	1	200.00	18.00	A
35	1	200.00	18.00	A
36	1	200.00	18.00	A
37	1	200.00	18.00	A
38	1	200.00	18.00	A
39	1	200.00	18.00	A
40	1	200.00	18.00	A

41	1	200.00	18.00	A
42	1	200.00	18.00	A
43	1	200.00	18.00	A
44	1	200.00	18.00	A
45	1	600.00	34.00	A
46	1	600.00	34.00	A
47	1	600.00	34.00	A
48	1	600.00	34.00	A
49	1	600.00	34.00	A
50	1	600.00	34.00	A
51	1	600.00	34.00	A
52	1	600.00	34.00	A
53	1	600.00	34.00	A
54	1	600.00	34.00	A
55	1	600.00	34.00	A
56	1	600.00	34.00	A
57	1	600.00	34.00	A
58	1	600.00	34.00	A
59	1	600.00	34.00	A
60	1	600.00	34.00	A
61	1	600.00	34.00	A
62	1	600.00	34.00	A
63	1	600.00	34.00	A

SOIL OPTIONS: A = ANISOTROPIC, C = CURVED STRENGTH ENVELOPE (TANGENT PHI & C),
F = FIBER-REINFORCED SOIL (FRS), N = NONLINEAR UNDRAINED SHEAR STRENGTH,
R = RAPID DRAWDOWN OR RAPID LOADING (SEISMIC) SHEAR STRENGTH
NOTE: Phi and C in Table 4 are modified values based on specified
Soil Options (if any).

TABLE 3 - Effective and Base Shear Stress Data on the 63 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-30.95	54.89	6.92	1007.39	1279.49	1224.39
1	-30.95	54.89	6.92	1007.39	1279.49	1224.39
2	-30.95	60.83	6.92	1742.18	1775.11	1698.68
2	-30.95	60.83	6.92	1742.18	1775.11	1698.68
3	-30.95	64.94	2.65	2353.47	2187.44	

2093.24
   3   -30.95   64.94   2.65   2353.47   2187.44
2093.24
   4   -0.79   68.58   5.01   1283.05   616.89
590.32
   4   -0.79   68.58   5.01   1283.05   616.89
590.32
   5   -0.79   73.59   5.01   1556.16   705.63
675.24
   5   -0.79   73.59   5.01   1556.16   705.63
675.24
   6   -0.79   78.59   5.01   1829.28   794.37
760.16
   6   -0.79   78.59   5.01   1829.28   794.37
760.16
   7   -0.79   83.60   5.01   2102.39   883.11
845.08
   7   -0.79   83.60   5.01   2102.39   883.11
845.08
   8   -0.79   88.61   5.01   2375.51   971.85
930.00
   8   -0.79   88.61   5.01   2375.51   971.85
930.00
   9   -0.79   93.62   5.01   2648.63   1060.59
1014.92
   9   -0.79   93.62   5.01   2648.63   1060.59
1014.92
  10   -0.79   98.62   5.01   2921.74   1149.33
1099.84
  10   -0.79   98.62   5.01   2921.74   1149.33
1099.84
  11   -0.79   103.63   5.01   3194.86   1238.07
1184.76
  11   -0.79   103.63   5.01   3194.86   1238.07
1184.76
  12   -0.79   108.64   5.01   3467.98   1326.81
1269.68
  12   -0.79   108.64   5.01   3467.98   1326.81
1269.68
  13   -0.79   113.65   5.01   3741.09   1415.55
1354.60
  13   -0.79   113.65   5.01   3741.09   1415.55
1354.60
  14   -0.79   118.65   5.01   4014.21   1504.30
1439.52
  14   -0.79   118.65   5.01   4014.21   1504.30
1439.52
  15   -0.79   123.66   5.01   4287.32   1593.04
1524.44
  15   -0.79   123.66   5.01   4287.32   1593.04

1524.44					
16	-0.79	128.67	5.01	4560.44	1681.78
1609.36					
16	-0.79	128.67	5.01	4560.44	1681.78
1609.36					
17	-0.79	133.67	5.01	4833.56	1770.52
1694.28					
17	-0.79	133.67	5.01	4833.56	1770.52
1694.28					
18	-0.79	138.68	5.01	5106.67	1859.26
1779.20					
18	-0.79	138.68	5.01	5106.67	1859.26
1779.20					
19	-0.79	143.69	5.01	5379.79	1948.00
1864.12					
19	-0.79	143.69	5.01	5379.79	1948.00
1864.12					
20	-0.79	148.70	5.01	5652.90	2036.74
1949.04					
20	-0.79	148.70	5.01	5652.90	2036.74
1949.04					
21	-0.79	153.70	5.01	5926.02	2125.48
2033.96					
21	-0.79	153.70	5.01	5926.02	2125.48
2033.96					
22	-0.79	158.71	5.01	6199.14	2214.22
2118.88					
22	-0.79	158.71	5.01	6199.14	2214.22
2118.88					
23	-0.79	163.72	5.01	6472.25	2302.96
2203.79					
23	-0.79	163.72	5.01	6472.25	2302.96
2203.79					
24	-0.79	168.72	5.01	6745.37	2391.70
2288.71					
24	-0.79	168.72	5.01	6745.37	2391.70
2288.71					
25	-0.79	173.73	5.01	7018.48	2480.44
2373.63					
25	-0.79	173.73	5.01	7018.48	2480.44
2373.63					
26	-0.79	178.74	5.01	7291.60	2569.18
2458.55					
26	-0.79	178.74	5.01	7291.60	2569.18
2458.55					
27	-0.79	183.75	5.01	7564.72	2657.93
2543.47					
27	-0.79	183.75	5.01	7564.72	2657.93
2543.47					
28	-0.79	188.75	5.01	7837.83	2746.67

2628.39					
28	-0.79	188.75	5.01	7837.83	2746.67
2628.39					
29	-0.79	193.76	5.01	8110.95	2835.41
2713.31					
29	-0.79	193.76	5.01	8110.95	2835.41
2713.31					
30	-0.79	198.77	5.01	8384.07	2924.15
2798.23					
30	-0.79	198.77	5.01	8384.07	2924.15
2798.23					
31	-0.79	203.77	5.01	8657.18	3012.89
2883.15					
31	-0.79	203.77	5.01	8657.18	3012.89
2883.15					
32	-0.79	208.78	5.01	8930.30	3101.63
2968.07					
32	-0.79	208.78	5.01	8930.30	3101.63
2968.07					
33	-0.79	213.79	5.01	9203.41	3190.37
3052.99					
33	-0.79	213.79	5.01	9203.41	3190.37
3052.99					
34	-0.79	218.80	5.01	9476.53	3279.11
3137.91					
34	-0.79	218.80	5.01	9476.53	3279.11
3137.91					
35	-0.79	223.00	3.40	9668.49	3341.48
3197.59					
35	-0.79	223.00	3.40	9668.49	3341.48
3197.59					
36	-0.79	227.09	4.79	9801.89	3384.83
3239.07					
36	-0.79	227.09	4.79	9801.89	3384.83
3239.07					
37	-0.79	231.88	4.79	9957.90	3435.52
3287.58					
37	-0.79	231.88	4.79	9957.90	3435.52
3287.58					
38	-0.79	236.67	4.79	10113.91	3486.21
3336.09					
38	-0.79	236.67	4.79	10113.91	3486.21
3336.09					
39	-0.79	241.46	4.79	10269.92	3536.90
3384.60					
39	-0.79	241.46	4.79	10269.92	3536.90
3384.60					
40	-0.79	246.24	4.79	10425.93	3587.59
3433.11					
40	-0.79	246.24	4.79	10425.93	3587.59

3433.11					
41	-0.79	251.03	4.79	10581.94	3638.28
3481.61					
41	-0.79	251.03	4.79	10581.94	3638.28
3481.61					
42	-0.79	255.82	4.79	10737.96	3688.97
3530.12					
42	-0.79	255.82	4.79	10737.96	3688.97
3530.12					
43	-0.79	260.61	4.79	10893.97	3739.66
3578.63					
43	-0.79	260.61	4.79	10893.97	3739.66
3578.63					
44	-0.79	264.68	3.36	11031.54	3784.37
3621.41					
44	-0.79	264.68	3.36	11031.54	3784.37
3621.41					
45	53.78	268.79	8.20	5056.22	4010.46
3837.77					
45	53.78	268.79	8.20	5056.22	4010.46
3837.77					
46	53.78	273.63	8.20	4733.03	3792.47
3629.16					
46	53.78	273.63	8.20	4733.03	3792.47
3629.16					
47	53.78	278.48	8.20	4409.83	3574.47
3420.55					
47	53.78	278.48	8.20	4409.83	3574.47
3420.55					
48	53.78	282.49	5.40	4141.94	3393.77
3247.63					
48	53.78	282.49	5.40	4141.94	3393.77
3247.63					
49	47.63	286.39	6.84	4431.73	3589.24
3434.68					
49	47.63	286.39	6.84	4431.73	3589.24
3434.68					
50	47.63	291.30	7.72	4120.54	3379.34
3233.82					
50	47.63	291.30	7.72	4120.54	3379.34
3233.82					
51	47.63	296.50	7.72	3754.13	3132.19
2997.32					
51	47.63	296.50	7.72	3754.13	3132.19
2997.32					
52	47.63	301.70	7.72	3387.72	2885.05
2760.81					
52	47.63	301.70	7.72	3387.72	2885.05
2760.81					
53	45.14	304.80	1.41	3324.73	2842.56

2720.15
  53 45.14 304.80 1.41 3324.73 2842.56
2720.15
  54 45.14 307.82 7.15 3125.35 2708.07
2591.46
  54 45.14 307.82 7.15 3125.35 2708.07
2591.46
  55 45.14 312.86 7.15 2792.98 2483.89
2376.93
  55 45.14 312.86 7.15 2792.98 2483.89
2376.93
  56 45.14 317.90 7.15 2460.60 2259.70
2162.39
  56 45.14 317.90 7.15 2460.60 2259.70
2162.39
  57 45.14 322.94 7.15 2128.23 2035.51
1947.86
  57 45.14 322.94 7.15 2128.23 2035.51
1947.86
  58 48.54 327.95 7.50 1644.32 1709.11
1635.51
  58 48.54 327.95 7.50 1644.32 1709.11
1635.51
  59 48.54 332.91 7.50 1290.86 1470.70
1407.37
  59 48.54 332.91 7.50 1290.86 1470.70
1407.37
  60 48.54 337.88 7.50 937.41 1232.29
1179.23
  60 48.54 337.88 7.50 937.41 1232.29
1179.23
  61 48.54 342.84 7.50 583.95 993.88
951.08
  61 48.54 342.84 7.50 583.95 993.88
951.08
  62 65.05 346.66 6.34 439.29 296.30
283.54
  62 65.05 346.66 6.34 439.29 296.30
283.54
  63 65.05 349.48 7.03 152.95 103.17
98.72
  63 65.05 349.48 7.03 152.95 103.17
98.72

Table 4 - Base Force Data on the 63 Slices

 Slice Alpha X-Coord. Base Effective Available
Mobilized

No.	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Force (lbs)	Shear Force (lbs)	Shear Force * (lbs)
1	-30.95	54.89	6.92	6975.65	8859.84	8478.32
1	-30.95	54.89	6.92	6975.65	8859.84	8478.32
2	-30.95	60.83	6.92	12063.73	12291.79	11762.50
2	-30.95	60.83	6.92	12063.73	12291.79	11762.50
3	-30.95	64.94	2.65	6247.59	5806.82	5556.78
3	-30.95	64.94	2.65	6247.59	5806.82	5556.78
4	-0.79	68.58	5.01	6425.08	3089.17	2956.15
4	-0.79	68.58	5.01	6425.08	3089.17	2956.15
5	-0.79	73.59	5.01	7792.76	3533.56	3381.40
5	-0.79	73.59	5.01	7792.76	3533.56	3381.40
6	-0.79	78.59	5.01	9160.43	3977.94	3806.65
6	-0.79	78.59	5.01	9160.43	3977.94	3806.65
7	-0.79	83.60	5.01	10528.11	4422.33	4231.90
7	-0.79	83.60	5.01	10528.11	4422.33	4231.90
8	-0.79	88.61	5.01	11895.79	4866.71	4657.15
8	-0.79	88.61	5.01	11895.79	4866.71	4657.15
9	-0.79	93.62	5.01	13263.46	5311.10	5082.40
9	-0.79	93.62	5.01	13263.46	5311.10	5082.40
10	-0.79	98.62	5.01	14631.14	5755.48	5507.65
10	-0.79	98.62	5.01	14631.14	5755.48	5507.65
11	-0.79	103.63	5.01	15998.82	6199.87	5932.89
11	-0.79	103.63	5.01	15998.82	6199.87	5932.89
12	-0.79	108.64	5.01	17366.49	6644.25	

6358.14

12	-0.79	108.64	5.01	17366.49	6644.25

6358.14

13	-0.79	113.65	5.01	18734.17	7088.64

6783.39

13	-0.79	113.65	5.01	18734.17	7088.64

6783.39

14	-0.79	118.65	5.01	20101.85	7533.02

7208.64

14	-0.79	118.65	5.01	20101.85	7533.02

7208.64

15	-0.79	123.66	5.01	21469.52	7977.41

7633.89

15	-0.79	123.66	5.01	21469.52	7977.41

7633.89

16	-0.79	128.67	5.01	22837.20	8421.79

8059.14

16	-0.79	128.67	5.01	22837.20	8421.79

8059.14

17	-0.79	133.67	5.01	24204.88	8866.18

8484.39

17	-0.79	133.67	5.01	24204.88	8866.18

8484.39

18	-0.79	138.68	5.01	25572.55	9310.56

8909.64

18	-0.79	138.68	5.01	25572.55	9310.56

8909.64

19	-0.79	143.69	5.01	26940.23	9754.95

9334.89

19	-0.79	143.69	5.01	26940.23	9754.95

9334.89

20	-0.79	148.70	5.01	28307.91	10199.33

9760.14

20	-0.79	148.70	5.01	28307.91	10199.33

9760.14

21	-0.79	153.70	5.01	29675.58	10643.72

10185.39

21	-0.79	153.70	5.01	29675.58	10643.72

10185.39

22	-0.79	158.71	5.01	31043.26	11088.10

10610.64

22	-0.79	158.71	5.01	31043.26	11088.10

10610.64

23	-0.79	163.72	5.01	32410.94	11532.49

11035.89

23	-0.79	163.72	5.01	32410.94	11532.49

11035.89

24	-0.79	168.72	5.01	33778.62	11976.87

11461.14

24	-0.79	168.72	5.01	33778.62	11976.87

11461.14					
25	-0.79	173.73	5.01	35146.29	12421.26
11886.39					
25	-0.79	173.73	5.01	35146.29	12421.26
11886.39					
26	-0.79	178.74	5.01	36513.97	12865.64
12311.64					
26	-0.79	178.74	5.01	36513.97	12865.64
12311.64					
27	-0.79	183.75	5.01	37881.65	13310.03
12736.89					
27	-0.79	183.75	5.01	37881.65	13310.03
12736.89					
28	-0.79	188.75	5.01	39249.32	13754.41
13162.14					
28	-0.79	188.75	5.01	39249.32	13754.41
13162.14					
29	-0.79	193.76	5.01	40617.00	14198.80
13587.39					
29	-0.79	193.76	5.01	40617.00	14198.80
13587.39					
30	-0.79	198.77	5.01	41984.68	14643.18
14012.64					
30	-0.79	198.77	5.01	41984.68	14643.18
14012.64					
31	-0.79	203.77	5.01	43352.35	15087.57
14437.89					
31	-0.79	203.77	5.01	43352.35	15087.57
14437.89					
32	-0.79	208.78	5.01	44720.03	15531.95
14863.13					
32	-0.79	208.78	5.01	44720.03	15531.95
14863.13					
33	-0.79	213.79	5.01	46087.71	15976.34
15288.38					
33	-0.79	213.79	5.01	46087.71	15976.34
15288.38					
34	-0.79	218.80	5.01	47455.38	16420.72
15713.63					
34	-0.79	218.80	5.01	47455.38	16420.72
15713.63					
35	-0.79	223.00	3.40	32875.94	11362.10
10872.84					
35	-0.79	223.00	3.40	32875.94	11362.10
10872.84					
36	-0.79	227.09	4.79	46930.96	16206.38
15508.52					
36	-0.79	227.09	4.79	46930.96	16206.38
15508.52					
37	-0.79	231.88	4.79	47677.93	16449.09

15740.78
37 -0.79 231.88 4.79 47677.93 16449.09
15740.78
38 -0.79 236.67 4.79 48424.90 16691.79
15973.03
38 -0.79 236.67 4.79 48424.90 16691.79
15973.03
39 -0.79 241.46 4.79 49171.88 16934.50
16205.29
39 -0.79 241.46 4.79 49171.88 16934.50
16205.29
40 -0.79 246.24 4.79 49918.85 17177.21
16437.54
40 -0.79 246.24 4.79 49918.85 17177.21
16437.54
41 -0.79 251.03 4.79 50665.82 17419.91
16669.80
41 -0.79 251.03 4.79 50665.82 17419.91
16669.80
42 -0.79 255.82 4.79 51412.80 17662.62
16902.05
42 -0.79 255.82 4.79 51412.80 17662.62
16902.05
43 -0.79 260.61 4.79 52159.77 17905.33
17134.31
43 -0.79 260.61 4.79 52159.77 17905.33
17134.31
44 -0.79 264.68 3.36 37101.63 12727.70
12179.63
44 -0.79 264.68 3.36 37101.63 12727.70
12179.63
45 53.78 268.79 8.20 41469.30 32892.38
31476.01
45 53.78 268.79 8.20 41469.30 32892.38
31476.01
46 53.78 273.63 8.20 38818.58 31104.44
29765.06
46 53.78 273.63 8.20 38818.58 31104.44
29765.06
47 53.78 278.48 8.20 36167.85 29316.51
28054.12
47 53.78 278.48 8.20 36167.85 29316.51
28054.12
48 53.78 282.49 5.40 22346.09 18309.68
17521.25
48 53.78 282.49 5.40 22346.09 18309.68
17521.25
49 47.63 286.39 6.84 30333.68 24567.12
23509.24
49 47.63 286.39 6.84 30333.68 24567.12

23509.24					
50	47.63	291.30	7.72	31804.17	26083.25
24960.09					
50	47.63	291.30	7.72	31804.17	26083.25
24960.09					
51	47.63	296.50	7.72	28976.05	24175.66
23134.64					
51	47.63	296.50	7.72	28976.05	24175.66
23134.64					
52	47.63	301.70	7.72	26147.93	22268.07
21309.19					
52	47.63	301.70	7.72	26147.93	22268.07
21309.19					
53	45.14	304.80	1.41	4695.33	4014.39
3841.53					
53	45.14	304.80	1.41	4695.33	4014.39
3841.53					
54	45.14	307.82	7.15	22336.68	19354.44
18521.02					
54	45.14	307.82	7.15	22336.68	19354.44
18521.02					
55	45.14	312.86	7.15	19961.22	17752.18
16987.76					
55	45.14	312.86	7.15	19961.22	17752.18
16987.76					
56	45.14	317.90	7.15	17585.77	16149.91
15454.49					
56	45.14	317.90	7.15	17585.77	16149.91
15454.49					
57	45.14	322.94	7.15	15210.31	14547.65
13921.22					
57	45.14	322.94	7.15	15210.31	14547.65
13921.22					
58	48.54	327.95	7.50	12332.40	12818.31
12266.34					
58	48.54	327.95	7.50	12332.40	12818.31
12266.34					
59	48.54	332.91	7.50	9681.48	11030.24
10555.27					
59	48.54	332.91	7.50	9681.48	11030.24
10555.27					
60	48.54	337.88	7.50	7030.57	9242.18
8844.20					
60	48.54	337.88	7.50	7030.57	9242.18
8844.20					
61	48.54	342.84	7.50	4379.65	7454.11
7133.13					
61	48.54	342.84	7.50	4379.65	7454.11
7133.13					
62	65.05	346.66	6.34	2783.34	1877.39

```
1796.54
  62      65.05     346.66       6.34         2783.34         1877.39
1796.54
  63      65.05     349.48       7.03         1074.85          725.00
693.78
  63      65.05     349.48       7.03         1074.85          725.00
693.78

     Sum of the Resisting Forces =  695993.80 (lbs)

     Average Available Shear Strength =   1987.58(psf)

     Sum of the Driving Forces =   720131.34 (lbs)

     Average Mobilized Shear Stress =    2056.51(psf)

     Total length of the failure surface =     350.17(ft)


     Factor of Safety Balance Check: FS =  0.96648

     Janbu's Correction Factor (fo) =  1.0771

     Janub's FS Corrected =  1.04101

              *** SEISMIC SLOPE DISPLACEMENT DATA ***
           (Note: kv is set = zero for displacement calculations)
           Seismic Yield Coefficient (ky) =  0.28050(g)
           Calculated Newmark Seismic Displacement =    0.000(ft)


           Average Elevation of Point of Application of kh on Sliding Mass =
1305.439(ft)

           Non-Symmetrical Sliding Resistance Has Been Specified
           for Downhill Sliding.

                        **** END OF GEOSTASE OUTPUT ****
```

Appendix E
Infiltration Testing Results

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/27/2023
Boring Number: I-2

Test hole dimensions (if circular)	
Boring Depth (feet)*:	3
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	7:25	7:54	29.0	0.17	0.19	0.02	No
2	7:54	8:19	25.0	0.19	0.19	0.00	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	8:19	8:49	30.0	0.19	0.20	0.01	0.01
2	8:49	9:19	30.0	0.20	0.21	0.01	0.01
3	9:19	9:49	30.0	0.21	0.21	0.00	0.00
4	9:49	10:19	30.0	0.21	0.22	0.01	0.01
5	10:19	10:49	30.0	0.22	0.23	0.01	0.01
6	10:49	11:19	30.0	0.23	0.23	0.00	0.00
7	11:19	11:49	30.0	0.23	0.24	0.01	0.01
8	11:49	12:19	30.0	0.24	0.24	0.00	0.00
9	12:19	12:49	30.0	0.24	0.25	0.01	0.01
10	12:49	13:19	30.0	0.25	0.26	0.01	0.01
11	13:19	13:49	30.0	0.26	0.26	0.00	0.00
12	13:49	14:19	30.0	0.26	0.27	0.01	0.01

Tested Infiltration Rate (No Factor of Safety)	**0.01**
MinimumFactor of Safety	**See Report**
Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/27/2023
Boring Number: I-3

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	7:44	8:09	25.0	6.27	6.31	0.04	No
2	8:09	8:34	25.0	6.31	6.34	0.03	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	8:34	9:04	30.0	6.06	6.06	0.00	0.00
2	9:04	9:34	30.0	6.06	6.07	0.01	0.01
3	9:34	10:04	30.0	6.07	6.09	0.02	0.02
4	10:04	10:36	32.0	6.09	6.11	0.02	0.02
5	10:36	11:06	30.0	6.11	6.14	0.03	0.03
6	11:06	11:38	32.0	6.14	6.16	0.02	0.02
7	11:38	12:09	31.0	6.16	6.19	0.03	0.03
8	12:09	12:39	30.0	6.19	6.21	0.02	0.02
9	12:39	13:09	30.0	6.21	6.24	0.03	0.03
10	13:10	13:40	30.0	6.04	6.06	0.02	0.02
11	13:40	14:13	33.0	6.06	6.08	0.02	0.02
12	14:13	14:43	30.0	6.08	6.10	0.02	0.02

Tested Infiltration Rate (No Factor of Safety)	**0.02**
MinimumFactor of Safety	**See Report**
Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/27/2023
Boring Number: I-4

Test hole dimensions (if circular)	
Boring Depth (feet)*:	3
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	7:38	8:03	25.0	0.26	0.45	0.19	No
2	8:05	8:30	25.0	0.27	0.38	0.11	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	8:30	9:00	30.0	0.27	0.36	0.09	0.13
2	9:01	9:31	30.0	0.26	0.33	0.07	0.10
3	9:32	10:02	30.0	0.27	0.31	0.04	0.06
4	10:03	10:33	30.0	0.25	0.3	0.05	0.07
5	10:34	11:04	30.0	0.25	0.29	0.04	0.06
6	11:05	11:35	30.0	0.24	0.28	0.04	0.06
7	11:36	12:06	30.0	0.24	0.27	0.03	0.04
8	12:07	12:37	30.0	0.24	0.28	0.04	0.06
9	12:37	13:07	30.0	0.23	0.27	0.04	0.05
10	13:08	13:38	30.0	0.23	0.26	0.03	0.04
11	13:39	14:10	31.0	0.21	0.26	0.05	0.07
12	14:11	14:41	30.0	0.21	0.26	0.05	0.07
						Tested Infiltration Rate (No Factor of Safety)	**0.07**
						MinimumFactor of Safety	**See Report**
						Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/28/2023
Boring Number: I-5

Test hole dimensions (if circular)	
Boring Depth (feet)*:	12
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	6:56	7:22	26.0	4.88	4.89	0.01	No
2	7:22	7:47	25.0	4.89	4.89	0.00	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	7:47	8:17	30.0	4.89	4.91	0.02	0.01
2	8:17	8:47	30.0	4.91	4.92	0.01	0.01
3	8:47	9:17	30.0	4.92	4.94	0.02	0.01
4	9:17	9:47	30.0	4.94	4.96	0.02	0.01
5	9:47	10:17	30.0	4.96	4.97	0.01	0.01
6	10:17	10:47	30.0	4.97	4.99	0.02	0.01
7	10:47	11:17	30.0	4.99	5.00	0.01	0.01
8	11:17	11:47	30.0	5.00	5.01	0.01	0.01
9	11:47	12:18	31.0	5.01	5.03	0.02	0.01
10	12:18	12:48	30.0	5.03	5.05	0.02	0.01
11	12:48	13:18	30.0	5.05	5.07	0.02	0.01
12	13:19	13:49	30.0	5.07	5.08	0.01	0.01

Tested Infiltration Rate (No Factor of Safety)	**0.01**
MinimumFactor of Safety	**See Report**
Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Baker St
Project Number: 23160-01
Date: 9/28/2023
Boring Number: I-6

Test hole dimensions (if circular)	
Boring Depth (feet)*:	3
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	6:59	7:24	25.0	0.31	0.46	0.15	No
2	7:24	7:49	25.0	0.46	0.54	0.08	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Tested Infiltration Rate(in/hr)
1	7:50	8:20	30.0	0.42	0.50	0.08	0.12
2	8:21	8:51	30.0	0.34	0.44	0.10	0.14
3	8:51	9:21	30.0	0.44	0.53	0.09	0.13
4	9:22	9:52	30.0	0.29	0.44	0.15	0.21
5	9:53	10:23	30.0	0.21	0.43	0.22	0.31
6	10:24	10:54	30.0	0.27	0.43	0.16	0.23
7	10:55	11:25	30.0	0.31	0.43	0.12	0.17
8	11:26	11:56	30.0	0.20	0.41	0.21	0.29
9	11:58	12:28	30.0	0.20	0.43	0.23	0.32
10	12:30	13:00	30.0	0.25	0.42	0.17	0.24
11	13:00	13:30	30.0	0.42	0.50	0.08	0.12
12	13:31	14:01	30.0	0.33	0.43	0.10	0.14

Tested Infiltration Rate (No Factor of Safety)	**0.14**
MinimumFactor of Safety	**See Report**
Infiltration Rate (With Factor of Safety)	**See Report**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

LGC Geotechnical, Inc.

Appendix F
General Earthwork and Grading Specifications for Rough Grading

General Earthwork and Grading Specifications for Rough Grading

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 more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (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 the 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 the 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.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor 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 the project plans and 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 “equipment” of work and the estimated quantities of daily earthwork

contemplated 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 personnel will be available for observation and testing. 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 rectified. It is the contractor's sole responsibility to provide proper fill compaction.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be over-excavated as specified in the following section. Scarification shall continue until soils are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Over-excavation

In addition to removals and over-excavations 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 over-excavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. 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 over-excavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by 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.

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 8 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 such 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 underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of the geotechnical consultant. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate 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 the American Society of Testing and Materials (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 with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet 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.

4.5 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).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. 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.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that 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.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the 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 by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. 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 The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

7.2 All 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

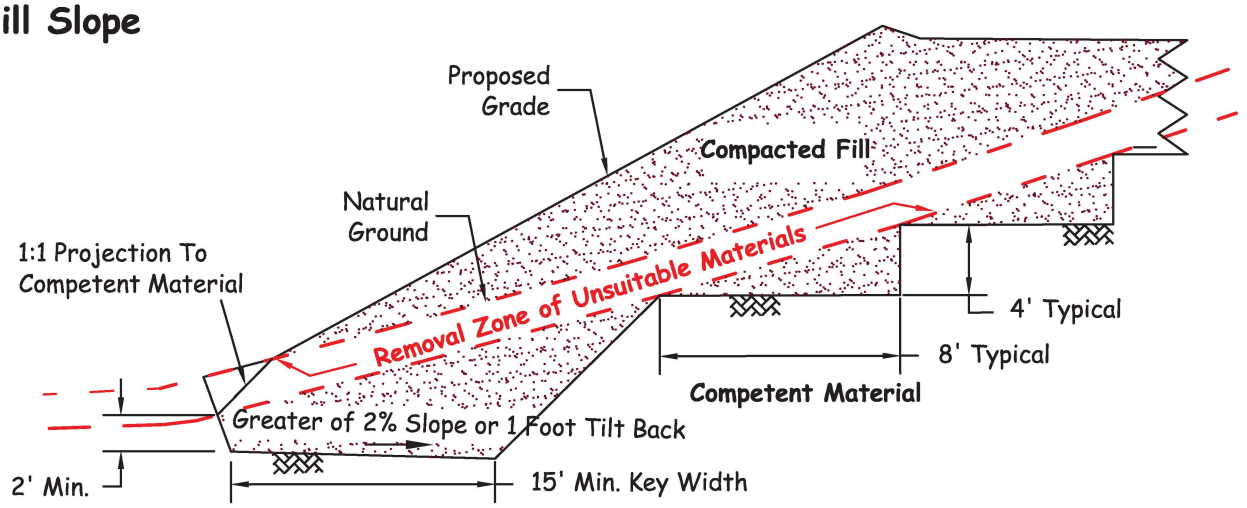
the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

7.3 The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

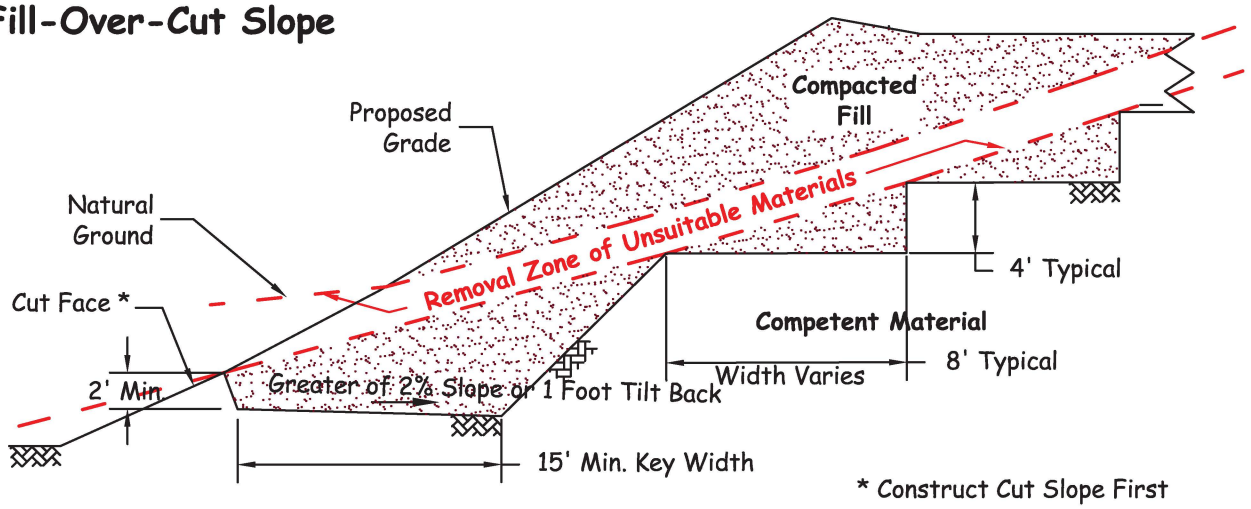
7.4 The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

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.

Fill Slope

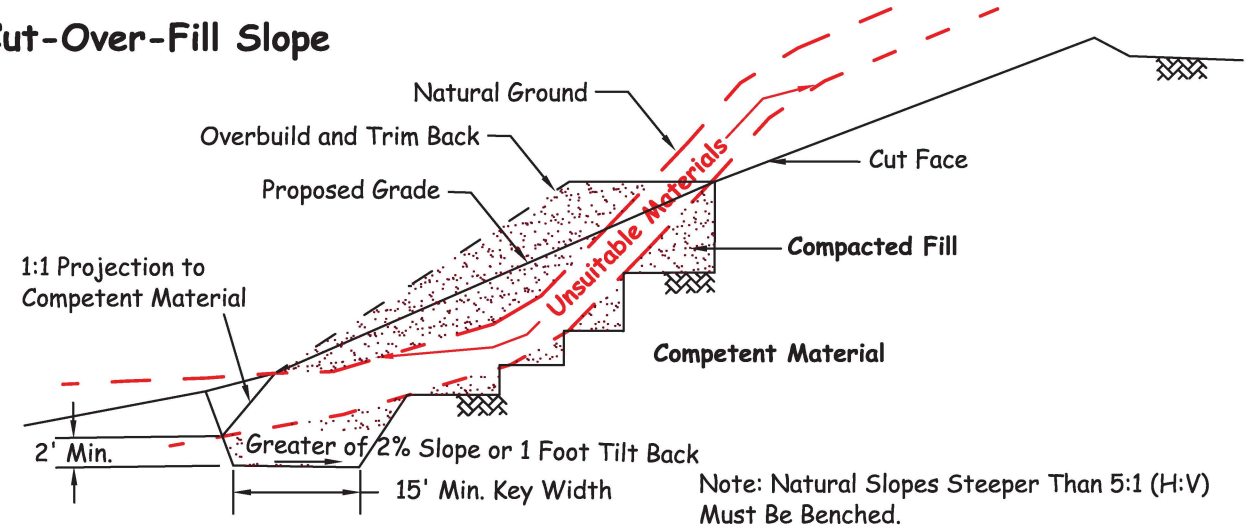


Fill-Over-Cut Slope



* Construct Cut Slope First

Cut-Over-Fill Slope



Note: Natural Slopes Steeper Than 5:1 (H:V) Must Be Benched.

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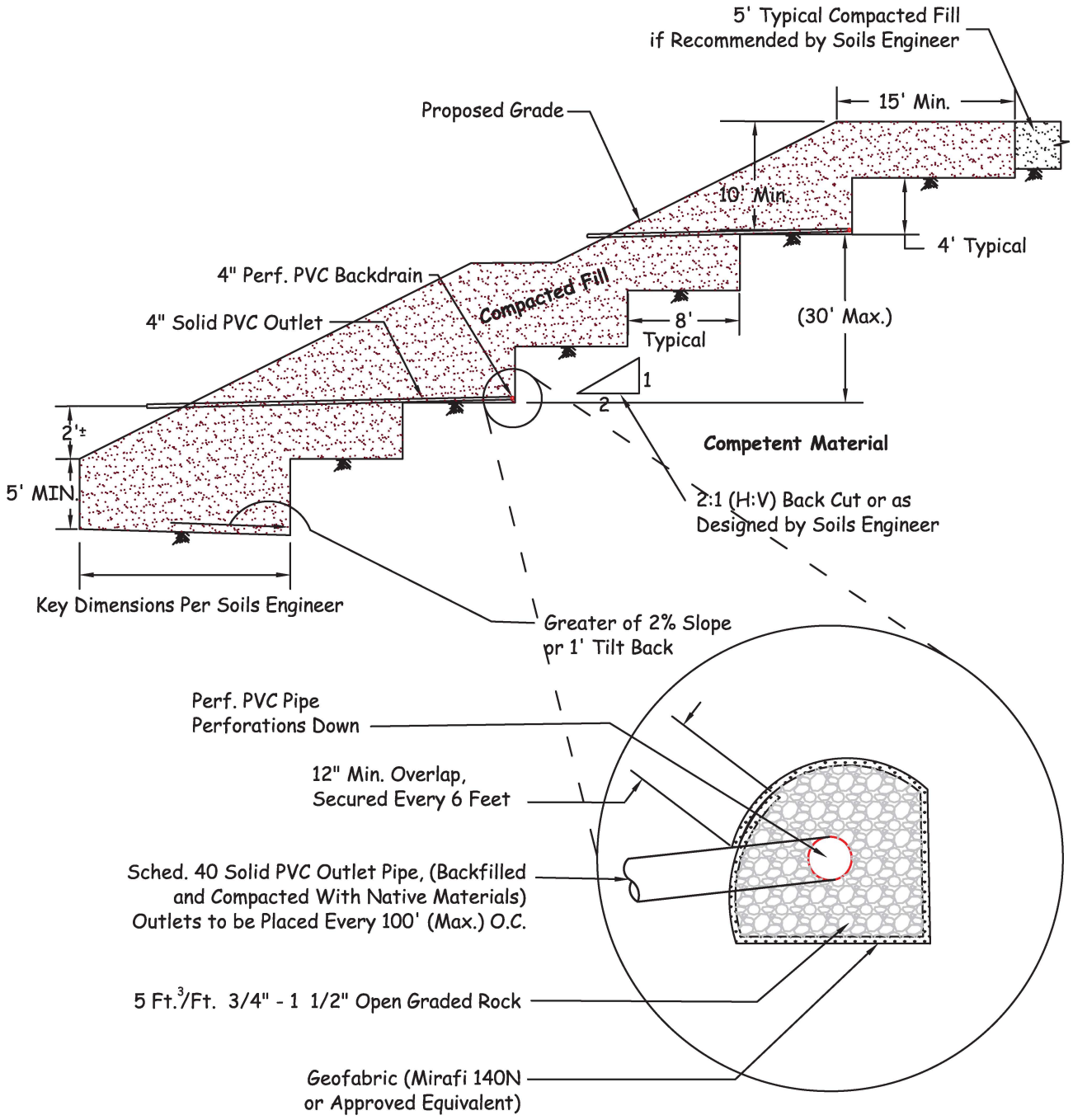
KEYING AND BENCHING



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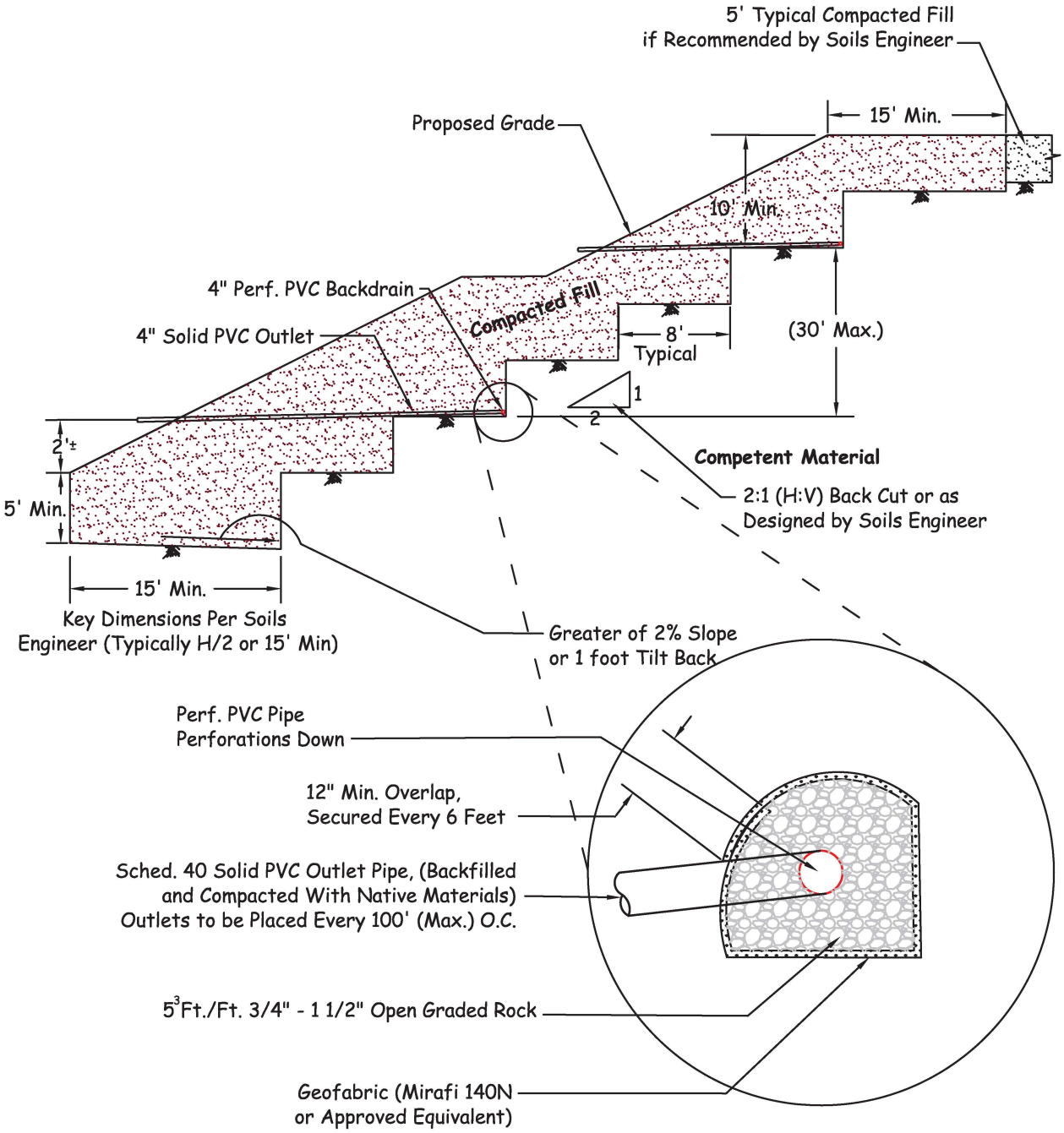
TYPICAL BUTTRESS DETAIL



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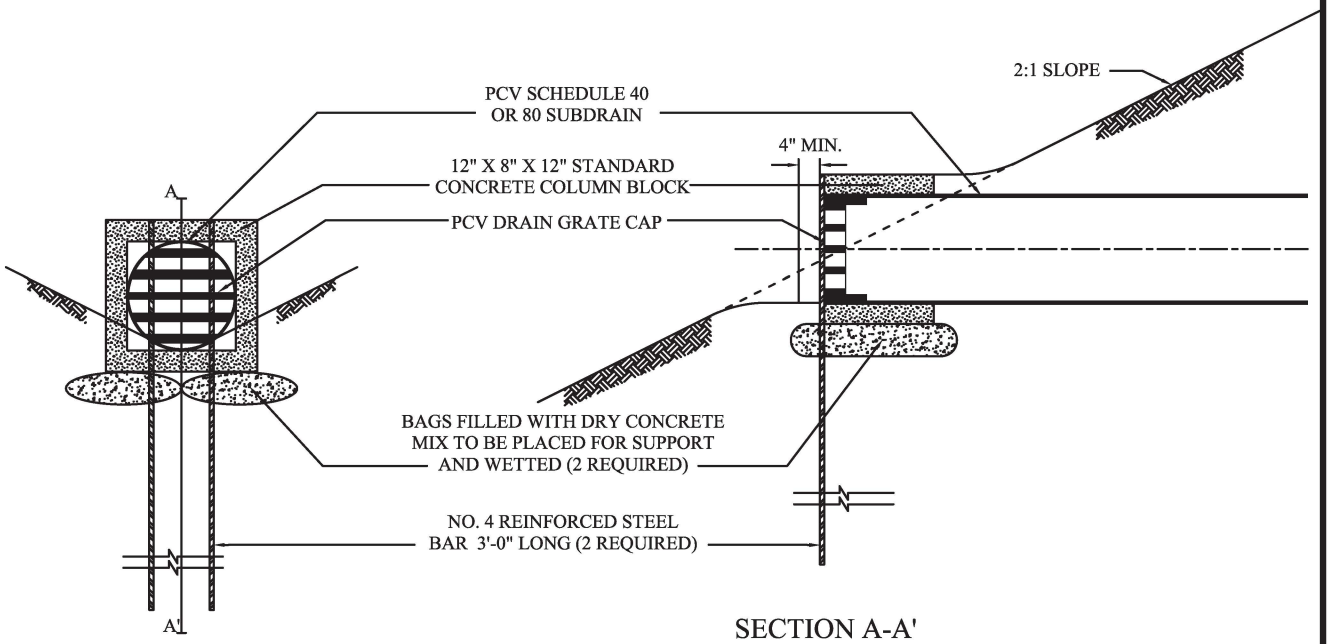
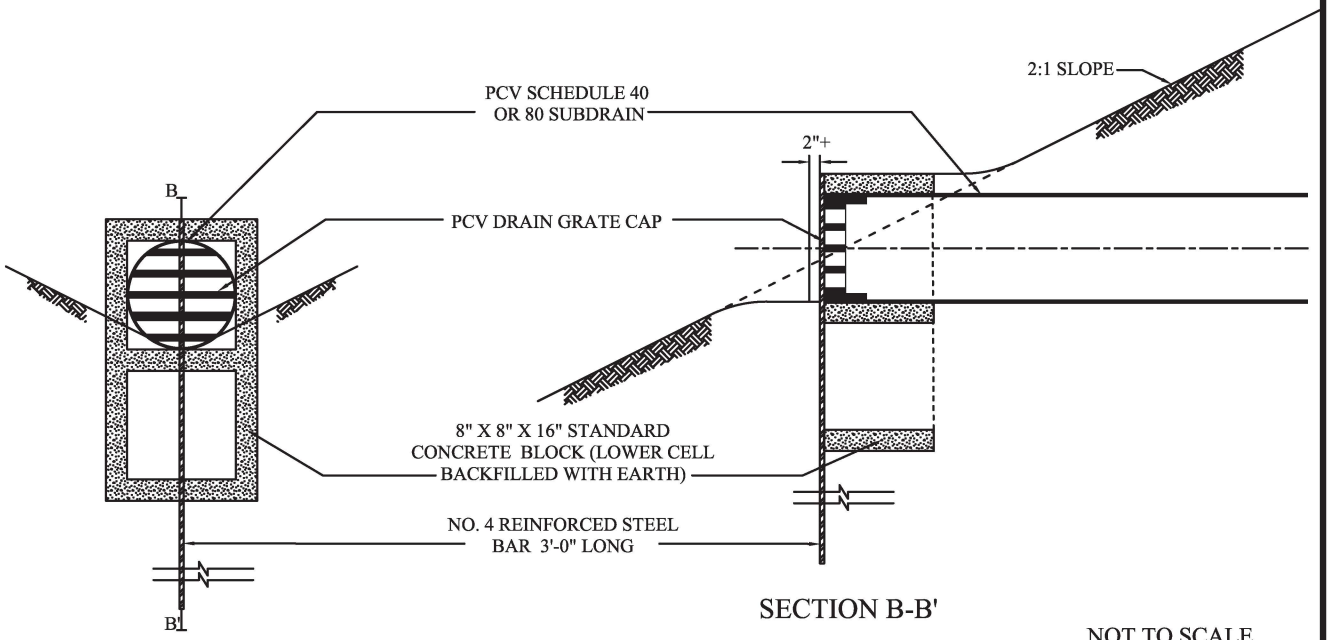
TYPICAL STABILIZATION FILL DETAIL

SUBDRAIN OUTLET MARKER -6" & 8" PIPE



SECTION A-A'

SUBDRAIN OUTLET MARKER -4" PIPE



SECTION B-B'

NOT TO SCALE

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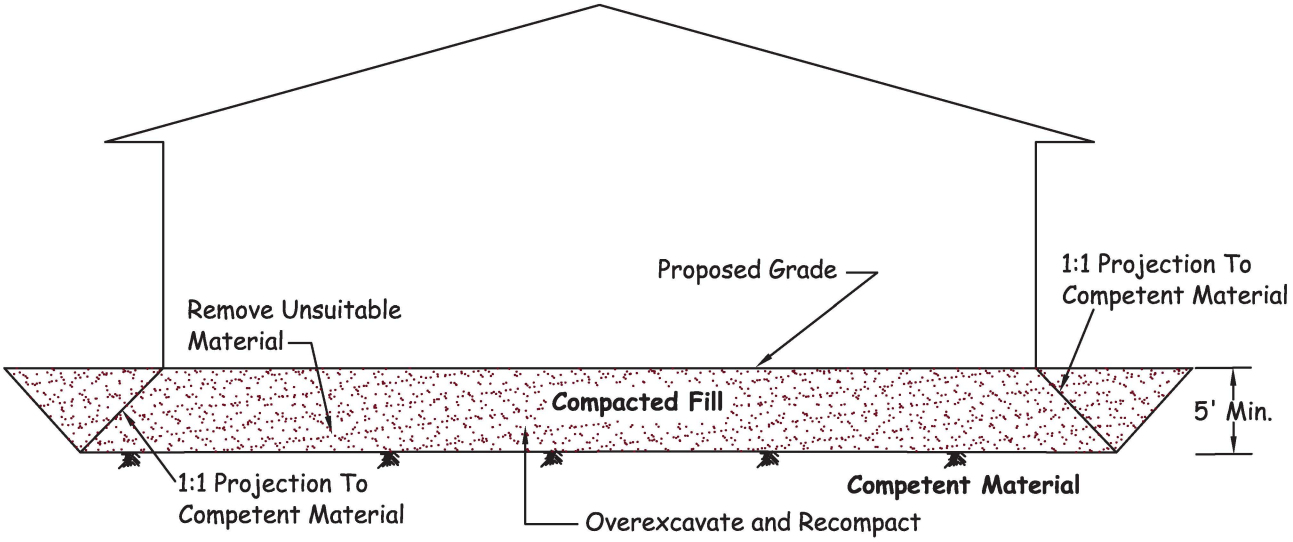
SUBDRAIN OUTLET MARKER DETAIL

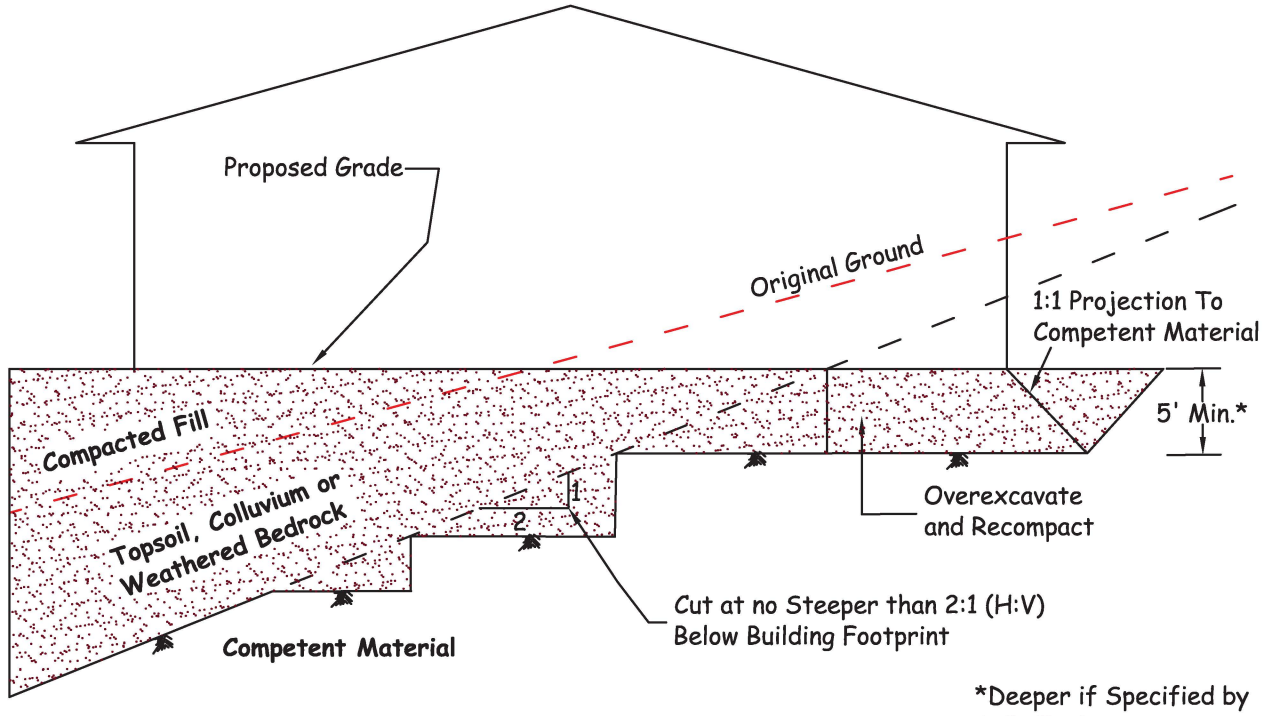
Cut Lot
(Exposing Unsuitable Soils at Design Grade)



Note 1: Removal Bottom Should be Graded With Minimum 2% Fall Towards Street or Other Suitable Area (as Determined by Soils Engineer) to Avoid Ponding Below Building

Note 2: Where Design Cut Lots are Excavated Entirely Into Competent Material, Overexcavation May Still be Required for Hard-Rock Conditions or for Materials With Variable Expansion Characteristics.

Cut/Fill Transition Lot



*Deeper if Specified by Soils Engineer

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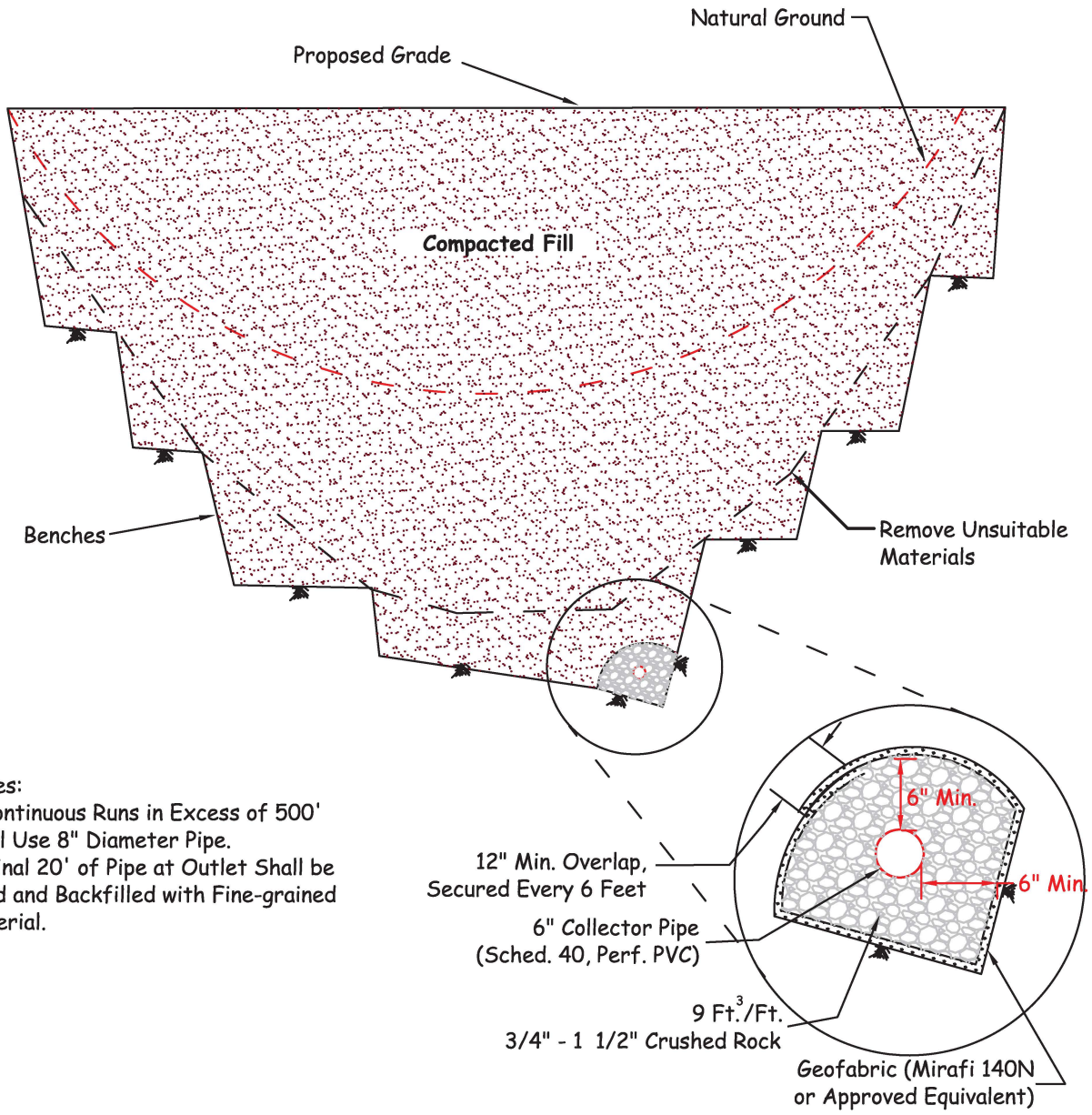
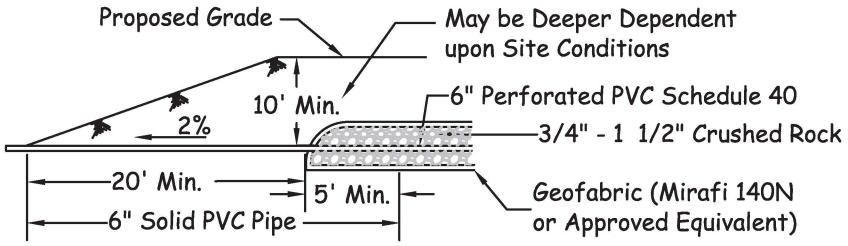
CUT AND TRANSITION LOT OVEREXCAVATION DETAIL



Notes:
1) Continuous Runs in Excess of 500' Shall Use 8" Diameter Pipe.
2) Final 20' of Pipe at Outlet Shall be Solid and Backfilled with Fine-grained Material.

Proposed Outlet Detail



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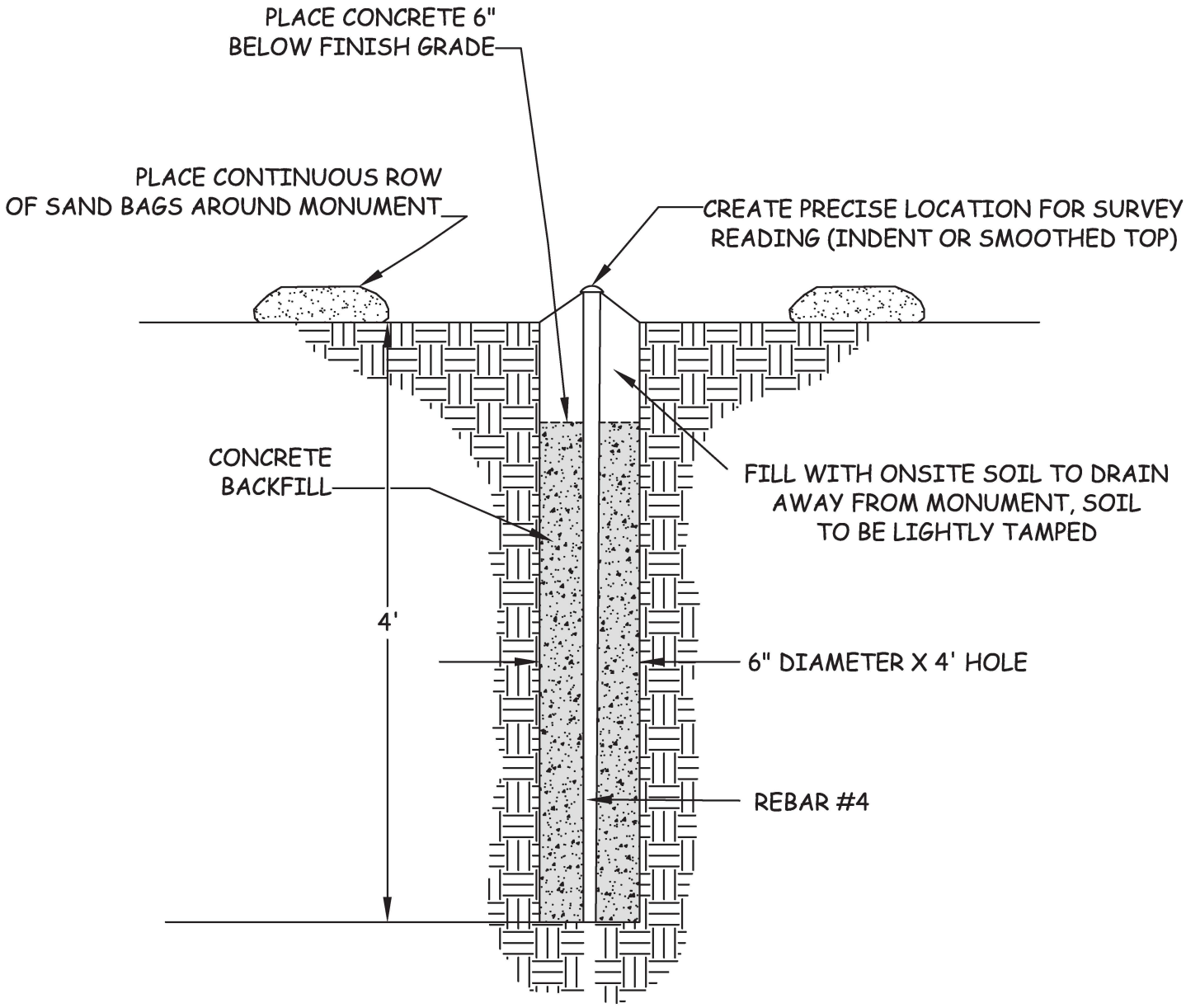
CANYON SUBDRAINS



NO CONSTRUCTION EQUIPMENT WITHIN 25 FEET
OF ANY INSTALLED SETTLEMENT MONUMENTS

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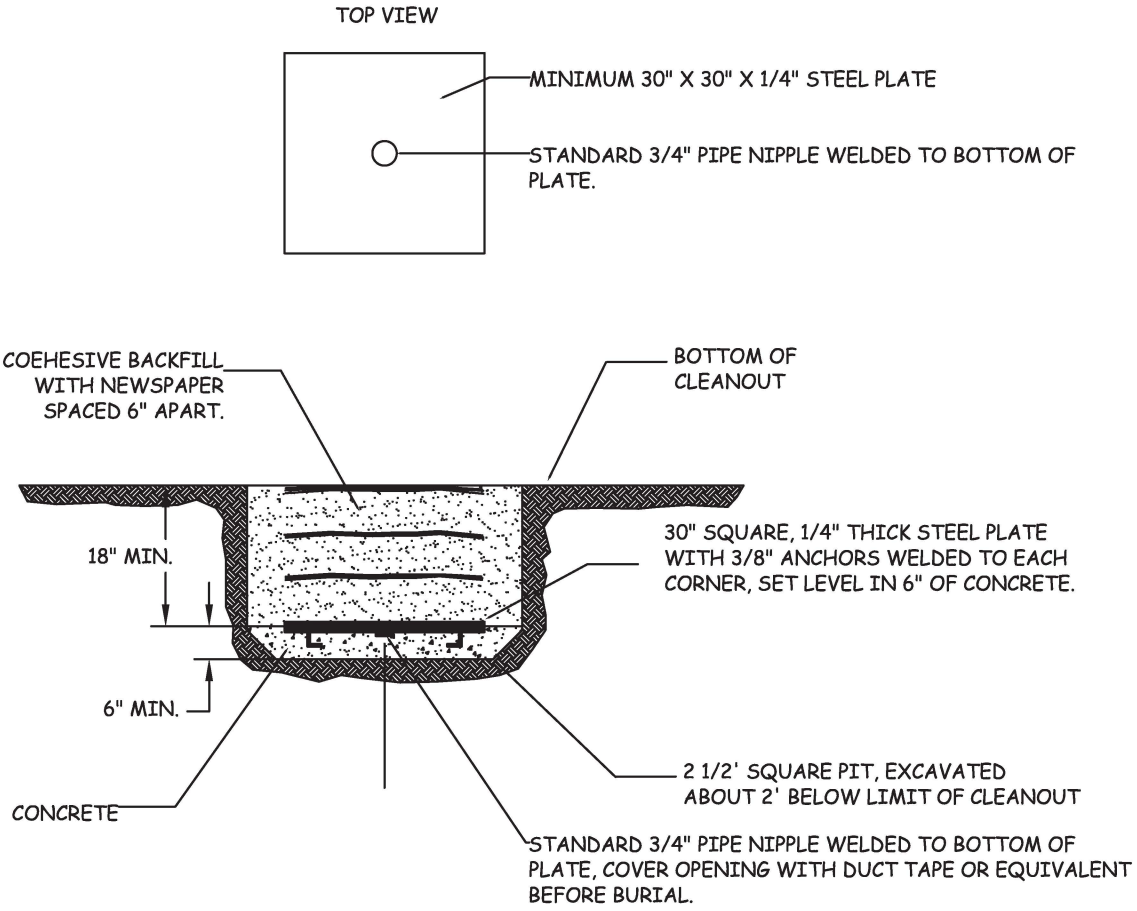
TYPICAL SURFACE SETTLEMENT MONUMENT



1. SURVEY FOR HORIZONTAL AND VERTICAL LOCATION TO NEAREST .01 INCH PRIOR TO BACKFILL USING KNOW LOCATIONS THAT WILL REMAIN INTACT DURING THE DURATION OF THE MONITORING PROGRAM. KNOW POINTS EXPLICITELY NOT ALLOWED ARE THOSE LOCATED ON FILL OR THAT WILL BE DESTROYED DURING GRADING.
2. IN THE EVENT OF DAMAGE TO SETTLEMENT PLATE DURING GRADING, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE GEOTECHNICAL ENGINEER AND SHALL BE RESPONSIBLE FOR RESTORING THE SETTLEMENT PLATES TO WORKING ORDER.
3. DRILL TO RECOVER AND ATTACH RISER PIPE.

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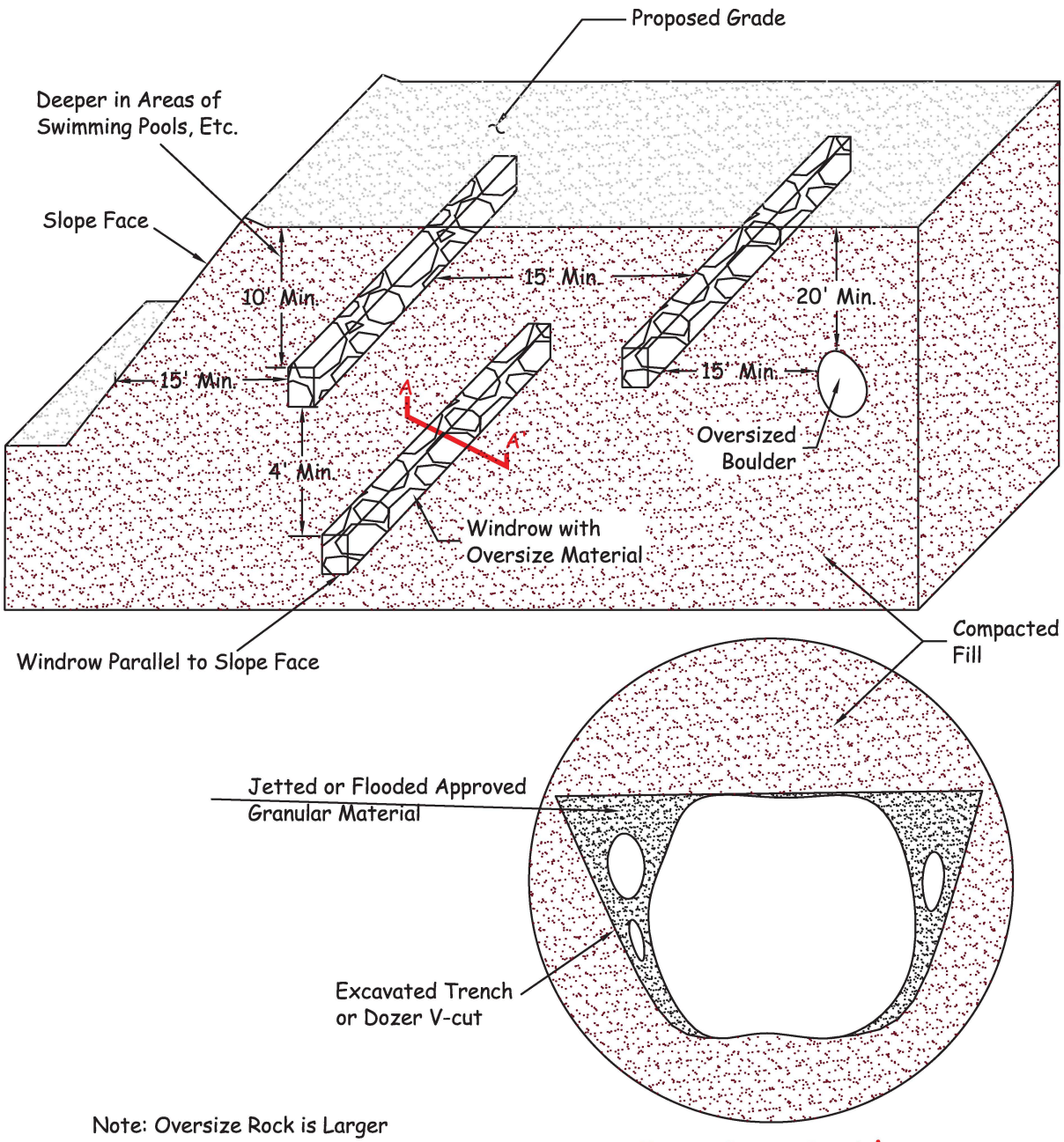
TYPICAL SETTLEMENT PLATE AND RISER



Note: Oversize Rock is Larger than 8" in Maximum Dimension.

Section A-A'

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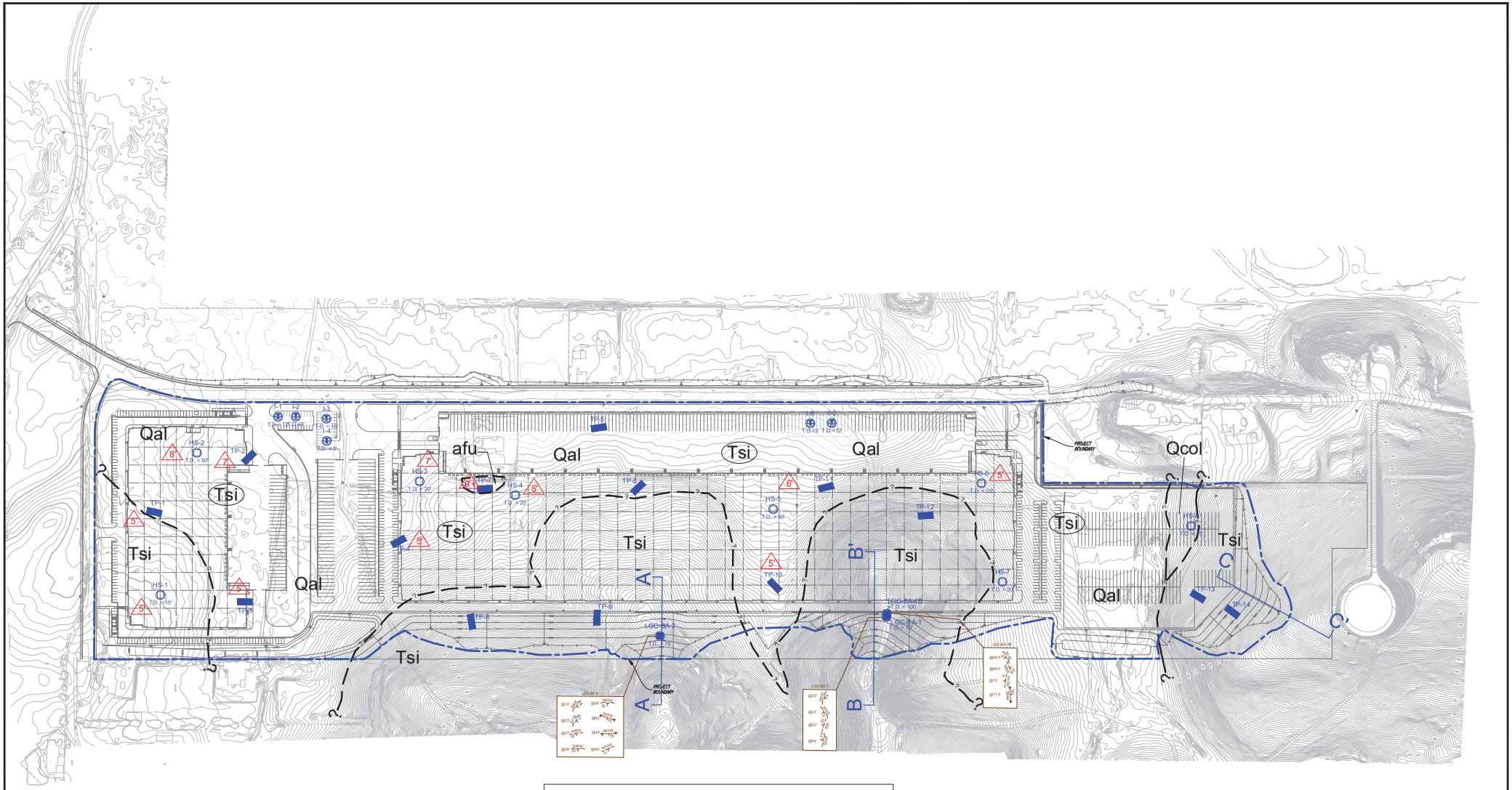
OVERSIZE ROCK DISPOSAL DETAIL



LEGEND

afu	Artificial Fill - Undocumented, Circled Where Buried
Qal	Quaternary Alluvium, Circled Where Buried
Qcol	Quaternary Colluvium, Circled Where Buried
Tsi	Tertiary Silverado Formation
	Approximate Location of Geologic Contact; Dotted Where Buried, Queried Where Uncertain
	Approximate Location of Large Diameter Bucket Auger Boring by LGC Geotechnical, With Total Depth in Feet
	Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet
	Approximate Location of Hollow Stem Auger Infiltration Boring by LGC Geotechnical, With Total Depth in Feet
	Approximate Location of Exploratory Test Pit by LGC Geotechnical, With Total Depth in Feet
	Estimated Remedial Grading Depth in Feet
C C'	Geotechnical Cross-Section Alignment
	Approximate Limits of This Report

Geologic Attitudes (Dashed Where Subsurface)

General Bedding

Clay Bed

Bedding

SCALE: 1"=100'

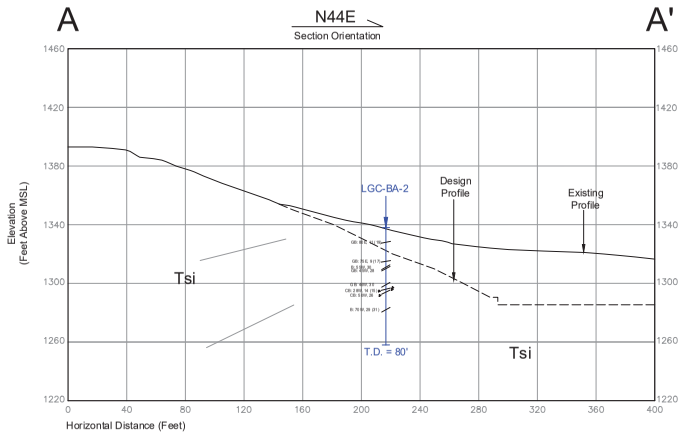
100' 0 100' 200'

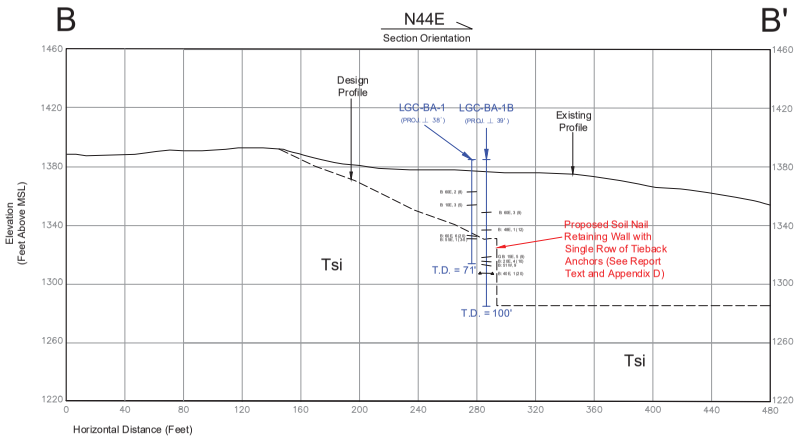
LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

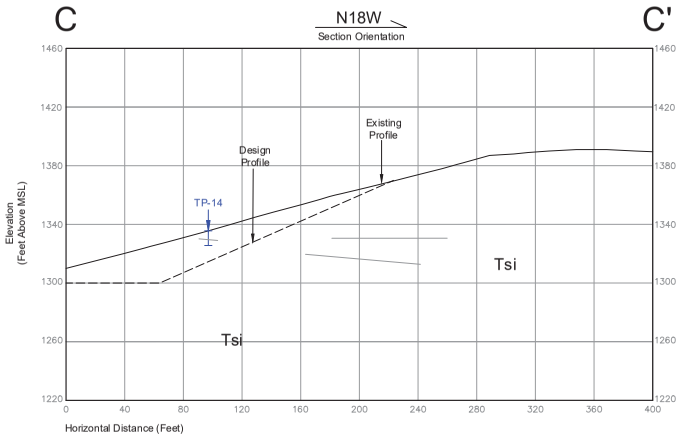
Preliminary Geotechnical Map

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	1" = 40'
DATE	January 2024

SHEET 1 of 2







SCALE: 1"=40'
40' 0 40' 80'

LGC Geotechnical, Inc.

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Geotechnical Cross-Sections
A-A', B-B', and C-C'

PROJECT NAME	EIP - Lake Elsinore
PROJECT NO.	23160-01
ENG. / GEOL.	RLD / BPG
SCALE	1" = 40'
DATE	January 2024

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Western Riverside Area, California

January 29, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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AbF—Altamont cobbly clay, 8 to 35 percent slopes.....14
GaC—Garretson very fine sandy loam, 2 to 8 percent slopes.....15
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RuF—Rough broken land.....18
Wg—Willows silty clay, saline-alkali.....18
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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 16, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AaD	Altamont clay, 5 to 15 percent slopes	2.1	3.6%
AbF	Altamont cobbly clay, 8 to 35 percent slopes	27.9	47.5%
GaC	Garretson very fine sandy loam, 2 to 8 percent slopes	1.0	1.6%
RaD3	Ramona sandy loam, 8 to 15 percent slopes, severely eroded	2.3	3.9%
RuF	Rough broken land	3.1	5.2%
Wg	Willows silty clay, saline-alkali	22.5	38.2%
Totals for Area of Interest		**58.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

AaD—Altamont clay, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: hcqg
Elevation: 200 to 3,250 feet
Mean annual precipitation: 9 to 25 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 200 to 310 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Altamont and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altamont

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 18 inches: clay
H2 - 18 to 23 inches: silty clay
H3 - 23 to 27 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R019XD001CA - CLAYEY
Hydric soil rating: No

Minor Components

Gaviota
Percent of map unit: 5 percent
Hydric soil rating: No

Soper
Percent of map unit: 5 percent
Hydric soil rating: No

Vallecitos
Percent of map unit: 2 percent
Hydric soil rating: No

Altamont
Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 1 percent
Hydric soil rating: No

AbF—Altamont cobbly clay, 8 to 35 percent slopes

Map Unit Setting
National map unit symbol: hcqk
Elevation: 200 to 3,000 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 250 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition
Altamont and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altamont

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile
H1 - 0 to 18 inches: cobbly clay
H2 - 18 to 23 inches: silty clay
H3 - 23 to 27 inches: bedrock

Properties and qualities

Slope: 8 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R019XD001CA - CLAYEY
Hydric soil rating: No

Minor Components

Soper

Percent of map unit: 5 percent

Gaviota

Percent of map unit: 5 percent

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 2 percent
Hydric soil rating: No

GaC—Garretson very fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hcv2
Elevation: 430 to 1,740 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Garretson and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Garretson

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metasedimentary rock

Typical profile

H1 - 0 to 10 inches: very fine sandy loam
H2 - 10 to 60 inches: loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Arbuckle

Percent of map unit: 5 percent
Hydric soil rating: No

Cortina

Percent of map unit: 5 percent
Hydric soil rating: No

Perkins

Percent of map unit: 5 percent
Hydric soil rating: No

RaD3—Ramona sandy loam, 8 to 15 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hcyb
Elevation: 250 to 3,500 feet

Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Ramona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 8 inches: sandy loam
H2 - 8 to 17 inches: fine sandy loam
H3 - 17 to 68 inches: sandy clay loam
H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 5 percent
Hydric soil rating: No

RuF—Rough broken land

Map Unit Composition

Rough broken land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rough Broken Land

Setting

Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum derived from mixed sources

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Wg—Willows silty clay, saline-alkali

Map Unit Setting

National map unit symbol: hd08
Elevation: 0 to 1,700 feet
Mean annual precipitation: 19 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 210 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Willows and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willows

Setting

Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 10 inches: silty clay
H2 - 10 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: R019XD068CA - SILTY BASIN
Hydric soil rating: No

Minor Components

Domino

Percent of map unit: 5 percent
Hydric soil rating: No

Chino

Percent of map unit: 5 percent
Hydric soil rating: No

Madera

Percent of map unit: 5 percent
Hydric soil rating: No

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Appendix

C

EXISTING CONDITION HYDROLOGY RATIONAL METHOD & KEY MAP

DRAINAGE AREA A					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
102	Q10 = 13.35 CFS	13.39	Q100 = 22.29 CFS	13.39	9.75
103	Q10 = 32.35 CFS	14.75	Q100 = 54.37 CFS	14.54	24.45
104	Q10 = 68.41 CFS	18.04	Q100 = 114.42 CFS	17.31	52.50
105	Q10 = 107.35 CFS	20.84	Q100 = 179.89 CFS	19.67	84.96
109	Q10 = 14.55 CFS	11.10	Q100 = 23.59 CFS	11.10	8.91
110	Q10 = 31.07 CFS	12.88	Q100 = 50.70 CFS	12.62	19.79
106	Q10 = 182.49 CFS	25.05	Q100 = 306.12 CFS	23.23	149.29
107	Q10 = 201.89 CFS	27.61	Q100 = 338.96 CFS	25.35	167.70

DRAINAGE AREA B					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
202	Q10 = 8.36 CFS	10.28	Q100 = 13.57 CFS	10.23	4.93
203	Q10 = 19.33 CFS	12.41	Q100 = 31.58 CFS	12.09	12.01
204	Q10 = 36.54 CFS	14.30	Q100 = 60.11 CFS	13.73	23.93

DRAINAGE AREA C					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
302	Q10 = 8.15 CFS	11.52	Q100 = 13.22 CFS	11.52	5.08
303	Q10 = 11.95 CFS	11.83	Q100 = 19.38 CFS	11.62	7.46

DRAINAGE AREA D					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
401	Q10 = 180.10 CFS	14.20	Q100 = 297.40 CFS	14.20	131.40
402	Q10 = 234.68 CFS	17.23	Q100 = 387.51 CFS	16.79	172.82
403	Q10 = 289.46 CFS	19.48	Q100 = 478.64 CFS	18.70	217.10

LEGEND

- MAJOR AREA BOUNDARY
- MINOR AREA BOUNDARY
- FLOWLINE
- SOIL GROUP BOUNDARY
- A / 5.98 — TRIBUTARY AREA DESIGNATION / TRIBUTARY AREA ACREAGE
- ZZZ — ELEVATION @ NODE
- XY — NODAL POINT REFERENCE

200' 0 200' 400' 600'
SCALE IN FEET

EXISTING CONDITION HYDROLOGY KEY MAP
BAKER INDUSTRIAL
COUNTY OF RIVERSIDE

S:\2017\2017-04-xx\Engineering\Hydrology\Baker Industrial\Exhibits\Baker Industrial Existing Condition Hydrology Key Map.dwg, 11/1/2023 8:19:35 AM, Adobe PDF Printer, Scott

100 YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994E100A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
EXISTING CONDITION
RCFC&WCD 100-YR STORM
BY: PS

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

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Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

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Rainfall intensity =      2.847(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     22.286(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


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Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1370.000(Ft.)
Length of natural channel  =   341.000(Ft.)
Estimated mean flow rate at midpoint of channel =     39.085(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0704
Corrected/adjusted channel slope =  0.0704
Travel time =    1.14 min.     TC =   14.54  min.


 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.795
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.950
RI index for soil(AMC 2)  =  74.05
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      2.744(In/Hr) for a   100.0 year storm
Subarea runoff =     32.081(CFS) for     14.700(Ac.)
Total runoff =     54.367(CFS)  Total area =      24.450(Ac.)


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Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1370.000(Ft.)
End of natural channel elevation =   1327.000(Ft.)
Length of natural channel  =   891.000(Ft.)
Estimated mean flow rate at midpoint of channel =     85.553(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.35(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0483
Corrected/adjusted channel slope =  0.0483
Travel time =    2.77 min.     TC =   17.31  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.020
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.980
RI index for soil(AMC 2)  =  88.78
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.537(In/Hr) for a   100.0 year storm
Subarea runoff =     60.056(CFS) for     28.050(Ac.)
Total runoff =    114.423(CFS)  Total area =      52.500(Ac.)


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Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1310.000(Ft.)
Length of natural channel  =   667.000(Ft.)
Estimated mean flow rate at midpoint of channel =    149.796(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.71(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
```

```
        Normal channel slope =  0.0255
Corrected/adjusted channel slope =  0.0255
Travel time =    2.36 min.     TC =   19.67  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.395(In/Hr) for a   100.0 year storm
Subarea runoff =     65.463(CFS) for     32.460(Ac.)
Total runoff =    179.886(CFS)  Total area =      84.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1310.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  1197.000(Ft.)
Estimated mean flow rate at midpoint of channel =    207.898(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.61(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0292
Corrected/adjusted channel slope =  0.0292
Travel time =    3.56 min.     TC =   23.23  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.222(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =     49.272(CFS) for     26.460(Ac.)
Total runoff =    229.158(CFS)  Total area =     111.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    111.420(Ac.)
Runoff from this stream =    229.158(CFS)
Time of concentration =   23.23 min.
Rainfall intensity =     2.222(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      3.098(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     23.590(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1298.000(Ft.)
Length of natural channel  =   437.000(Ft.)
Estimated mean flow rate at midpoint of channel =     37.992(CFS)
```

```
Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.79(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0664
Corrected/adjusted channel slope =  0.0664
Travel time =    1.52 min.     TC =   12.62  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.924(In/Hr) for a   100.0 year storm
Subarea runoff =     27.108(CFS) for     10.880(Ac.)
Total runoff =     50.697(CFS)  Total area =      19.790(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1298.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =   809.000(Ft.)
Estimated mean flow rate at midpoint of channel =     73.856(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0284
Corrected/adjusted channel slope =  0.0284
Travel time =    3.43 min.     TC =   16.05  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.625(In/Hr) for a   100.0 year storm
Subarea runoff =     40.184(CFS) for     18.080(Ac.)
Total runoff =     90.881(CFS)  Total area =      37.870(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.870(Ac.)
Runoff from this stream =     90.881(CFS)
Time of concentration =   16.05 min.
Rainfall intensity =     2.625(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      229.158     23.23                2.222
2       90.881     16.05                2.625
Largest stream flow has longer time of concentration
Qp =    229.158 + sum of
          Qb         Ia/Ib
          90.881 *    0.847 =     76.956
Qp =    306.115

Total of 2 main streams to confluence:
Flow rates before confluence point:
     229.158      90.881
Area of streams before confluence:
      111.420       37.870


Results of confluence:
Total flow rate =    306.115(CFS)
Time of concentration =    23.228 min.
Effective stream area after confluence  =    149.290(Ac.)


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```

```
Process from Point/Station      106.000 to Point/Station      107.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1275.000(Ft.)
End of natural channel elevation =   1267.000(Ft.)
Length of natural channel  =   580.000(Ft.)
Estimated mean flow rate at midpoint of channel =    324.989(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.49(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0138
Corrected/adjusted channel slope =  0.0138
Travel time =    2.15 min.     TC =   25.38  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.836
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.136(In/Hr) for a   100.0 year storm
Subarea runoff =     32.849(CFS) for     18.410(Ac.)
Total runoff =    338.964(CFS)  Total area =     167.700(Ac.)
End of computations, total study area =          167.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.971
Area averaged RI index number =  86.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994E100B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
EXISTING CONDITION
RCFC&WCD 100-YR STORM
BY: PS

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 772.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1360.000(Ft.)
Difference in elevation = 172.000(Ft.)
Slope = 0.22280 s(percent)= 22.28
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.227 min.

```
Rainfall intensity =      3.215(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.568(CFS)
Total initial stream area =        4.930(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1360.000(Ft.)
End of natural channel elevation =   1293.000(Ft.)
Length of natural channel  =   584.000(Ft.)
Estimated mean flow rate at midpoint of channel =     23.311(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.24(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1147
Corrected/adjusted channel slope =  0.1103
Travel time =    1.86 min.     TC =   12.09  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.982(In/Hr) for a   100.0 year storm
Subarea runoff =     18.007(CFS) for      7.080(Ac.)
Total runoff =     31.575(CFS)  Total area =      12.010(Ac.)


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Process from Point/Station      203.000 to Point/Station      204.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1293.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =   792.000(Ft.)
Estimated mean flow rate at midpoint of channel =     47.244(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.00(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0442
Corrected/adjusted channel slope =  0.0442
Travel time =    1.65 min.     TC =   13.73  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.815(In/Hr) for a   100.0 year storm
Subarea runoff =     28.532(CFS) for     11.920(Ac.)
Total runoff =     60.107(CFS)  Total area =      23.930(Ac.)
End of computations, total study area =           23.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994E100C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
EXISTING CONDITION
RCFC&WCD 100-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++
Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 684.000(Ft.)
Top (of initial area) elevation = 1327.000(Ft.)
Bottom (of initial area) elevation = 1261.000(Ft.)
Difference in elevation = 66.000(Ft.)
Slope = 0.09649 s(percent)= 9.65
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.519 min.
Rainfall intensity = 3.047(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 13.217(CFS)
Total initial stream area = 5.080(Ac.)
Pervious area fraction = 1.000

++
Process from Point/Station 302.000 to Point/Station 303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1261.000(Ft.)

```
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =    44.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.313(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.41(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0682
Corrected/adjusted channel slope =  0.0682
Travel time =    0.10 min.     TC =   11.62  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.036(In/Hr) for a   100.0 year storm
Subarea runoff =      6.167(CFS) for      2.380(Ac.)
Total runoff =     19.384(CFS)  Total area =       7.460(Ac.)
End of computations, total study area =            7.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994E100D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
EXISTING CONDITION
RCFC&WCD 100-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.773(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.801
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
User specified values are as follows:
TC = 14.20 min. Rain intensity = 2.77(In/Hr)
Total area = 131.40(Ac.) Total runoff = 297.40(CFS)

++

Process from Point/Station 401.000 to Point/Station 402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1283.000(Ft.)
End of natural channel elevation = 1272.000(Ft.)
Length of natural channel = 1086.000(Ft.)
Estimated mean flow rate at midpoint of channel = 344.273(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)

```
Velocity using mean channel flow =   7.00(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0101
Corrected/adjusted channel slope =  0.0101
Travel time =    2.59 min.     TC =   16.79  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.572(In/Hr) for a   100.0 year storm
Subarea runoff =     90.113(CFS) for     41.420(Ac.)
Total runoff =    387.513(CFS)  Total area =     172.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1272.000(Ft.)
End of natural channel elevation =   1261.000(Ft.)
Length of natural channel  =   936.000(Ft.)
Estimated mean flow rate at midpoint of channel =    437.157(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.13(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0118
Corrected/adjusted channel slope =  0.0118
Travel time =    1.92 min.     TC =   18.70  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2)  =  88.74
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.450(In/Hr) for a   100.0 year storm
Subarea runoff =     91.328(CFS) for     44.280(Ac.)
Total runoff =    478.841(CFS)  Total area =     217.100(Ac.)
End of computations, total study area =          217.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.879
Area averaged RI index number =  80.5
```

10 YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994E10A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
EXISTING CONDITION
RCFC&WCD 10-YR STORM
BY: PS

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

```
Rainfall intensity =      1.807(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.758
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     13.353(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1370.000(Ft.)
Length of natural channel  =   341.000(Ft.)
Estimated mean flow rate at midpoint of channel =     23.418(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.20(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0704
Corrected/adjusted channel slope =  0.0704
Travel time =    1.35 min.     TC =   14.75  min.


 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.747
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.950
RI index for soil(AMC 2)  =  74.05
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      1.731(In/Hr) for a    10.0 year storm
Subarea runoff =     19.001(CFS) for     14.700(Ac.)
Total runoff =     32.353(CFS)  Total area =      24.450(Ac.)


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Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1370.000(Ft.)
End of natural channel elevation =   1327.000(Ft.)
Length of natural channel  =   891.000(Ft.)
Estimated mean flow rate at midpoint of channel =     50.912(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.51(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0483
Corrected/adjusted channel slope =  0.0483
Travel time =    3.29 min.     TC =   18.04  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.020
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.980
RI index for soil(AMC 2)  =  88.78
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.581(In/Hr) for a    10.0 year storm
Subarea runoff =     36.056(CFS) for     28.050(Ac.)
Total runoff =     68.410(CFS)  Total area =      52.500(Ac.)


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Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1310.000(Ft.)
Length of natural channel  =   667.000(Ft.)
Estimated mean flow rate at midpoint of channel =     89.558(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.97(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
```

```
        Normal channel slope =  0.0255
Corrected/adjusted channel slope =  0.0255
Travel time =    2.80 min.     TC =   20.84  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.810
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.481(In/Hr) for a    10.0 year storm
Subarea runoff =     38.939(CFS) for     32.460(Ac.)
Total runoff =    107.348(CFS)  Total area =      84.960(Ac.)


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Process from Point/Station      105.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1310.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  1197.000(Ft.)
Estimated mean flow rate at midpoint of channel =    124.064(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.73(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0292
Corrected/adjusted channel slope =  0.0292
Travel time =    4.22 min.     TC =   25.05  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.363(In/Hr) for a    10.0 year storm
```

```
Subarea runoff =     28.964(CFS) for     26.460(Ac.)
Total runoff =    136.312(CFS)  Total area =     111.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    111.420(Ac.)
Runoff from this stream =    136.312(CFS)
Time of concentration =   25.05 min.
Rainfall intensity =     1.363(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      1.966(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     14.549(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      109.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1298.000(Ft.)
Length of natural channel  =   437.000(Ft.)
Estimated mean flow rate at midpoint of channel =     23.431(CFS)
```

```
Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.09(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0664
Corrected/adjusted channel slope =  0.0664
Travel time =    1.78 min.     TC =   12.88  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.839(In/Hr) for a    10.0 year storm
Subarea runoff =     16.525(CFS) for     10.880(Ac.)
Total runoff =     31.074(CFS)  Total area =      19.790(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1298.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =   809.000(Ft.)
Estimated mean flow rate at midpoint of channel =     45.268(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.35(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0284
Corrected/adjusted channel slope =  0.0284
Travel time =    4.03 min.     TC =   16.92  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.627(In/Hr) for a    10.0 year storm
Subarea runoff =     24.038(CFS) for     18.080(Ac.)
Total runoff =     55.112(CFS)  Total area =      37.870(Ac.)


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Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.870(Ac.)
Runoff from this stream =     55.112(CFS)
Time of concentration =   16.92 min.
Rainfall intensity =     1.627(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      136.312     25.05                 1.363
2       55.112     16.92                 1.627
Largest stream flow has longer time of concentration
Qp =    136.312 + sum of
          Qb         Ia/Ib
          55.112 *    0.838 =     46.182
Qp =    182.494

Total of 2 main streams to confluence:
Flow rates before confluence point:
     136.312      55.112
Area of streams before confluence:
      111.420       37.870


Results of confluence:
Total flow rate =    182.494(CFS)
Time of concentration =    25.054 min.
Effective stream area after confluence  =    149.290(Ac.)


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Process from Point/Station      106.000 to Point/Station      107.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1275.000(Ft.)
End of natural channel elevation =   1267.000(Ft.)
Length of natural channel  =   580.000(Ft.)
Estimated mean flow rate at midpoint of channel =    193.746(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.79(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0138
Corrected/adjusted channel slope =  0.0138
Travel time =    2.55 min.     TC =   27.61  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.799
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.305(In/Hr) for a    10.0 year storm
Subarea runoff =     19.199(CFS) for     18.410(Ac.)
Total runoff =    201.693(CFS)  Total area =     167.700(Ac.)
End of computations, total study area =          167.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.971
Area averaged RI index number =  86.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994E10B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
EXISTING CONDITION
RCFC&WCD 10-YR STORM
BY: PS

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 772.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1360.000(Ft.)
Difference in elevation = 172.000(Ft.)
Slope = 0.22280 s(percent)= 22.28
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.227 min.

```
Rainfall intensity =      2.040(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.376(CFS)
Total initial stream area =        4.930(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      202.000 to Point/Station      203.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1360.000(Ft.)
End of natural channel elevation =   1293.000(Ft.)
Length of natural channel  =   584.000(Ft.)
Estimated mean flow rate at midpoint of channel =     14.391(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.47(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1147
Corrected/adjusted channel slope =  0.1103
Travel time =    2.18 min.     TC =   12.41  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.870(In/Hr) for a    10.0 year storm
Subarea runoff =     10.953(CFS) for      7.080(Ac.)
Total runoff =     19.330(CFS)  Total area =      12.010(Ac.)


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Process from Point/Station      203.000 to Point/Station      204.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1293.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =   792.000(Ft.)
Estimated mean flow rate at midpoint of channel =     28.922(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.97(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0442
Corrected/adjusted channel slope =  0.0442
Travel time =    1.89 min.     TC =   14.30  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.755(In/Hr) for a    10.0 year storm
Subarea runoff =     17.207(CFS) for     11.920(Ac.)
Total runoff =     36.537(CFS)  Total area =      23.930(Ac.)
End of computations, total study area =           23.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994E10C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
EXISTING CONDITION
RCFC&WCD 10-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 684.000(Ft.)
Top (of initial area) elevation = 1327.000(Ft.)
Bottom (of initial area) elevation = 1261.000(Ft.)
Difference in elevation = 66.000(Ft.)
Slope = 0.09649 s(percent)= 9.65
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.519 min.
Rainfall intensity = 1.934(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 8.148(CFS)
Total initial stream area = 5.080(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 302.000 to Point/Station 303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1261.000(Ft.)

```
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =    44.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.057(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.54(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0682
Corrected/adjusted channel slope =  0.0682
Travel time =    0.11 min.     TC =   11.63  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.926(In/Hr) for a    10.0 year storm
Subarea runoff =      3.799(CFS) for      2.380(Ac.)
Total runoff =     11.947(CFS)  Total area =       7.460(Ac.)
End of computations, total study area =            7.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994E10D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
EXISTING CONDITION
RCFC&WCD 10-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.760(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.755
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
User specified values are as follows:
TC = 14.20 min. Rain intensity = 1.76(In/Hr)
Total area = 131.40(Ac.) Total runoff = 180.10(CFS)

++

Process from Point/Station 401.000 to Point/Station 402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1283.000(Ft.)
End of natural channel elevation = 1272.000(Ft.)
Length of natural channel = 1086.000(Ft.)
Estimated mean flow rate at midpoint of channel = 208.486(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)

```
Velocity using mean channel flow =   5.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0101
Corrected/adjusted channel slope =  0.0101
Travel time =    3.03 min.     TC =   17.23  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.614(In/Hr) for a    10.0 year storm
Subarea runoff =     54.576(CFS) for     41.420(Ac.)
Total runoff =    234.676(CFS)  Total area =     172.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1272.000(Ft.)
End of natural channel elevation =   1261.000(Ft.)
Length of natural channel  =   936.000(Ft.)
Estimated mean flow rate at midpoint of channel =    264.741(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0118
Corrected/adjusted channel slope =  0.0118
Travel time =    2.25 min.     TC =   19.48  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.810
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2)  =  88.74
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.527(In/Hr) for a    10.0 year storm
Subarea runoff =     54.781(CFS) for     44.280(Ac.)
Total runoff =    289.457(CFS)  Total area =     217.100(Ac.)
End of computations, total study area =          217.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.879
Area averaged RI index number =  80.5
```

5 YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994E5A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
EXISTING CONDITION
RCFC&WCD 5-YR STORM
BY: PS

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 5.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.761(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

```
Rainfall intensity =      1.494(In/Hr) for a     5.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.610
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      8.889(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1370.000(Ft.)
Length of natural channel  =   341.000(Ft.)
Estimated mean flow rate at midpoint of channel =     15.590(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0704
Corrected/adjusted channel slope =  0.0704
Travel time =    1.55 min.     TC =   14.94  min.


 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.594
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.950
RI index for soil(AMC 1)  =  55.86
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      1.422(In/Hr) for a     5.0 year storm
Subarea runoff =     12.411(CFS) for     14.700(Ac.)
Total runoff =     21.300(CFS)  Total area =      24.450(Ac.)


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Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1370.000(Ft.)
End of natural channel elevation =   1327.000(Ft.)
Length of natural channel  =   891.000(Ft.)
Estimated mean flow rate at midpoint of channel =     33.518(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0483
Corrected/adjusted channel slope =  0.0483
Travel time =    3.78 min.     TC =   18.72  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.678
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.020
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.980
RI index for soil(AMC 1)  =  76.05
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.285(In/Hr) for a     5.0 year storm
Subarea runoff =     24.450(CFS) for     28.050(Ac.)
Total runoff =     45.750(CFS)  Total area =      52.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1310.000(Ft.)
Length of natural channel  =   667.000(Ft.)
Estimated mean flow rate at midpoint of channel =     59.893(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
```

```
        Normal channel slope =  0.0255
Corrected/adjusted channel slope =  0.0255
Travel time =    3.20 min.     TC =   21.92  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.670
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.197(In/Hr) for a     5.0 year storm
Subarea runoff =     26.017(CFS) for     32.460(Ac.)
Total runoff =     71.768(CFS)  Total area =      84.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1310.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  1197.000(Ft.)
Estimated mean flow rate at midpoint of channel =     82.943(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.14(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0292
Corrected/adjusted channel slope =  0.0292
Travel time =    4.82 min.     TC =   26.73  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.654
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.095(In/Hr) for a     5.0 year storm
```

```
Subarea runoff =     18.941(CFS) for     26.460(Ac.)
Total runoff =     90.709(CFS)  Total area =     111.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    111.420(Ac.)
Runoff from this stream =     90.709(CFS)
Time of concentration =   26.73 min.
Rainfall intensity =     1.095(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      1.626(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.718
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.401(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1298.000(Ft.)
Length of natural channel  =   437.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.751(CFS)
```

```
Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.66(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0664
Corrected/adjusted channel slope =  0.0664
Travel time =    1.99 min.     TC =   13.09  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.707
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.509(In/Hr) for a     5.0 year storm
Subarea runoff =     11.610(CFS) for     10.880(Ac.)
Total runoff =     22.011(CFS)  Total area =      19.790(Ac.)


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Process from Point/Station      110.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1298.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =   809.000(Ft.)
Estimated mean flow rate at midpoint of channel =     32.065(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   2.99(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0284
Corrected/adjusted channel slope =  0.0284
Travel time =    4.52 min.     TC =   17.61  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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```
Runoff Coefficient = 0.686
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.321(In/Hr) for a     5.0 year storm
Subarea runoff =     16.384(CFS) for     18.080(Ac.)
Total runoff =     38.395(CFS)  Total area =      37.870(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.870(Ac.)
Runoff from this stream =     38.395(CFS)
Time of concentration =   17.61 min.
Rainfall intensity =     1.321(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       90.709     26.73                 1.095
2       38.395     17.61                 1.321
Largest stream flow has longer time of concentration
Qp =     90.709 + sum of
          Qb         Ia/Ib
          38.395 *    0.829 =     31.820
Qp =    122.529

Total of 2 main streams to confluence:
Flow rates before confluence point:
      90.709      38.395
Area of streams before confluence:
      111.420       37.870


Results of confluence:
Total flow rate =    122.529(CFS)
Time of concentration =    26.732 min.
Effective stream area after confluence  =    149.290(Ac.)


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```
Process from Point/Station      106.000 to Point/Station      107.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1275.000(Ft.)
End of natural channel elevation =   1267.000(Ft.)
Length of natural channel  =   580.000(Ft.)
Estimated mean flow rate at midpoint of channel =    130.084(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.32(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0138
Corrected/adjusted channel slope =  0.0138
Travel time =    2.91 min.     TC =   29.64  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.646
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.045(In/Hr) for a     5.0 year storm
Subarea runoff =     12.418(CFS) for     18.410(Ac.)
Total runoff =    134.947(CFS)  Total area =     167.700(Ac.)
End of computations, total study area =          167.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.971
Area averaged RI index number =  86.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994E5B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
EXISTING CONDITION
RCFC&WCD 5-YR STORM
BY: PS

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 5.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.761(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 772.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1360.000(Ft.)
Difference in elevation = 172.000(Ft.)
Slope = 0.22280 s(percent)= 22.28
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.227 min.

```
Rainfall intensity =      1.687(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.723
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.015(CFS)
Total initial stream area =        4.930(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1360.000(Ft.)
End of natural channel elevation =   1293.000(Ft.)
Length of natural channel  =   584.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.335(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.00(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1147
Corrected/adjusted channel slope =  0.1103
Travel time =    2.43 min.     TC =   12.66  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.709
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.532(In/Hr) for a     5.0 year storm
Subarea runoff =      7.696(CFS) for      7.080(Ac.)
Total runoff =     13.711(CFS)  Total area =      12.010(Ac.)


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```
Process from Point/Station      203.000 to Point/Station      204.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1293.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =   792.000(Ft.)
Estimated mean flow rate at midpoint of channel =     20.516(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.34(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0442
Corrected/adjusted channel slope =  0.0442
Travel time =    2.08 min.     TC =   14.74  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.699
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.431(In/Hr) for a     5.0 year storm
Subarea runoff =     11.920(CFS) for     11.920(Ac.)
Total runoff =     25.632(CFS)  Total area =      23.930(Ac.)
End of computations, total study area =           23.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994E5C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
EXISTING CONDITION
RCFC&WCD 5-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 5.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.761(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 684.000(Ft.)
Top (of initial area) elevation = 1327.000(Ft.)
Bottom (of initial area) elevation = 1261.000(Ft.)
Difference in elevation = 66.000(Ft.)
Slope = 0.09649 s(percent)= 9.65
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.519 min.
Rainfall intensity = 1.599(In/Hr) for a 5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 6.627(CFS)
Total initial stream area = 5.080(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 302.000 to Point/Station 303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1261.000(Ft.)

```
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =    44.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.179(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0682
Corrected/adjusted channel slope =  0.0682
Travel time =    0.12 min.     TC =   11.64  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.592(In/Hr) for a     5.0 year storm
Subarea runoff =      3.089(CFS) for      2.380(Ac.)
Total runoff =      9.716(CFS)  Total area =       7.460(Ac.)
End of computations, total study area =            7.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994E5D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
EXISTING CONDITION
RCFC&WCD 5-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 5.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.761(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.455(In/Hr) for a 5.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.732
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
User specified values are as follows:
TC = 14.20 min. Rain intensity = 1.46(In/Hr)
Total area = 131.40(Ac.) Total runoff = 112.60(CFS)

++

Process from Point/Station 401.000 to Point/Station 402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1283.000(Ft.)
End of natural channel elevation = 1272.000(Ft.)
Length of natural channel = 1086.000(Ft.)
Estimated mean flow rate at midpoint of channel = 130.347(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)

```
Velocity using mean channel flow =   5.18(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0101
Corrected/adjusted channel slope =  0.0101
Travel time =    3.50 min.     TC =   17.70  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.318(In/Hr) for a     5.0 year storm
Subarea runoff =     43.668(CFS) for     41.420(Ac.)
Total runoff =    156.268(CFS)  Total area =     172.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1272.000(Ft.)
End of natural channel elevation =   1261.000(Ft.)
Length of natural channel  =   936.000(Ft.)
Estimated mean flow rate at midpoint of channel =    176.288(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.11(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0118
Corrected/adjusted channel slope =  0.0118
Travel time =    2.55 min.     TC =   20.25  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.792
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2)  =  88.74
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.240(In/Hr) for a     5.0 year storm
Subarea runoff =     43.499(CFS) for     44.280(Ac.)
Total runoff =    199.767(CFS)  Total area =     217.100(Ac.)
End of computations, total study area =          217.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.879
Area averaged RI index number =  80.5
```

2 YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994E2A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
EXISTING CONDITION
RCFC&WCD 2-YR STORM
BY: PS

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.550(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

```
Rainfall intensity =      1.080(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.553
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      5.821(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1370.000(Ft.)
Length of natural channel  =   341.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.209(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.20(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0704
Corrected/adjusted channel slope =  0.0704
Travel time =    1.78 min.     TC =   15.17  min.


 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.534
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.950
RI index for soil(AMC 1)  =  55.86
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      1.021(In/Hr) for a     2.0 year storm
Subarea runoff =      8.021(CFS) for     14.700(Ac.)
Total runoff =     13.841(CFS)  Total area =      24.450(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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```
Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1370.000(Ft.)
End of natural channel elevation =   1327.000(Ft.)
Length of natural channel  =   891.000(Ft.)
Estimated mean flow rate at midpoint of channel =     21.781(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.41(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0483
Corrected/adjusted channel slope =  0.0483
Travel time =    4.36 min.     TC =   19.53  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.616
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.020
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.980
RI index for soil(AMC 1)  =  76.05
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.911(In/Hr) for a     2.0 year storm
Subarea runoff =     15.752(CFS) for     28.050(Ac.)
Total runoff =     29.593(CFS)  Total area =      52.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1310.000(Ft.)
Length of natural channel  =   667.000(Ft.)
Estimated mean flow rate at midpoint of channel =     38.742(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.01(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
```

```
        Normal channel slope =  0.0255
Corrected/adjusted channel slope =  0.0255
Travel time =    3.69 min.     TC =   23.22  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.605
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.843(In/Hr) for a     2.0 year storm
Subarea runoff =     16.548(CFS) for     32.460(Ac.)
Total runoff =     46.141(CFS)  Total area =      84.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1310.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =  1197.000(Ft.)
Estimated mean flow rate at midpoint of channel =     53.326(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.58(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0292
Corrected/adjusted channel slope =  0.0292
Travel time =    5.57 min.     TC =   28.79  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.585
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.765(In/Hr) for a     2.0 year storm
```

```
Subarea runoff =     11.849(CFS) for     26.460(Ac.)
Total runoff =     57.991(CFS)  Total area =     111.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    111.420(Ac.)
Runoff from this stream =     57.991(CFS)
Time of concentration =   28.79 min.
Rainfall intensity =     0.765(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      1.175(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.666
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.978(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1298.000(Ft.)
Length of natural channel  =   437.000(Ft.)
Estimated mean flow rate at midpoint of channel =     11.239(CFS)
```

```
Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0664
Corrected/adjusted channel slope =  0.0664
Travel time =    2.27 min.     TC =   13.37  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.652
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.081(In/Hr) for a     2.0 year storm
Subarea runoff =      7.662(CFS) for     10.880(Ac.)
Total runoff =     14.640(CFS)  Total area =      19.790(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1298.000(Ft.)
End of natural channel elevation =   1275.000(Ft.)
Length of natural channel  =   809.000(Ft.)
Estimated mean flow rate at midpoint of channel =     21.328(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   2.61(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0284
Corrected/adjusted channel slope =  0.0284
Travel time =    5.17 min.     TC =   18.54  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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```
Runoff Coefficient = 0.624
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.933(In/Hr) for a     2.0 year storm
Subarea runoff =     10.532(CFS) for     18.080(Ac.)
Total runoff =     25.173(CFS)  Total area =      37.870(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.870(Ac.)
Runoff from this stream =     25.173(CFS)
Time of concentration =   18.54 min.
Rainfall intensity =     0.933(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       57.991     28.79                 0.765
2       25.173     18.54                 0.933
Largest stream flow has longer time of concentration
Qp =     57.991 + sum of
          Qb         Ia/Ib
          25.173 *    0.820 =     20.650
Qp =     78.640

Total of 2 main streams to confluence:
Flow rates before confluence point:
      57.991      25.173
Area of streams before confluence:
      111.420       37.870


Results of confluence:
Total flow rate =     78.640(CFS)
Time of concentration =    28.791 min.
Effective stream area after confluence  =    149.290(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station      106.000 to Point/Station      107.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1275.000(Ft.)
End of natural channel elevation =   1267.000(Ft.)
Length of natural channel  =   580.000(Ft.)
Estimated mean flow rate at midpoint of channel =     83.489(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   2.87(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0138
Corrected/adjusted channel slope =  0.0138
Travel time =    3.37 min.     TC =   32.16  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.575
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.728(In/Hr) for a     2.0 year storm
Subarea runoff =      7.706(CFS) for     18.410(Ac.)
Total runoff =     86.347(CFS)  Total area =     167.700(Ac.)
End of computations, total study area =          167.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.971
Area averaged RI index number =  86.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994E2B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
EXISTING CONDITION
RCFC&WCD 2-YR STORM
BY: PS

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.550(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 772.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1360.000(Ft.)
Difference in elevation = 172.000(Ft.)
Slope = 0.22280 s(percent)= 22.28
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.227 min.

```
Rainfall intensity =      1.219(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.673
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.044(CFS)
Total initial stream area =        4.930(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1360.000(Ft.)
End of natural channel elevation =   1293.000(Ft.)
Length of natural channel  =   584.000(Ft.)
Estimated mean flow rate at midpoint of channel =      6.949(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.51(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1147
Corrected/adjusted channel slope =  0.1103
Travel time =    2.77 min.     TC =   13.00  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.654
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.095(In/Hr) for a     2.0 year storm
Subarea runoff =      5.068(CFS) for      7.080(Ac.)
Total runoff =      9.113(CFS)  Total area =      12.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station      203.000 to Point/Station      204.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1293.000(Ft.)
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =   792.000(Ft.)
Estimated mean flow rate at midpoint of channel =     13.635(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.69(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0442
Corrected/adjusted channel slope =  0.0442
Travel time =    2.32 min.     TC =   15.32  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.641
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.017(In/Hr) for a     2.0 year storm
Subarea runoff =      7.762(CFS) for     11.920(Ac.)
Total runoff =     16.875(CFS)  Total area =      23.930(Ac.)
End of computations, total study area =           23.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994E2C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
EXISTING CONDITION
RCFC&WCD 2-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.550(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 684.000(Ft.)
Top (of initial area) elevation = 1327.000(Ft.)
Bottom (of initial area) elevation = 1261.000(Ft.)
Difference in elevation = 66.000(Ft.)
Slope = 0.09649 s(percent)= 9.65
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.519 min.
Rainfall intensity = 1.156(In/Hr) for a 2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.788
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 4.625(CFS)
Total initial stream area = 5.080(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 302.000 to Point/Station 303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1261.000(Ft.)

```
End of natural channel elevation =   1258.000(Ft.)
Length of natural channel  =    44.000(Ft.)
Estimated mean flow rate at midpoint of channel =      5.709(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0682
Corrected/adjusted channel slope =  0.0682
Travel time =    0.13 min.     TC =   11.65  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.787
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.150(In/Hr) for a     2.0 year storm
Subarea runoff =      2.155(CFS) for      2.380(Ac.)
Total runoff =      6.780(CFS)  Total area =       7.460(Ac.)
End of computations, total study area =            7.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994E2D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
EXISTING CONDITION
RCFC&WCD 2-YR STORM
BY: AB

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.550(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.052(In/Hr) for a 2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.686
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
User specified values are as follows:
TC = 14.20 min. Rain intensity = 1.05(In/Hr)
Total area = 131.40(Ac.) Total runoff = 71.90(CFS)

++

Process from Point/Station 401.000 to Point/Station 402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1283.000(Ft.)
End of natural channel elevation = 1272.000(Ft.)
Length of natural channel = 1086.000(Ft.)
Estimated mean flow rate at midpoint of channel = 83.232(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)

```
Velocity using mean channel flow =   4.52(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0101
Corrected/adjusted channel slope =  0.0101
Travel time =    4.00 min.     TC =   18.20  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.766
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.941(In/Hr) for a     2.0 year storm
Subarea runoff =     29.842(CFS) for     41.420(Ac.)
Total runoff =    101.742(CFS)  Total area =     172.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1272.000(Ft.)
End of natural channel elevation =   1261.000(Ft.)
Length of natural channel  =   936.000(Ft.)
Estimated mean flow rate at midpoint of channel =    114.776(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.36(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0118
Corrected/adjusted channel slope =  0.0118
Travel time =    2.91 min.     TC =   21.11  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.755
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.050
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2)  =  88.74
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.880(In/Hr) for a     2.0 year storm
Subarea runoff =     29.416(CFS) for     44.280(Ac.)
Total runoff =    131.158(CFS)  Total area =     217.100(Ac.)
End of computations, total study area =          217.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.879
Area averaged RI index number =  80.5
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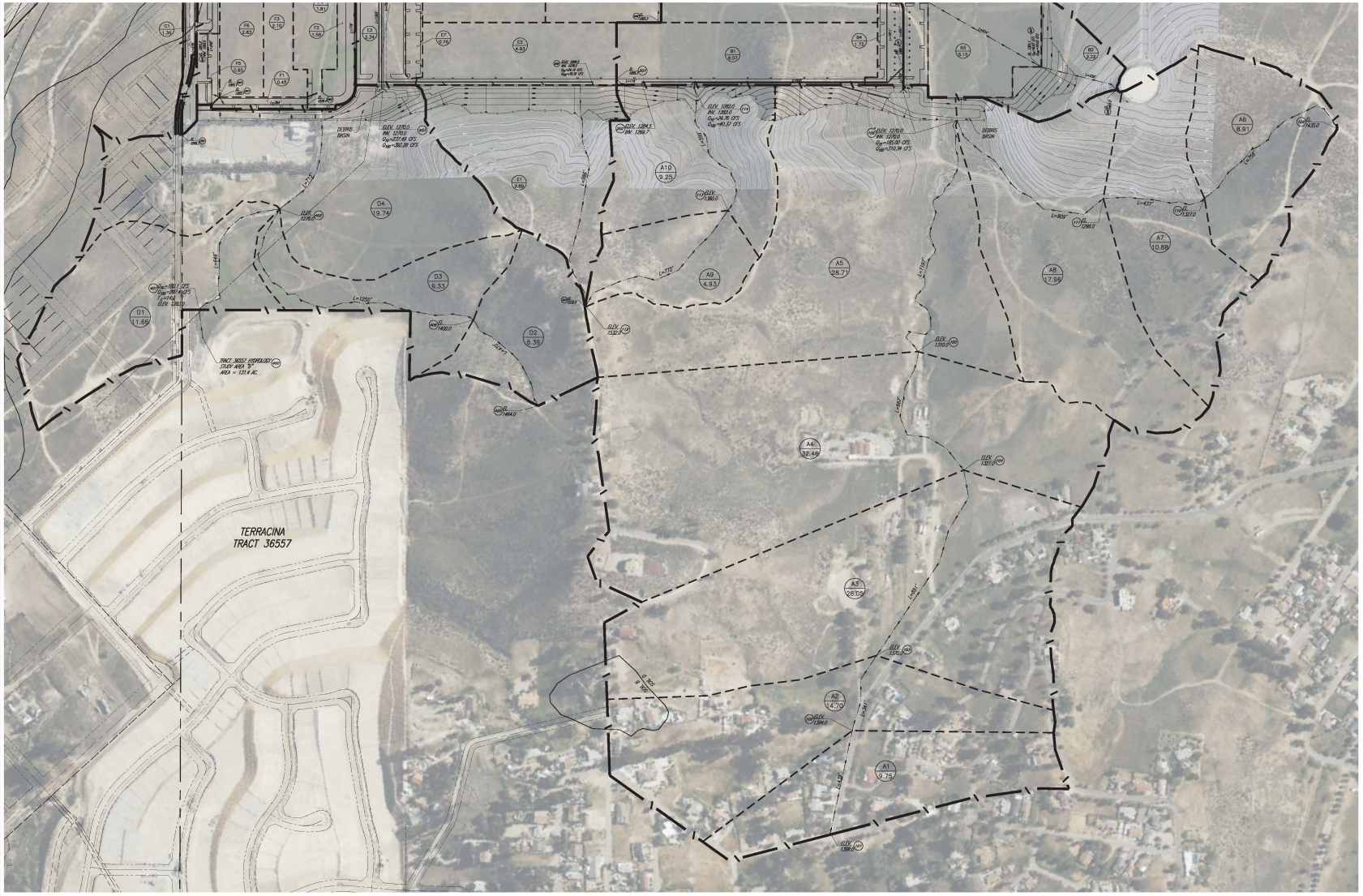
Appendix

D

PROPOSED CONDITION HYDROLOGY RATIONAL METHOD & KEY MAP

FOR ONSITE SEE SHEET 2



DRAINAGE AREA A					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
102	Q10 = 13.35 CFS	13.30	Q100 = 22.29 CFS	13.39	9.75
103	Q10 = 32.35 CFS	14.75	Q100 = 54.37 CFS	14.54	24.45
104	Q10 = 68.41 CFS	18.04	Q100 = 114.42 CFS	17.31	52.50
105	Q10 = 107.35 CFS	20.84	Q100 = 179.89 CFS	19.67	84.96
110	Q10 = 14.55 CFS	11.10	Q100 = 23.59 CFS	11.10	8.91
111	Q10 = 31.07 CFS	12.88	Q100 = 50.70 CFS	12.62	19.79
106	Q10 = 185.00 CFS	24.77	Q100 = 310.39 CFS	22.99	151.42
113	Q10 = 8.38 CFS	10.28	Q100 = 13.57 CFS	10.33	4.93
114	Q10 = 23.41 CFS	11.20	Q100 = 38.08 CFS	11.08	14.18
107	Q10 = 202.37 CFS	24.91	Q100 = 339.31 CFS	23.11	165.80
108	Q10 = 202.37 CFS	25.69	Q100 = 339.31 CFS	23.82	165.80

DRAINAGE AREA B					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
202	Q10 = 15.81 CFS	5.44	Q100 = 25.03 CFS	5.44	6.57
203	Q10 = 41.63 CFS	10.05	Q100 = 76.22 CFS	10.61	24.61
207	Q10 = 6.60 CFS	6.92	Q100 = 10.65 CFS	6.92	3.22
208	Q10 = 15.67 CFS	10.79	Q100 = 25.27 CFS	10.38	8.37
204	Q10 = 50.02 CFS	11.35	Q100 = 79.94 CFS	11.79	25.98
210	Q10 = 2.72 CFS	8.26	Q100 = 4.32 CFS	8.26	1.37
205	Q10 = 50.02 CFS	11.47	Q100 = 79.94 CFS	11.89	25.98

DRAINAGE AREA C					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
302	Q10 = 2.33 CFS	11.31	Q100 = 3.69 CFS	11.31	1.36
303	Q10 = 6.43 CFS	18.68	Q100 = 10.33 CFS	17.91	4.36
304	Q10 = 7.73 CFS	20.52	Q100 = 12.43 CFS	19.58	5.35
305	Q10 = 7.73 CFS	20.93	Q100 = 12.43 CFS	19.95	5.35

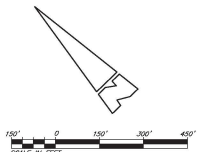
DRAINAGE AREA D					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
401	Q10 = 180.10 CFS	14.20	Q100 = 297.40 CFS	14.20	131.40
406	Q10 = 20.66 CFS	13.90	Q100 = 33.87 CFS	13.22	12.72
402	Q10 = 214.03 CFS	17.43	Q100 = 352.95 CFS	16.84	155.78
403	Q10 = 237.49 CFS	21.24	Q100 = 392.28 CFS	20.17	175.52
404	Q10 = 237.49 CFS	22.03	Q100 = 392.28 CFS	20.89	175.52

DRAINAGE AREA E					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
502	Q10 = 16.31 CFS	10.88	Q100 = 40.14 CFS	10.88	14.82
503	Q10 = 28.67 CFS	13.51	Q100 = 46.08 CFS	13.27	17.16
504	Q10 = 29.40 CFS	13.65	Q100 = 47.24 CFS	13.39	17.62
509	Q10 = 7.76 CFS	8.66	Q100 = 12.29 CFS	8.66	4.03
510	Q10 = 15.49 CFS	10.81	Q100 = 24.84 CFS	10.43	8.39
511	Q10 = 16.78 CFS	11.69	Q100 = 26.71 CFS	11.37	9.15
505	Q10 = 45.14 CFS	13.66	Q100 = 72.19 CFS	13.40	26.77
506	Q10 = 45.84 CFS	13.76	Q100 = 73.30 CFS	13.49	27.21
507	Q10 = 45.84 CFS	13.98	Q100 = 73.30 CFS	13.69	27.21

DRAINAGE AREA F					TRIBUTARY
NODE	10-YR STORM RUNOFF	TC (MIN.)	100-YR STORM RUNOFF	TC (MIN.)	AREA (AC.)
602	Q10 = 0.89 CFS	8.33	Q100 = 1.41 CFS	8.33	0.45
603	Q10 = 3.09 CFS	17.53	Q100 = 4.99 CFS	16.62	2.01
604	Q10 = 8.59 CFS	17.54	Q100 = 13.92 CFS	16.72	5.92
608	Q10 = 1.31 CFS	8.05	Q100 = 2.07 CFS	8.05	0.85
605	Q10 = 15.66 CFS	17.87	Q100 = 25.38 CFS	16.93	10.83
606	Q10 = 15.66 CFS	18.15	Q100 = 25.38 CFS	17.16	10.83

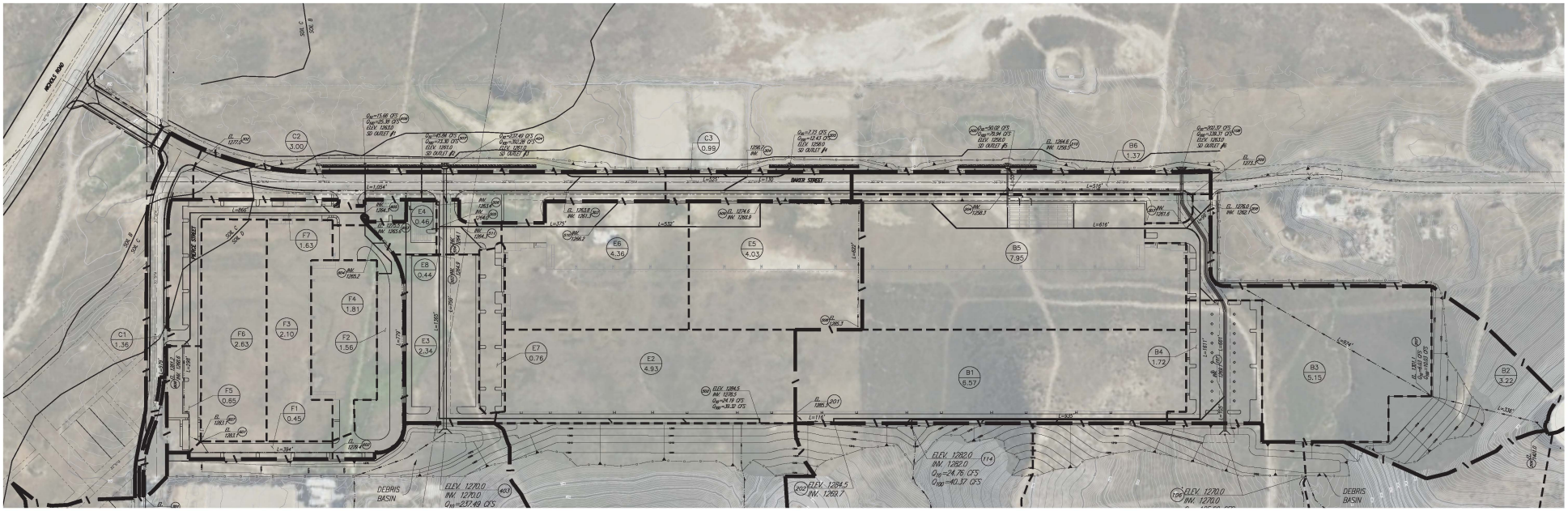
LEGEND

- MAJOR AREA BOUNDARY
- MINOR AREA BOUNDARY
- FLOWLINE
- PROPOSED STORM DRAIN
- SOIL GROUP BOUNDARY
- A / 8.98 — TRIBUTARY AREA DESIGNATION / TRIBUTARY AREA ACREAGE
- XX — ELEVATION @ NODE
- XXX — HIGH POINT REFERENCE



PROPOSED CONDITION HYDROLOGY KEY MAP
for
BAKER INDUSTRIAL
COUNTY OF RIVERSIDE

K:\21736\Civil\Exhibits\Hydrology\21736_Hydrology Key Map.dwg, 1/7/2025 3:08 PM, Thomas Ng, Adobe PDF



FOR OFFSITE SEE SHEET 1

LEGEND

- MAJOR AREA BOUNDARY
- MINOR AREA BOUNDARY
- FLOWLINE
- PROPOSED STORM DRAIN
- SUB GROUP BOUNDARY
- A / 8.98 — TRIBUTARY AREA DESIGNATION / TRIBUTARY AREA ACREAGE
- XX / ZZZ — ELEVATION @ NODE / NODAL POINT REFERENCE

100' 0 100' 200' 300'
SCALE IN FEET

PROPOSED CONDITION HYDROLOGY KEY MAP
for
BAKER INDUSTRIAL
COUNTY OF RIVERSIDE

DES. E.J.
DRAFT E.J.
SCALE 1" = 100'

KWC ENGINEERS
DESIGNING SUCCESS
3 OF 3 SHEETS

S:\17\17044\Civil\Hydrology\Unmitigated\17044_Proposed_Hydro_Key_Map.dwg, 11/1/2023 3:37 PM, Thomas Ng, Bottom Screen

100 YEAR PROPOSED CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994D100A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

```
Rainfall intensity =      2.847(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     22.286(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1370.000(Ft.)
Length of natural channel  =   341.000(Ft.)
Estimated mean flow rate at midpoint of channel =     39.085(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0704
Corrected/adjusted channel slope =  0.0704
Travel time =    1.14 min.     TC =   14.54  min.


 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.795
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.950
RI index for soil(AMC 2)  =  74.05
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      2.744(In/Hr) for a   100.0 year storm
Subarea runoff =     32.081(CFS) for     14.700(Ac.)
Total runoff =     54.367(CFS)  Total area =      24.450(Ac.)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Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1370.000(Ft.)
End of natural channel elevation =   1327.000(Ft.)
Length of natural channel  =   891.000(Ft.)
Estimated mean flow rate at midpoint of channel =     85.553(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.35(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0483
Corrected/adjusted channel slope =  0.0483
Travel time =    2.77 min.     TC =   17.31  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.020
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.980
RI index for soil(AMC 2)  =  88.78
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.537(In/Hr) for a   100.0 year storm
Subarea runoff =     60.056(CFS) for     28.050(Ac.)
Total runoff =    114.423(CFS)  Total area =      52.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1310.000(Ft.)
Length of natural channel  =   667.000(Ft.)
Estimated mean flow rate at midpoint of channel =    149.796(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.71(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
```

```
        Normal channel slope =  0.0255
Corrected/adjusted channel slope =  0.0255
Travel time =    2.36 min.     TC =   19.67  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.395(In/Hr) for a   100.0 year storm
Subarea runoff =     65.463(CFS) for     32.460(Ac.)
Total runoff =    179.886(CFS)  Total area =      84.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1310.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =  1197.000(Ft.)
Estimated mean flow rate at midpoint of channel =    210.280(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.01(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0334
Corrected/adjusted channel slope =  0.0334
Travel time =    3.32 min.     TC =   22.99  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.233(In/Hr) for a   100.0 year storm
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Subarea runoff =     53.728(CFS) for     28.710(Ac.)
Total runoff =    233.614(CFS)  Total area =     113.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    113.670(Ac.)
Runoff from this stream =    233.614(CFS)
Time of concentration =   22.99 min.
Rainfall intensity =     2.233(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      3.098(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     23.590(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      111.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1298.000(Ft.)
Length of natural channel  =   437.000(Ft.)
Estimated mean flow rate at midpoint of channel =     37.992(CFS)
```

```
Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.79(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0664
Corrected/adjusted channel slope =  0.0664
Travel time =    1.52 min.     TC =   12.62  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.924(In/Hr) for a   100.0 year storm
Subarea runoff =     27.108(CFS) for     10.880(Ac.)
Total runoff =     50.697(CFS)  Total area =      19.790(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      111.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1298.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =   809.000(Ft.)
Estimated mean flow rate at midpoint of channel =     73.702(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.33(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0346
Corrected/adjusted channel slope =  0.0346
Travel time =    3.11 min.     TC =   15.74  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.648(In/Hr) for a   100.0 year storm
Subarea runoff =     40.295(CFS) for     17.960(Ac.)
Total runoff =     90.993(CFS)  Total area =      37.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.750(Ac.)
Runoff from this stream =     90.993(CFS)
Time of concentration =   15.74 min.
Rainfall intensity =     2.648(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      233.614     22.99                 2.233
2       90.993     15.74                 2.648
Largest stream flow has longer time of concentration
Qp =    233.614 + sum of
          Qb         Ia/Ib
          90.993 *    0.843 =     76.724
Qp =    310.338

Total of 2 main streams to confluence:
Flow rates before confluence point:
     233.614      90.993
Area of streams before confluence:
      113.670       37.750


Results of confluence:
Total flow rate =    310.338(CFS)
Time of concentration =    22.990 min.
Effective stream area after confluence  =    151.420(Ac.)


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Process from Point/Station      106.000 to Point/Station      107.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1270.000(Ft.)
Downstream point/station elevation =  1269.100(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   310.338(CFS)
Nearest computed pipe diameter  =     66.00(In.)
Calculated individual pipe flow  =   310.338(CFS)
Normal flow depth in pipe =   54.00(In.)
Flow top width inside pipe =   50.91(In.)
Critical Depth =   57.90(In.)
Pipe flow velocity =     14.92(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    23.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    151.420(Ac.)
Runoff from this stream =    310.338(CFS)
Time of concentration =   23.11 min.
Rainfall intensity =     2.228(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   772.000(Ft.)
Top (of initial area) elevation =  1532.000(Ft.)
Bottom (of initial area) elevation =  1360.000(Ft.)
Difference in elevation =   172.000(Ft.)
Slope =    0.22280  s(percent)=      22.28
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.227 min.
Rainfall intensity =      3.215(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Initial subarea runoff =     13.568(CFS)
Total initial stream area =        4.930(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      114.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1360.000(Ft.)
End of natural channel elevation =   1282.000(Ft.)
Length of natural channel  =   599.000(Ft.)
Estimated mean flow rate at midpoint of channel =     26.298(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.65(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1302
Corrected/adjusted channel slope =  0.1302
Travel time =    0.86 min.     TC =   11.08  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.100(In/Hr) for a   100.0 year storm
Subarea runoff =     24.509(CFS) for      9.250(Ac.)
Total runoff =     38.077(CFS)  Total area =      14.180(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      114.000 to Point/Station      107.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1282.000(Ft.)
Downstream point/station elevation =  1269.100(Ft.)
Pipe length  =   935.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    38.077(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    38.077(CFS)
```

```
Normal flow depth in pipe =   23.48(In.)
Flow top width inside pipe =   18.17(In.)
Critical Depth =   24.79(In.)
Pipe flow velocity =     10.37(Ft/s)
Travel time through pipe =    1.50 min.
Time of concentration (TC) =    12.59 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.180(Ac.)
Runoff from this stream =     38.077(CFS)
Time of concentration =   12.59 min.
Rainfall intensity =     2.928(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      310.338     23.11                 2.228
2       38.077     12.59                 2.928
Largest stream flow has longer time of concentration
Qp =    310.338 + sum of
          Qb         Ia/Ib
          38.077 *    0.761 =     28.969
Qp =    339.307

Total of 2 main streams to confluence:
Flow rates before confluence point:
     310.338      38.077
Area of streams before confluence:
      151.420       14.180


Results of confluence:
Total flow rate =    339.307(CFS)
Time of concentration =    23.107 min.
Effective stream area after confluence  =    165.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1269.100(Ft.)
```

Downstream point/station elevation = 1263.000(Ft.)
Pipe length =   661.00(Ft.)   Manning's N = 0.013
No. of pipes = 1 Required pipe flow =   339.307(CFS)
Nearest computed pipe diameter =   66.00(In.)
Calculated individual pipe flow =   339.307(CFS)
Normal flow depth in pipe =   57.94(In.)
Flow top width inside pipe =   43.23(In.)
Critical Depth =   59.71(In.)
Pipe flow velocity =   15.37(Ft/s)
Travel time through pipe =   0.72 min.
Time of concentration (TC) =   23.82 min.
End of computations, total study area =   165.60 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.970
Area averaged RI index number = 86.8

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994D100B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 116.000(Ft.)
Top (of initial area) elevation = 1285.300(Ft.)
Bottom (of initial area) elevation = 1284.500(Ft.)
Difference in elevation = 0.800(Ft.)
Slope = 0.00690 s(percent)= 0.69
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.435 min.

```
Rainfall intensity =      4.273(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     25.027(CFS)
Total initial stream area =        6.570(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1269.700(Ft.)
Downstream point/station elevation =  1261.600(Ft.)
Pipe length  =  1611.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.027(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    25.027(CFS)
Normal flow depth in pipe =   21.45(In.)
Flow top width inside pipe =   27.09(In.)
Critical Depth =   20.46(In.)
Pipe flow velocity =      6.66(Ft/s)
Travel time through pipe =    4.03 min.
Time of concentration (TC) =     9.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.570(Ac.)
Runoff from this stream =     25.027(CFS)
Time of concentration =    9.46 min.
Rainfall intensity =     3.329(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   336.000(Ft.)
```

```
Top (of initial area) elevation =  1401.000(Ft.)
Bottom (of initial area) elevation =  1301.100(Ft.)
Difference in elevation =    99.900(Ft.)
Slope =    0.29732  s(percent)=      29.73
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.921 min.
Rainfall intensity =      3.832(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.648(CFS)
Total initial stream area =        3.220(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1301.100(Ft.)
End of street segment elevation =  1276.000(Ft.)
Length of street segment  =   924.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     18.038(CFS)
Depth of flow =   0.402(Ft.), Average velocity =   4.458(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.772(Ft.)
Flow velocity =   4.46(Ft/s)
Travel time =    3.45 min.     TC =   10.38  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
```

```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      3.194(In/Hr) for a   100.0 year storm
Subarea runoff =     14.623(CFS) for      5.150(Ac.)
Total runoff =     25.271(CFS)  Total area =       8.370(Ac.)
Street flow at end of street =     25.271(CFS)
Half street flow at end of street =     12.636(CFS)
Depth of flow =   0.442(Ft.), Average velocity =   4.835(Ft/s)
Flow width (from curb towards crown)=  15.770(Ft.)


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Process from Point/Station      208.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1262.100(Ft.)
Downstream point/station elevation =  1261.600(Ft.)
Pipe length  =    96.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.271(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    25.271(CFS)
Normal flow depth in pipe =   21.33(In.)
Flow top width inside pipe =   27.20(In.)
Critical Depth =   20.55(In.)
Pipe flow velocity =      6.77(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =    10.61 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.370(Ac.)
Runoff from this stream =     25.271(CFS)
Time of concentration =   10.61 min.
Rainfall intensity =     3.162(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       25.027      9.46                3.329
2       25.271     10.61                3.162
```

```
Largest stream flow has longer time of concentration
Qp =     25.271 + sum of
          Qb         Ia/Ib
          25.027 *    0.950 =     23.771
Qp =     49.042

Total of 2 main streams to confluence:
Flow rates before confluence point:
      25.027      25.271
Area of streams before confluence:
        6.570        8.370


Results of confluence:
Total flow rate =     49.042(CFS)
Time of concentration =    10.612 min.
Effective stream area after confluence  =     14.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.61 min.
Rainfall intensity =      3.162(In/Hr) for a   100.0 year storm
Subarea runoff =      4.834(CFS) for      1.720(Ac.)
Total runoff =     53.876(CFS)  Total area =      16.660(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.61 min.
```

```
Rainfall intensity =      3.162(In/Hr) for a   100.0 year storm
Subarea runoff =     22.344(CFS) for      7.950(Ac.)
Total runoff =     76.220(CFS)  Total area =      24.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1261.600(Ft.)
Downstream point/station elevation =  1258.300(Ft.)
Pipe length  =   616.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    76.220(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    76.220(CFS)
Normal flow depth in pipe =   35.91(In.)
Flow top width inside pipe =   29.58(In.)
Critical Depth =   32.78(In.)
Pipe flow velocity =      8.70(Ft/s)
Travel time through pipe =    1.18 min.
Time of concentration (TC) =    11.79 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     24.610(Ac.)
Runoff from this stream =     76.220(CFS)
Time of concentration =   11.79 min.
Rainfall intensity =     3.015(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   516.000(Ft.)
Top (of initial area) elevation =  1273.300(Ft.)
Bottom (of initial area) elevation =  1264.600(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01686  s(percent)=       1.69
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.257 min.
Rainfall intensity =      3.540(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.316(CFS)
Total initial stream area =        1.370(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1258.500(Ft.)
Downstream point/station elevation =  1258.300(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.316(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     4.316(CFS)
Normal flow depth in pipe =   10.90(In.)
Flow top width inside pipe =   17.59(In.)
Critical Depth =    9.55(In.)
Pipe flow velocity =      3.86(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =     8.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.370(Ac.)
Runoff from this stream =      4.316(CFS)
Time of concentration =    8.49 min.
Rainfall intensity =     3.495(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       76.220     11.79                3.015
2        4.316      8.49                3.495
Largest stream flow has longer time of concentration
Qp =     76.220 + sum of
          Qb         Ia/Ib
```

```
          4.316 *    0.863 =      3.724
Qp =     79.943

Total of 2 main streams to confluence:
Flow rates before confluence point:
      76.220       4.316
Area of streams before confluence:
       24.610        1.370


Results of confluence:
Total flow rate =     79.943(CFS)
Time of concentration =    11.792 min.
Effective stream area after confluence  =     25.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1258.300(Ft.)
Downstream point/station elevation =  1258.000(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    79.943(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =    79.943(CFS)
Normal flow depth in pipe =   33.23(In.)
Flow top width inside pipe =   39.55(In.)
Critical Depth =   33.05(In.)
Pipe flow velocity =      9.15(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    11.89 min.
End of computations, total study area =           25.98 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.212
Area averaged RI index number =  76.7
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994D100C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 979.000(Ft.)
Top (of initial area) elevation = 1289.300(Ft.)
Bottom (of initial area) elevation = 1277.000(Ft.)
Difference in elevation = 12.300(Ft.)
Slope = 0.01256 s(percent)= 1.26
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.314 min.

```
Rainfall intensity =      3.072(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.290
Decimal fraction soil group C = 0.410
Decimal fraction soil group D = 0.300
RI index for soil(AMC 2)  =  67.03
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.694(CFS)
Total initial stream area =        1.360(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1277.000(Ft.)
End of street segment elevation =  1263.800(Ft.)
Length of street segment  =  1054.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  24.000(Ft.)
Distance from crown to crossfall grade break  =  22.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      7.109(CFS)
Depth of flow =   0.347(Ft.), Average velocity =   2.662(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.994(Ft.)
Flow velocity =   2.66(Ft/s)
Travel time =    6.60 min.     TC =   17.91  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.070
Decimal fraction soil group C = 0.080
Decimal fraction soil group D = 0.850
RI index for soil(AMC 2)  =  73.19
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.498(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =      6.635(CFS) for      3.000(Ac.)
Total runoff =     10.328(CFS)  Total area =       4.360(Ac.)
Street flow at end of street =     10.328(CFS)
Half street flow at end of street =      5.164(CFS)
Depth of flow =   0.384(Ft.), Average velocity =   2.906(Ft/s)
Flow width (from curb towards crown)=  12.846(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1261.300(Ft.)
Downstream point/station elevation =  1258.700(Ft.)
Pipe length  =   525.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.328(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    10.328(CFS)
Normal flow depth in pipe =   15.96(In.)
Flow top width inside pipe =   17.94(In.)
Critical Depth =   14.36(In.)
Pipe flow velocity =      5.26(Ft/s)
Travel time through pipe =    1.66 min.
Time of concentration (TC) =    19.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    19.58 min.
Rainfall intensity =      2.400(In/Hr) for a   100.0 year storm
Subarea runoff =      2.105(CFS) for      0.990(Ac.)
Total runoff =     12.434(CFS)  Total area =       5.350(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1258.700(Ft.)
Downstream point/station elevation =  1258.000(Ft.)
```

Pipe length =   130.00(Ft.)   Manning's N = 0.013
No. of pipes = 1 Required pipe flow =   12.434(CFS)
Nearest computed pipe diameter =   24.00(In.)
Calculated individual pipe flow =   12.434(CFS)
Normal flow depth in pipe =   15.49(In.)
Flow top width inside pipe =   22.96(In.)
Critical Depth =   15.21(In.)
Pipe flow velocity =   5.80(Ft/s)
Travel time through pipe =   0.37 min.
Time of concentration (TC) =   19.95 min.
End of computations, total study area =   5.35 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 72.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994D100D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.773(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.801
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
User specified values are as follows:
TC = 14.20 min. Rain intensity = 2.77(In/Hr)
Total area = 131.40(Ac.) Total runoff = 297.40(CFS)

++

Process from Point/Station 401.000 to Point/Station 402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1283.000(Ft.)
End of natural channel elevation = 1276.000(Ft.)
Length of natural channel = 646.000(Ft.)
Estimated mean flow rate at midpoint of channel = 310.595(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
Velocity = 5.48(q^.33)(slope^.492)

```
Velocity using mean channel flow =   3.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0108
Corrected/adjusted channel slope =  0.0108
Travel time =    2.74 min.     TC =   16.94  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.562(In/Hr) for a   100.0 year storm
Subarea runoff =     25.258(CFS) for     11.660(Ac.)
Total runoff =    322.658(CFS)  Total area =     143.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    143.060(Ac.)
Runoff from this stream =    322.658(CFS)
Time of concentration =   16.94 min.
Rainfall intensity =     2.562(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      406.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   470.000(Ft.)
Top (of initial area) elevation =  1464.000(Ft.)
Bottom (of initial area) elevation =  1400.000(Ft.)
Difference in elevation =    64.000(Ft.)
Slope =    0.13617  s(percent)=      13.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.253 min.
Rainfall intensity =      3.363(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     18.436(CFS)
Total initial stream area =        6.390(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      406.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1276.000(Ft.)
Length of natural channel  =  1250.000(Ft.)
Estimated mean flow rate at midpoint of channel =     27.567(CFS)
```

```
Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.25(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0992
Corrected/adjusted channel slope =  0.0992
Travel time =    3.97 min.     TC =   13.22  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.864(In/Hr) for a   100.0 year storm
Subarea runoff =     15.429(CFS) for      6.330(Ac.)
Total runoff =     33.865(CFS)  Total area =      12.720(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     12.720(Ac.)
Runoff from this stream =     33.865(CFS)
Time of concentration =   13.22 min.
Rainfall intensity =     2.864(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1      322.658     16.94                 2.562
2       33.865     13.22                 2.864
Largest stream flow has longer time of concentration
Qp =    322.658 + sum of
          Qb         Ia/Ib
          33.865 *    0.894 =     30.289
Qp =    352.947

Total of 2 main streams to confluence:
Flow rates before confluence point:
     322.658      33.865
Area of streams before confluence:
      143.060       12.720


Results of confluence:
Total flow rate =    352.947(CFS)
Time of concentration =    16.940 min.
Effective stream area after confluence  =    155.780(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1276.000(Ft.)
```

```
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =   715.000(Ft.)
Estimated mean flow rate at midpoint of channel =    375.309(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.69(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0084
Corrected/adjusted channel slope =  0.0084
Travel time =    3.23 min.     TC =   20.17  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.368(In/Hr) for a   100.0 year storm
Subarea runoff =     39.336(CFS) for     19.740(Ac.)
Total runoff =    392.283(CFS)  Total area =     175.520(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1270.000(Ft.)
Downstream point/station elevation =  1261.000(Ft.)
Pipe length  =   750.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   392.283(CFS)
Nearest computed pipe diameter  =     66.00(In.)
Calculated individual pipe flow  =   392.283(CFS)
Normal flow depth in pipe =   59.40(In.)
Flow top width inside pipe =   39.60(In.)
Critical Depth =   62.03(In.)
Pipe flow velocity =     17.41(Ft/s)
Travel time through pipe =    0.72 min.
Time of concentration (TC) =    20.89 min.
End of computations, total study area =          175.52 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.850
Area averaged RI index number =  78.5
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994D100E.out

BAKER INDUSTRIAL HYDROLOGY AREA E
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 966.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1284.500(Ft.)
Difference in elevation = 247.500(Ft.)
Slope = 0.25621 s(percent)= 25.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =   10.878 min.
Rainfall intensity =      3.127(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     26.438(CFS)
Total initial stream area =        9.890(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      502.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.88 min.
Rainfall intensity =      3.127(In/Hr) for a   100.0 year storm
Subarea runoff =     13.701(CFS) for      4.930(Ac.)
Total runoff =     40.138(CFS)  Total area =      14.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1278.500(Ft.)
Downstream point/station elevation =  1264.900(Ft.)
Pipe length  =  1365.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    40.138(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    40.138(CFS)
Normal flow depth in pipe =   24.09(In.)
Flow top width inside pipe =   23.86(In.)
Critical Depth =   25.57(In.)
Pipe flow velocity =      9.51(Ft/s)
Travel time through pipe =    2.39 min.
Time of concentration (TC) =    13.27 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      503.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.27 min.
Rainfall intensity =      2.859(In/Hr) for a   100.0 year storm
Subarea runoff =      5.940(CFS) for      2.340(Ac.)
Total runoff =     46.079(CFS)  Total area =      17.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1264.900(Ft.)
Downstream point/station elevation =  1264.100(Ft.)
Pipe length  =    76.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    46.079(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    46.079(CFS)
Normal flow depth in pipe =   23.34(In.)
Flow top width inside pipe =   30.03(In.)
Critical Depth =   26.97(In.)
Pipe flow velocity =     10.25(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    13.39 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      504.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.39 min.
```

```
Rainfall intensity =      2.847(In/Hr) for a   100.0 year storm
Subarea runoff =      1.163(CFS) for      0.460(Ac.)
Total runoff =     47.241(CFS)  Total area =      17.620(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1264.100(Ft.)
Downstream point/station elevation =  1264.000(Ft.)
Pipe length  =     6.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    47.241(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    47.241(CFS)
Normal flow depth in pipe =   22.08(In.)
Flow top width inside pipe =   26.45(In.)
Critical Depth =   27.12(In.)
Pipe flow velocity =     12.19(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    13.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     17.620(Ac.)
Runoff from this stream =     47.241(CFS)
Time of concentration =   13.40 min.
Rainfall intensity =     2.846(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      508.000 to Point/Station      509.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1285.300(Ft.)
Bottom (of initial area) elevation =  1274.600(Ft.)
Difference in elevation =    10.700(Ft.)
Slope =    0.01720  s(percent)=       1.72
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.862 min.
Rainfall intensity =      3.429(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     12.294(CFS)
Total initial stream area =        4.030(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      509.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1268.900(Ft.)
Downstream point/station elevation =  1266.200(Ft.)
Pipe length  =   532.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.294(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.294(CFS)
Normal flow depth in pipe =   15.70(In.)
Flow top width inside pipe =   22.83(In.)
Critical Depth =   15.13(In.)
Pipe flow velocity =      5.65(Ft/s)
Travel time through pipe =    1.57 min.
Time of concentration (TC) =    10.43 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      510.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.43 min.
Rainfall intensity =      3.186(In/Hr) for a   100.0 year storm
Subarea runoff =     12.350(CFS) for      4.360(Ac.)
Total runoff =     24.644(CFS)  Total area =       8.390(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      511.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =  1266.200(Ft.)
Downstream point/station elevation =  1264.300(Ft.)
Pipe length  =   375.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.644(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    24.644(CFS)
Normal flow depth in pipe =   21.14(In.)
Flow top width inside pipe =   27.37(In.)
Critical Depth =   20.30(In.)
Pipe flow velocity =      6.67(Ft/s)
Travel time through pipe =    0.94 min.
Time of concentration (TC) =    11.37 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      511.000 to Point/Station      511.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.37 min.
Rainfall intensity =      3.065(In/Hr) for a   100.0 year storm
Subarea runoff =      2.070(CFS) for      0.760(Ac.)
Total runoff =     26.714(CFS)  Total area =       9.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      511.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1264.300(Ft.)
Downstream point/station elevation =  1264.000(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.714(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    26.714(CFS)
Normal flow depth in pipe =   22.69(In.)
Flow top width inside pipe =   25.76(In.)
Critical Depth =   21.14(In.)
Pipe flow velocity =      6.70(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    11.52 min.
```

```
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Process from Point/Station      505.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      9.150(Ac.)
Runoff from this stream =     26.714(CFS)
Time of concentration =   11.52 min.
Rainfall intensity =     3.047(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       47.241     13.40                2.846
2       26.714     11.52                3.047
Largest stream flow has longer time of concentration
Qp =     47.241 + sum of
          Qb         Ia/Ib
          26.714 *    0.934 =     24.952
Qp =     72.194

Total of 2 main streams to confluence:
Flow rates before confluence point:
      47.241      26.714
Area of streams before confluence:
       17.620        9.150


Results of confluence:
Total flow rate =     72.194(CFS)
Time of concentration =    13.403 min.
Effective stream area after confluence  =     26.770(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      506.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1264.000(Ft.)
Downstream point/station elevation =  1263.400(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    72.194(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    72.194(CFS)
Normal flow depth in pipe =   28.45(In.)
Flow top width inside pipe =   34.65(In.)
```

```
Critical Depth =   32.33(In.)
Pipe flow velocity =     11.14(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    13.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      506.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.49 min.
Rainfall intensity =      2.838(In/Hr) for a   100.0 year storm
Subarea runoff =      1.109(CFS) for      0.440(Ac.)
Total runoff =     73.302(CFS)  Total area =      27.210(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      507.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1263.400(Ft.)
Downstream point/station elevation =  1261.000(Ft.)
Pipe length  =   154.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    73.302(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    73.302(CFS)
Normal flow depth in pipe =   26.20(In.)
Flow top width inside pipe =   32.04(In.)
Critical Depth =   32.37(In.)
Pipe flow velocity =     13.29(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =    13.69 min.
End of computations, total study area =           27.21 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.427
Area averaged RI index number =  80.1
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Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994D100F.out

BAKER INDUSTRIAL HYDROLOGY AREA F
PROPOSED CONDITION
RCFC&WCD 100-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4500

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Process from Point/Station 601.000 to Point/Station 602.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 394.000(Ft.)
Top (of initial area) elevation = 1283.100(Ft.)
Bottom (of initial area) elevation = 1279.400(Ft.)
Difference in elevation = 3.700(Ft.)
Slope = 0.00939 s(percent)= 0.94
TC = k(0.300)*[(length^3)/(elevation change)]^0.2

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Initial area time of concentration =    8.333 min.
Rainfall intensity =      3.525(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.412(CFS)
Total initial stream area =        0.450(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      602.000 to Point/Station      603.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1279.400(Ft.)
End of street segment elevation =  1275.500(Ft.)
Length of street segment  =   779.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.286(CFS)
Depth of flow =   0.319(Ft.), Average velocity =   1.566(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.604(Ft.)
Flow velocity =   1.57(Ft/s)
Travel time =    8.29 min.     TC =   16.62  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
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Rainfall intensity =      2.584(In/Hr) for a   100.0 year storm
Subarea runoff =      3.574(CFS) for      1.560(Ac.)
Total runoff =      4.986(CFS)  Total area =       2.010(Ac.)
Street flow at end of street =      4.986(CFS)
Half street flow at end of street =      2.493(CFS)
Depth of flow =   0.356(Ft.), Average velocity =   1.724(Ft/s)
Flow width (from curb towards crown)=  11.485(Ft.)


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Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1265.600(Ft.)
Downstream point/station elevation =  1265.200(Ft.)
Pipe length  =    35.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.986(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.986(CFS)
Normal flow depth in pipe =    9.45(In.)
Flow top width inside pipe =   14.49(In.)
Critical Depth =   10.86(In.)
Pipe flow velocity =      6.13(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    16.72 min.


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Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.72 min.
Rainfall intensity =      2.577(In/Hr) for a   100.0 year storm
Subarea runoff =      4.799(CFS) for      2.100(Ac.)
Total runoff =      9.785(CFS)  Total area =       4.110(Ac.)


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Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
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Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.72 min.
Rainfall intensity =      2.577(In/Hr) for a   100.0 year storm
Subarea runoff =      4.136(CFS) for      1.810(Ac.)
Total runoff =     13.921(CFS)  Total area =       5.920(Ac.)


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Process from Point/Station      604.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1265.200(Ft.)
Downstream point/station elevation =  1264.300(Ft.)
Pipe length  =    93.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.921(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    13.921(CFS)
Normal flow depth in pipe =   15.47(In.)
Flow top width inside pipe =   18.50(In.)
Critical Depth =   16.65(In.)
Pipe flow velocity =      7.33(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    16.93 min.


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Process from Point/Station      605.000 to Point/Station      605.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.920(Ac.)
Runoff from this stream =     13.921(CFS)
Time of concentration =   16.93 min.
Rainfall intensity =     2.562(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      607.000 to Point/Station      608.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   298.000(Ft.)
Top (of initial area) elevation =  1283.100(Ft.)
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Bottom (of initial area) elevation =  1281.200(Ft.)
Difference in elevation =     1.900(Ft.)
Slope =    0.00638  s(percent)=       0.64
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.052 min.
Rainfall intensity =      3.580(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.071(CFS)
Total initial stream area =        0.650(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      608.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1268.600(Ft.)
Downstream point/station elevation =  1264.300(Ft.)
Pipe length  =   848.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.071(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.071(CFS)
Normal flow depth in pipe =    8.24(In.)
Flow top width inside pipe =   11.13(In.)
Critical Depth =    7.38(In.)
Pipe flow velocity =      3.60(Ft/s)
Travel time through pipe =    3.92 min.
Time of concentration (TC) =    11.98 min.


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Process from Point/Station      605.000 to Point/Station      605.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.070
Decimal fraction soil group D = 0.930
RI index for soil(AMC 2)  =  74.58
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.98 min.
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Rainfall intensity =      2.994(In/Hr) for a   100.0 year storm
Subarea runoff =      6.994(CFS) for      2.630(Ac.)
Total runoff =      9.065(CFS)  Total area =       3.280(Ac.)


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Process from Point/Station      605.000 to Point/Station      605.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  72.60
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.98 min.
Rainfall intensity =      2.994(In/Hr) for a   100.0 year storm
Subarea runoff =      4.329(CFS) for      1.630(Ac.)
Total runoff =     13.395(CFS)  Total area =       4.910(Ac.)


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Process from Point/Station      605.000 to Point/Station      605.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.910(Ac.)
Runoff from this stream =     13.395(CFS)
Time of concentration =   11.98 min.
Rainfall intensity =     2.994(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       13.921     16.93                2.562
2       13.395     11.98                2.994
Largest stream flow has longer time of concentration
Qp =     13.921 + sum of
          Qb         Ia/Ib
          13.395 *    0.856 =     11.463
Qp =     25.384

Total of 2 main streams to confluence:
Flow rates before confluence point:
      13.921      13.395
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Area of streams before confluence:
        5.920        4.910


Results of confluence:
Total flow rate =     25.384(CFS)
Time of concentration =    16.928 min.
Effective stream area after confluence  =     10.830(Ac.)


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Process from Point/Station      605.000 to Point/Station      606.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1264.300(Ft.)
Downstream point/station elevation =  1263.000(Ft.)
Pipe length  =   125.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.384(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    25.384(CFS)
Normal flow depth in pipe =   18.33(In.)
Flow top width inside pipe =   25.21(In.)
Critical Depth =   21.11(In.)
Pipe flow velocity =      8.83(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =    17.16 min.
End of computations, total study area =           10.83 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  74.5
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10 YEAR PROPOSED CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994D10A.out

BAKER INDUSTRIAL HYDROLOGY AREA A
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

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Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 439.000(Ft.)
Top (of initial area) elevation = 1399.000(Ft.)
Bottom (of initial area) elevation = 1394.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.01139 s(percent)= 1.14
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.394 min.

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Rainfall intensity =      1.807(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.758
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     13.353(CFS)
Total initial stream area =        9.750(Ac.)
Pervious area fraction = 0.800


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Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1394.000(Ft.)
End of natural channel elevation =   1370.000(Ft.)
Length of natural channel  =   341.000(Ft.)
Estimated mean flow rate at midpoint of channel =     23.418(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.20(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0704
Corrected/adjusted channel slope =  0.0704
Travel time =    1.35 min.     TC =   14.75  min.


 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.747
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.950
RI index for soil(AMC 2)  =  74.05
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      1.731(In/Hr) for a    10.0 year storm
Subarea runoff =     19.001(CFS) for     14.700(Ac.)
Total runoff =     32.353(CFS)  Total area =      24.450(Ac.)


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Process from Point/Station      103.000 to Point/Station      104.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1370.000(Ft.)
End of natural channel elevation =   1327.000(Ft.)
Length of natural channel  =   891.000(Ft.)
Estimated mean flow rate at midpoint of channel =     50.912(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.51(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0483
Corrected/adjusted channel slope =  0.0483
Travel time =    3.29 min.     TC =   18.04  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.020
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.980
RI index for soil(AMC 2)  =  88.78
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.581(In/Hr) for a    10.0 year storm
Subarea runoff =     36.056(CFS) for     28.050(Ac.)
Total runoff =     68.410(CFS)  Total area =      52.500(Ac.)


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Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1310.000(Ft.)
Length of natural channel  =   667.000(Ft.)
Estimated mean flow rate at midpoint of channel =     89.558(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.97(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
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        Normal channel slope =  0.0255
Corrected/adjusted channel slope =  0.0255
Travel time =    2.80 min.     TC =   20.84  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.810
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.481(In/Hr) for a    10.0 year storm
Subarea runoff =     38.939(CFS) for     32.460(Ac.)
Total runoff =    107.348(CFS)  Total area =      84.960(Ac.)


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Process from Point/Station      105.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1310.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =  1197.000(Ft.)
Estimated mean flow rate at midpoint of channel =    125.486(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.07(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0334
Corrected/adjusted channel slope =  0.0334
Travel time =    3.93 min.     TC =   24.77  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.370(In/Hr) for a    10.0 year storm
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Subarea runoff =     31.605(CFS) for     28.710(Ac.)
Total runoff =    138.954(CFS)  Total area =     113.670(Ac.)


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Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    113.670(Ac.)
Runoff from this stream =    138.954(CFS)
Time of concentration =   24.77 min.
Rainfall intensity =     1.370(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      109.000 to Point/Station      110.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   758.000(Ft.)
Top (of initial area) elevation =  1435.000(Ft.)
Bottom (of initial area) elevation =  1327.000(Ft.)
Difference in elevation =   108.000(Ft.)
Slope =    0.14248  s(percent)=      14.25
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.102 min.
Rainfall intensity =      1.966(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     14.549(CFS)
Total initial stream area =        8.910(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      110.000 to Point/Station      111.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1327.000(Ft.)
End of natural channel elevation =   1298.000(Ft.)
Length of natural channel  =   437.000(Ft.)
Estimated mean flow rate at midpoint of channel =     23.431(CFS)
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Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.09(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0664
Corrected/adjusted channel slope =  0.0664
Travel time =    1.78 min.     TC =   12.88  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.839(In/Hr) for a    10.0 year storm
Subarea runoff =     16.525(CFS) for     10.880(Ac.)
Total runoff =     31.074(CFS)  Total area =      19.790(Ac.)


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Process from Point/Station      111.000 to Point/Station      106.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1298.000(Ft.)
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =   809.000(Ft.)
Estimated mean flow rate at midpoint of channel =     45.174(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0346
Corrected/adjusted channel slope =  0.0346
Travel time =    3.66 min.     TC =   16.55  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.643(In/Hr) for a    10.0 year storm
Subarea runoff =     24.139(CFS) for     17.960(Ac.)
Total runoff =     55.212(CFS)  Total area =      37.750(Ac.)


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Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     37.750(Ac.)
Runoff from this stream =     55.212(CFS)
Time of concentration =   16.55 min.
Rainfall intensity =     1.643(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      138.954     24.77                 1.370
2       55.212     16.55                 1.643
Largest stream flow has longer time of concentration
Qp =    138.954 + sum of
          Qb         Ia/Ib
          55.212 *    0.834 =     46.044
Qp =    184.997

Total of 2 main streams to confluence:
Flow rates before confluence point:
     138.954      55.212
Area of streams before confluence:
      113.670       37.750


Results of confluence:
Total flow rate =    184.997(CFS)
Time of concentration =    24.771 min.
Effective stream area after confluence  =    151.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station      106.000 to Point/Station      107.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1270.000(Ft.)
Downstream point/station elevation =  1269.100(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   184.997(CFS)
Nearest computed pipe diameter  =     54.00(In.)
Calculated individual pipe flow  =   184.997(CFS)
Normal flow depth in pipe =   45.09(In.)
Flow top width inside pipe =   40.08(In.)
Critical Depth =   47.12(In.)
Pipe flow velocity =     13.04(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    24.91 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    151.420(Ac.)
Runoff from this stream =    184.997(CFS)
Time of concentration =   24.91 min.
Rainfall intensity =     1.367(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   772.000(Ft.)
Top (of initial area) elevation =  1532.000(Ft.)
Bottom (of initial area) elevation =  1360.000(Ft.)
Difference in elevation =   172.000(Ft.)
Slope =    0.22280  s(percent)=      22.28
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.227 min.
Rainfall intensity =      2.040(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Initial subarea runoff =      8.376(CFS)
Total initial stream area =        4.930(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      114.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of natural channel elevation =   1360.000(Ft.)
End of natural channel elevation =   1282.000(Ft.)
Length of natural channel  =   599.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.235(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.23(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1302
Corrected/adjusted channel slope =  0.1302
Travel time =    0.98 min.     TC =   11.20  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.958(In/Hr) for a    10.0 year storm
Subarea runoff =     15.037(CFS) for      9.250(Ac.)
Total runoff =     23.414(CFS)  Total area =      14.180(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      114.000 to Point/Station      107.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  1282.000(Ft.)
Downstream point/station elevation =  1269.100(Ft.)
Pipe length  =   935.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    23.414(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    23.414(CFS)
```

```
Normal flow depth in pipe =   17.48(In.)
Flow top width inside pipe =   21.35(In.)
Critical Depth =   20.61(In.)
Pipe flow velocity =      9.54(Ft/s)
Travel time through pipe =    1.63 min.
Time of concentration (TC) =    12.84 min.


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Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.180(Ac.)
Runoff from this stream =     23.414(CFS)
Time of concentration =   12.84 min.
Rainfall intensity =     1.842(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1      184.997     24.91                1.367
2       23.414     12.84                1.842
Largest stream flow has longer time of concentration
Qp =    184.997 + sum of
          Qb         Ia/Ib
          23.414 *    0.742 =     17.375
Qp =    202.372

Total of 2 main streams to confluence:
Flow rates before confluence point:
     184.997      23.414
Area of streams before confluence:
      151.420       14.180


Results of confluence:
Total flow rate =    202.372(CFS)
Time of concentration =    24.905 min.
Effective stream area after confluence  =    165.600(Ac.)


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Process from Point/Station      107.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1269.100(Ft.)
```

Downstream point/station elevation = 1263.000(Ft.)
Pipe length =   661.00(Ft.)   Manning's N = 0.013
No. of pipes = 1 Required pipe flow =   202.372(CFS)
Nearest computed pipe diameter =   57.00(In.)
Calculated individual pipe flow =   202.372(CFS)
Normal flow depth in pipe =   43.41(In.)
Flow top width inside pipe =   48.58(In.)
Critical Depth =   48.85(In.)
Pipe flow velocity =   13.98(Ft/s)
Travel time through pipe =   0.79 min.
Time of concentration (TC) =   25.69 min.
End of computations, total study area =   165.60 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.970
Area averaged RI index number = 86.8

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994D10B.out

BAKER INDUSTRIAL HYDROLOGY AREA B
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 116.000(Ft.)
Top (of initial area) elevation = 1285.300(Ft.)
Bottom (of initial area) elevation = 1284.500(Ft.)
Difference in elevation = 0.800(Ft.)
Slope = 0.00690 s(percent)= 0.69
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.435 min.

```
Rainfall intensity =      2.712(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     15.809(CFS)
Total initial stream area =        6.570(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1269.700(Ft.)
Downstream point/station elevation =  1261.600(Ft.)
Pipe length  =  1611.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.809(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    15.809(CFS)
Normal flow depth in pipe =   19.36(In.)
Flow top width inside pipe =   18.96(In.)
Critical Depth =   17.19(In.)
Pipe flow velocity =      5.82(Ft/s)
Travel time through pipe =    4.61 min.
Time of concentration (TC) =    10.05 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.570(Ac.)
Runoff from this stream =     15.809(CFS)
Time of concentration =   10.05 min.
Rainfall intensity =     2.057(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   336.000(Ft.)
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Top (of initial area) elevation =  1401.000(Ft.)
Bottom (of initial area) elevation =  1301.100(Ft.)
Difference in elevation =    99.900(Ft.)
Slope =    0.29732  s(percent)=      29.73
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.921 min.
Rainfall intensity =      2.432(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.843
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.601(CFS)
Total initial stream area =        3.220(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      208.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1301.100(Ft.)
End of street segment elevation =  1276.000(Ft.)
Length of street segment  =   924.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     11.230(CFS)
Depth of flow =   0.353(Ft.), Average velocity =   3.985(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.324(Ft.)
Flow velocity =   3.99(Ft/s)
Travel time =    3.86 min.     TC =   10.79  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
```

```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.992(In/Hr) for a    10.0 year storm
Subarea runoff =      9.065(CFS) for      5.150(Ac.)
Total runoff =     15.666(CFS)  Total area =       8.370(Ac.)
Street flow at end of street =     15.666(CFS)
Half street flow at end of street =      7.833(CFS)
Depth of flow =   0.387(Ft.), Average velocity =   4.310(Ft/s)
Flow width (from curb towards crown)=  13.002(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      208.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1262.100(Ft.)
Downstream point/station elevation =  1261.600(Ft.)
Pipe length  =    96.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.666(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    15.666(CFS)
Normal flow depth in pipe =   18.84(In.)
Flow top width inside pipe =   19.71(In.)
Critical Depth =   17.12(In.)
Pipe flow velocity =      5.92(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    11.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.370(Ac.)
Runoff from this stream =     15.666(CFS)
Time of concentration =   11.06 min.
Rainfall intensity =     1.970(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       15.809     10.05                2.057
2       15.666     11.06                1.970
```

```
Largest stream flow has longer or shorter time of concentration
Qp =     15.809 + sum of
          Qa          Tb/Ta
          15.666 *    0.909 =     14.238
Qp =     30.046

Total of 2 main streams to confluence:
Flow rates before confluence point:
      15.809      15.666
Area of streams before confluence:
        6.570        8.370


Results of confluence:
Total flow rate =     30.046(CFS)
Time of concentration =    10.048 min.
Effective stream area after confluence  =     14.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.05 min.
Rainfall intensity =      2.057(In/Hr) for a    10.0 year storm
Subarea runoff =      3.127(CFS) for      1.720(Ac.)
Total runoff =     33.174(CFS)  Total area =      16.660(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.05 min.
```

```
Rainfall intensity =      2.057(In/Hr) for a    10.0 year storm
Subarea runoff =     14.454(CFS) for      7.950(Ac.)
Total runoff =     47.627(CFS)  Total area =      24.610(Ac.)


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Process from Point/Station      203.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1261.600(Ft.)
Downstream point/station elevation =  1258.300(Ft.)
Pipe length  =   616.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    47.627(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    47.627(CFS)
Normal flow depth in pipe =   28.73(In.)
Flow top width inside pipe =   28.90(In.)
Critical Depth =   26.97(In.)
Pipe flow velocity =      7.87(Ft/s)
Travel time through pipe =    1.30 min.
Time of concentration (TC) =    11.35 min.


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Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     24.610(Ac.)
Runoff from this stream =     47.627(CFS)
Time of concentration =   11.35 min.
Rainfall intensity =     1.947(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   516.000(Ft.)
Top (of initial area) elevation =  1273.300(Ft.)
Bottom (of initial area) elevation =  1264.600(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01686  s(percent)=       1.69
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.257 min.
Rainfall intensity =      2.247(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.724(CFS)
Total initial stream area =        1.370(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1258.500(Ft.)
Downstream point/station elevation =  1258.300(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.724(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.724(CFS)
Normal flow depth in pipe =    9.25(In.)
Flow top width inside pipe =   14.59(In.)
Critical Depth =    7.95(In.)
Pipe flow velocity =      3.43(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =     8.52 min.


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Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.370(Ac.)
Runoff from this stream =      2.724(CFS)
Time of concentration =    8.52 min.
Rainfall intensity =     2.215(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       47.627     11.35                1.947
2        2.724      8.52                2.215
Largest stream flow has longer time of concentration
Qp =     47.627 + sum of
          Qb         Ia/Ib
```

```
          2.724 *    0.879 =      2.395
Qp =     50.022

Total of 2 main streams to confluence:
Flow rates before confluence point:
      47.627       2.724
Area of streams before confluence:
       24.610        1.370


Results of confluence:
Total flow rate =     50.022(CFS)
Time of concentration =    11.352 min.
Effective stream area after confluence  =     25.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1258.300(Ft.)
Downstream point/station elevation =  1258.000(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    50.022(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    50.022(CFS)
Normal flow depth in pipe =   30.00(In.)
Flow top width inside pipe =   26.83(In.)
Critical Depth =   27.62(In.)
Pipe flow velocity =      7.94(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    11.47 min.
End of computations, total study area =           25.98 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.212
Area averaged RI index number =  76.7
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 04/07/25 File:1994D10C.out

BAKER INDUSTRIAL HYDROLOGY AREA C
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 979.000(Ft.)
Top (of initial area) elevation = 1289.300(Ft.)
Bottom (of initial area) elevation = 1277.000(Ft.)
Difference in elevation = 12.300(Ft.)
Slope = 0.01256 s(percent)= 1.26
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.314 min.

```
Rainfall intensity =      1.950(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.290
Decimal fraction soil group C = 0.410
Decimal fraction soil group D = 0.300
RI index for soil(AMC 2)  =  67.03
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.326(CFS)
Total initial stream area =        1.360(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1277.000(Ft.)
End of street segment elevation =  1263.800(Ft.)
Length of street segment  =  1054.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  24.000(Ft.)
Distance from crown to crossfall grade break  =  22.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      4.444(CFS)
Depth of flow =   0.306(Ft.), Average velocity =   2.392(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.958(Ft.)
Flow velocity =   2.39(Ft/s)
Travel time =    7.34 min.     TC =   18.66  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.070
Decimal fraction soil group C = 0.080
Decimal fraction soil group D = 0.850
RI index for soil(AMC 2)  =  73.19
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.557(In/Hr) for a    10.0 year storm
```

```
Subarea runoff =      4.103(CFS) for      3.000(Ac.)
Total runoff =      6.429(CFS)  Total area =       4.360(Ac.)
Street flow at end of street =      6.429(CFS)
Half street flow at end of street =      3.214(CFS)
Depth of flow =   0.337(Ft.), Average velocity =   2.601(Ft/s)
Flow width (from curb towards crown)=  10.532(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1261.300(Ft.)
Downstream point/station elevation =  1258.700(Ft.)
Pipe length  =   525.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.429(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.429(CFS)
Normal flow depth in pipe =   12.98(In.)
Flow top width inside pipe =   16.14(In.)
Critical Depth =   11.77(In.)
Pipe flow velocity =      4.71(Ft/s)
Travel time through pipe =    1.86 min.
Time of concentration (TC) =    20.52 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    20.52 min.
Rainfall intensity =      1.492(In/Hr) for a    10.0 year storm
Subarea runoff =      1.298(CFS) for      0.990(Ac.)
Total runoff =      7.727(CFS)  Total area =       5.350(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1258.700(Ft.)
Downstream point/station elevation =  1258.000(Ft.)
```

Pipe length =   130.00(Ft.)   Manning's N = 0.013
No. of pipes = 1 Required pipe flow =   7.727(CFS)
Nearest computed pipe diameter =   18.00(In.)
Calculated individual pipe flow =   7.727(CFS)
Normal flow depth in pipe =   14.79(In.)
Flow top width inside pipe =   13.78(In.)
Critical Depth =   12.92(In.)
Pipe flow velocity =   4.97(Ft/s)
Travel time through pipe =   0.44 min.
Time of concentration (TC) =   20.95 min.
End of computations, total study area =   5.35 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 72.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/04/25 File:1994D10D.out

BAKER INDUSTRIAL HYDROLOGY AREA D
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 400.000 to Point/Station 401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.760(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.755
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
User specified values are as follows:
TC = 14.20 min. Rain intensity = 1.76(In/Hr)
Total area = 131.40(Ac.) Total runoff = 180.10(CFS)

++

Process from Point/Station 401.000 to Point/Station 402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1283.000(Ft.)
End of natural channel elevation = 1276.000(Ft.)
Length of natural channel = 646.000(Ft.)
Estimated mean flow rate at midpoint of channel = 188.091(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
Velocity = 5.48(q^.33)(slope^.492)

```
Velocity using mean channel flow =   3.33(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0108
Corrected/adjusted channel slope =  0.0108
Travel time =    3.23 min.     TC =   17.43  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.605(In/Hr) for a    10.0 year storm
Subarea runoff =     15.274(CFS) for     11.660(Ac.)
Total runoff =    195.374(CFS)  Total area =     143.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    143.060(Ac.)
Runoff from this stream =    195.374(CFS)
Time of concentration =   17.43 min.
Rainfall intensity =     1.605(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      406.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   470.000(Ft.)
Top (of initial area) elevation =  1464.000(Ft.)
Bottom (of initial area) elevation =  1400.000(Ft.)
Difference in elevation =    64.000(Ft.)
Slope =    0.13617  s(percent)=      13.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.253 min.
Rainfall intensity =      2.134(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     11.394(CFS)
Total initial stream area =        6.390(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      406.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1400.000(Ft.)
End of natural channel elevation =   1276.000(Ft.)
Length of natural channel  =  1250.000(Ft.)
Estimated mean flow rate at midpoint of channel =     17.038(CFS)
```

```
Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0992
Corrected/adjusted channel slope =  0.0992
Travel time =    4.65 min.     TC =   13.90  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.824
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.777(In/Hr) for a    10.0 year storm
Subarea runoff =      9.265(CFS) for      6.330(Ac.)
Total runoff =     20.659(CFS)  Total area =      12.720(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     12.720(Ac.)
Runoff from this stream =     20.659(CFS)
Time of concentration =   13.90 min.
Rainfall intensity =     1.777(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1      195.374     17.43                 1.605
2       20.659     13.90                 1.777
Largest stream flow has longer time of concentration
Qp =    195.374 + sum of
          Qb         Ia/Ib
          20.659 *    0.903 =     18.658
Qp =    214.033

Total of 2 main streams to confluence:
Flow rates before confluence point:
     195.374      20.659
Area of streams before confluence:
      143.060       12.720


Results of confluence:
Total flow rate =    214.033(CFS)
Time of concentration =    17.433 min.
Effective stream area after confluence  =    155.780(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1276.000(Ft.)
```

```
End of natural channel elevation =   1270.000(Ft.)
Length of natural channel  =   715.000(Ft.)
Estimated mean flow rate at midpoint of channel =    227.593(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.13(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0084
Corrected/adjusted channel slope =  0.0084
Travel time =    3.81 min.     TC =   21.24  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.809
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.468(In/Hr) for a    10.0 year storm
Subarea runoff =     23.454(CFS) for     19.740(Ac.)
Total runoff =    237.487(CFS)  Total area =     175.520(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      404.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1270.000(Ft.)
Downstream point/station elevation =  1261.000(Ft.)
Pipe length  =   750.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   237.487(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   237.487(CFS)
Normal flow depth in pipe =   44.53(In.)
Flow top width inside pipe =   47.13(In.)
Critical Depth =   51.70(In.)
Pipe flow velocity =     15.98(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =    22.03 min.
End of computations, total study area =          175.52 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.850
Area averaged RI index number =  78.5
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994D10E.out

BAKER INDUSTRIAL HYDROLOGY AREA E
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 966.000(Ft.)
Top (of initial area) elevation = 1532.000(Ft.)
Bottom (of initial area) elevation = 1284.500(Ft.)
Difference in elevation = 247.500(Ft.)
Slope = 0.25621 s(percent)= 25.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =   10.878 min.
Rainfall intensity =      1.984(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.831
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     16.309(CFS)
Total initial stream area =        9.890(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      502.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.88 min.
Rainfall intensity =      1.984(In/Hr) for a    10.0 year storm
Subarea runoff =      8.644(CFS) for      4.930(Ac.)
Total runoff =     24.953(CFS)  Total area =      14.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1278.500(Ft.)
Downstream point/station elevation =  1264.900(Ft.)
Pipe length  =  1365.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.953(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    24.953(CFS)
Normal flow depth in pipe =   18.38(In.)
Flow top width inside pipe =   25.18(In.)
Critical Depth =   20.95(In.)
Pipe flow velocity =      8.65(Ft/s)
Travel time through pipe =    2.63 min.
Time of concentration (TC) =    13.51 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      503.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.51 min.
Rainfall intensity =      1.800(In/Hr) for a    10.0 year storm
Subarea runoff =      3.716(CFS) for      2.340(Ac.)
Total runoff =     28.669(CFS)  Total area =      17.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1264.900(Ft.)
Downstream point/station elevation =  1264.100(Ft.)
Pipe length  =    76.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.669(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    28.669(CFS)
Normal flow depth in pipe =   20.06(In.)
Flow top width inside pipe =   23.60(In.)
Critical Depth =   22.34(In.)
Pipe flow velocity =      9.05(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    13.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      504.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.65 min.
```

```
Rainfall intensity =      1.792(In/Hr) for a    10.0 year storm
Subarea runoff =      0.727(CFS) for      0.460(Ac.)
Total runoff =     29.396(CFS)  Total area =      17.620(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1264.100(Ft.)
Downstream point/station elevation =  1264.000(Ft.)
Pipe length  =     6.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.396(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    29.396(CFS)
Normal flow depth in pipe =   19.83(In.)
Flow top width inside pipe =   18.19(In.)
Critical Depth =   22.22(In.)
Pipe flow velocity =     10.60(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    13.66 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     17.620(Ac.)
Runoff from this stream =     29.396(CFS)
Time of concentration =   13.66 min.
Rainfall intensity =     1.791(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      508.000 to Point/Station      509.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1285.300(Ft.)
Bottom (of initial area) elevation =  1274.600(Ft.)
Difference in elevation =    10.700(Ft.)
Slope =    0.01720  s(percent)=       1.72
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.862 min.
Rainfall intensity =      2.176(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.759(CFS)
Total initial stream area =        4.030(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      509.000 to Point/Station      510.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1268.900(Ft.)
Downstream point/station elevation =  1266.200(Ft.)
Pipe length  =   532.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.759(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.759(CFS)
Normal flow depth in pipe =   12.80(In.)
Flow top width inside pipe =   20.49(In.)
Critical Depth =   12.39(In.)
Pipe flow velocity =      5.06(Ft/s)
Travel time through pipe =    1.75 min.
Time of concentration (TC) =    10.61 min.


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Process from Point/Station      510.000 to Point/Station      510.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.61 min.
Rainfall intensity =      2.006(In/Hr) for a    10.0 year storm
Subarea runoff =      7.731(CFS) for      4.360(Ac.)
Total runoff =     15.490(CFS)  Total area =       8.390(Ac.)


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Process from Point/Station      510.000 to Point/Station      511.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =  1266.200(Ft.)
Downstream point/station elevation =  1264.300(Ft.)
Pipe length  =   375.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.490(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    15.490(CFS)
Normal flow depth in pipe =   18.89(In.)
Flow top width inside pipe =   19.65(In.)
Critical Depth =   17.03(In.)
Pipe flow velocity =      5.84(Ft/s)
Travel time through pipe =    1.07 min.
Time of concentration (TC) =    11.69 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      511.000 to Point/Station      511.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.69 min.
Rainfall intensity =      1.922(In/Hr) for a    10.0 year storm
Subarea runoff =      1.290(CFS) for      0.760(Ac.)
Total runoff =     16.779(CFS)  Total area =       9.150(Ac.)


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Process from Point/Station      511.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1264.300(Ft.)
Downstream point/station elevation =  1264.000(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.779(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    16.779(CFS)
Normal flow depth in pipe =   20.95(In.)
Flow top width inside pipe =   15.98(In.)
Critical Depth =   17.72(In.)
Pipe flow velocity =      5.77(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    11.86 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      505.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      9.150(Ac.)
Runoff from this stream =     16.779(CFS)
Time of concentration =   11.86 min.
Rainfall intensity =     1.909(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       29.396     13.66                 1.791
2       16.779     11.86                 1.909
Largest stream flow has longer time of concentration
Qp =     29.396 + sum of
          Qb         Ia/Ib
          16.779 *    0.938 =     15.746
Qp =     45.142

Total of 2 main streams to confluence:
Flow rates before confluence point:
      29.396      16.779
Area of streams before confluence:
       17.620        9.150


Results of confluence:
Total flow rate =     45.142(CFS)
Time of concentration =    13.657 min.
Effective stream area after confluence  =     26.770(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      506.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1264.000(Ft.)
Downstream point/station elevation =  1263.400(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    45.142(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    45.142(CFS)
Normal flow depth in pipe =   23.60(In.)
Flow top width inside pipe =   29.79(In.)
```

```
Critical Depth =   26.71(In.)
Pipe flow velocity =      9.93(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    13.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      506.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.76 min.
Rainfall intensity =      1.785(In/Hr) for a    10.0 year storm
Subarea runoff =      0.693(CFS) for      0.440(Ac.)
Total runoff =     45.835(CFS)  Total area =      27.210(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      506.000 to Point/Station      507.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1263.400(Ft.)
Downstream point/station elevation =  1261.000(Ft.)
Pipe length  =   154.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    45.835(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    45.835(CFS)
Normal flow depth in pipe =   22.15(In.)
Flow top width inside pipe =   26.37(In.)
Critical Depth =   26.88(In.)
Pipe flow velocity =     11.80(Ft/s)
Travel time through pipe =    0.22 min.
Time of concentration (TC) =    13.98 min.
End of computations, total study area =           27.21 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.427
Area averaged RI index number =  80.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 06/13/25 File:1994D10F.out

BAKER INDUSTRIAL HYDROLOGY AREA F
PROPOSED CONDITION
RCFC&WCD 10-YR STORM
BY: P.S

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6653

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.450(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.920(In/Hr)
Slope of intensity duration curve = 0.4500

++

Process from Point/Station 601.000 to Point/Station 602.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 394.000(Ft.)
Top (of initial area) elevation = 1283.100(Ft.)
Bottom (of initial area) elevation = 1279.400(Ft.)
Difference in elevation = 3.700(Ft.)
Slope = 0.00939 s(percent)= 0.94
TC = k(0.300)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =    8.333 min.
Rainfall intensity =      2.237(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.891(CFS)
Total initial stream area =        0.450(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1279.400(Ft.)
End of street segment elevation =  1275.500(Ft.)
Length of street segment  =   779.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.049(CFS)
Depth of flow =   0.281(Ft.), Average velocity =   1.412(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.740(Ft.)
Flow velocity =   1.41(Ft/s)
Travel time =    9.20 min.     TC =   17.53  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Rainfall intensity =      1.601(In/Hr) for a    10.0 year storm
Subarea runoff =      2.199(CFS) for      1.560(Ac.)
Total runoff =      3.090(CFS)  Total area =       2.010(Ac.)
Street flow at end of street =      3.090(CFS)
Half street flow at end of street =      1.545(CFS)
Depth of flow =   0.314(Ft.), Average velocity =   1.545(Ft/s)
Flow width (from curb towards crown)=   9.346(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1265.600(Ft.)
Downstream point/station elevation =  1265.200(Ft.)
Pipe length  =    35.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.090(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.090(CFS)
Normal flow depth in pipe =    8.20(In.)
Flow top width inside pipe =   11.16(In.)
Critical Depth =    9.04(In.)
Pipe flow velocity =      5.40(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    17.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.64 min.
Rainfall intensity =      1.597(In/Hr) for a    10.0 year storm
Subarea runoff =      2.952(CFS) for      2.100(Ac.)
Total runoff =      6.042(CFS)  Total area =       4.110(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
```

```
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.64 min.
Rainfall intensity =      1.597(In/Hr) for a    10.0 year storm
Subarea runoff =      2.544(CFS) for      1.810(Ac.)
Total runoff =      8.586(CFS)  Total area =       5.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1265.200(Ft.)
Downstream point/station elevation =  1264.300(Ft.)
Pipe length  =    93.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.586(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.586(CFS)
Normal flow depth in pipe =   12.53(In.)
Flow top width inside pipe =   16.56(In.)
Critical Depth =   13.61(In.)
Pipe flow velocity =      6.54(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =    17.87 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      605.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.920(Ac.)
Runoff from this stream =      8.586(CFS)
Time of concentration =   17.87 min.
Rainfall intensity =     1.587(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      607.000 to Point/Station      608.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   298.000(Ft.)
Top (of initial area) elevation =  1283.100(Ft.)
```

```
Bottom (of initial area) elevation =  1281.200(Ft.)
Difference in elevation =     1.900(Ft.)
Slope =    0.00638  s(percent)=       0.64
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.052 min.
Rainfall intensity =      2.272(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.307(CFS)
Total initial stream area =        0.650(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      608.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1268.600(Ft.)
Downstream point/station elevation =  1264.300(Ft.)
Pipe length  =   848.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.307(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.307(CFS)
Normal flow depth in pipe =    6.11(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    5.80(In.)
Pipe flow velocity =      3.25(Ft/s)
Travel time through pipe =    4.34 min.
Time of concentration (TC) =    12.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      605.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.070
Decimal fraction soil group D = 0.930
RI index for soil(AMC 2)  =  74.58
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    12.40 min.
```

```
Rainfall intensity =      1.871(In/Hr) for a    10.0 year storm
Subarea runoff =      4.343(CFS) for      2.630(Ac.)
Total runoff =      5.650(CFS)  Total area =       3.280(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      605.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  72.60
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    12.40 min.
Rainfall intensity =      1.871(In/Hr) for a    10.0 year storm
Subarea runoff =      2.687(CFS) for      1.630(Ac.)
Total runoff =      8.337(CFS)  Total area =       4.910(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      605.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.910(Ac.)
Runoff from this stream =      8.337(CFS)
Time of concentration =   12.40 min.
Rainfall intensity =     1.871(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        8.586     17.87                 1.587
2        8.337     12.40                 1.871
Largest stream flow has longer time of concentration
Qp =      8.586 + sum of
          Qb         Ia/Ib
           8.337 *    0.848 =      7.071
Qp =     15.657

Total of 2 main streams to confluence:
Flow rates before confluence point:
       8.586       8.337
```

```
Area of streams before confluence:
        5.920        4.910


Results of confluence:
Total flow rate =     15.657(CFS)
Time of concentration =    17.874 min.
Effective stream area after confluence  =     10.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      606.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1264.300(Ft.)
Downstream point/station elevation =  1263.000(Ft.)
Pipe length  =   125.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.657(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    15.657(CFS)
Normal flow depth in pipe =   16.64(In.)
Flow top width inside pipe =   17.03(In.)
Critical Depth =   17.54(In.)
Pipe flow velocity =      7.65(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    18.15 min.
End of computations, total study area =           10.83 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  74.5
```

Appendix

E

FEMA FLOOD INSURANCE RATE MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NINGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

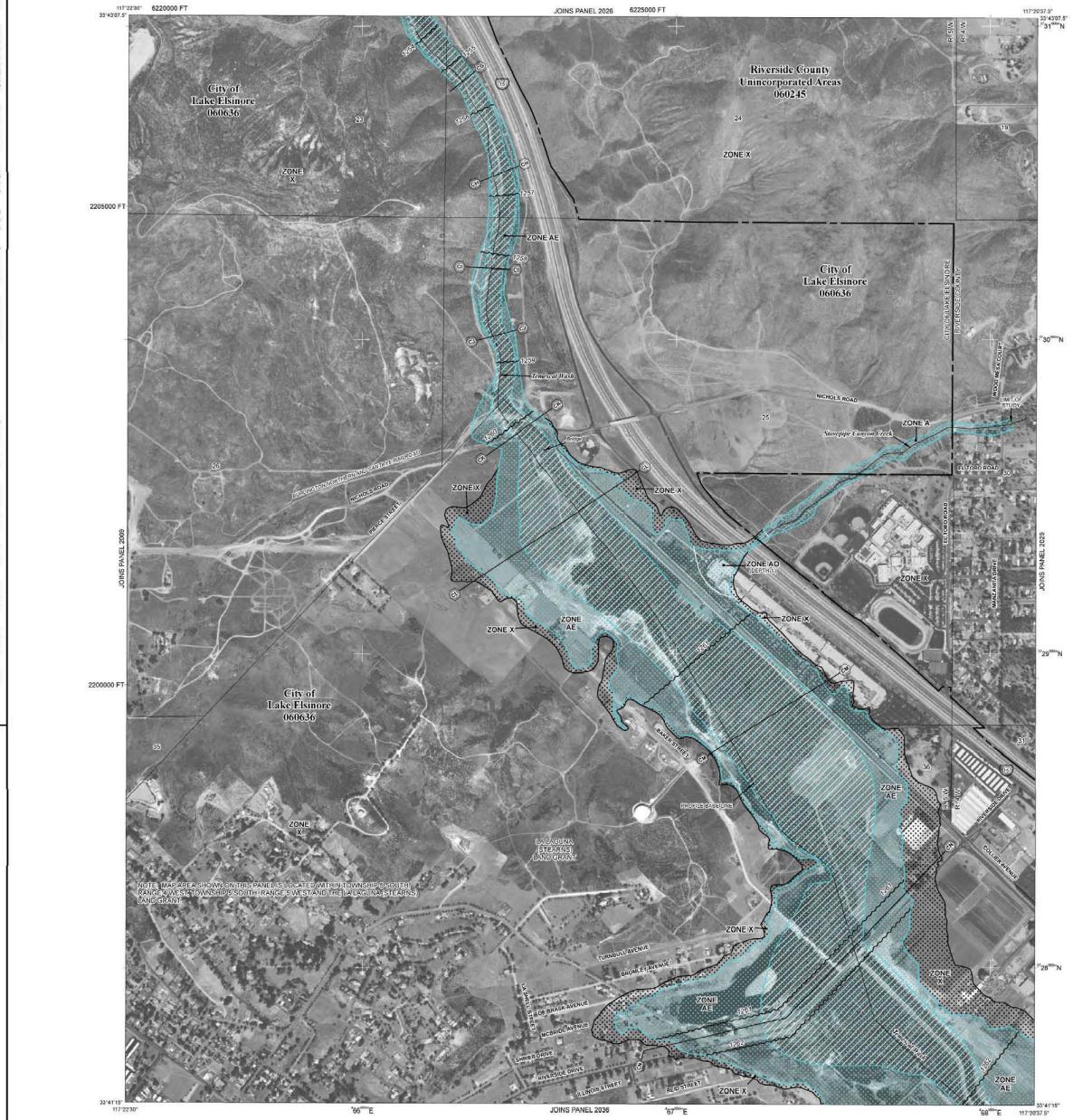
This map may reflect more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** — No Base Flood Elevations determined.
- **ZONE AE** — Base Flood Elevations determined.
- **ZONE AH** — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** — Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL. 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 7576000 N — 1000-meter Universal Transverse Mercator grid values, zone 11N
- 600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2028G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2028 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINING:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAKE ELSINORE, CITY OF	060636	2028	G
RIVERSIDE COUNTY	060245	2028	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C2028G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

Appendix

F

STORM DRAIN HYDRAULICS WSPG ANALYSIS

```
T1 1994 Baker Industrial                                                                                0
T2 City of Lake Elsinore
T3 1994 SD LINE A
SO   1000.0001261.000  1                          1263.000
R    1085.0001261.430  1      .013                                    .000    .000 0
R    1730.9901269.800  1      .013                                    .000    .000 0
SH   1730.9901269.800  2                          1276.000
CD   1  3   1   1.000   4.000    8.000  .000  .000   .00
CD   2  3   0    .000   7.000    5.000  .000  .000   .00
Q           400.200   .0
```

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING Date: 6-20-2025 Time: 3:24:42

1994 Baker Industrial
City of Lake Elsinore
1994 SD LINE A

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	1261.000	4.000	1265.000	400.20	14.29	3.17	1268.17	.00	4.00	8.00	4.000	8.000	.00	1 1.0
85.000	.0051					.0171	1.46	4.00	1.35	4.00	.013	.00	.00	BOX
1085.000	1261.430	5.027	1266.457	400.20	14.29	3.17	1269.63	.00	4.00	8.00	4.000	8.000	.00	1 1.0
645.990	.0130					.0171	11.07	5.03	1.35	3.88	.013	.00	.00	BOX
1730.990	1269.800	7.730	1277.530	400.20	14.29	3.17	1280.70	.00	4.00	8.00	4.000	8.000	.00	1 1.0

```
T1 1994 Baker Industrial                                                    0
T2 City of Lake Elsinore
T3 1994 SD Line B
SO   1000.0001263.000  1                        1265.000
R    1079.0001263.810  1      .013                            .000    .000 0
R    1106.3501264.090  1      .013                          -33.160    .000 0
R    1199.3501265.040  1      .013                            .000    .000 0
R    1226.5301265.310  1      .013                           33.670    .000 0
R    1298.4701266.050  1      .013                            .000    .000 0
R    1335.0101266.420  1      .013                          -34.600    .000 0
R    1392.3901267.010  1      .013                            .000    .000 0
R    1428.3201267.370  1      .013                           34.600    .000 0
R    1667.2201269.810  1      .013                            .000    .000 0
JX   1669.2201269.830  3  2   .013   38.080         1270.890         45.0         .000
R    1763.7401270.800  3      .013                            .000    .000 0
SH   1763.7401270.800  4                        1270.000
CD   1  4   2    .000   4.000     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
CD   3  4   2    .000   4.000     .000  .000  .000   .00
CD   4  2   0    .000   8.000    5.000  .000  .000   .00
Q           325.920   .0
```

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING Date: 6-20-2025 Time: 4: 0:14

1994 Baker Industrial
City of Lake Elsinore
1994 SD Line B

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	1263.000	3.784	1266.784	364.00	14.79	3.40	1270.18	.00	3.78	1.81	4.000	.000	.00	2 .0
17.154	.0103					.0146	.25	3.78	.71	4.00	.013	.00	.00	PIPE
1017.154	1263.176	4.000	1267.176	364.00	14.48	3.26	1270.43	.00	3.78	.00	4.000	.000	.00	2 .0
61.846	.0103					.0157	.97	4.00	.00	4.00	.013	.00	.00	PIPE
1079.000	1263.810	4.359	1268.169	364.00	14.48	3.26	1271.43	.00	3.78	.00	4.000	.000	.00	2 .0
27.350	.0102					.0161	.44	.00	.00	4.00	.013	.00	.00	PIPE
1106.350	1264.090	4.913	1269.003	364.00	14.48	3.26	1272.26	.00	3.78	.00	4.000	.000	.00	2 .0
93.000	.0102					.0161	1.49	4.91	.00	4.00	.013	.00	.00	PIPE
1199.350	1265.040	5.456	1270.496	364.00	14.48	3.26	1273.75	.00	3.78	.00	4.000	.000	.00	2 .0
27.180	.0099					.0161	.44	.00	.00	4.00	.013	.00	.00	PIPE
1226.530	1265.310	6.021	1271.331	364.00	14.48	3.26	1274.59	.00	3.78	.00	4.000	.000	.00	2 .0
71.940	.0103					.0161	1.15	6.02	.00	4.00	.013	.00	.00	PIPE
1298.470	1266.050	6.436	1272.486	364.00	14.48	3.26	1275.74	.00	3.78	.00	4.000	.000	.00	2 .0
36.540	.0101					.0161	.59	.00	.00	4.00	.013	.00	.00	PIPE
1335.010	1266.420	7.056	1273.476	364.00	14.48	3.26	1276.73	.00	3.78	.00	4.000	.000	.00	2 .0
57.380	.0103					.0161	.92	7.06	.00	4.00	.013	.00	.00	PIPE
1392.390	1267.010	7.388	1274.398	364.00	14.48	3.26	1277.65	.00	3.78	.00	4.000	.000	.00	2 .0
35.930	.0100					.0161	.58	.00	.00	4.00	.013	.00	.00	PIPE

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING Date: 6-20-2025 Time: 4: 0:14

1994 Baker Industrial
City of Lake Elsinore
1994 SD Line B

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1428.320	1267.370	8.008	1275.378	364.00	14.48	3.26	1278.64	.00	3.78	.00	4.000	.000	.00	2 .0
238.900	.0102					.0161	3.84	8.01	.00	4.00	.013	.00	.00	PIPE
1667.220	1269.810	9.403	1279.214	364.00	14.48	3.26	1282.47	.00	3.78	.00	4.000	.000	.00	2 .0
JUNCT STR	.0099					.0145	.03	9.40	.00		.013	.00	.00	PIPE
1669.220	1269.830	10.301	1280.131	325.92	12.97	2.61	1282.74	.00	3.69	.00	4.000	.000	.00	2 .0
94.520	.0103					.0129	1.22	10.30	.00	4.00	.013	.00	.00	PIPE
1763.740	1270.800	10.547	1281.347	325.92	12.97	2.61	1283.96	.00	3.69	.00	4.000	.000	.00	2 .0

Appendix

G

DEBRIS SIZING CALCULATIONS

DEBRIS BASIN VOLUME DETERMINATION WORKSHEET
DEBRIS BASIN 1: 100-YEAR STORM

= User entry required = Computed by worksheet

1) Determine the Debris Yield*

$$LogDY = 0.65(Log(P*100)) + 0.62(LogRR) + 0.18(LogA) + 0.12FF$$

Where:
Dy = Debris Yield given in cubic yards per square mile
P = Maximum one-hour precipitation (Usually 100-year as shown on isohyeatal map), inches
RR = Relief Ratio given in feet-of-drop per mile (ft/mile)
A = Area of the watershed, Acres
FF = Fire Factor (Non-dimensional)

User to Supply:

P =	1.45	Inches/hr
RR =	269.3878	ft/mile
A =	99	acres
FF =	4	

Work sheet computes:

Dy	5635.569	Yds^3/mi.^2	*

*Based on Tatum method (US Army COE, Los Angeles District)

Debris Volume = 872 cy 0.54 ac-ft

2) Use Dy (above) to determine the Bulking Factor:

$$Fb = 1 + \left[\frac{D}{120{,}000}\right]$$

Where:
Fb = Bulking Factor
D = Debris Yield

Worksheet Computes:

Fb =	1.05

Solution: Use 1.05

DEBRIS BASIN VOLUME DETERMINATION WORKSHEET
DEBRIS BASIN 2: 100-YEAR STORM

= User entry required = Computed by worksheet

1) Determine the Debris Yield*

$$LogDY = 0.65(Log(P*100)) + 0.62(LogRR) + 0.18(LogA) + 0.12FF$$

Where:
Dy = Debris Yield given in cubic yards per square mile
P = Maximum one-hour precipitation (Usually 100-year as shown on isohyeatal map), inches
RR = Relief Ratio given in feet-of-drop per mile (ft/mile)
A = Area of the watershed, Acres
FF = Fire Factor (Non-dimensional)

User to Supply:

P =	1.45	Inches/hr
RR =	63.26267	ft/mile
A =	38.5	acres
FF =	4	

Work sheet computes:

Dy	1936.349	Yds^3/mi.^2

*

*Based on Tatum method (US Army COE, Los Angeles District)

Debris Volume = 116 cy 0.07 ac-ft

2) Use Dy (above) to determine the Bulking Factor:

$$Fb = 1 + \left[\frac{D}{120{,}000}\right]$$

Where:
Fb = Bulking Factor
D = Debris Yield

Worksheet Computes:

Fb =	1.02

Solution: Use 1.02

Appendix

H

BASIN UNIT HYDROGRAPH KEY MAPS & CALCULATIONS

LEGEND

- AREA BOUNDARY
- FLOWLINE
- A / 6.98 — TRIBUTARY AREA DESIGNATION / TRIBUTARY AREA ACREAGE
- XX — ZZZ — ELEVATION @ NODE / NODAL POINT REFERENCE

350' 0 350'

SCALE IN FEET

KWC ENGINEERS, INC.
CIVIL ENGINEERING, PLANNING AND CONSTRUCTION MANAGEMENT
1181 CALIFORNIA AVE, SUITE 235 • CORONA, CA. 92881-3370 • 909-734-2130

DRAINAGE AREA "A"
PROPOSED CONDITION UNIT HYDROGRAPH MAP
BAKER INDUSTRIAL
COUNTY OF RIVERSIDE

R:\19\1994\PRELIM\REPORTS\HYDRO\1994 UNITHYD PROP-A.dwg (6/27/2025 12:16 PM) Plotted by: Andrew Burror

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

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Study date 03/04/25 File: 1994D100A11100.out

++

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

Program License Serial Number 6653

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

English Units used in output format

BAKER INDUSTRIAL UNIT HYDROGRAPH AREA A
PROPOSED CONDITION
RCFC&WCD 100-YR 1 HR STORM
BY: P.S

Drainage Area = 165.60(Ac.) = 0.259 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 165.60(Ac.) = 0.259 Sq. Mi.
Length along longest watercourse = 3786.00(Ft.)
Length along longest watercourse measured to centroid = 1946.00(Ft.)
Length along longest watercourse = 0.717 Mi.
Length along longest watercourse measured to centroid = 0.369 Mi.
Difference in elevation = 129.00(Ft.)
Slope along watercourse = 179.9049 Ft./Mi.
Average Manning's 'N' = 0.041
Lag time = 0.219 Hr.
Lag time = 13.11 Min.
25% of lag time = 3.28 Min.
40% of lag time = 5.25 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]
165.60	0.55	91.08

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
165.60	1.45	240.12

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 1.450(In)
Areal adjustment factor = 99.85 %
Adjusted average point rain = 1.448(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

```
   165.600           88.00         0.012
 Total Area Entered =    165.60(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
88.0  88.0      0.153     0.012        0.151       1.000      0.151
                                                 Sum (F) =   0.151
Area averaged mean soil loss (F) (In/Hr) =  0.151
Minimum soil loss rate ((In/Hr)) =  0.076
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
------------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.4800
------------------------------------------------------------------------

               U n i t  H y d r o g r a p h
                       VALLEY S-Curve
------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------
     1   0.083         38.127          4.056              6.769
     2   0.167         76.253         16.429             27.420
     3   0.250        114.380         25.619             42.756
     4   0.333        152.507         18.357             30.636
     5   0.417        190.634          9.111             15.206
     6   0.500        228.760          5.556              9.273
     7   0.583        266.887          4.110              6.859
     8   0.667        305.014          3.233              5.396
     9   0.750        343.141          2.474              4.129
    10   0.833        381.267          2.082              3.476
    11   0.917        419.394          1.628              2.717
    12   1.000        457.521          1.274              2.126
    13   1.083        495.647          1.168              1.950
    14   1.167        533.774          1.024              1.709
    15   1.250        571.901          0.816              1.361
    16   1.333        610.028          0.695              1.160
    17   1.417        648.154          0.575              0.960
    18   1.500        686.281          0.465              0.776
    19   1.583        724.408          0.381              0.637
    20   1.667        762.535          0.381              0.636
    21   1.750        800.661          0.565              0.943
                                  Sum = 100.000   Sum=     166.894
------------------------------------------------------------------------


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

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     4.40      0.764          0.151    (  0.688)       0.613
   2   0.17     4.50      0.782          0.151    (  0.704)       0.631
   3   0.25     5.40      0.938          0.151    (  0.844)       0.787
   4   0.33     5.40      0.938          0.151    (  0.844)       0.787
   5   0.42     5.70      0.990          0.151    (  0.891)       0.839
   6   0.50     6.40      1.112          0.151    (  1.001)       0.961
   7   0.58     7.90      1.373          0.151    (  1.235)       1.221
   8   0.67     9.10      1.581          0.151    (  1.423)       1.430
   9   0.75    12.80      2.224          0.151    (  2.001)       2.073
  10   0.83    25.60      4.448          0.151    (  4.003)       4.297
  11   0.92     7.90      1.373          0.151    (  1.235)       1.221
  12   1.00     4.90      0.851          0.151    (  0.766)       0.700
               (Loss Rate Not Used)
     Sum =     100.0                                 Sum =    15.6
        Flood volume = Effective rainfall      1.30(In)
```

```
 times area     165.6(Ac.)/[(In)/(Ft.)] =      17.9(Ac.Ft)
Total soil loss =      0.15(In)
Total soil loss =     2.086(Ac.Ft)
Total rainfall =      1.45(In)
Flood volume =      779467.1 Cubic Feet
Total soil loss =       90860.4 Cubic Feet
------------------------------------------------------------------------
 Peak flow rate of this hydrograph =    338.796(CFS)
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                    1 - H O U R    S T O R M
                R u n o f f     H y d r o g r a p h
------------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

------------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0      100.0     200.0     300.0     400.0
------------------------------------------------------------------------
  0+ 5       0.0286      4.15  Q         |         |         |         |
  0+10       0.1739     21.10  V Q       |         |         |         |
  0+15       0.5105     48.87  |V  Q     |         |         |         |
  0+20       1.0111     72.70  | V    Q  |         |         |         |
  0+25       1.6282     89.60  |  V    Q |         |         |         |
  0+30       2.3349    102.61  |    V    Q         |         |         |
  0+35       3.1385    116.69  |      V  |Q        |         |         |
  0+40       4.0815    136.93  |        V|  Q      |         |         |
  0+45       5.2273    166.37  |         |V    Q   |         |         |
  0+50       6.7518    221.36  |         |    V    | Q       |         |
  0+55       8.8404    303.25  |         |        V|         Q         |
  1+ 0      11.1737    338.80  |         |         |   V     |  Q      |
  1+ 5      13.0497    272.40  |         |         |      Q V|         |
  1+10      14.2988    181.37  |         |       Q |         |V        |
  1+15      15.1090    117.64  |         |Q        |         |  V      |
  1+20      15.6715     81.66  |       Q |         |         |    V    |
  1+25      16.1008     62.35  |     Q   |         |         |    V    |
  1+30      16.4398     49.22  |   Q     |         |         |     V   |
  1+35      16.7164     40.16  |   Q     |         |         |      V  |
  1+40      16.9406     32.55  |  Q      |         |         |      V  |
  1+45      17.1269     27.06  | Q       |         |         |       V |
  1+50      17.2851     22.96  | Q       |         |         |       V |
  1+55      17.4187     19.40  |Q        |         |         |       V |
  2+ 0      17.5283     15.92  |Q        |         |         |        V|
  2+ 5      17.6187     13.13  |Q        |         |         |        V|
  2+10      17.6924     10.70  |Q        |         |         |        V|
  2+15      17.7524      8.70  Q         |         |         |        V|
  2+20      17.8008      7.03  Q         |         |         |        V|
  2+25      17.8422      6.01  Q         |         |         |        V|
  2+30      17.8785      5.28  Q         |         |         |        V|
  2+35      17.8896      1.60  Q         |         |         |        V|
  2+40      17.8941      0.66  Q         |         |         |        V|
------------------------------------------------------------------------
```

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

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Study date 03/11/25 File: 1994D100A33100.out

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

Program License Serial Number 6653

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

English Units used in output format

BAKER INDUSTRIAL UNIT HYDROGRAPH AREA A
PROPOSED CONDITION
RCFC&WCD 100-YR 3 HR STORM
BY: P.S

Drainage Area = 165.60(Ac.) = 0.259 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 165.60(Ac.) = 0.259 Sq. Mi.
Length along longest watercourse = 3786.00(Ft.)
Length along longest watercourse measured to centroid = 1946.00(Ft.)
Length along longest watercourse = 0.717 Mi.
Length along longest watercourse measured to centroid = 0.369 Mi.
Difference in elevation = 129.00(Ft.)
Slope along watercourse = 179.9049 Ft./Mi.
Average Manning's 'N' = 0.041
Lag time = 0.219 Hr.
Lag time = 13.11 Min.
25% of lag time = 3.28 Min.
40% of lag time = 5.25 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]
165.60	1.00	165.60

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
165.60	2.50	414.00

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

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.93 %
Adjusted average point rain = 2.498(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %

```
   165.600           88.00         0.012
 Total Area Entered =    165.60(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
88.0  88.0      0.153     0.012        0.151       1.000      0.151
                                                 Sum (F) =   0.151
Area averaged mean soil loss (F) (In/Hr) =  0.151
Minimum soil loss rate ((In/Hr)) =  0.076
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
------------------------------------------------------------------------

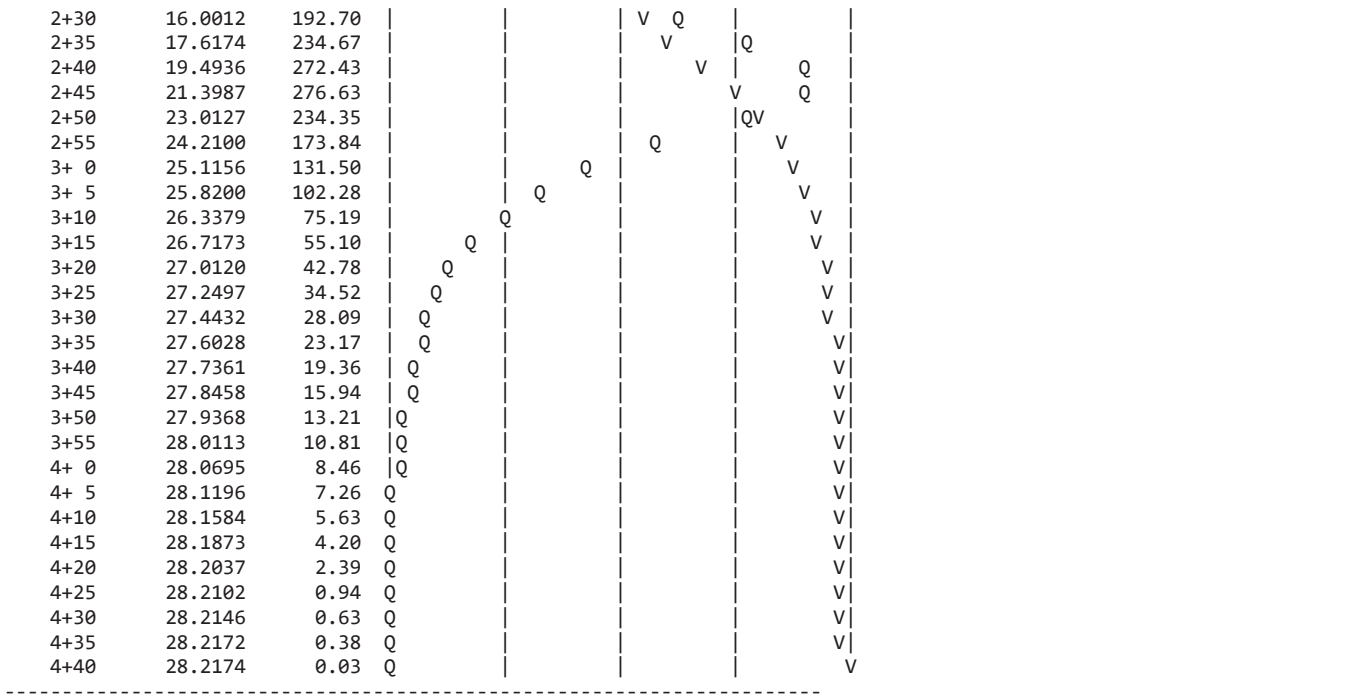
               U n i t  H y d r o g r a p h
                       VALLEY S-Curve
------------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         38.127          4.056             6.769
    2   0.167         76.253         16.429            27.420
    3   0.250        114.380         25.619            42.756
    4   0.333        152.507         18.357            30.636
    5   0.417        190.634          9.111            15.206
    6   0.500        228.760          5.556             9.273
    7   0.583        266.887          4.110             6.859
    8   0.667        305.014          3.233             5.396
    9   0.750        343.141          2.474             4.129
   10   0.833        381.267          2.082             3.476
   11   0.917        419.394          1.628             2.717
   12   1.000        457.521          1.274             2.126
   13   1.083        495.647          1.168             1.950
   14   1.167        533.774          1.024             1.709
   15   1.250        571.901          0.816             1.361
   16   1.333        610.028          0.695             1.160
   17   1.417        648.154          0.575             0.960
   18   1.500        686.281          0.465             0.776
   19   1.583        724.408          0.381             0.637
   20   1.667        762.535          0.381             0.636
   21   1.750        800.661          0.565             0.943
                                Sum = 100.000   Sum=     166.894
------------------------------------------------------------------------

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

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     1.30      0.390          0.151    (  0.351)        0.239
    2   0.17     1.30      0.390          0.151    (  0.351)        0.239
    3   0.25     1.10      0.330          0.151    (  0.297)        0.179
    4   0.33     1.50      0.450          0.151    (  0.405)        0.299
    5   0.42     1.50      0.450          0.151    (  0.405)        0.299
    6   0.50     1.80      0.540          0.151    (  0.486)        0.388
    7   0.58     1.50      0.450          0.151    (  0.405)        0.299
    8   0.67     1.80      0.540          0.151    (  0.486)        0.388
    9   0.75     1.80      0.540          0.151    (  0.486)        0.388
   10   0.83     1.50      0.450          0.151    (  0.405)        0.299
   11   0.92     1.60      0.480          0.151    (  0.432)        0.329
   12   1.00     1.80      0.540          0.151    (  0.486)        0.388
   13   1.08     2.20      0.660          0.151    (  0.594)        0.508
   14   1.17     2.20      0.660          0.151    (  0.594)        0.508
   15   1.25     2.20      0.660          0.151    (  0.594)        0.508
   16   1.33     2.00      0.600          0.151    (  0.540)        0.448
   17   1.42     2.60      0.779          0.151    (  0.701)        0.628
```

```
18   1.50     2.70      0.809          0.151    (  0.728)        0.658
19   1.58     2.40      0.719          0.151    (  0.648)        0.568
20   1.67     2.70      0.809          0.151    (  0.728)        0.658
21   1.75     3.30      0.989          0.151    (  0.890)        0.838
22   1.83     3.10      0.929          0.151    (  0.836)        0.778
23   1.92     2.90      0.869          0.151    (  0.782)        0.718
24   2.00     3.00      0.899          0.151    (  0.809)        0.748
25   2.08     3.10      0.929          0.151    (  0.836)        0.778
26   2.17     4.20      1.259          0.151    (  1.133)        1.108
27   2.25     5.00      1.499          0.151    (  1.349)        1.348
28   2.33     3.50      1.049          0.151    (  0.944)        0.898
29   2.42     6.80      2.039          0.151    (  1.835)        1.887
30   2.50     7.30      2.188          0.151    (  1.970)        2.037
31   2.58     8.20      2.458          0.151    (  2.212)        2.307
32   2.67     5.90      1.769          0.151    (  1.592)        1.618
33   2.75     2.00      0.600          0.151    (  0.540)        0.448
34   2.83     1.80      0.540          0.151    (  0.486)        0.388
35   2.92     1.80      0.540          0.151    (  0.486)        0.388
36   3.00     0.60      0.180          0.151    (  0.162)        0.029
              (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    24.5
      Flood volume = Effective rainfall      2.04(In)
       times area     165.6(Ac.)/[(In)/(Ft.)] =      28.2(Ac.Ft)
      Total soil loss =      0.45(In)
      Total soil loss =     6.258(Ac.Ft)
      Total rainfall =      2.50(In)
      Flood volume =     1229150.1 Cubic Feet
      Total soil loss =      272581.1 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    276.628(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       75.0     150.0     225.0     300.0
-------------------------------------------------------------------------
  0+ 5       0.0111      1.62  Q         |         |         |         |
  0+10       0.0673      8.16  VQ        |         |         |         |
  0+15       0.1910     17.96  V Q       |         |         |         |
  0+20       0.3593     24.44  V  Q      |         |         |         |
  0+25       0.5576     28.79  V  Q      |         |         |         |
  0+30       0.7981     34.91  |V  Q     |         |         |         |
  0+35       1.0816     41.17  |V   Q    |         |         |         |
  0+40       1.3964     45.71  |V    Q   |         |         |         |
  0+45       1.7323     48.78  | V   Q   |         |         |         |
  0+50       2.0901     51.95  | V   Q   |         |         |         |
  0+55       2.4549     52.96  |  V   Q  |         |         |         |
  1+ 0       2.8150     52.29  |  V  Q   |         |         |         |
  1+ 5       3.1916     54.69  |   V  Q  |         |         |         |
  1+10       3.6132     61.21  |    V  Q |         |         |         |
  1+15       4.0862     68.69  |    V   Q|         |         |         |
  1+20       4.5906     73.24  |     V  Q|         |         |         |
  1+25       5.1108     75.53  |      V  Q         |         |         |
  1+30       5.6612     79.92  |       V Q         |         |         |
  1+35       6.2628     87.35  |       V |Q        |         |         |
  1+40       6.8998     92.50  |        V| Q       |         |         |
  1+45       7.5640     96.44  |         V Q       |         |         |
  1+50       8.2830    104.39  |         |V Q      |         |         |
  1+55       9.0617    113.07  |         | V  Q    |         |         |
  2+ 0       9.8643    116.53  |         |  V Q    |         |         |
  2+ 5      10.6711    117.15  |         |    Q    |         |         |
  2+10      11.5074    121.44  |         |     Q   |         |         |
  2+15      12.4360    134.82  |         |      Q  |         |         |
  2+20      13.5000    154.50  |         |       VQ|         |         |
  2+25      14.6740    170.47  |         |         V Q       |         |
```


2+30 16.0012 192.70
2+35 17.6174 234.67
2+40 19.4936 272.43
2+45 21.3987 276.63
2+50 23.0127 234.35
2+55 24.2100 173.84
3+ 0 25.1156 131.50
3+ 5 25.8200 102.28
3+10 26.3379 75.19
3+15 26.7173 55.10
3+20 27.0120 42.78
3+25 27.2497 34.52
3+30 27.4432 28.09
3+35 27.6028 23.17
3+40 27.7361 19.36
3+45 27.8458 15.94
3+50 27.9368 13.21
3+55 28.0113 10.81
4+ 0 28.0695 8.46
4+ 5 28.1196 7.26
4+10 28.1584 5.63
4+15 28.1873 4.20
4+20 28.2037 2.39
4+25 28.2102 0.94
4+30 28.2146 0.63
4+35 28.2172 0.38
4+40 28.2174 0.03

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

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Study date 03/11/25 File: 1994D100A66100.out

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

Program License Serial Number 6653

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

English Units used in output format

BAKER INDUSTRIAL UNIT HYDROGRAPH AREA A
PROPOSED CONDITION
RCFC&WCD 100-YR 6 HR STORM
BY: P.S

Drainage Area = 165.60(Ac.) = 0.259 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 165.60(Ac.) = 0.259 Sq. Mi.
Length along longest watercourse = 3786.00(Ft.)
Length along longest watercourse measured to centroid = 1946.00(Ft.)
Length along longest watercourse = 0.717 Mi.
Length along longest watercourse measured to centroid = 0.369 Mi.
Difference in elevation = 129.00(Ft.)
Slope along watercourse = 179.9049 Ft./Mi.
Average Manning's 'N' = 0.041
Lag time = 0.219 Hr.
Lag time = 13.11 Min.
25% of lag time = 3.28 Min.
40% of lag time = 5.25 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
165.60	1.40	231.84

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
165.60	3.50	579.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.500(In)

Point rain (area averaged) = 3.500(In)
Areal adjustment factor = 99.94 %
Adjusted average point rain = 3.498(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

```
   165.600           88.00         0.012
 Total Area Entered =    165.60(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
88.0  88.0      0.153     0.012        0.151       1.000      0.151
                                                 Sum (F) =   0.151
Area averaged mean soil loss (F) (In/Hr) =  0.151
Minimum soil loss rate ((In/Hr)) =  0.076
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
------------------------------------------------------------------------

               U n i t  H y d r o g r a p h
                       VALLEY S-Curve
------------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         38.127          4.056             6.769
    2   0.167         76.253         16.429            27.420
    3   0.250        114.380         25.619            42.756
    4   0.333        152.507         18.357            30.636
    5   0.417        190.634          9.111            15.206
    6   0.500        228.760          5.556             9.273
    7   0.583        266.887          4.110             6.859
    8   0.667        305.014          3.233             5.396
    9   0.750        343.141          2.474             4.129
   10   0.833        381.267          2.082             3.476
   11   0.917        419.394          1.628             2.717
   12   1.000        457.521          1.274             2.126
   13   1.083        495.647          1.168             1.950
   14   1.167        533.774          1.024             1.709
   15   1.250        571.901          0.816             1.361
   16   1.333        610.028          0.695             1.160
   17   1.417        648.154          0.575             0.960
   18   1.500        686.281          0.465             0.776
   19   1.583        724.408          0.381             0.637
   20   1.667        762.535          0.381             0.636
   21   1.750        800.661          0.565             0.943
                                Sum = 100.000   Sum=     166.894
------------------------------------------------------------------------

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

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     0.50      0.210          0.151    (  0.189)        0.059
    2   0.17     0.60      0.252          0.151    (  0.227)        0.101
    3   0.25     0.60      0.252          0.151    (  0.227)        0.101
    4   0.33     0.60      0.252          0.151    (  0.227)        0.101
    5   0.42     0.60      0.252          0.151    (  0.227)        0.101
    6   0.50     0.70      0.294          0.151    (  0.264)        0.143
    7   0.58     0.70      0.294          0.151    (  0.264)        0.143
    8   0.67     0.70      0.294          0.151    (  0.264)        0.143
    9   0.75     0.70      0.294          0.151    (  0.264)        0.143
   10   0.83     0.70      0.294          0.151    (  0.264)        0.143
   11   0.92     0.70      0.294          0.151    (  0.264)        0.143
   12   1.00     0.80      0.336          0.151    (  0.302)        0.185
   13   1.08     0.80      0.336          0.151    (  0.302)        0.185
   14   1.17     0.80      0.336          0.151    (  0.302)        0.185
   15   1.25     0.80      0.336          0.151    (  0.302)        0.185
   16   1.33     0.80      0.336          0.151    (  0.302)        0.185
   17   1.42     0.80      0.336          0.151    (  0.302)        0.185
```

```
18   1.50     0.80      0.336          0.151    (  0.302)        0.185
19   1.58     0.80      0.336          0.151    (  0.302)        0.185
20   1.67     0.80      0.336          0.151    (  0.302)        0.185
21   1.75     0.80      0.336          0.151    (  0.302)        0.185
22   1.83     0.80      0.336          0.151    (  0.302)        0.185
23   1.92     0.80      0.336          0.151    (  0.302)        0.185
24   2.00     0.90      0.378          0.151    (  0.340)        0.227
25   2.08     0.80      0.336          0.151    (  0.302)        0.185
26   2.17     0.90      0.378          0.151    (  0.340)        0.227
27   2.25     0.90      0.378          0.151    (  0.340)        0.227
28   2.33     0.90      0.378          0.151    (  0.340)        0.227
29   2.42     0.90      0.378          0.151    (  0.340)        0.227
30   2.50     0.90      0.378          0.151    (  0.340)        0.227
31   2.58     0.90      0.378          0.151    (  0.340)        0.227
32   2.67     0.90      0.378          0.151    (  0.340)        0.227
33   2.75     1.00      0.420          0.151    (  0.378)        0.269
34   2.83     1.00      0.420          0.151    (  0.378)        0.269
35   2.92     1.00      0.420          0.151    (  0.378)        0.269
36   3.00     1.00      0.420          0.151    (  0.378)        0.269
37   3.08     1.00      0.420          0.151    (  0.378)        0.269
38   3.17     1.10      0.462          0.151    (  0.416)        0.311
39   3.25     1.10      0.462          0.151    (  0.416)        0.311
40   3.33     1.10      0.462          0.151    (  0.416)        0.311
41   3.42     1.20      0.504          0.151    (  0.453)        0.353
42   3.50     1.30      0.546          0.151    (  0.491)        0.395
43   3.58     1.40      0.588          0.151    (  0.529)        0.437
44   3.67     1.40      0.588          0.151    (  0.529)        0.437
45   3.75     1.50      0.630          0.151    (  0.567)        0.478
46   3.83     1.50      0.630          0.151    (  0.567)        0.478
47   3.92     1.60      0.672          0.151    (  0.604)        0.520
48   4.00     1.60      0.672          0.151    (  0.604)        0.520
49   4.08     1.70      0.714          0.151    (  0.642)        0.562
50   4.17     1.80      0.756          0.151    (  0.680)        0.604
51   4.25     1.90      0.798          0.151    (  0.718)        0.646
52   4.33     2.00      0.840          0.151    (  0.756)        0.688
53   4.42     2.10      0.881          0.151    (  0.793)        0.730
54   4.50     2.10      0.881          0.151    (  0.793)        0.730
55   4.58     2.20      0.923          0.151    (  0.831)        0.772
56   4.67     2.30      0.965          0.151    (  0.869)        0.814
57   4.75     2.40      1.007          0.151    (  0.907)        0.856
58   4.83     2.40      1.007          0.151    (  0.907)        0.856
59   4.92     2.50      1.049          0.151    (  0.944)        0.898
60   5.00     2.60      1.091          0.151    (  0.982)        0.940
61   5.08     3.10      1.301          0.151    (  1.171)        1.150
62   5.17     3.60      1.511          0.151    (  1.360)        1.360
63   5.25     3.90      1.637          0.151    (  1.473)        1.486
64   5.33     4.20      1.763          0.151    (  1.587)        1.612
65   5.42     4.70      1.973          0.151    (  1.776)        1.822
66   5.50     5.60      2.351          0.151    (  2.116)        2.200
67   5.58     1.90      0.798          0.151    (  0.718)        0.646
68   5.67     0.90      0.378          0.151    (  0.340)        0.227
69   5.75     0.60      0.252          0.151    (  0.227)        0.101
70   5.83     0.50      0.210          0.151    (  0.189)        0.059
71   5.92     0.30      0.126       (  0.151)       0.113        0.013
72   6.00     0.20      0.084       (  0.151)       0.076        0.008
              (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    31.2
      Flood volume = Effective rainfall      2.60(In)
       times area     165.6(Ac.)/[(In)/(Ft.)] =      35.9(Ac.Ft)
      Total soil loss =      0.90(In)
      Total soil loss =    12.385(Ac.Ft)
      Total rainfall =      3.50(In)
      Flood volume =     1563269.2 Cubic Feet
      Total soil loss =      539481.1 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    257.815(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         6 - H O U R    S T O R M
```

R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	75.0	150.0	225.0	300.0
0+ 5	0.0027	0.40	Q				
0+10	0.0185	2.29	Q				
0+15	0.0596	5.96	Q				
0+20	0.1254	9.55	VQ				
0+25	0.2062	11.73	VQ				
0+30	0.2971	13.20	VQ				
0+35	0.4014	15.15	V Q				
0+40	0.5222	17.55	V Q				
0+45	0.6552	19.30	V Q				
0+50	0.7951	20.32	V Q				
0+55	0.9398	21.01	VQ				
1+ 0	1.0901	21.82	VQ				
1+ 5	1.2513	23.41	V Q				
1+10	1.4273	25.56	V Q				
1+15	1.6143	27.14	V Q				
1+20	1.8072	28.02	VQ				
1+25	2.0042	28.60	VQ				
1+30	2.2044	29.06	VQ				
1+35	2.4070	29.43	VQ				
1+40	2.6117	29.72	VQ				
1+45	2.8184	30.00	Q				
1+50	3.0263	30.19	VQ				
1+55	3.2351	30.32	VQ				
2+ 0	3.4466	30.71	VQ				
2+ 5	3.6647	31.67	Q				
2+10	3.8899	32.70	Q				
2+15	4.1199	33.39	Q				
2+20	4.3580	34.58	Q				
2+25	4.6036	35.65	QV				
2+30	4.8530	36.21	QV				
2+35	5.1048	36.57	QV				
2+40	5.3585	36.84	QV				
2+45	5.6156	37.33	Q V				
2+50	5.8816	38.62	QV				
2+55	6.1607	40.54	QV				
3+ 0	6.4495	41.93	Q V				
3+ 5	6.7432	42.65	Q V				
3+10	7.0420	43.39	Q V				
3+15	7.3512	44.89	Q V				
3+20	7.6746	46.96	Q V				
3+25	8.0103	48.75	Q V				
3+30	8.3616	51.00	Q V				
3+35	8.7388	54.77	Q V				
3+40	9.1480	59.42	Q V				
3+45	9.5869	63.72	Q V				
3+50	10.0515	67.47	Q V				
3+55	10.5410	71.07	Q V				
4+ 0	11.0546	74.58	Q V				
4+ 5	11.5926	78.11	Q V				
4+10	12.1565	81.89	Q V				
4+15	12.7528	86.58	Q V				
4+20	13.3874	92.14	Q V				
4+25	14.0632	98.13	Q V				
4+30	14.7798	104.05	Q V				
4+35	15.5324	109.27	Q V				
4+40	16.3173	113.97	Q V				
4+45	17.1388	119.29	Q V				
4+50	18.0002	125.07	Q V				
4+55	18.8973	130.26	Q V				
5+ 0	19.8268	134.97	Q V				
5+ 5	20.8009	141.45	Q V				
5+10	21.8564	153.26	Q V				

```
    5+15      23.0409    171.98  |         |         | Q  V    |         |
    5+20      24.3748    193.69  |         |         |    Q V  |         |
    5+25      25.8559    215.05  |         |         |       Q |         |
    5+30      27.5012    238.90  |         |         |         VQ        |
    5+35      29.2768    257.81  |         |         |          | V Q    |
    5+40      30.9390    241.35  |         |         |          | Q V    |
    5+45      32.1924    181.99  |         |         |   Q      |    V   |
    5+50      33.0466    124.03  |         |     Q   |          |     V  |
    5+55      33.6564     88.54  |         |Q        |          |      V |
    6+ 0      34.1167     66.84  |       Q |         |          |       V|
    6+ 5      34.4730     51.75  |     Q   |         |          |       V|
    6+10      34.7534     40.71  |    Q    |         |          |       V|
    6+15      34.9794     32.81  |   Q     |         |          |       V|
    6+20      35.1623     26.56  |  Q      |         |          |        V
    6+25      35.3124     21.79  | Q       |         |          |        V
    6+30      35.4378     18.21  | Q       |         |          |        V
    6+35      35.5418     15.09  | Q       |         |          |        V
    6+40      35.6265     12.30  |Q        |         |          |        V
    6+45      35.6961     10.10  |Q        |         |          |        V
    6+50      35.7524      8.18  |Q        |         |          |        V
    6+55      35.7969      6.46  Q         |         |          |        V
    7+ 0      35.8315      5.04  Q         |         |          |        V
    7+ 5      35.8584      3.90  Q         |         |          |        V
    7+10      35.8777      2.79  Q         |         |          |        V
    7+15      35.8838      0.89  Q         |         |          |        V
    7+20      35.8861      0.33  Q         |         |          |        V
    7+25      35.8871      0.15  Q         |         |          |        V
    7+30      35.8876      0.07  Q         |         |          |        V
    7+35      35.8877      0.02  Q         |         |          |        V
    7+40      35.8877      0.01  Q         |         |          |         V
-------------------------------------------------------------------------
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 03/11/25 File: 1994D100A2424100.out

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

Program License Serial Number 6653

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

English Units used in output format

BAKER INDUSTRIAL UNIT HYDROGRAPH AREA A
PROPOSED CONDITION
RCFC&WCD 100-YR 24 HR STORM
BY: P.S

Drainage Area = 165.60(Ac.) = 0.259 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 165.60(Ac.) = 0.259 Sq. Mi.
Length along longest watercourse = 3786.00(Ft.)
Length along longest watercourse measured to centroid = 1946.00(Ft.)
Length along longest watercourse = 0.717 Mi.
Length along longest watercourse measured to centroid = 0.369 Mi.
Difference in elevation = 129.00(Ft.)
Slope along watercourse = 179.9049 Ft./Mi.
Average Manning's 'N' = 0.041
Lag time = 0.219 Hr.
Lag time = 13.11 Min.
25% of lag time = 3.28 Min.
40% of lag time = 5.25 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]
165.60	2.50	414.00

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
165.60	6.00	993.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.500(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 5.998(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %

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   165.600           88.00         0.012
 Total Area Entered =    165.60(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
88.0  88.0      0.153     0.012        0.151       1.000      0.151
                                                 Sum (F) =   0.151
Area averaged mean soil loss (F) (In/Hr) =  0.151
Minimum soil loss rate ((In/Hr)) =  0.076
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
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               U n i t  H y d r o g r a p h
                       VALLEY S-Curve
------------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         38.127          4.056             6.769
    2   0.167         76.253         16.429            27.420
    3   0.250        114.380         25.619            42.756
    4   0.333        152.507         18.357            30.636
    5   0.417        190.634          9.111            15.206
    6   0.500        228.760          5.556             9.273
    7   0.583        266.887          4.110             6.859
    8   0.667        305.014          3.233             5.396
    9   0.750        343.141          2.474             4.129
   10   0.833        381.267          2.082             3.476
   11   0.917        419.394          1.628             2.717
   12   1.000        457.521          1.274             2.126
   13   1.083        495.647          1.168             1.950
   14   1.167        533.774          1.024             1.709
   15   1.250        571.901          0.816             1.361
   16   1.333        610.028          0.695             1.160
   17   1.417        648.154          0.575             0.960
   18   1.500        686.281          0.465             0.776
   19   1.583        724.408          0.381             0.637
   20   1.667        762.535          0.381             0.636
   21   1.750        800.661          0.565             0.943
                                Sum = 100.000   Sum=     166.894
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 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     0.07      0.048       (  0.268)       0.043       0.005
    2   0.17     0.07      0.048       (  0.267)       0.043       0.005
    3   0.25     0.07      0.048       (  0.266)       0.043       0.005
    4   0.33     0.10      0.072       (  0.265)       0.065       0.007
    5   0.42     0.10      0.072       (  0.264)       0.065       0.007
    6   0.50     0.10      0.072       (  0.263)       0.065       0.007
    7   0.58     0.10      0.072       (  0.262)       0.065       0.007
    8   0.67     0.10      0.072       (  0.261)       0.065       0.007
    9   0.75     0.10      0.072       (  0.260)       0.065       0.007
   10   0.83     0.13      0.096       (  0.259)       0.086       0.010
   11   0.92     0.13      0.096       (  0.258)       0.086       0.010
   12   1.00     0.13      0.096       (  0.257)       0.086       0.010
   13   1.08     0.10      0.072       (  0.256)       0.065       0.007
   14   1.17     0.10      0.072       (  0.255)       0.065       0.007
   15   1.25     0.10      0.072       (  0.254)       0.065       0.007
   16   1.33     0.10      0.072       (  0.253)       0.065       0.007
   17   1.42     0.10      0.072       (  0.252)       0.065       0.007
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18	1.50	0.10	0.072	(	0.251)	0.065		0.007
19	1.58	0.10	0.072	(	0.250)	0.065		0.007
20	1.67	0.10	0.072	(	0.249)	0.065		0.007
21	1.75	0.10	0.072	(	0.248)	0.065		0.007
22	1.83	0.13	0.096	(	0.247)	0.086		0.010
23	1.92	0.13	0.096	(	0.246)	0.086		0.010
24	2.00	0.13	0.096	(	0.245)	0.086		0.010
25	2.08	0.13	0.096	(	0.244)	0.086		0.010
26	2.17	0.13	0.096	(	0.243)	0.086		0.010
27	2.25	0.13	0.096	(	0.242)	0.086		0.010
28	2.33	0.13	0.096	(	0.241)	0.086		0.010
29	2.42	0.13	0.096	(	0.240)	0.086		0.010
30	2.50	0.13	0.096	(	0.239)	0.086		0.010
31	2.58	0.17	0.120	(	0.238)	0.108		0.012
32	2.67	0.17	0.120	(	0.237)	0.108		0.012
33	2.75	0.17	0.120	(	0.236)	0.108		0.012
34	2.83	0.17	0.120	(	0.235)	0.108		0.012
35	2.92	0.17	0.120	(	0.234)	0.108		0.012
36	3.00	0.17	0.120	(	0.233)	0.108		0.012
37	3.08	0.17	0.120	(	0.232)	0.108		0.012
38	3.17	0.17	0.120	(	0.231)	0.108		0.012
39	3.25	0.17	0.120	(	0.230)	0.108		0.012
40	3.33	0.17	0.120	(	0.229)	0.108		0.012
41	3.42	0.17	0.120	(	0.228)	0.108		0.012
42	3.50	0.17	0.120	(	0.227)	0.108		0.012
43	3.58	0.17	0.120	(	0.226)	0.108		0.012
44	3.67	0.17	0.120	(	0.225)	0.108		0.012
45	3.75	0.17	0.120	(	0.224)	0.108		0.012
46	3.83	0.20	0.144	(	0.223)	0.130		0.014
47	3.92	0.20	0.144	(	0.222)	0.130		0.014
48	4.00	0.20	0.144	(	0.221)	0.130		0.014
49	4.08	0.20	0.144	(	0.221)	0.130		0.014
50	4.17	0.20	0.144	(	0.220)	0.130		0.014
51	4.25	0.20	0.144	(	0.219)	0.130		0.014
52	4.33	0.23	0.168	(	0.218)	0.151		0.017
53	4.42	0.23	0.168	(	0.217)	0.151		0.017
54	4.50	0.23	0.168	(	0.216)	0.151		0.017
55	4.58	0.23	0.168	(	0.215)	0.151		0.017
56	4.67	0.23	0.168	(	0.214)	0.151		0.017
57	4.75	0.23	0.168	(	0.213)	0.151		0.017
58	4.83	0.27	0.192	(	0.212)	0.173		0.019
59	4.92	0.27	0.192	(	0.211)	0.173		0.019
60	5.00	0.27	0.192	(	0.210)	0.173		0.019
61	5.08	0.20	0.144	(	0.209)	0.130		0.014
62	5.17	0.20	0.144	(	0.209)	0.130		0.014
63	5.25	0.20	0.144	(	0.208)	0.130		0.014
64	5.33	0.23	0.168	(	0.207)	0.151		0.017
65	5.42	0.23	0.168	(	0.206)	0.151		0.017
66	5.50	0.23	0.168	(	0.205)	0.151		0.017
67	5.58	0.27	0.192	(	0.204)	0.173		0.019
68	5.67	0.27	0.192	(	0.203)	0.173		0.019
69	5.75	0.27	0.192	(	0.202)	0.173		0.019
70	5.83	0.27	0.192	(	0.201)	0.173		0.019
71	5.92	0.27	0.192	(	0.200)	0.173		0.019
72	6.00	0.27	0.192	(	0.200)	0.173		0.019
73	6.08	0.30	0.216	(	0.199)	0.194		0.022
74	6.17	0.30	0.216	(	0.198)	0.194		0.022
75	6.25	0.30	0.216	(	0.197)	0.194		0.022
76	6.33	0.30	0.216	(	0.196)	0.194		0.022
77	6.42	0.30	0.216	(	0.195)	0.194		0.022
78	6.50	0.30	0.216		0.194	(0.194)		0.022
79	6.58	0.33	0.240		0.193	(0.216)		0.047
80	6.67	0.33	0.240		0.192	(0.216)		0.047
81	6.75	0.33	0.240		0.192	(0.216)		0.048
82	6.83	0.33	0.240		0.191	(0.216)		0.049
83	6.92	0.33	0.240		0.190	(0.216)		0.050
84	7.00	0.33	0.240		0.189	(0.216)		0.051
85	7.08	0.33	0.240		0.188	(0.216)		0.052
86	7.17	0.33	0.240		0.187	(0.216)		0.053

87	7.25	0.33	0.240	0.186	(	0.216)	0.053
88	7.33	0.37	0.264	0.186	(	0.238)	0.078
89	7.42	0.37	0.264	0.185	(	0.238)	0.079
90	7.50	0.37	0.264	0.184	(	0.238)	0.080
91	7.58	0.40	0.288	0.183	(	0.259)	0.105
92	7.67	0.40	0.288	0.182	(	0.259)	0.106
93	7.75	0.40	0.288	0.181	(	0.259)	0.107
94	7.83	0.43	0.312	0.181	(	0.281)	0.131
95	7.92	0.43	0.312	0.180	(	0.281)	0.132
96	8.00	0.43	0.312	0.179	(	0.281)	0.133
97	8.08	0.50	0.360	0.178	(	0.324)	0.182
98	8.17	0.50	0.360	0.177	(	0.324)	0.183
99	8.25	0.50	0.360	0.176	(	0.324)	0.183
100	8.33	0.50	0.360	0.176	(	0.324)	0.184
101	8.42	0.50	0.360	0.175	(	0.324)	0.185
102	8.50	0.50	0.360	0.174	(	0.324)	0.186
103	8.58	0.53	0.384	0.173	(	0.345)	0.211
104	8.67	0.53	0.384	0.172	(	0.345)	0.212
105	8.75	0.53	0.384	0.171	(	0.345)	0.212
106	8.83	0.57	0.408	0.171	(	0.367)	0.237
107	8.92	0.57	0.408	0.170	(	0.367)	0.238
108	9.00	0.57	0.408	0.169	(	0.367)	0.239
109	9.08	0.63	0.456	0.168	(	0.410)	0.288
110	9.17	0.63	0.456	0.167	(	0.410)	0.288
111	9.25	0.63	0.456	0.167	(	0.410)	0.289
112	9.33	0.67	0.480	0.166	(	0.432)	0.314
113	9.42	0.67	0.480	0.165	(	0.432)	0.315
114	9.50	0.67	0.480	0.164	(	0.432)	0.316
115	9.58	0.70	0.504	0.164	(	0.453)	0.340
116	9.67	0.70	0.504	0.163	(	0.453)	0.341
117	9.75	0.70	0.504	0.162	(	0.453)	0.342
118	9.83	0.73	0.528	0.161	(	0.475)	0.367
119	9.92	0.73	0.528	0.160	(	0.475)	0.367
120	10.00	0.73	0.528	0.160	(	0.475)	0.368
121	10.08	0.50	0.360	0.159	(	0.324)	0.201
122	10.17	0.50	0.360	0.158	(	0.324)	0.202
123	10.25	0.50	0.360	0.157	(	0.324)	0.203
124	10.33	0.50	0.360	0.157	(	0.324)	0.203
125	10.42	0.50	0.360	0.156	(	0.324)	0.204
126	10.50	0.50	0.360	0.155	(	0.324)	0.205
127	10.58	0.67	0.480	0.154	(	0.432)	0.326
128	10.67	0.67	0.480	0.154	(	0.432)	0.326
129	10.75	0.67	0.480	0.153	(	0.432)	0.327
130	10.83	0.67	0.480	0.152	(	0.432)	0.328
131	10.92	0.67	0.480	0.151	(	0.432)	0.329
132	11.00	0.67	0.480	0.151	(	0.432)	0.329
133	11.08	0.63	0.456	0.150	(	0.410)	0.306
134	11.17	0.63	0.456	0.149	(	0.410)	0.307
135	11.25	0.63	0.456	0.148	(	0.410)	0.308
136	11.33	0.63	0.456	0.148	(	0.410)	0.308
137	11.42	0.63	0.456	0.147	(	0.410)	0.309
138	11.50	0.63	0.456	0.146	(	0.410)	0.310
139	11.58	0.57	0.408	0.145	(	0.367)	0.262
140	11.67	0.57	0.408	0.145	(	0.367)	0.263
141	11.75	0.57	0.408	0.144	(	0.367)	0.264
142	11.83	0.60	0.432	0.143	(	0.389)	0.289
143	11.92	0.60	0.432	0.143	(	0.389)	0.289
144	12.00	0.60	0.432	0.142	(	0.389)	0.290
145	12.08	0.83	0.600	0.141	(	0.540)	0.459
146	12.17	0.83	0.600	0.140	(	0.540)	0.459
147	12.25	0.83	0.600	0.140	(	0.540)	0.460
148	12.33	0.87	0.624	0.139	(	0.561)	0.485
149	12.42	0.87	0.624	0.138	(	0.561)	0.486
150	12.50	0.87	0.624	0.138	(	0.561)	0.486
151	12.58	0.93	0.672	0.137	(	0.605)	0.535
152	12.67	0.93	0.672	0.136	(	0.605)	0.536
153	12.75	0.93	0.672	0.136	(	0.605)	0.536
154	12.83	0.97	0.696	0.135	(	0.626)	0.561
155	12.92	0.97	0.696	0.134	(	0.626)	0.562

156	13.00	0.97	0.696		0.133	(	0.626)	0.562
157	13.08	1.13	0.816		0.133	(	0.734)	0.683
158	13.17	1.13	0.816		0.132	(	0.734)	0.684
159	13.25	1.13	0.816		0.131	(	0.734)	0.684
160	13.33	1.13	0.816		0.131	(	0.734)	0.685
161	13.42	1.13	0.816		0.130	(	0.734)	0.686
162	13.50	1.13	0.816		0.129	(	0.734)	0.686
163	13.58	0.77	0.552		0.129	(	0.497)	0.423
164	13.67	0.77	0.552		0.128	(	0.497)	0.424
165	13.75	0.77	0.552		0.127	(	0.497)	0.424
166	13.83	0.77	0.552		0.127	(	0.497)	0.425
167	13.92	0.77	0.552		0.126	(	0.497)	0.426
168	14.00	0.77	0.552		0.126	(	0.497)	0.426
169	14.08	0.90	0.648		0.125	(	0.583)	0.523
170	14.17	0.90	0.648		0.124	(	0.583)	0.524
171	14.25	0.90	0.648		0.124	(	0.583)	0.524
172	14.33	0.87	0.624		0.123	(	0.561)	0.501
173	14.42	0.87	0.624		0.122	(	0.561)	0.501
174	14.50	0.87	0.624		0.122	(	0.561)	0.502
175	14.58	0.87	0.624		0.121	(	0.561)	0.503
176	14.67	0.87	0.624		0.121	(	0.561)	0.503
177	14.75	0.87	0.624		0.120	(	0.561)	0.504
178	14.83	0.83	0.600		0.119	(	0.540)	0.481
179	14.92	0.83	0.600		0.119	(	0.540)	0.481
180	15.00	0.83	0.600		0.118	(	0.540)	0.482
181	15.08	0.80	0.576		0.117	(	0.518)	0.458
182	15.17	0.80	0.576		0.117	(	0.518)	0.459
183	15.25	0.80	0.576		0.116	(	0.518)	0.460
184	15.33	0.77	0.552		0.116	(	0.497)	0.436
185	15.42	0.77	0.552		0.115	(	0.497)	0.437
186	15.50	0.77	0.552		0.114	(	0.497)	0.437
187	15.58	0.63	0.456		0.114	(	0.410)	0.342
188	15.67	0.63	0.456		0.113	(	0.410)	0.343
189	15.75	0.63	0.456		0.113	(	0.410)	0.343
190	15.83	0.63	0.456		0.112	(	0.410)	0.344
191	15.92	0.63	0.456		0.112	(	0.410)	0.344
192	16.00	0.63	0.456		0.111	(	0.410)	0.345
193	16.08	0.13	0.096	(	0.110)		0.086	0.010
194	16.17	0.13	0.096	(	0.110)		0.086	0.010
195	16.25	0.13	0.096	(	0.109)		0.086	0.010
196	16.33	0.13	0.096	(	0.109)		0.086	0.010
197	16.42	0.13	0.096	(	0.108)		0.086	0.010
198	16.50	0.13	0.096	(	0.108)		0.086	0.010
199	16.58	0.10	0.072	(	0.107)		0.065	0.007
200	16.67	0.10	0.072	(	0.107)		0.065	0.007
201	16.75	0.10	0.072	(	0.106)		0.065	0.007
202	16.83	0.10	0.072	(	0.105)		0.065	0.007
203	16.92	0.10	0.072	(	0.105)		0.065	0.007
204	17.00	0.10	0.072	(	0.104)		0.065	0.007
205	17.08	0.17	0.120		0.104	(	0.108)	0.016
206	17.17	0.17	0.120		0.103	(	0.108)	0.017
207	17.25	0.17	0.120		0.103	(	0.108)	0.017
208	17.33	0.17	0.120		0.102	(	0.108)	0.018
209	17.42	0.17	0.120		0.102	(	0.108)	0.018
210	17.50	0.17	0.120		0.101	(	0.108)	0.019
211	17.58	0.17	0.120		0.101	(	0.108)	0.019
212	17.67	0.17	0.120		0.100	(	0.108)	0.020
213	17.75	0.17	0.120		0.100	(	0.108)	0.020
214	17.83	0.13	0.096	(	0.099)		0.086	0.010
215	17.92	0.13	0.096	(	0.099)		0.086	0.010
216	18.00	0.13	0.096	(	0.098)		0.086	0.010
217	18.08	0.13	0.096	(	0.098)		0.086	0.010
218	18.17	0.13	0.096	(	0.097)		0.086	0.010
219	18.25	0.13	0.096	(	0.097)		0.086	0.010
220	18.33	0.13	0.096	(	0.096)		0.086	0.010
221	18.42	0.13	0.096	(	0.096)		0.086	0.010
222	18.50	0.13	0.096	(	0.095)		0.086	0.010
223	18.58	0.10	0.072	(	0.095)		0.065	0.007
224	18.67	0.10	0.072	(	0.095)		0.065	0.007

225	18.75	0.10	0.072	(0.094)	0.065	0.007
226	18.83	0.07	0.048	(0.094)	0.043	0.005
227	18.92	0.07	0.048	(0.093)	0.043	0.005
228	19.00	0.07	0.048	(0.093)	0.043	0.005
229	19.08	0.10	0.072	(0.092)	0.065	0.007
230	19.17	0.10	0.072	(0.092)	0.065	0.007
231	19.25	0.10	0.072	(0.091)	0.065	0.007
232	19.33	0.13	0.096	(0.091)	0.086	0.010
233	19.42	0.13	0.096	(0.091)	0.086	0.010
234	19.50	0.13	0.096	(0.090)	0.086	0.010
235	19.58	0.10	0.072	(0.090)	0.065	0.007
236	19.67	0.10	0.072	(0.089)	0.065	0.007
237	19.75	0.10	0.072	(0.089)	0.065	0.007
238	19.83	0.07	0.048	(0.089)	0.043	0.005
239	19.92	0.07	0.048	(0.088)	0.043	0.005
240	20.00	0.07	0.048	(0.088)	0.043	0.005
241	20.08	0.10	0.072	(0.087)	0.065	0.007
242	20.17	0.10	0.072	(0.087)	0.065	0.007
243	20.25	0.10	0.072	(0.087)	0.065	0.007
244	20.33	0.10	0.072	(0.086)	0.065	0.007
245	20.42	0.10	0.072	(0.086)	0.065	0.007
246	20.50	0.10	0.072	(0.086)	0.065	0.007
247	20.58	0.10	0.072	(0.085)	0.065	0.007
248	20.67	0.10	0.072	(0.085)	0.065	0.007
249	20.75	0.10	0.072	(0.084)	0.065	0.007
250	20.83	0.07	0.048	(0.084)	0.043	0.005
251	20.92	0.07	0.048	(0.084)	0.043	0.005
252	21.00	0.07	0.048	(0.083)	0.043	0.005
253	21.08	0.10	0.072	(0.083)	0.065	0.007
254	21.17	0.10	0.072	(0.083)	0.065	0.007
255	21.25	0.10	0.072	(0.082)	0.065	0.007
256	21.33	0.07	0.048	(0.082)	0.043	0.005
257	21.42	0.07	0.048	(0.082)	0.043	0.005
258	21.50	0.07	0.048	(0.082)	0.043	0.005
259	21.58	0.10	0.072	(0.081)	0.065	0.007
260	21.67	0.10	0.072	(0.081)	0.065	0.007
261	21.75	0.10	0.072	(0.081)	0.065	0.007
262	21.83	0.07	0.048	(0.080)	0.043	0.005
263	21.92	0.07	0.048	(0.080)	0.043	0.005
264	22.00	0.07	0.048	(0.080)	0.043	0.005
265	22.08	0.10	0.072	(0.080)	0.065	0.007
266	22.17	0.10	0.072	(0.079)	0.065	0.007
267	22.25	0.10	0.072	(0.079)	0.065	0.007
268	22.33	0.07	0.048	(0.079)	0.043	0.005
269	22.42	0.07	0.048	(0.079)	0.043	0.005
270	22.50	0.07	0.048	(0.078)	0.043	0.005
271	22.58	0.07	0.048	(0.078)	0.043	0.005
272	22.67	0.07	0.048	(0.078)	0.043	0.005
273	22.75	0.07	0.048	(0.078)	0.043	0.005
274	22.83	0.07	0.048	(0.077)	0.043	0.005
275	22.92	0.07	0.048	(0.077)	0.043	0.005
276	23.00	0.07	0.048	(0.077)	0.043	0.005
277	23.08	0.07	0.048	(0.077)	0.043	0.005
278	23.17	0.07	0.048	(0.077)	0.043	0.005
279	23.25	0.07	0.048	(0.077)	0.043	0.005
280	23.33	0.07	0.048	(0.076)	0.043	0.005
281	23.42	0.07	0.048	(0.076)	0.043	0.005
282	23.50	0.07	0.048	(0.076)	0.043	0.005
283	23.58	0.07	0.048	(0.076)	0.043	0.005
284	23.67	0.07	0.048	(0.076)	0.043	0.005
285	23.75	0.07	0.048	(0.076)	0.043	0.005
286	23.83	0.07	0.048	(0.076)	0.043	0.005
287	23.92	0.07	0.048	(0.076)	0.043	0.005
288	24.00	0.07	0.048	(0.076)	0.043	0.005

(Loss Rate Not Used)

Sum = 100.0 Sum = 39.8

Flood volume = Effective rainfall 3.32(In)

times area 165.6(Ac.)/[(In)/(Ft.)] = 45.7(Ac.Ft)

Total soil loss = 2.68(In)

```
      Total soil loss =    37.026(Ac.Ft)
      Total rainfall =      6.00(In)
      Flood volume =     1992767.8 Cubic Feet
      Total soil loss =     1612833.6 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    108.546(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       50.0     100.0     150.0     200.0
-------------------------------------------------------------------------
  0+ 5       0.0002      0.03  Q         |         |         |         |
  0+10       0.0014      0.16  Q         |         |         |         |
  0+15       0.0039      0.37  Q         |         |         |         |
  0+20       0.0076      0.53  Q         |         |         |         |
  0+25       0.0122      0.67  Q         |         |         |         |
  0+30       0.0178      0.82  Q         |         |         |         |
  0+35       0.0242      0.93  Q         |         |         |         |
  0+40       0.0310      0.99  Q         |         |         |         |
  0+45       0.0381      1.03  Q         |         |         |         |
  0+50       0.0455      1.08  Q         |         |         |         |
  0+55       0.0536      1.17  Q         |         |         |         |
  1+ 0       0.0625      1.29  Q         |         |         |         |
  1+ 5       0.0719      1.37  Q         |         |         |         |
  1+10       0.0813      1.35  Q         |         |         |         |
  1+15       0.0901      1.29  Q         |         |         |         |
  1+20       0.0986      1.24  Q         |         |         |         |
  1+25       0.1071      1.22  Q         |         |         |         |
  1+30       0.1155      1.22  Q         |         |         |         |
  1+35       0.1238      1.22  Q         |         |         |         |
  1+40       0.1322      1.21  Q         |         |         |         |
  1+45       0.1406      1.22  Q         |         |         |         |
  1+50       0.1490      1.23  Q         |         |         |         |
  1+55       0.1580      1.30  Q         |         |         |         |
  2+ 0       0.1676      1.40  Q         |         |         |         |
  2+ 5       0.1777      1.47  Q         |         |         |         |
  2+10       0.1881      1.50  Q         |         |         |         |
  2+15       0.1986      1.53  Q         |         |         |         |
  2+20       0.2092      1.54  Q         |         |         |         |
  2+25       0.2199      1.55  Q         |         |         |         |
  2+30       0.2307      1.56  Q         |         |         |         |
  2+35       0.2416      1.59  Q         |         |         |         |
  2+40       0.2530      1.66  Q         |         |         |         |
  2+45       0.2652      1.76  Q         |         |         |         |
  2+50       0.2778      1.84  Q         |         |         |         |
  2+55       0.2908      1.88  Q         |         |         |         |
  3+ 0       0.3039      1.91  Q         |         |         |         |
  3+ 5       0.3172      1.93  Q         |         |         |         |
  3+10       0.3306      1.94  Q         |         |         |         |
  3+15       0.3440      1.95  Q         |         |         |         |
  3+20       0.3576      1.96  Q         |         |         |         |
  3+25       0.3711      1.97  Q         |         |         |         |
  3+30       0.3848      1.98  Q         |         |         |         |
  3+35       0.3984      1.98  Q         |         |         |         |
  3+40       0.4121      1.99  Q         |         |         |         |
  3+45       0.4258      1.99  Q         |         |         |         |
  3+50       0.4397      2.01  Q         |         |         |         |
  3+55       0.4540      2.08  Q         |         |         |         |
  4+ 0       0.4690      2.18  Q         |         |         |         |
  4+ 5       0.4845      2.26  Q         |         |         |         |
  4+10       0.5004      2.30  Q         |         |         |         |
  4+15       0.5163      2.32  Q         |         |         |         |
  4+20       0.5325      2.35  Q         |         |         |         |
  4+25       0.5493      2.43  Q         |         |         |         |
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 4+30       0.5668      2.54  Q        |        |        |        |
 4+35       0.5849      2.63  Q        |        |        |        |
 4+40       0.6033      2.67  Q        |        |        |        |
 4+45       0.6218      2.70  Q        |        |        |        |
 4+50       0.6407      2.73  Q        |        |        |        |
 4+55       0.6601      2.82  Q        |        |        |        |
 5+ 0       0.6803      2.93  Q        |        |        |        |
 5+ 5       0.7008      2.98  Q        |        |        |        |
 5+10       0.7208      2.90  Q        |        |        |        |
 5+15       0.7395      2.72  Q        |        |        |        |
 5+20       0.7575      2.61  Q        |        |        |        |
 5+25       0.7756      2.63  Q        |        |        |        |
 5+30       0.7942      2.70  Q        |        |        |        |
 5+35       0.8133      2.77  Q        |        |        |        |
 5+40       0.8329      2.85  Q        |        |        |        |
 5+45       0.8533      2.96  Q        |        |        |        |
 5+50       0.8743      3.04  Q        |        |        |        |
 5+55       0.8955      3.09  Q        |        |        |        |
 6+ 0       0.9170      3.11  Q        |        |        |        |
 6+ 5       0.9387      3.15  Q        |        |        |        |
 6+10       0.9609      3.23  Q        |        |        |        |
 6+15       0.9839      3.34  Q        |        |        |        |
 6+20       1.0075      3.42  Q        |        |        |        |
 6+25       1.0313      3.47  Q        |        |        |        |
 6+30       1.0554      3.50  Q        |        |        |        |
 6+35       1.0808      3.69  Q        |        |        |        |
 6+40       1.1111      4.40  Q        |        |        |        |
 6+45       1.1490      5.50  |Q       |        |        |        |
 6+50       1.1928      6.35  |Q       |        |        |        |
 6+55       1.2398      6.83  |Q       |        |        |        |
 7+ 0       1.2892      7.18  |Q       |        |        |        |
 7+ 5       1.3407      7.47  |Q       |        |        |        |
 7+10       1.3939      7.73  |Q       |        |        |        |
 7+15       1.4488      7.96  |Q       |        |        |        |
 7+20       1.5062      8.34  |Q       |        |        |        |
 7+25       1.5696      9.20  |Q       |        |        |        |
 7+30       1.6413     10.41  |VQ      |        |        |        |
 7+35       1.7205     11.50  |VQ      |        |        |        |
 7+40       1.8079     12.70  |VQ      |        |        |        |
 7+45       1.9052     14.12  |VQ      |        |        |        |
 7+50       2.0109     15.35  |V Q     |        |        |        |
 7+55       2.1256     16.66  |V Q     |        |        |        |
 8+ 0       2.2508     18.17  |V Q     |        |        |        |
 8+ 5       2.3860     19.63  | VQ     |        |        |        |
 8+10       2.5351     21.66  | V Q    |        |        |        |
 8+15       2.7022     24.25  | V Q    |        |        |        |
 8+20       2.8823     26.15  | V  Q   |        |        |        |
 8+25       3.0700     27.26  | V  Q   |        |        |        |
 8+30       3.2630     28.02  | V  Q   |        |        |        |
 8+35       3.4614     28.81  |  V Q   |        |        |        |
 8+40       3.6680     30.00  |  V Q   |        |        |        |
 8+45       3.8847     31.46  |  V  Q  |        |        |        |
 8+50       4.1102     32.75  |  V  Q  |        |        |        |
 8+55       4.3452     34.12  |  V  Q  |        |        |        |
 9+ 0       4.5910     35.68  |   V  Q |        |        |        |
 9+ 5       4.8470     37.18  |   V  Q |        |        |        |
 9+10       5.1173     39.25  |   V  Q |        |        |        |
 9+15       5.4056     41.86  |   V   Q|        |        |        |
 9+20       5.7083     43.95  |   V   Q|        |        |        |
 9+25       6.0232     45.73  |    V   Q        |        |        |
 9+30       6.3506     47.54  |    V   Q        |        |        |
 9+35       6.6885     49.06  |    V   Q        |        |        |
 9+40       7.0371     50.61  |     V   Q       |        |        |
 9+45       7.3974     52.32  |     V   Q       |        |        |
 9+50       7.7676     53.76  |     V   Q       |        |        |
 9+55       8.1480     55.24  |      V  |Q      |        |        |
10+ 0       8.5397     56.87  |      V  |Q      |        |        |
10+ 5       8.9321     56.98  |      V  |Q      |        |        |
10+10       9.2984     53.18  |       V Q       |        |        |
```

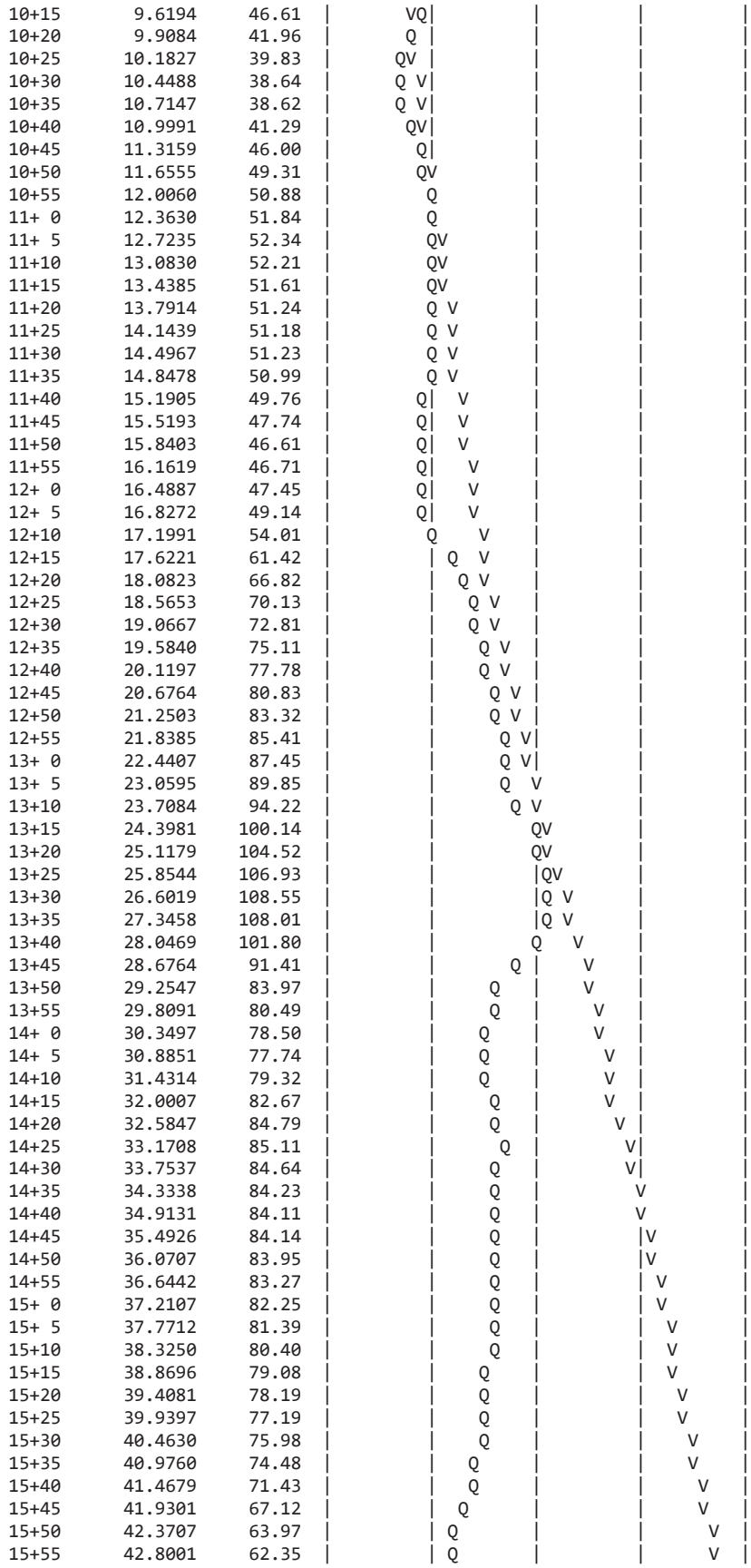

16+ 0	43.2227	61.35	|	| Q	|	|	V |
16+ 5	43.6246	58.36	|	|Q	|	|	V |
16+10	43.9593	48.59	|	Q|	|	|	V |
16+15	44.1921	33.80	|	Q |	|	|	V |
16+20	44.3514	23.14	|	Q |	|	|	V |
16+25	44.4735	17.72	|	Q |	|	|	V |
16+30	44.5724	14.36	|	Q |	|	|	V |
16+35	44.6538	11.82	|	Q |	|	|	V|
16+40	44.7210	9.76	|	Q|	|	|	V|
16+45	44.7769	8.11	|	Q|	|	|	V|
16+50	44.8234	6.75	|	Q|	|	|	V|
16+55	44.8627	5.71	|	Q|	|	|	V|
17+ 0	44.8963	4.88	Q	|	|	|	V|
17+ 5	44.9253	4.21	Q	|	|	|	V|
17+10	44.9516	3.82	Q	|	|	|	V|
17+15	44.9768	3.66	Q	|	|	|	V|
17+20	45.0014	3.58	Q	|	|	|	V|
17+25	45.0251	3.44	Q	|	|	|	V|
17+30	45.0480	3.32	Q	|	|	|	V|
17+35	45.0703	3.23	Q	|	|	|	V|
17+40	45.0919	3.14	Q	|	|	|	V|
17+45	45.1120	2.93	Q	|	|	|	V|
17+50	45.1324	2.96	Q	|	|	|	V|
17+55	45.1513	2.75	Q	|	|	|	V|
18+ 0	45.1675	2.35	Q	|	|	|	V|
18+ 5	45.1817	2.07	Q	|	|	|	V|
18+10	45.1951	1.94	Q	|	|	|	V|
18+15	45.2079	1.86	Q	|	|	|	V|
18+20	45.2204	1.81	Q	|	|	|	V|
18+25	45.2326	1.77	Q	|	|	|	V|
18+30	45.2446	1.75	Q	|	|	|	V|
18+35	45.2564	1.70	Q	|	|	|	V|
18+40	45.2675	1.62	Q	|	|	|	V|
18+45	45.2779	1.51	Q	|	|	|	V|
18+50	45.2876	1.40	Q	|	|	|	V|
18+55	45.2965	1.29	Q	|	|	|	V|
19+ 0	45.3044	1.15	Q	|	|	|	V|
19+ 5	45.3117	1.06	Q	|	|	|	V|
19+10	45.3191	1.07	Q	|	|	|	V|
19+15	45.3269	1.14	Q	|	|	|	V|
19+20	45.3351	1.20	Q	|	|	|	V|
19+25	45.3439	1.27	Q	|	|	|	V|
19+30	45.3533	1.37	Q	|	|	|	V|
19+35	45.3632	1.43	Q	|	|	|	V|
19+40	45.3729	1.41	Q	|	|	|	V|
19+45	45.3820	1.33	Q	|	|	|	V|
19+50	45.3907	1.25	Q	|	|	|	V|
19+55	45.3987	1.16	Q	|	|	|	V|
20+ 0	45.4059	1.05	Q	|	|	|	V|
20+ 5	45.4127	0.98	Q	|	|	|	V|
20+10	45.4196	1.01	Q	|	|	|	V|
20+15	45.4271	1.08	Q	|	|	|	V|
20+20	45.4349	1.14	Q	|	|	|	V|
20+25	45.4429	1.16	Q	|	|	|	V|
20+30	45.4510	1.17	Q	|	|	|	V|
20+35	45.4591	1.18	Q	|	|	|	V|
20+40	45.4672	1.18	Q	|	|	|	V|
20+45	45.4754	1.19	Q	|	|	|	V|
20+50	45.4835	1.18	Q	|	|	|	V|
20+55	45.4911	1.11	Q	|	|	|	V|
21+ 0	45.4981	1.01	Q	|	|	|	V|
21+ 5	45.5047	0.95	Q	|	|	|	V|
21+10	45.5114	0.98	Q	|	|	|	V|
21+15	45.5188	1.06	Q	|	|	|	V|
21+20	45.5264	1.10	Q	|	|	|	V|
21+25	45.5337	1.06	Q	|	|	|	V|
21+30	45.5404	0.97	Q	|	|	|	V|
21+35	45.5468	0.92	Q	|	|	|	V|
21+40	45.5534	0.96	Q	|	|	|	V|

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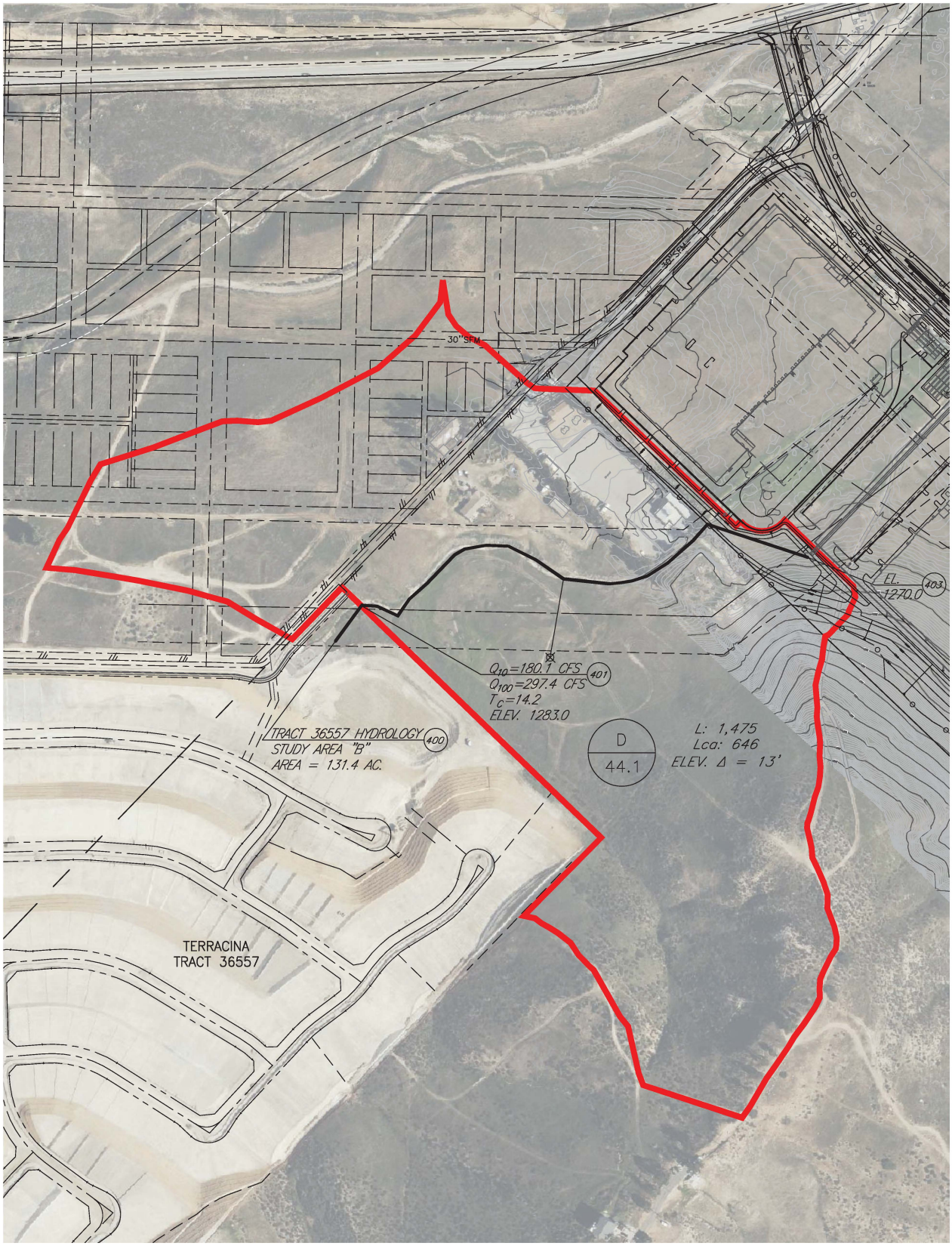
   21+45      45.5606      1.05  Q        |         |         |        V|
   21+50      45.5681      1.09  Q        |         |         |        V|
   21+55      45.5754      1.05  Q        |         |         |        V|
   22+ 0      45.5821      0.97  Q        |         |         |        V|
   22+ 5      45.5884      0.92  Q        |         |         |        V|
   22+10      45.5950      0.96  Q        |         |         |        V|
   22+15      45.6022      1.04  Q        |         |         |        V|
   22+20      45.6096      1.09  Q        |         |         |        V|
   22+25      45.6169      1.05  Q        |         |         |        V|
   22+30      45.6235      0.96  Q        |         |         |        V|
   22+35      45.6297      0.90  Q        |         |         |        V|
   22+40      45.6357      0.87  Q        |         |         |        V|
   22+45      45.6416      0.86  Q        |         |         |        V|
   22+50      45.6474      0.85  Q        |         |         |        V|
   22+55      45.6532      0.84  Q        |         |         |        V|
   23+ 0      45.6589      0.83  Q        |         |         |        V|
   23+ 5      45.6646      0.82  Q        |         |         |        V|
   23+10      45.6702      0.82  Q        |         |         |        V|
   23+15      45.6758      0.82  Q        |         |         |        V|
   23+20      45.6815      0.82  Q        |         |         |        V|
   23+25      45.6870      0.81  Q        |         |         |        V|
   23+30      45.6926      0.81  Q        |         |         |        V|
   23+35      45.6982      0.81  Q        |         |         |        V|
   23+40      45.7037      0.81  Q        |         |         |        V|
   23+45      45.7093      0.81  Q        |         |         |        V|
   23+50      45.7148      0.81  Q        |         |         |        V|
   23+55      45.7204      0.80  Q        |         |         |        V|
   24+ 0      45.7259      0.80  Q        |         |         |        V|
   24+ 5      45.7312      0.77  Q        |         |         |        V|
   24+10      45.7356      0.64  Q        |         |         |        V|
   24+15      45.7385      0.43  Q        |         |         |        V|
   24+20      45.7405      0.28  Q        |         |         |        V|
   24+25      45.7419      0.21  Q        |         |         |        V|
   24+30      45.7431      0.17  Q        |         |         |        V|
   24+35      45.7440      0.13  Q        |         |         |        V|
   24+40      45.7448      0.11  Q        |         |         |        V|
   24+45      45.7454      0.09  Q        |         |         |        V|
   24+50      45.7459      0.07  Q        |         |         |        V|
   24+55      45.7463      0.06  Q        |         |         |        V|
   25+ 0      45.7466      0.05  Q        |         |         |        V|
   25+ 5      45.7469      0.04  Q        |         |         |        V|
   25+10      45.7471      0.03  Q        |         |         |        V|
   25+15      45.7473      0.02  Q        |         |         |        V|
   25+20      45.7474      0.02  Q        |         |         |        V|
   25+25      45.7475      0.01  Q        |         |         |        V|
   25+30      45.7476      0.01  Q        |         |         |        V|
   25+35      45.7476      0.01  Q        |         |         |        V|
   25+40      45.7477      0.00  Q        |         |         |         V
-------------------------------------------------------------------------
```



LEGEND

- AREA BOUNDARY
- FLOWLINE
- A / 6.98 — TRIBUTARY AREA DESIGNATION / TRIBUTARY AREA ACREAGE
- XX / ZZZ — ELEVATION @ NODE / NODAL POINT REFERENCE

250' 0 250'

SCALE IN FEET

KWC ENGINEERS, INC.
CIVIL ENGINEERING, PLANNING AND CONSTRUCTION MANAGEMENT
1181 CALIFORNIA AVE, SUITE 235 • CORONA, CA. 92881-3370 • 909-734-2130

DRAINAGE AREA "D"
PROPOSED CONDITION UNIT HYDROGRAPH MAP
BAKER INDUSTRIAL
COUNTY OF RIVERSIDE

R:\19\1994\PRELIM\REPORTS\HYDRO\1994 UNITHYD PROP-D.dwg (6/27/2025 12:15 PM) Plotted by: Andrew Burror

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

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Study date 03/04/25 File: 1994D100D11100.out

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

Program License Serial Number 6653

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

English Units used in output format

BAKER INDUSTRIAL UNIT HYDROGRAPH AREA D
PROPOSED CONDITION
RCFC&WCD 100-YR 1 HR STORM
BY: P.S

Drainage Area = 44.10(Ac.) = 0.069 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 44.10(Ac.) = 0.069 Sq. Mi.
Length along longest watercourse = 1475.00(Ft.)
Length along longest watercourse measured to centroid = 646.00(Ft.)
Length along longest watercourse = 0.279 Mi.
Length along longest watercourse measured to centroid = 0.122 Mi.
Difference in elevation = 13.00(Ft.)
Slope along watercourse = 46.5356 Ft./Mi.
Average Manning's 'N' = 0.051
Lag time = 0.165 Hr.
Lag time = 9.91 Min.
25% of lag time = 2.48 Min.
40% of lag time = 3.96 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 297.40(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
44.10	0.55	24.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
44.10	1.45	63.95

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 1.450(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 1.449(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %

```
    44.100           78.50         0.150
 Total Area Entered =     44.10(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
78.5  78.5      0.262     0.150        0.226       1.000      0.226
                                                 Sum (F) =   0.226
Area averaged mean soil loss (F) (In/Hr) =  0.226
Minimum soil loss rate ((In/Hr)) =  0.113
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.780
------------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.4800
------------------------------------------------------------------------

               U n i t  H y d r o g r a p h
                       VALLEY S-Curve
------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------
      1   0.083         50.449          6.210             2.760
      2   0.167        100.898         26.533            11.792
      3   0.250        151.347         28.803            12.802
      4   0.333        201.796         12.796             5.687
      5   0.417        252.245          6.753             3.001
      6   0.500        302.694          4.700             2.089
      7   0.583        353.142          3.379             1.502
      8   0.667        403.591          2.573             1.144
      9   0.750        454.040          1.875             0.833
     10   0.833        504.489          1.555             0.691
     11   0.917        554.938          1.276             0.567
     12   1.000        605.387          0.989             0.440
     13   1.083        655.836          0.785             0.349
     14   1.167        706.285          0.583             0.259
     15   1.250        756.734          0.504             0.224
     16   1.333        807.183          0.685             0.304
                                 Sum = 100.000   Sum=      44.445
------------------------------------------------------------------------


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

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     4.40      0.765          0.226    (  0.597)        0.539
   2   0.17     4.50      0.783          0.226    (  0.610)        0.556
   3   0.25     5.40      0.939          0.226    (  0.733)        0.713
   4   0.33     5.40      0.939          0.226    (  0.733)        0.713
   5   0.42     5.70      0.991          0.226    (  0.773)        0.765
   6   0.50     6.40      1.113          0.226    (  0.868)        0.887
   7   0.58     7.90      1.374          0.226    (  1.072)        1.148
   8   0.67     9.10      1.583          0.226    (  1.235)        1.356
   9   0.75    12.80      2.226          0.226    (  1.737)        2.000
  10   0.83    25.60      4.453          0.226    (  3.473)        4.226
  11   0.92     7.90      1.374          0.226    (  1.072)        1.148
  12   1.00     4.90      0.852          0.226    (  0.665)        0.626
                (Loss Rate Not Used)
     Sum =     100.0                                 Sum =    14.7
        Flood volume = Effective rainfall      1.22(In)
         times area      44.1(Ac.)/[(In)/(Ft.)] =       4.5(Ac.Ft)
        Total soil loss =      0.23(In)
        Total soil loss =     0.832(Ac.Ft)
        Total rainfall =      1.45(In)
        Flood volume =      195789.5 Cubic Feet
```

Total soil loss = 36238.1 Cubic Feet

Peak flow rate of this hydrograph = 392.316(CFS)

++

1 - H O U R S T O R M

R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 100.0 200.0 300.0 400.0
0+ 5	2.0585	298.89	V Q
0+10	4.1610	305.29	V Q
0+15	6.3155	312.83	V Q
0+20	8.5054	317.97	V Q
0+25	10.7219	321.84	V Q
0+30	12.9593	324.86	V Q
0+35	15.2251	329.00	V Q
0+40	17.5356	335.48	V Q
0+45	19.9089	344.62	V Q
0+50	22.4128	363.55	V Q
0+55	25.1147	392.32	V Q
1+ 0	27.7903	388.50	V Q
1+ 5	30.2495	357.08	V Q
1+10	32.5531	334.49	V Q
1+15	34.7613	320.63	V Q
1+20	36.9225	313.80	V Q
1+25	39.0554	309.70	V Q
1+30	41.1678	306.72	V Q
1+35	43.2666	304.75	V Q
1+40	45.3547	303.20	Q
1+45	47.4341	301.92	QV
1+50	49.5064	300.91	Q V
1+55	51.5728	300.03	Q V
2+ 0	53.6353	299.47	Q V
2+ 5	55.6953	299.11	Q V
2+10	57.7468	297.89	Q V
2+15	59.7964	297.59	Q V

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

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Study date 03/11/25 File: 1994D100D33100.out

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

Program License Serial Number 6653

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

English Units used in output format

BAKER INDUSTRIAL UNIT HYDROGRAPH AREA D
PROPOSED CONDITION
RCFC&WCD 100-YR 3 HR STORM
BY: P.S

Drainage Area = 44.10(Ac.) = 0.069 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 44.10(Ac.) = 0.069 Sq. Mi.
Length along longest watercourse = 1475.00(Ft.)
Length along longest watercourse measured to centroid = 646.00(Ft.)
Length along longest watercourse = 0.279 Mi.
Length along longest watercourse measured to centroid = 0.122 Mi.
Difference in elevation = 13.00(Ft.)
Slope along watercourse = 46.5356 Ft./Mi.
Average Manning's 'N' = 0.051
Lag time = 0.165 Hr.
Lag time = 9.91 Min.
25% of lag time = 2.48 Min.
40% of lag time = 3.96 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 297.40(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
44.10	1.00	44.10

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
44.10	2.50	110.25

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

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

```
    44.100           78.50         0.150
 Total Area Entered =     44.10(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
78.5  78.5      0.262     0.150        0.226       1.000      0.226
                                                 Sum (F) =   0.226
Area averaged mean soil loss (F) (In/Hr) =  0.226
Minimum soil loss rate ((In/Hr)) =  0.113
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.780
------------------------------------------------------------------------

               U n i t  H y d r o g r a p h
                       VALLEY S-Curve
------------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         50.449          6.210              2.760
    2   0.167        100.898         26.533             11.792
    3   0.250        151.347         28.803             12.802
    4   0.333        201.796         12.796              5.687
    5   0.417        252.245          6.753              3.001
    6   0.500        302.694          4.700              2.089
    7   0.583        353.142          3.379              1.502
    8   0.667        403.591          2.573              1.144
    9   0.750        454.040          1.875              0.833
   10   0.833        504.489          1.555              0.691
   11   0.917        554.938          1.276              0.567
   12   1.000        605.387          0.989              0.440
   13   1.083        655.836          0.785              0.349
   14   1.167        706.285          0.583              0.259
   15   1.250        756.734          0.504              0.224
   16   1.333        807.183          0.685              0.304
                                Sum = 100.000   Sum=      44.445
------------------------------------------------------------------------

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

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     1.30      0.390          0.226    (  0.304)        0.164
    2   0.17     1.30      0.390          0.226    (  0.304)        0.164
    3   0.25     1.10      0.330          0.226    (  0.257)        0.104
    4   0.33     1.50      0.450          0.226    (  0.351)        0.224
    5   0.42     1.50      0.450          0.226    (  0.351)        0.224
    6   0.50     1.80      0.540          0.226    (  0.421)        0.314
    7   0.58     1.50      0.450          0.226    (  0.351)        0.224
    8   0.67     1.80      0.540          0.226    (  0.421)        0.314
    9   0.75     1.80      0.540          0.226    (  0.421)        0.314
   10   0.83     1.50      0.450          0.226    (  0.351)        0.224
   11   0.92     1.60      0.480          0.226    (  0.374)        0.254
   12   1.00     1.80      0.540          0.226    (  0.421)        0.314
   13   1.08     2.20      0.660          0.226    (  0.515)        0.434
   14   1.17     2.20      0.660          0.226    (  0.515)        0.434
   15   1.25     2.20      0.660          0.226    (  0.515)        0.434
   16   1.33     2.00      0.600          0.226    (  0.468)        0.374
   17   1.42     2.60      0.780          0.226    (  0.608)        0.553
   18   1.50     2.70      0.810          0.226    (  0.632)        0.583
   19   1.58     2.40      0.720          0.226    (  0.561)        0.493
   20   1.67     2.70      0.810          0.226    (  0.632)        0.583
   21   1.75     3.30      0.990          0.226    (  0.772)        0.763
   22   1.83     3.10      0.930          0.226    (  0.725)        0.703
```

```
23   1.92     2.90      0.870          0.226    (  0.678)        0.643
24   2.00     3.00      0.900          0.226    (  0.702)        0.673
25   2.08     3.10      0.930          0.226    (  0.725)        0.703
26   2.17     4.20      1.260          0.226    (  0.983)        1.033
27   2.25     5.00      1.500          0.226    (  1.170)        1.273
28   2.33     3.50      1.050          0.226    (  0.819)        0.823
29   2.42     6.80      2.040          0.226    (  1.591)        1.813
30   2.50     7.30      2.190          0.226    (  1.708)        1.963
31   2.58     8.20      2.460          0.226    (  1.918)        2.233
32   2.67     5.90      1.770          0.226    (  1.380)        1.543
33   2.75     2.00      0.600          0.226    (  0.468)        0.374
34   2.83     1.80      0.540          0.226    (  0.421)        0.314
35   2.92     1.80      0.540          0.226    (  0.421)        0.314
36   3.00     0.60      0.180       (  0.226)       0.140        0.040
              (Loss Rate Not Used)
   Sum =     100.0                                   Sum =    21.9
      Flood volume = Effective rainfall      1.83(In)
       times area      44.1(Ac.)/[(In)/(Ft.)] =       6.7(Ac.Ft)
      Total soil loss =      0.67(In)
      Total soil loss =     2.469(Ac.Ft)
      Total rainfall =      2.50(In)
      Flood volume =      292563.3 Cubic Feet
      Total soil loss =      107567.0 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    373.336(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      100.0     200.0     300.0     400.0
-------------------------------------------------------------------------
  0+ 5       2.0513    297.85  V         |         |        Q|         |
  0+10       4.1159    299.78  |V        |         |        Q|         |
  0+15       6.1938    301.71  | V       |         |         Q         |
  0+20       8.2755    302.26  | V       |         |         Q         |
  0+25      10.3651    303.40  |  V      |         |         Q         |
  0+30      12.4669    305.19  |   V     |         |         Q         |
  0+35      14.5795    306.75  |    V    |         |         Q         |
  0+40      16.6974    307.51  |     V   |         |         Q         |
  0+45      18.8202    308.23  |     V   |         |         Q         |
  0+50      20.9491    309.12  |      V  |         |         Q         |
  0+55      23.0754    308.75  |       V |         |         Q         |
  1+ 0      25.1998    308.46  |        V|         |         Q         |
  1+ 5      27.3323    309.64  |        V|         |         Q         |
  1+10      29.4805    311.91  |         V         |         |Q        |
  1+15      31.6420    313.85  |         |V        |         |Q        |
  1+20      33.8087    314.61  |         | V       |         |Q        |
  1+25      35.9775    314.90  |         | V       |         |Q        |
  1+30      38.1585    316.69  |         |  V      |         |Q        |
  1+35      40.3558    319.04  |         |   V     |         |Q        |
  1+40      42.5571    319.64  |         |    V    |         |Q        |
  1+45      44.7664    320.78  |         |     V   |         | Q       |
  1+50      46.9967    323.85  |         |     V   |         | Q       |
  1+55      49.2411    325.89  |         |      V  |         | Q       |
  2+ 0      51.4854    325.87  |         |       V |         | Q       |
  2+ 5      53.7304    325.97  |         |        V|         | Q       |
  2+10      55.9871    327.67  |         |         V         | Q       |
  2+15      58.2799    332.92  |         |         V         |  Q      |
  2+20      60.6153    339.11  |         |         |V        |  Q      |
  2+25      62.9686    341.70  |         |         | V       |   Q     |
  2+30      65.3829    350.55  |         |         |  V      |    Q    |
  2+35      67.8948    364.72  |         |         |   V     |     Q   |
  2+40      70.4660    373.34  |         |         |    V    |      Q  |
  2+45      73.0080    369.11  |         |         |     V   |     Q   |
  2+50      75.4203    350.26  |         |         |      V  |    Q    |
```

```
    2+55      77.7153    333.23  |         |         |      V  |  Q      |
    3+ 0      79.9531    324.93  |         |         |       V | Q       |
    3+ 5      82.1408    317.65  |         |         |         V|Q       |
    3+10      84.2833    311.10  |         |         |          VQ       |
    3+15      86.3993    307.24  |         |         |          QV       |
    3+20      88.4990    304.88  |         |         |          QV       |
    3+25      90.5876    303.27  |         |         |          Q V      |
    3+30      92.6670    301.92  |         |         |          Q  V     |
    3+35      94.7383    300.76  |         |         |          Q   V    |
    3+40      96.8052    300.10  |         |         |          Q   V    |
    3+45      98.8670    299.37  |         |         |         Q|    V   |
    3+50     100.9248    298.79  |         |         |         Q|     V  |
    3+55     102.9782    298.16  |         |         |         Q|      V |
    4+ 0     105.0284    297.68  |         |         |         Q|      V |
    4+ 5     107.0778    297.58  |         |         |         Q|       V|
    4+10     109.1267    297.50  |         |         |         Q|        V|
    4+15     111.1750    297.41  |         |         |         Q|         V
-------------------------------------------------------------------------
```

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

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Study date 03/11/25 File: 1994D100D66100.out

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

Program License Serial Number 6653

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

English Units used in output format

BAKER INDUSTRIAL UNIT HYDROGRAPH AREA D
PROPOSED CONDITION
RCFC&WCD 100-YR 6 HR STORM
BY: P.S

Drainage Area = 44.10(Ac.) = 0.069 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 44.10(Ac.) = 0.069 Sq. Mi.
Length along longest watercourse = 1475.00(Ft.)
Length along longest watercourse measured to centroid = 646.00(Ft.)
Length along longest watercourse = 0.279 Mi.
Length along longest watercourse measured to centroid = 0.122 Mi.
Difference in elevation = 13.00(Ft.)
Slope along watercourse = 46.5356 Ft./Mi.
Average Manning's 'N' = 0.051
Lag time = 0.165 Hr.
Lag time = 9.91 Min.
25% of lag time = 2.48 Min.
40% of lag time = 3.96 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 297.40(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
44.10	1.40	61.74

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
44.10	3.50	154.35

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.500(In)

Point rain (area averaged) = 3.500(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 3.499(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %

```
    44.100           78.50         0.150
 Total Area Entered =     44.10(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
78.5  78.5      0.262     0.150        0.226       1.000      0.226
                                                 Sum (F) =   0.226
Area averaged mean soil loss (F) (In/Hr) =  0.226
Minimum soil loss rate ((In/Hr)) =  0.113
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.780
------------------------------------------------------------------------

               U n i t  H y d r o g r a p h
                       VALLEY S-Curve
------------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
     1   0.083         50.449          6.210              2.760
     2   0.167        100.898         26.533             11.792
     3   0.250        151.347         28.803             12.802
     4   0.333        201.796         12.796              5.687
     5   0.417        252.245          6.753              3.001
     6   0.500        302.694          4.700              2.089
     7   0.583        353.142          3.379              1.502
     8   0.667        403.591          2.573              1.144
     9   0.750        454.040          1.875              0.833
    10   0.833        504.489          1.555              0.691
    11   0.917        554.938          1.276              0.567
    12   1.000        605.387          0.989              0.440
    13   1.083        655.836          0.785              0.349
    14   1.167        706.285          0.583              0.259
    15   1.250        756.734          0.504              0.224
    16   1.333        807.183          0.685              0.304
                                Sum = 100.000   Sum=      44.445
------------------------------------------------------------------------

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

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.50      0.210       (  0.226)       0.164       0.046
   2   0.17     0.60      0.252       (  0.226)       0.197       0.055
   3   0.25     0.60      0.252       (  0.226)       0.197       0.055
   4   0.33     0.60      0.252       (  0.226)       0.197       0.055
   5   0.42     0.60      0.252       (  0.226)       0.197       0.055
   6   0.50     0.70      0.294          0.226    (  0.229)       0.068
   7   0.58     0.70      0.294          0.226    (  0.229)       0.068
   8   0.67     0.70      0.294          0.226    (  0.229)       0.068
   9   0.75     0.70      0.294          0.226    (  0.229)       0.068
  10   0.83     0.70      0.294          0.226    (  0.229)       0.068
  11   0.92     0.70      0.294          0.226    (  0.229)       0.068
  12   1.00     0.80      0.336          0.226    (  0.262)       0.110
  13   1.08     0.80      0.336          0.226    (  0.262)       0.110
  14   1.17     0.80      0.336          0.226    (  0.262)       0.110
  15   1.25     0.80      0.336          0.226    (  0.262)       0.110
  16   1.33     0.80      0.336          0.226    (  0.262)       0.110
  17   1.42     0.80      0.336          0.226    (  0.262)       0.110
  18   1.50     0.80      0.336          0.226    (  0.262)       0.110
  19   1.58     0.80      0.336          0.226    (  0.262)       0.110
  20   1.67     0.80      0.336          0.226    (  0.262)       0.110
  21   1.75     0.80      0.336          0.226    (  0.262)       0.110
  22   1.83     0.80      0.336          0.226    (  0.262)       0.110
```

```
23   1.92     0.80      0.336          0.226    (  0.262)        0.110
24   2.00     0.90      0.378          0.226    (  0.295)        0.152
25   2.08     0.80      0.336          0.226    (  0.262)        0.110
26   2.17     0.90      0.378          0.226    (  0.295)        0.152
27   2.25     0.90      0.378          0.226    (  0.295)        0.152
28   2.33     0.90      0.378          0.226    (  0.295)        0.152
29   2.42     0.90      0.378          0.226    (  0.295)        0.152
30   2.50     0.90      0.378          0.226    (  0.295)        0.152
31   2.58     0.90      0.378          0.226    (  0.295)        0.152
32   2.67     0.90      0.378          0.226    (  0.295)        0.152
33   2.75     1.00      0.420          0.226    (  0.328)        0.194
34   2.83     1.00      0.420          0.226    (  0.328)        0.194
35   2.92     1.00      0.420          0.226    (  0.328)        0.194
36   3.00     1.00      0.420          0.226    (  0.328)        0.194
37   3.08     1.00      0.420          0.226    (  0.328)        0.194
38   3.17     1.10      0.462          0.226    (  0.360)        0.236
39   3.25     1.10      0.462          0.226    (  0.360)        0.236
40   3.33     1.10      0.462          0.226    (  0.360)        0.236
41   3.42     1.20      0.504          0.226    (  0.393)        0.278
42   3.50     1.30      0.546          0.226    (  0.426)        0.320
43   3.58     1.40      0.588          0.226    (  0.459)        0.362
44   3.67     1.40      0.588          0.226    (  0.459)        0.362
45   3.75     1.50      0.630          0.226    (  0.491)        0.404
46   3.83     1.50      0.630          0.226    (  0.491)        0.404
47   3.92     1.60      0.672          0.226    (  0.524)        0.446
48   4.00     1.60      0.672          0.226    (  0.524)        0.446
49   4.08     1.70      0.714          0.226    (  0.557)        0.488
50   4.17     1.80      0.756          0.226    (  0.590)        0.530
51   4.25     1.90      0.798          0.226    (  0.622)        0.572
52   4.33     2.00      0.840          0.226    (  0.655)        0.614
53   4.42     2.10      0.882          0.226    (  0.688)        0.655
54   4.50     2.10      0.882          0.226    (  0.688)        0.655
55   4.58     2.20      0.924          0.226    (  0.721)        0.697
56   4.67     2.30      0.966          0.226    (  0.753)        0.739
57   4.75     2.40      1.008          0.226    (  0.786)        0.781
58   4.83     2.40      1.008          0.226    (  0.786)        0.781
59   4.92     2.50      1.050          0.226    (  0.819)        0.823
60   5.00     2.60      1.092          0.226    (  0.852)        0.865
61   5.08     3.10      1.302          0.226    (  1.015)        1.075
62   5.17     3.60      1.512          0.226    (  1.179)        1.285
63   5.25     3.90      1.638          0.226    (  1.277)        1.411
64   5.33     4.20      1.764          0.226    (  1.376)        1.537
65   5.42     4.70      1.974          0.226    (  1.539)        1.747
66   5.50     5.60      2.352          0.226    (  1.834)        2.125
67   5.58     1.90      0.798          0.226    (  0.622)        0.572
68   5.67     0.90      0.378          0.226    (  0.295)        0.152
69   5.75     0.60      0.252       (  0.226)       0.197        0.055
70   5.83     0.50      0.210       (  0.226)       0.164        0.046
71   5.92     0.30      0.126       (  0.226)       0.098        0.028
72   6.00     0.20      0.084       (  0.226)       0.066        0.018
              (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    26.3
      Flood volume = Effective rainfall      2.19(In)
       times area      44.1(Ac.)/[(In)/(Ft.)] =       8.0(Ac.Ft)
      Total soil loss =      1.31(In)
      Total soil loss =     4.819(Ac.Ft)
      Total rainfall =      3.50(In)
      Flood volume =      350292.5 Cubic Feet
      Total soil loss =      209913.1 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    367.455(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          6 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
```

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	100.0	200.0	300.0	400.0
0+ 5	2.0491	297.53	V	|	|	Q|	|
0+10	4.1021	298.10	V	|	|	Q|	|
0+15	6.1599	298.80	|V	|	|	Q|	|
0+20	8.2204	299.18	|V	|	|	Q|	|
0+25	10.2822	299.37	| V	|	|	Q|	|
0+30	12.3451	299.53	| V	|	|	Q|	|
0+35	14.4095	299.76	| V	|	|	Q|	|
0+40	16.4755	299.98	| V	|	|	Q|	|
0+45	18.5424	300.10	| V	|	|	Q	|
0+50	20.6097	300.18	| V	|	|	Q	|
0+55	22.6774	300.24	| V	|	|	Q	|
1+ 0	24.7463	300.40	| V	|	|	Q	|
1+ 5	26.8188	300.93	| V	|	|	Q	|
1+10	28.8951	301.49	| V	|	|	Q	|
1+15	30.9733	301.75	| V	|	|	Q	|
1+20	33.0525	301.90	| V	|	|	Q	|
1+25	35.1323	301.99	| V	|	|	Q	|
1+30	37.2126	302.06	| V	|	|	Q	|
1+35	39.2933	302.11	| V	|	|	Q	|
1+40	41.3742	302.15	| V	|	|	Q	|
1+45	43.4554	302.18	| V	|	|	Q	|
1+50	45.5367	302.21	| V	|	|	Q	|
1+55	47.6181	302.22	| V	|	|	Q	|
2+ 0	49.7005	302.36	| V	|	|	Q	|
2+ 5	51.7855	302.75	| |V	|	|	Q	|
2+10	53.8717	302.91	| |V	|	|	Q	|
2+15	55.9593	303.12	| | V	|	|	Q	|
2+20	58.0498	303.55	| | V	|	|	Q	|
2+25	60.1418	303.75	| | V	|	|	Q	|
2+30	62.2344	303.85	| | V	|	|	Q	|
2+35	64.3275	303.92	| | V	|	|	Q	|
2+40	66.4210	303.97	| | V	|	|	Q	|
2+45	68.5156	304.13	| | V	|	|	Q	|
2+50	70.6138	304.66	| | V	|	|	Q	|
2+55	72.7158	305.22	| | V	|	|	Q	|
3+ 0	74.8196	305.48	| | V	|	|	Q	|
3+ 5	76.9245	305.62	| | V	|	|	Q	|
3+10	79.0307	305.83	| | V	|	|	Q	|
3+15	81.1410	306.41	| | V	|	|	Q	|
3+20	83.2552	306.99	| | V	|	|	Q	|
3+25	85.3723	307.39	| | V	|	|	Q	|
3+30	87.4946	308.16	| | V	|	|	Q	|
3+35	89.6256	309.42	| | V	|	|	Q	|
3+40	91.7659	310.77	| | V	|	|	|Q	|
3+45	93.9137	311.86	| | V	|	|	|Q	|
3+50	96.0683	312.85	| | V	|	|	|Q	|
3+55	98.2295	313.82	| | V	|	|	|Q	|
4+ 0	100.3975	314.79	| | V	|	|	|Q	|
4+ 5	102.5720	315.73	| | V	|	|	|Q	|
4+10	104.7538	316.80	| | V	|	|	|Q	|
4+15	106.9455	318.24	| | V	|	|	|Q	|
4+20	109.1482	319.84	| | V	|	|	|Q	|
4+25	111.3626	321.52	| | V	|	|	| Q	|
4+30	113.5880	323.13	| | V	|	|	| Q	|
4+35	115.8221	324.39	| | V	|	|	| Q	|
4+40	118.0649	325.65	| | V	|	|	| Q	|
4+45	120.3184	327.22	| | V	|	|	| Q	|
4+50	122.5829	328.80	| | V	|	|	| Q	|
4+55	124.8559	330.04	| | V	|	|	| Q	|
5+ 0	127.1374	331.28	| | V	|	|	| Q	|
5+ 5	129.4329	333.30	| | V	|	|	| Q	|
5+10	131.7569	337.44	| | V	|	|	| Q	|
5+15	134.1229	343.55	| | V	|	|	| Q	|
5+20	136.5310	349.66	| | V	|	|	| Q	|
5+25	138.9790	355.45	| | V	|	|	| Q	|
5+30	141.4762	362.58	| | V	|	|	| Q	|
5+35	144.0068	367.45	| | V	|	|	| Q	|

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    5+40     146.4539    355.32  |         |         |         |V   Q    |
    5+45     148.7537    333.93  |         |         |         |V Q      |
    5+50     150.9635    320.86  |         |         |         | Q       |
    5+55     153.1266    314.08  |         |         |         |QV       |
    6+ 0     155.2610    309.92  |         |         |        Q  V       |
    6+ 5     157.3748    306.92  |         |         |        Q  V       |
    6+10     159.4724    304.58  |         |         |        Q   V      |
    6+15     161.5584    302.89  |         |         |        Q   V      |
    6+20     163.6359    301.66  |         |         |        Q    V     |
    6+25     165.7066    300.66  |         |         |        Q    V     |
    6+30     167.7717    299.84  |         |         |       Q|    V    |
    6+35     169.8322    299.19  |         |         |       Q|    V    |
    6+40     171.8893    298.70  |         |         |       Q|    V    |
    6+45     173.9436    298.28  |         |         |       Q|     V   |
    6+50     175.9936    297.66  |         |         |       Q|     V   |
    6+55     178.0424    297.49  |         |         |       Q|      V  |
    7+ 0     180.0909    297.44  |         |         |       Q|      V  |
    7+ 5     182.1393    297.43  |         |         |       Q|       V|
    7+10     184.1876    297.41  |         |         |       Q|       V|
    7+15     186.2358    297.41  |         |         |       Q|        V
-------------------------------------------------------------------------
```

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

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Study date 03/11/25 File: 1994D100D2424100.out

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

Program License Serial Number 6653

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

English Units used in output format

BAKER INDUSTRIAL UNIT HYDROGRAPH AREA D
PROPOSED CONDITION
RCFC&WCD 100-YR 24 HR STORM
BY: P.S

Drainage Area = 44.10(Ac.) = 0.069 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 44.10(Ac.) = 0.069 Sq. Mi.
Length along longest watercourse = 1475.00(Ft.)
Length along longest watercourse measured to centroid = 646.00(Ft.)
Length along longest watercourse = 0.279 Mi.
Length along longest watercourse measured to centroid = 0.122 Mi.
Difference in elevation = 13.00(Ft.)
Slope along watercourse = 46.5356 Ft./Mi.
Average Manning's 'N' = 0.051
Lag time = 0.165 Hr.
Lag time = 9.91 Min.
25% of lag time = 2.48 Min.
40% of lag time = 3.96 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 297.40(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
44.10	2.50	110.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
44.10	6.00	264.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.500(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 5.999(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %

```
    44.100           78.50         0.150
 Total Area Entered =     44.10(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
78.5  78.5      0.262     0.150        0.226       1.000      0.226
                                                 Sum (F) =   0.226
Area averaged mean soil loss (F) (In/Hr) =  0.226
Minimum soil loss rate ((In/Hr)) =  0.113
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.780
------------------------------------------------------------------------

               U n i t  H y d r o g r a p h
                       VALLEY S-Curve
------------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
     1   0.083         50.449          6.210              2.760
     2   0.167        100.898         26.533             11.792
     3   0.250        151.347         28.803             12.802
     4   0.333        201.796         12.796              5.687
     5   0.417        252.245          6.753              3.001
     6   0.500        302.694          4.700              2.089
     7   0.583        353.142          3.379              1.502
     8   0.667        403.591          2.573              1.144
     9   0.750        454.040          1.875              0.833
    10   0.833        504.489          1.555              0.691
    11   0.917        554.938          1.276              0.567
    12   1.000        605.387          0.989              0.440
    13   1.083        655.836          0.785              0.349
    14   1.167        706.285          0.583              0.259
    15   1.250        756.734          0.504              0.224
    16   1.333        807.183          0.685              0.304
                                Sum = 100.000   Sum=      44.445
------------------------------------------------------------------------


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

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     0.07      0.048       (  0.401)       0.037        0.011
    2   0.17     0.07      0.048       (  0.400)       0.037        0.011
    3   0.25     0.07      0.048       (  0.398)       0.037        0.011
    4   0.33     0.10      0.072       (  0.397)       0.056        0.016
    5   0.42     0.10      0.072       (  0.395)       0.056        0.016
    6   0.50     0.10      0.072       (  0.394)       0.056        0.016
    7   0.58     0.10      0.072       (  0.392)       0.056        0.016
    8   0.67     0.10      0.072       (  0.390)       0.056        0.016
    9   0.75     0.10      0.072       (  0.389)       0.056        0.016
   10   0.83     0.13      0.096       (  0.387)       0.075        0.021
   11   0.92     0.13      0.096       (  0.386)       0.075        0.021
   12   1.00     0.13      0.096       (  0.384)       0.075        0.021
   13   1.08     0.10      0.072       (  0.383)       0.056        0.016
   14   1.17     0.10      0.072       (  0.381)       0.056        0.016
   15   1.25     0.10      0.072       (  0.380)       0.056        0.016
   16   1.33     0.10      0.072       (  0.378)       0.056        0.016
   17   1.42     0.10      0.072       (  0.377)       0.056        0.016
   18   1.50     0.10      0.072       (  0.375)       0.056        0.016
   19   1.58     0.10      0.072       (  0.374)       0.056        0.016
   20   1.67     0.10      0.072       (  0.372)       0.056        0.016
   21   1.75     0.10      0.072       (  0.371)       0.056        0.016
   22   1.83     0.13      0.096       (  0.369)       0.075        0.021
```

23	1.92	0.13	0.096	(0.368)	0.075	0.021
24	2.00	0.13	0.096	(0.366)	0.075	0.021
25	2.08	0.13	0.096	(0.365)	0.075	0.021
26	2.17	0.13	0.096	(0.363)	0.075	0.021
27	2.25	0.13	0.096	(0.362)	0.075	0.021
28	2.33	0.13	0.096	(0.360)	0.075	0.021
29	2.42	0.13	0.096	(0.359)	0.075	0.021
30	2.50	0.13	0.096	(0.358)	0.075	0.021
31	2.58	0.17	0.120	(0.356)	0.094	0.026
32	2.67	0.17	0.120	(0.355)	0.094	0.026
33	2.75	0.17	0.120	(0.353)	0.094	0.026
34	2.83	0.17	0.120	(0.352)	0.094	0.026
35	2.92	0.17	0.120	(0.350)	0.094	0.026
36	3.00	0.17	0.120	(0.349)	0.094	0.026
37	3.08	0.17	0.120	(0.347)	0.094	0.026
38	3.17	0.17	0.120	(0.346)	0.094	0.026
39	3.25	0.17	0.120	(0.344)	0.094	0.026
40	3.33	0.17	0.120	(0.343)	0.094	0.026
41	3.42	0.17	0.120	(0.342)	0.094	0.026
42	3.50	0.17	0.120	(0.340)	0.094	0.026
43	3.58	0.17	0.120	(0.339)	0.094	0.026
44	3.67	0.17	0.120	(0.337)	0.094	0.026
45	3.75	0.17	0.120	(0.336)	0.094	0.026
46	3.83	0.20	0.144	(0.334)	0.112	0.032
47	3.92	0.20	0.144	(0.333)	0.112	0.032
48	4.00	0.20	0.144	(0.332)	0.112	0.032
49	4.08	0.20	0.144	(0.330)	0.112	0.032
50	4.17	0.20	0.144	(0.329)	0.112	0.032
51	4.25	0.20	0.144	(0.327)	0.112	0.032
52	4.33	0.23	0.168	(0.326)	0.131	0.037
53	4.42	0.23	0.168	(0.325)	0.131	0.037
54	4.50	0.23	0.168	(0.323)	0.131	0.037
55	4.58	0.23	0.168	(0.322)	0.131	0.037
56	4.67	0.23	0.168	(0.320)	0.131	0.037
57	4.75	0.23	0.168	(0.319)	0.131	0.037
58	4.83	0.27	0.192	(0.318)	0.150	0.042
59	4.92	0.27	0.192	(0.316)	0.150	0.042
60	5.00	0.27	0.192	(0.315)	0.150	0.042
61	5.08	0.20	0.144	(0.314)	0.112	0.032
62	5.17	0.20	0.144	(0.312)	0.112	0.032
63	5.25	0.20	0.144	(0.311)	0.112	0.032
64	5.33	0.23	0.168	(0.310)	0.131	0.037
65	5.42	0.23	0.168	(0.308)	0.131	0.037
66	5.50	0.23	0.168	(0.307)	0.131	0.037
67	5.58	0.27	0.192	(0.305)	0.150	0.042
68	5.67	0.27	0.192	(0.304)	0.150	0.042
69	5.75	0.27	0.192	(0.303)	0.150	0.042
70	5.83	0.27	0.192	(0.301)	0.150	0.042
71	5.92	0.27	0.192	(0.300)	0.150	0.042
72	6.00	0.27	0.192	(0.299)	0.150	0.042
73	6.08	0.30	0.216	(0.297)	0.168	0.048
74	6.17	0.30	0.216	(0.296)	0.168	0.048
75	6.25	0.30	0.216	(0.295)	0.168	0.048
76	6.33	0.30	0.216	(0.294)	0.168	0.048
77	6.42	0.30	0.216	(0.292)	0.168	0.048
78	6.50	0.30	0.216	(0.291)	0.168	0.048
79	6.58	0.33	0.240	(0.290)	0.187	0.053
80	6.67	0.33	0.240	(0.288)	0.187	0.053
81	6.75	0.33	0.240	(0.287)	0.187	0.053
82	6.83	0.33	0.240	(0.286)	0.187	0.053
83	6.92	0.33	0.240	(0.284)	0.187	0.053
84	7.00	0.33	0.240	(0.283)	0.187	0.053
85	7.08	0.33	0.240	(0.282)	0.187	0.053
86	7.17	0.33	0.240	(0.281)	0.187	0.053
87	7.25	0.33	0.240	(0.279)	0.187	0.053
88	7.33	0.37	0.264	(0.278)	0.206	0.058
89	7.42	0.37	0.264	(0.277)	0.206	0.058
90	7.50	0.37	0.264	(0.275)	0.206	0.058
91	7.58	0.40	0.288	(0.274)	0.225	0.063

92	7.67	0.40	0.288	(0.273)		0.225	0.063
93	7.75	0.40	0.288	(0.272)		0.225	0.063
94	7.83	0.43	0.312	(0.270)		0.243	0.069
95	7.92	0.43	0.312	(0.269)		0.243	0.069
96	8.00	0.43	0.312	(0.268)		0.243	0.069
97	8.08	0.50	0.360	0.267	(0.281)		0.093
98	8.17	0.50	0.360	0.265	(0.281)		0.095
99	8.25	0.50	0.360	0.264	(0.281)		0.096
100	8.33	0.50	0.360	0.263	(0.281)		0.097
101	8.42	0.50	0.360	0.262	(0.281)		0.098
102	8.50	0.50	0.360	0.260	(0.281)		0.099
103	8.58	0.53	0.384	0.259	(0.299)		0.125
104	8.67	0.53	0.384	0.258	(0.299)		0.126
105	8.75	0.53	0.384	0.257	(0.299)		0.127
106	8.83	0.57	0.408	0.256	(0.318)		0.152
107	8.92	0.57	0.408	0.254	(0.318)		0.154
108	9.00	0.57	0.408	0.253	(0.318)		0.155
109	9.08	0.63	0.456	0.252	(0.356)		0.204
110	9.17	0.63	0.456	0.251	(0.356)		0.205
111	9.25	0.63	0.456	0.250	(0.356)		0.206
112	9.33	0.67	0.480	0.248	(0.374)		0.232
113	9.42	0.67	0.480	0.247	(0.374)		0.233
114	9.50	0.67	0.480	0.246	(0.374)		0.234
115	9.58	0.70	0.504	0.245	(0.393)		0.259
116	9.67	0.70	0.504	0.244	(0.393)		0.260
117	9.75	0.70	0.504	0.243	(0.393)		0.261
118	9.83	0.73	0.528	0.241	(0.412)		0.287
119	9.92	0.73	0.528	0.240	(0.412)		0.288
120	10.00	0.73	0.528	0.239	(0.412)		0.289
121	10.08	0.50	0.360	0.238	(0.281)		0.122
122	10.17	0.50	0.360	0.237	(0.281)		0.123
123	10.25	0.50	0.360	0.236	(0.281)		0.124
124	10.33	0.50	0.360	0.234	(0.281)		0.126
125	10.42	0.50	0.360	0.233	(0.281)		0.127
126	10.50	0.50	0.360	0.232	(0.281)		0.128
127	10.58	0.67	0.480	0.231	(0.374)		0.249
128	10.67	0.67	0.480	0.230	(0.374)		0.250
129	10.75	0.67	0.480	0.229	(0.374)		0.251
130	10.83	0.67	0.480	0.228	(0.374)		0.252
131	10.92	0.67	0.480	0.227	(0.374)		0.253
132	11.00	0.67	0.480	0.225	(0.374)		0.255
133	11.08	0.63	0.456	0.224	(0.356)		0.232
134	11.17	0.63	0.456	0.223	(0.356)		0.233
135	11.25	0.63	0.456	0.222	(0.356)		0.234
136	11.33	0.63	0.456	0.221	(0.356)		0.235
137	11.42	0.63	0.456	0.220	(0.356)		0.236
138	11.50	0.63	0.456	0.219	(0.356)		0.237
139	11.58	0.57	0.408	0.218	(0.318)		0.190
140	11.67	0.57	0.408	0.217	(0.318)		0.191
141	11.75	0.57	0.408	0.216	(0.318)		0.192
142	11.83	0.60	0.432	0.215	(0.337)		0.217
143	11.92	0.60	0.432	0.213	(0.337)		0.219
144	12.00	0.60	0.432	0.212	(0.337)		0.220
145	12.08	0.83	0.600	0.211	(0.468)		0.389
146	12.17	0.83	0.600	0.210	(0.468)		0.390
147	12.25	0.83	0.600	0.209	(0.468)		0.391
148	12.33	0.87	0.624	0.208	(0.487)		0.416
149	12.42	0.87	0.624	0.207	(0.487)		0.417
150	12.50	0.87	0.624	0.206	(0.487)		0.418
151	12.58	0.93	0.672	0.205	(0.524)		0.467
152	12.67	0.93	0.672	0.204	(0.524)		0.468
153	12.75	0.93	0.672	0.203	(0.524)		0.469
154	12.83	0.97	0.696	0.202	(0.543)		0.494
155	12.92	0.97	0.696	0.201	(0.543)		0.495
156	13.00	0.97	0.696	0.200	(0.543)		0.496
157	13.08	1.13	0.816	0.199	(0.636)		0.617
158	13.17	1.13	0.816	0.198	(0.636)		0.618
159	13.25	1.13	0.816	0.197	(0.636)		0.619
160	13.33	1.13	0.816	0.196	(0.636)		0.620

161	13.42	1.13	0.816	0.195	(0.636)	0.621
162	13.50	1.13	0.816	0.194	(0.636)	0.622
163	13.58	0.77	0.552	0.193	(0.431)	0.359
164	13.67	0.77	0.552	0.192	(0.431)	0.360
165	13.75	0.77	0.552	0.191	(0.431)	0.361
166	13.83	0.77	0.552	0.190	(0.431)	0.362
167	13.92	0.77	0.552	0.189	(0.431)	0.363
168	14.00	0.77	0.552	0.188	(0.431)	0.364
169	14.08	0.90	0.648	0.187	(0.505)	0.461
170	14.17	0.90	0.648	0.186	(0.505)	0.462
171	14.25	0.90	0.648	0.185	(0.505)	0.463
172	14.33	0.87	0.624	0.184	(0.487)	0.440
173	14.42	0.87	0.624	0.183	(0.487)	0.441
174	14.50	0.87	0.624	0.182	(0.487)	0.442
175	14.58	0.87	0.624	0.181	(0.487)	0.443
176	14.67	0.87	0.624	0.180	(0.487)	0.443
177	14.75	0.87	0.624	0.180	(0.487)	0.444
178	14.83	0.83	0.600	0.179	(0.468)	0.421
179	14.92	0.83	0.600	0.178	(0.468)	0.422
180	15.00	0.83	0.600	0.177	(0.468)	0.423
181	15.08	0.80	0.576	0.176	(0.449)	0.400
182	15.17	0.80	0.576	0.175	(0.449)	0.401
183	15.25	0.80	0.576	0.174	(0.449)	0.402
184	15.33	0.77	0.552	0.173	(0.431)	0.379
185	15.42	0.77	0.552	0.172	(0.431)	0.380
186	15.50	0.77	0.552	0.171	(0.431)	0.381
187	15.58	0.63	0.456	0.171	(0.356)	0.285
188	15.67	0.63	0.456	0.170	(0.356)	0.286
189	15.75	0.63	0.456	0.169	(0.356)	0.287
190	15.83	0.63	0.456	0.168	(0.356)	0.288
191	15.92	0.63	0.456	0.167	(0.356)	0.289
192	16.00	0.63	0.456	0.166	(0.356)	0.290
193	16.08	0.13	0.096	(0.165)	0.075	0.021
194	16.17	0.13	0.096	(0.165)	0.075	0.021
195	16.25	0.13	0.096	(0.164)	0.075	0.021
196	16.33	0.13	0.096	(0.163)	0.075	0.021
197	16.42	0.13	0.096	(0.162)	0.075	0.021
198	16.50	0.13	0.096	(0.161)	0.075	0.021
199	16.58	0.10	0.072	(0.160)	0.056	0.016
200	16.67	0.10	0.072	(0.160)	0.056	0.016
201	16.75	0.10	0.072	(0.159)	0.056	0.016
202	16.83	0.10	0.072	(0.158)	0.056	0.016
203	16.92	0.10	0.072	(0.157)	0.056	0.016
204	17.00	0.10	0.072	(0.156)	0.056	0.016
205	17.08	0.17	0.120	(0.156)	0.094	0.026
206	17.17	0.17	0.120	(0.155)	0.094	0.026
207	17.25	0.17	0.120	(0.154)	0.094	0.026
208	17.33	0.17	0.120	(0.153)	0.094	0.026
209	17.42	0.17	0.120	(0.152)	0.094	0.026
210	17.50	0.17	0.120	(0.152)	0.094	0.026
211	17.58	0.17	0.120	(0.151)	0.094	0.026
212	17.67	0.17	0.120	(0.150)	0.094	0.026
213	17.75	0.17	0.120	(0.149)	0.094	0.026
214	17.83	0.13	0.096	(0.149)	0.075	0.021
215	17.92	0.13	0.096	(0.148)	0.075	0.021
216	18.00	0.13	0.096	(0.147)	0.075	0.021
217	18.08	0.13	0.096	(0.147)	0.075	0.021
218	18.17	0.13	0.096	(0.146)	0.075	0.021
219	18.25	0.13	0.096	(0.145)	0.075	0.021
220	18.33	0.13	0.096	(0.144)	0.075	0.021
221	18.42	0.13	0.096	(0.144)	0.075	0.021
222	18.50	0.13	0.096	(0.143)	0.075	0.021
223	18.58	0.10	0.072	(0.142)	0.056	0.016
224	18.67	0.10	0.072	(0.142)	0.056	0.016
225	18.75	0.10	0.072	(0.141)	0.056	0.016
226	18.83	0.07	0.048	(0.140)	0.037	0.011
227	18.92	0.07	0.048	(0.140)	0.037	0.011
228	19.00	0.07	0.048	(0.139)	0.037	0.011
229	19.08	0.10	0.072	(0.138)	0.056	0.016

230	19.17	0.10	0.072	(0.138)	0.056	0.016
231	19.25	0.10	0.072	(0.137)	0.056	0.016
232	19.33	0.13	0.096	(0.136)	0.075	0.021
233	19.42	0.13	0.096	(0.136)	0.075	0.021
234	19.50	0.13	0.096	(0.135)	0.075	0.021
235	19.58	0.10	0.072	(0.134)	0.056	0.016
236	19.67	0.10	0.072	(0.134)	0.056	0.016
237	19.75	0.10	0.072	(0.133)	0.056	0.016
238	19.83	0.07	0.048	(0.133)	0.037	0.011
239	19.92	0.07	0.048	(0.132)	0.037	0.011
240	20.00	0.07	0.048	(0.131)	0.037	0.011
241	20.08	0.10	0.072	(0.131)	0.056	0.016
242	20.17	0.10	0.072	(0.130)	0.056	0.016
243	20.25	0.10	0.072	(0.130)	0.056	0.016
244	20.33	0.10	0.072	(0.129)	0.056	0.016
245	20.42	0.10	0.072	(0.129)	0.056	0.016
246	20.50	0.10	0.072	(0.128)	0.056	0.016
247	20.58	0.10	0.072	(0.128)	0.056	0.016
248	20.67	0.10	0.072	(0.127)	0.056	0.016
249	20.75	0.10	0.072	(0.126)	0.056	0.016
250	20.83	0.07	0.048	(0.126)	0.037	0.011
251	20.92	0.07	0.048	(0.125)	0.037	0.011
252	21.00	0.07	0.048	(0.125)	0.037	0.011
253	21.08	0.10	0.072	(0.124)	0.056	0.016
254	21.17	0.10	0.072	(0.124)	0.056	0.016
255	21.25	0.10	0.072	(0.123)	0.056	0.016
256	21.33	0.07	0.048	(0.123)	0.037	0.011
257	21.42	0.07	0.048	(0.123)	0.037	0.011
258	21.50	0.07	0.048	(0.122)	0.037	0.011
259	21.58	0.10	0.072	(0.122)	0.056	0.016
260	21.67	0.10	0.072	(0.121)	0.056	0.016
261	21.75	0.10	0.072	(0.121)	0.056	0.016
262	21.83	0.07	0.048	(0.120)	0.037	0.011
263	21.92	0.07	0.048	(0.120)	0.037	0.011
264	22.00	0.07	0.048	(0.120)	0.037	0.011
265	22.08	0.10	0.072	(0.119)	0.056	0.016
266	22.17	0.10	0.072	(0.119)	0.056	0.016
267	22.25	0.10	0.072	(0.118)	0.056	0.016
268	22.33	0.07	0.048	(0.118)	0.037	0.011
269	22.42	0.07	0.048	(0.118)	0.037	0.011
270	22.50	0.07	0.048	(0.117)	0.037	0.011
271	22.58	0.07	0.048	(0.117)	0.037	0.011
272	22.67	0.07	0.048	(0.117)	0.037	0.011
273	22.75	0.07	0.048	(0.116)	0.037	0.011
274	22.83	0.07	0.048	(0.116)	0.037	0.011
275	22.92	0.07	0.048	(0.116)	0.037	0.011
276	23.00	0.07	0.048	(0.115)	0.037	0.011
277	23.08	0.07	0.048	(0.115)	0.037	0.011
278	23.17	0.07	0.048	(0.115)	0.037	0.011
279	23.25	0.07	0.048	(0.115)	0.037	0.011
280	23.33	0.07	0.048	(0.114)	0.037	0.011
281	23.42	0.07	0.048	(0.114)	0.037	0.011
282	23.50	0.07	0.048	(0.114)	0.037	0.011
283	23.58	0.07	0.048	(0.114)	0.037	0.011
284	23.67	0.07	0.048	(0.114)	0.037	0.011
285	23.75	0.07	0.048	(0.113)	0.037	0.011
286	23.83	0.07	0.048	(0.113)	0.037	0.011
287	23.92	0.07	0.048	(0.113)	0.037	0.011
288	24.00	0.07	0.048	(0.113)	0.037	0.011

(Loss Rate Not Used)

Sum = 100.0 Sum = 34.6

Flood volume = Effective rainfall 2.88(In)
times area 44.1(Ac.)/[(In)/(Ft.)] = 10.6(Ac.Ft)
Total soil loss = 3.12(In)
Total soil loss = 11.451(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 461628.7 Cubic Feet
Total soil loss = 498786.6 Cubic Feet

Peak flow rate of this hydrograph = 324.040(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)	0 100.0 200.0 300.0 400.0
0+ 5	2.0484	297.43	V Q
0+10	4.0977	297.55	V Q
0+15	6.1479	297.69	V Q
0+20	8.1986	297.76	V Q
0+25	10.2500	297.86	V Q
0+30	12.3019	297.95	V Q
0+35	14.3542	297.99	V Q
0+40	16.4067	298.02	V Q
0+45	18.4593	298.04	V Q
0+50	20.5122	298.07	V Q
0+55	22.5655	298.15	V Q
1+ 0	24.6194	298.22	V Q
1+ 5	26.6734	298.24	V Q
1+10	28.7271	298.20	V Q
1+15	30.7805	298.15	V Q
1+20	32.8338	298.13	V Q
1+25	34.8870	298.13	V Q
1+30	36.9402	298.12	V Q
1+35	38.9934	298.12	V Q
1+40	41.0465	298.12	V Q
1+45	43.0996	298.11	V Q
1+50	45.1528	298.13	V Q
1+55	47.2064	298.19	V Q
2+ 0	49.2605	298.25	V Q
2+ 5	51.3148	298.28	V Q
2+10	53.3692	298.30	V Q
2+15	55.4237	298.31	V Q
2+20	57.4782	298.31	V Q
2+25	59.5327	298.32	V Q
2+30	61.5873	298.32	V Q
2+35	63.6420	298.34	V Q
2+40	65.6971	298.41	V Q
2+45	67.7528	298.48	V Q
2+50	69.8086	298.51	V Q
2+55	71.8646	298.53	V Q
3+ 0	73.9206	298.54	V Q
3+ 5	75.9768	298.55	V Q
3+10	78.0329	298.55	V Q
3+15	80.0891	298.56	V Q
3+20	82.1453	298.56	V Q
3+25	84.2016	298.57	V Q
3+30	86.2578	298.57	V Q
3+35	88.3141	298.57	V Q
3+40	90.3704	298.57	V Q
3+45	92.4266	298.57	V Q
3+50	94.4830	298.59	V Q
3+55	96.5399	298.65	V Q
4+ 0	98.5971	298.72	V Q
4+ 5	100.6546	298.75	V Q
4+10	102.7122	298.76	V Q
4+15	104.7699	298.78	V Q
4+20	106.8278	298.80	V Q
4+25	108.8861	298.87	V Q
4+30	110.9449	298.94	V Q
4+35	113.0039	298.97	V Q
4+40	115.0631	298.99	V Q
4+45	117.1223	299.00	V Q
4+50	119.1818	299.03	V Q

4+55	121.2417	299.10	V		Q	
5+ 0	123.3021	299.17	V		Q	
5+ 5	125.3625	299.18	V		Q	
5+10	127.4222	299.07	V		Q	
5+15	129.4811	298.95	V		Q	
5+20	131.5398	298.91	V		Q	
5+25	133.5987	298.95	V		Q	
5+30	135.6579	299.00	V		Q	
5+35	137.7174	299.04	V		Q	
5+40	139.7774	299.11	V		Q	
5+45	141.8378	299.18	V		Q	
5+50	143.8985	299.21	V		Q	
5+55	145.9593	299.23	V		Q	
6+ 0	148.0202	299.24	V		Q	
6+ 5	150.0812	299.26	V		Q	
6+10	152.1427	299.33	V		Q	
6+15	154.2048	299.40	V		Q	
6+20	156.2670	299.44	V		Q	
6+25	158.3294	299.46	V		Q	
6+30	160.3919	299.47	V		Q	
6+35	162.4545	299.50	V		Q	
6+40	164.5177	299.57	V		Q	
6+45	166.5813	299.64	V		Q	
6+50	168.6452	299.68	V		Q	
6+55	170.7092	299.69	V		Q	
7+ 0	172.7733	299.71	V		Q	
7+ 5	174.8375	299.72	V		Q	
7+10	176.9017	299.73	V		Q	
7+15	178.9660	299.73	V		Q	
7+20	181.0304	299.75	V		Q	
7+25	183.0952	299.82	V		Q	
7+30	185.1605	299.89	V		Q	
7+35	187.2262	299.93	V		Q	
7+40	189.2924	300.01	V		Q	
7+45	191.3591	300.09	V		Q	
7+50	193.4263	300.15	V		Q	
7+55	195.4940	300.23	V		Q	
8+ 0	197.5622	300.31	V		Q	
8+ 5	199.6313	300.42	V		Q	
8+10	201.7025	300.74	V		Q	
8+15	203.7762	301.09	V		Q	
8+20	205.8511	301.28	V		Q	
8+25	207.9269	301.41	V		Q	
8+30	210.0034	301.51	V		Q	
8+35	212.0811	301.67	V		Q	
8+40	214.1612	302.03	V		Q	
8+45	216.2439	302.41	V		Q	
8+50	218.3286	302.69	V		Q	
8+55	220.4161	303.11	V		Q	
9+ 0	222.5065	303.53	V		Q	
9+ 5	224.5995	303.90	V		Q	
9+10	226.6975	304.63	V		Q	
9+15	228.8006	305.37	V		Q	
9+20	230.9068	305.82	V		Q	
9+25	233.0166	306.34	V		Q	
9+30	235.1298	306.83	V		Q	
9+35	237.2454	307.19	V		Q	
9+40	239.3643	307.67	V		Q	
9+45	241.4865	308.14	V		Q	
9+50	243.6109	308.48	V		Q	
9+55	245.7387	308.94	V		Q	
10+ 0	247.8695	309.40	V		Q	
10+ 5	249.9990	309.20	V		Q	
10+10	252.1161	307.40	V		Q	
10+15	254.2193	305.39	V		Q	
10+20	256.3168	304.56	V		Q	
10+25	258.4115	304.15	V		Q	
10+30	260.5044	303.89	V		Q	
10+35	262.5984	304.05	V		Q	

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10+40     264.7014    305.35  |         |     V   |         Q         |
10+45     266.8144    306.81  |         |     V   |         Q         |
10+50     268.9317    307.44  |         |      V  |         Q         |
10+55     271.0513    307.76  |         |      V  |         Q         |
11+ 0     273.1725    308.00  |         |      V  |         Q         |
11+ 5     275.2945    308.11  |         |      V  |         Q         |
11+10     277.4154    307.97  |         |      V  |         Q         |
11+15     279.5351    307.77  |         |      V  |         Q         |
11+20     281.6544    307.72  |         |      V  |         Q         |
11+25     283.7739    307.76  |         |      V  |         Q         |
11+30     285.8939    307.81  |         |       V |         Q         |
11+35     288.0133    307.74  |         |       V |         Q         |
11+40     290.1291    307.22  |         |       V |         Q         |
11+45     292.2411    306.66  |         |       V |         Q         |
11+50     294.3522    306.52  |         |       V |         Q         |
11+55     296.4644    306.70  |         |       V |         Q         |
12+ 0     298.5783    306.94  |         |       V |         Q         |
12+ 5     300.6962    307.51  |         |        V|         Q         |
12+10     302.8281    309.55  |         |        V|         Q         |
12+15     304.9751    311.75  |         |        V|         |Q        |
12+20     307.1295    312.82  |         |        V|         |Q        |
12+25     309.2897    313.65  |         |        V|         |Q        |
12+30     311.4547    314.36  |         |        V|         |Q        |
12+35     313.6236    314.93  |         |        V|         |Q        |
12+40     315.7985    315.80  |         |         V         |Q        |
12+45     317.9794    316.66  |         |         V         |Q        |
12+50     320.1638    317.19  |         |         V         |Q        |
12+55     322.3525    317.79  |         |         V         |Q        |
13+ 0     324.5449    318.34  |         |         V         |Q        |
13+ 5     326.7419    319.01  |         |         V         |Q        |
13+10     328.9503    320.65  |         |         V         | Q       |
13+15     331.1705    322.38  |         |         V         | Q       |
13+20     333.3966    323.23  |         |         |V        | Q       |
13+25     335.6260    323.70  |         |         |V        | Q       |
13+30     337.8576    324.04  |         |         |V        | Q       |
13+35     340.0861    323.58  |         |         |V        | Q       |
13+40     342.2946    320.67  |         |         |V        | Q       |
13+45     344.4809    317.45  |         |         |V        |Q        |
13+50     346.6579    316.10  |         |         |V        |Q        |
13+55     348.8303    315.43  |         |         | V       |Q        |
14+ 0     350.9995    314.98  |         |         | V       |Q        |
14+ 5     353.1685    314.94  |         |         | V       |Q        |
14+10     355.3438    315.84  |         |         | V       |Q        |
14+15     357.5264    316.92  |         |         | V       |Q        |
14+20     359.7117    317.30  |         |         | V       |Q        |
14+25     361.8962    317.20  |         |         | V       |Q        |
14+30     364.0795    317.02  |         |         |  V      |Q        |
14+35     366.2625    316.97  |         |         |  V      |Q        |
14+40     368.4456    316.98  |         |         |  V      |Q        |
14+45     370.6288    317.00  |         |         |  V      |Q        |
14+50     372.8114    316.92  |         |         |  V      |Q        |
14+55     374.9926    316.71  |         |         |  V      |Q        |
15+ 0     377.1721    316.46  |         |         |  V      |Q        |
15+ 5     379.3506    316.32  |         |         |   V     |Q        |
15+10     381.5270    316.01  |         |         |   V     |Q        |
15+15     383.7013    315.71  |         |         |   V     |Q        |
15+20     385.8744    315.53  |         |         |   V     |Q        |
15+25     388.0451    315.18  |         |         |   V     |Q        |
15+30     390.2134    314.84  |         |         |   V     |Q        |
15+35     392.3788    314.42  |         |         |   V     |Q        |
15+40     394.5359    313.21  |         |         |    V    |Q        |
15+45     396.6843    311.94  |         |         |    V    |Q        |
15+50     398.8287    311.37  |         |         |    V    |Q        |
15+55     400.9711    311.08  |         |         |    V    |Q        |
16+ 0     403.1121    310.88  |         |         |    V    |Q        |
16+ 5     405.2471    310.00  |         |         |    V    Q         |
16+10     407.3595    306.72  |         |         |    V    Q         |
16+15     409.4477    303.20  |         |         |    V    Q         |
16+20     411.5248    301.60  |         |         |     V   Q         |
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16+25	413.5960	300.74	|	|	| V Q	|
16+30	415.6631	300.14	|	|	| V Q	|
16+35	417.7270	299.68	|	|	| V Q|	|
16+40	419.7882	299.29	|	|	| V Q|	|
16+45	421.8473	298.98	|	|	| V Q|	|
16+50	423.9047	298.74	|	|	| V Q|	|
16+55	425.9610	298.57	|	|	| V Q|	|
17+ 0	428.0164	298.44	|	|	| V Q|	|
17+ 5	430.0713	298.37	|	|	| V Q|	|
17+10	432.1265	298.42	|	|	| V Q|	|
17+15	434.1822	298.49	|	|	| V Q|	|
17+20	436.2378	298.46	|	|	| V Q|	|
17+25	438.2935	298.49	|	|	| V Q|	|
17+30	440.3494	298.51	|	|	| V Q|	|
17+35	442.4054	298.53	|	|	| VQ|	|
17+40	444.4614	298.54	|	|	| VQ|	|
17+45	446.5175	298.55	|	|	| VQ|	|
17+50	448.5735	298.54	|	|	| VQ|	|
17+55	450.6292	298.48	|	|	| VQ|	|
18+ 0	452.6844	298.42	|	|	| VQ|	|
18+ 5	454.7394	298.39	|	|	| VQ|	|
18+10	456.7944	298.38	|	|	| VQ|	|
18+15	458.8493	298.37	|	|	| Q|	|
18+20	460.9041	298.36	|	|	| Q|	|
18+25	462.9589	298.36	|	|	| Q|	|
18+30	465.0137	298.35	|	|	| Q|	|
18+35	467.0684	298.34	|	|	| Q|	|
18+40	469.1226	298.27	|	|	| Q|	|
18+45	471.1763	298.20	|	|	| Q|	|
18+50	473.2297	298.15	|	|	| Q|	|
18+55	475.2825	298.07	|	|	| QV	|
19+ 0	477.3349	297.99	|	|	| QV	|
19+ 5	479.3870	297.97	|	|	| QV	|
19+10	481.4394	298.01	|	|	| QV	|
19+15	483.4922	298.06	|	|	| QV	|
19+20	485.5452	298.10	|	|	| QV	|
19+25	487.5986	298.16	|	|	| QV	|
19+30	489.6526	298.24	|	|	| Q|V	|
19+35	491.7067	298.25	|	|	| Q|V	|
19+40	493.7605	298.21	|	|	| Q|V	|
19+45	495.8139	298.15	|	|	| Q|V	|
19+50	497.8670	298.12	|	|	| Q|V	|
19+55	499.9197	298.05	|	|	| Q|V	|
20+ 0	501.9719	297.97	|	|	| Q|V	|
20+ 5	504.0239	297.95	|	|	| Q|V	|
20+10	506.0762	298.00	|	|	| Q| V	|
20+15	508.1289	298.05	|	|	| Q| V	|
20+20	510.1818	298.08	|	|	| Q| V	|
20+25	512.2347	298.08	|	|	| Q| V	|
20+30	514.2877	298.09	|	|	| Q| V	|
20+35	516.3407	298.09	|	|	| Q| V	|
20+40	518.3937	298.10	|	|	| Q| V	|
20+45	520.4467	298.10	|	|	| Q| V	|
20+50	522.4996	298.08	|	|	| Q| V	|
20+55	524.5521	298.02	|	|	| Q| V	|
21+ 0	526.6041	297.96	|	|	| Q| V	|
21+ 5	528.6561	297.94	|	|	| Q| V	|
21+10	530.7083	297.99	|	|	| Q| V	|
21+15	532.7610	298.05	|	|	| Q| V	|
21+20	534.8137	298.05	|	|	| Q| V	|
21+25	536.8661	298.00	|	|	| Q| V	|
21+30	538.9180	297.94	|	|	| Q| V	|
21+35	540.9699	297.93	|	|	| Q| V	|
21+40	543.0221	297.98	|	|	| Q| V	|
21+45	545.0747	298.04	|	|	| Q| V	|
21+50	547.1273	298.05	|	|	| Q| V	|
21+55	549.1797	298.00	|	|	| Q| V	|
22+ 0	551.2316	297.94	|	|	| Q| V	|
22+ 5	553.2834	297.93	|	|	| Q| V	|

22+10	555.3356	297.98				Q	V
22+15	557.3882	298.04				Q	V
22+20	559.4409	298.05				Q	V
22+25	561.4932	298.00				Q	V
22+30	563.5451	297.94				Q	V
22+35	565.5968	297.91				Q	V
22+40	567.6485	297.90				Q	V
22+45	569.7001	297.89				Q	V
22+50	571.7516	297.89				Q	V
22+55	573.8032	297.88				Q	V
23+ 0	575.8547	297.88				Q	V
23+ 5	577.9062	297.88				Q	V
23+10	579.9577	297.88				Q	V
23+15	582.0091	297.87				Q	V
23+20	584.0606	297.87				Q	V
23+25	586.1121	297.87				Q	V
23+30	588.1635	297.87				Q	V
23+35	590.2150	297.87				Q	V
23+40	592.2664	297.87				Q	V
23+45	594.3179	297.87				Q	V
23+50	596.3693	297.87				Q	V
23+55	598.4207	297.87				Q	V
24+ 0	600.4722	297.87				Q	V
24+ 5	602.5234	297.84				Q	V
24+10	604.5738	297.72				Q	V
24+15	606.6233	297.58				Q	V
24+20	608.6723	297.52				Q	V
24+25	610.7211	297.49				Q	V
24+30	612.7698	297.47				Q	V
24+35	614.8184	297.45				Q	V
24+40	616.8668	297.44				Q	V
24+45	618.9152	297.43				Q	V
24+50	620.9636	297.42				Q	V
24+55	623.0119	297.42				Q	V
25+ 0	625.0602	297.41				Q	V
25+ 5	627.1085	297.41				Q	V
25+10	629.1567	297.41				Q	V
25+15	631.2050	297.40				Q	V