

January 31, 2024

Project No. 23160-01

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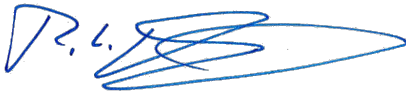
Subject: Preliminary Geotechnical Subsurface Evaluation and Recommendations, Proposed Approximate 65-Acre Industrial Development, Baker Street, Lake Elsinore, California

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,

LGC Geotechnical, Inc.



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Project Engineer



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RLD/BPG/BPP/amm

Distribution: (1) Addressee (electronic copy)

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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.



Approximate
Site Location

Terra Cotta

Collier Ave

Lakeshore Dr

74

Lincoln St

Lakeshore Dr

15



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 formation 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
S _s (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 (K_h) 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 (K_h) 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 $\frac{3}{4}$ -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 $\frac{1}{2}$ 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 foot 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 or 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.

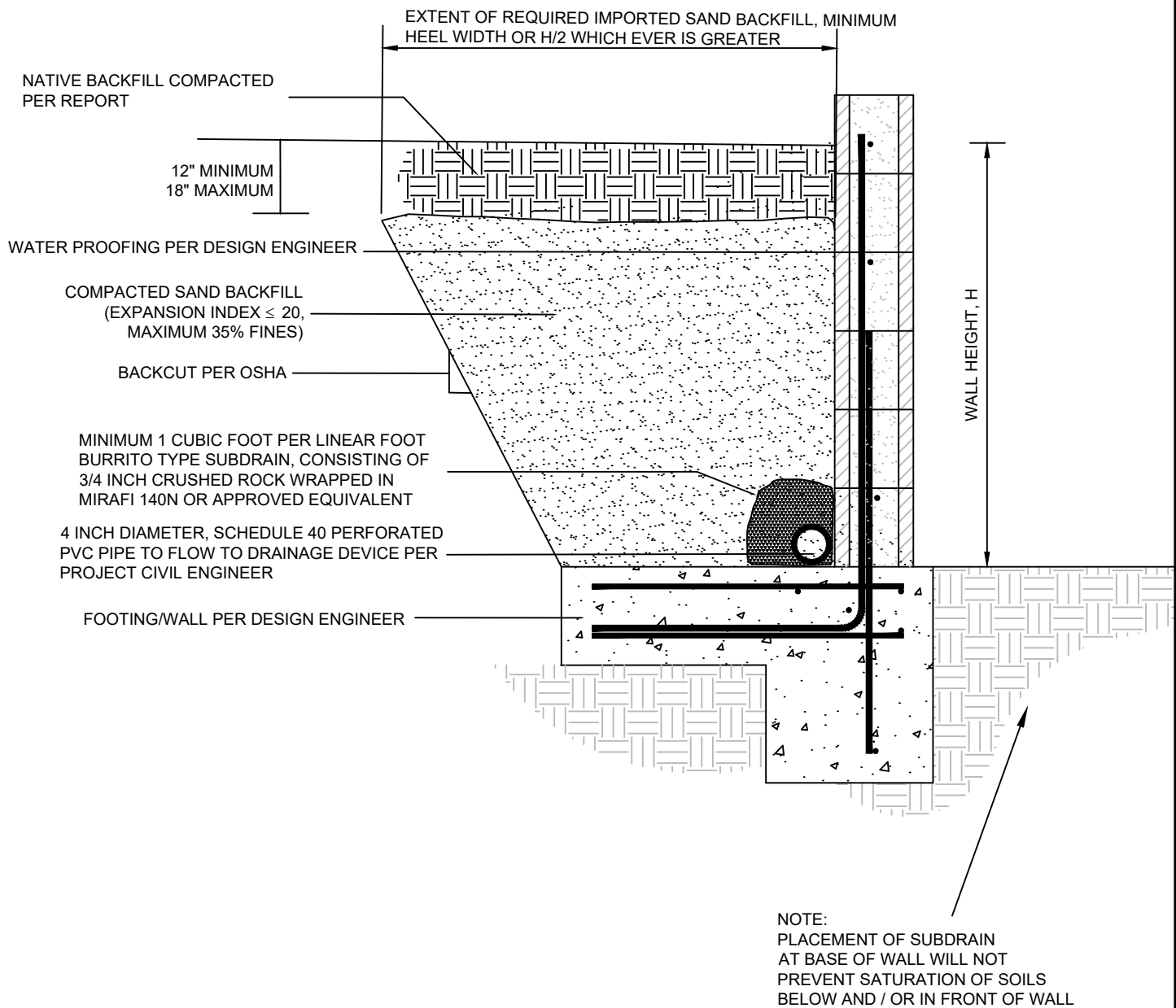


FIGURE 2A
Retaining Wall
Backfill Detail
(Level Condition)

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

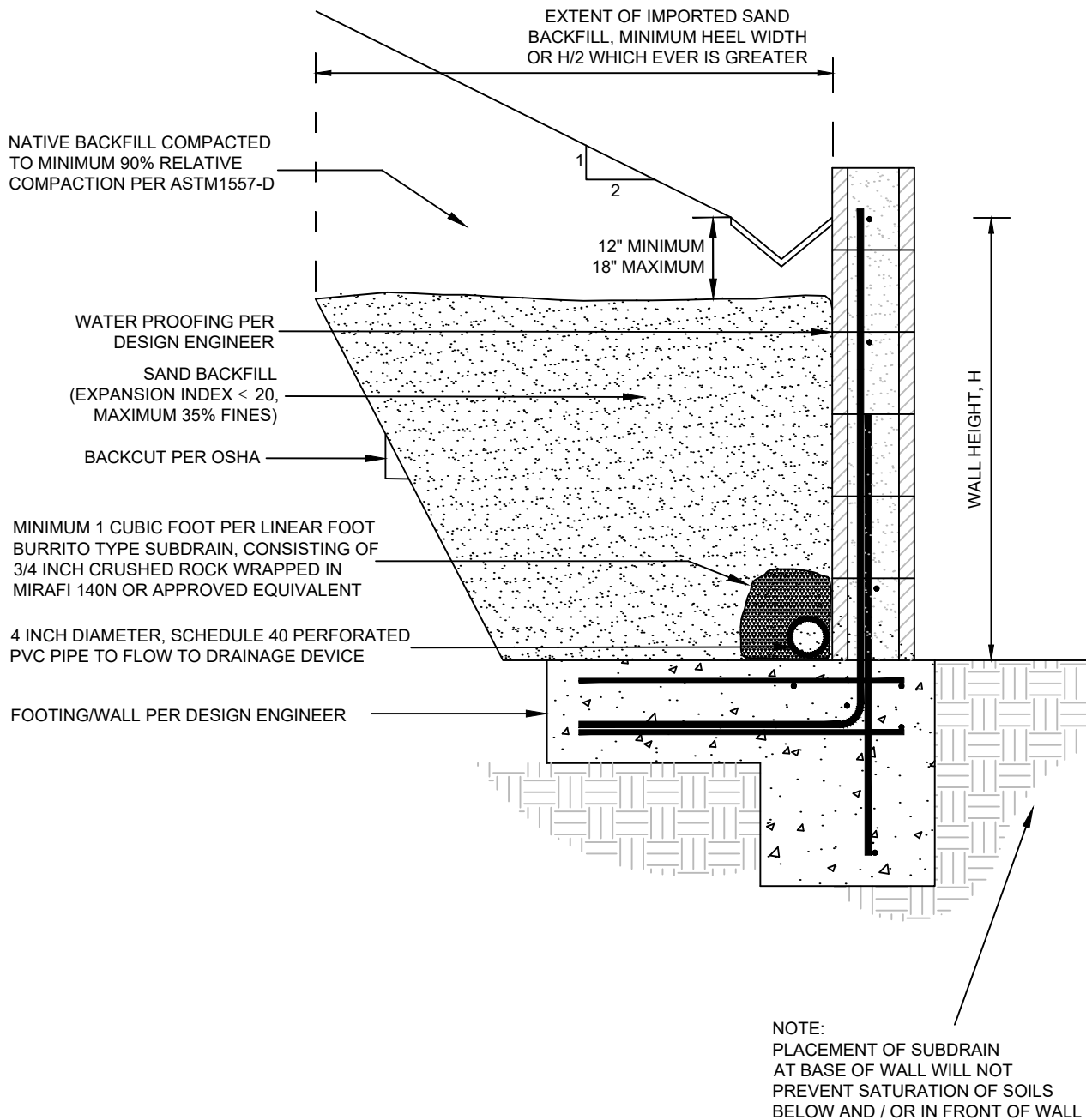


FIGURE 2B
Retaining Wall Backfill Detail
2:1 Backfill

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

Appendix A

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



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



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-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	Page 1 of 2

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



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

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	Page 2 of 2

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
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								



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

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



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

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	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							<u>@ 0 to 5' - Alluvium (Qal)</u>	
								@ 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	<u>@ 5' to TD - Tertiary Silverado Formation (Tsi)</u>	
								@ 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								



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

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 1 of 2

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
1275	0		R-1	6 12 22	121.7	10.0	SC	<u>@ 0 to 7.5' - Alluvium (Qal)</u> @ 0' - SILT with SAND: brown, dry, vegetation/topsoil	
	5		R-2	12 15 17	107.1	2.7	SP-SM/CL	@ 2.5' - Clayey SAND: pale brown, moist, medium dense @ 5' - SAND with Silt to Sandy CLAY: light brown, dry, medium dense/very stiff	
1270			R-3	26 50/5"	113.4	11.9	SM	<u>@ 7.5' to TD - Tertiary Silverado Formation (Tsi)</u> @ 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								



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



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-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

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
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	
1215	60								



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

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



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

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	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
1290	0	B-1	R-1	4 13 10	108.8	12.6	SC	<u>@ 0 to 2.5' - Alluvium (Qal)</u> @ 0' - Silty SAND: dark brown, dry, vegetation/topsoil <u>@ 2.5' to TD - Tertiary Silverado Formation (Tsi)</u> @ 2.5' - Clayey SAND: gray, moist, medium dense, weathered	MD
1290	5		R-2	9 27 50/4"	101.0	17.8	CL	@ 5' - Sandy CLAY: light yellowish gray, moist, hard	
1285	10		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								



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

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	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
1280	0	B-1	R-1	8 8 15	112.5	15.1	CL	<u>@ 0 to 15' - Colluvium (Qcol)</u> @ 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	
			R-3	7 14 19	105.4	19.0		@ 7.5' - Sandy CLAY: brown, very moist, very stiff	
1270	10		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	<u>@ 15' to TD - Tertiary Silverado Formation (Tsi)</u> @ 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								



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



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 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

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							<u>@ 0' to TD - Alluvium (Qal)</u> @ 0' - Vegetation/topsoil	
1255	5	B-1	SPT-1	8 4 6		13.0	SC	@ 5' - Clayey SAND: dark brown, moist, medium dense	
1250	10		SPT-2	7 11 16		17.3	CL	@ 10' - Sandy CLAY: yellowish brown, moist, hard	
1245	15							Total Depth = 12' Groundwater Encountered at Approximately 11', percolation test could not be run Backfilled with Cuttings on 9/25/2023	
1240	20								
1235	25								
	30								



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

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
1260	0							<u>@ 0' to TD - Alluvium (Qal)</u> @ 0' - 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								



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

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							<u>@ 0' to TD - Alluvium (Qal)</u> @ 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								



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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 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	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	B-1						<u>@ 0' to TD - Alluvium (Qal)</u> @ 0' - SILT: brown, dry, vegetation/topsoil	
	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	
	10								
	15								
	20								
	25								
	30								



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SAMPLE TYPES:	TEST TYPES:
B BULK SAMPLE	DS DIRECT SHEAR
R RING SAMPLE (CA Modified Sampler)	MD MAXIMUM DENSITY
G GRAB SAMPLE	SA SIEVE ANALYSIS
SPT STANDARD PENETRATION TEST SAMPLE	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

GROUNDWATER TABLE

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

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							<u>@ 0' to TD - Alluvium (Qal)</u> @ 0' - Silty SAND: brown, dry, vegetation/topsoil	
1255	5	B-1	SPT-1	6 12 8		12.2	SP-SC	@ 5' - SAND with Clay: grayish brown, moist, medium dense	
1250	10		SPT-2	5 5 8		16.1	CL	@ 10' - Sandy CLAY: grayish brown, moist, very stiff	
1245	15							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	
1240	20								
1235	25								
	30								



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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 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

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							<u>@ 0' to TD - Alluvium (Qal)</u> @ 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								



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

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		

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	Logged by BPG Sampled by BPG DESCRIPTION	Type of Test
1380	5			R-1	12/10"	117.0	11.1	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 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 @ 10' - Silty SANDSTONE: gray to olive, slightly moist, dense to very dense, fine grained, some mottled dry white chalky Silt, caliche staining @ 15' - increase in coarse Sand & gravel, massive, less staining, very dense @ 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-continuous @ 26-29' - Few infilled joints, white chalky infill	
1375	10			R-2	16/12"	120.9	10.9			
1370	15									
1365	20			R-3	12/10"	124.4	5.3			
1360	25									
1355	30									

GB: @22'
N60E, 8SE



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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
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AL ATTERBERG LIMITS
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RV R-VALUE

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		

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	Logged by BPG Sampled by BPG DESCRIPTION	Type of Test
1350	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	
	35								@ 33' - 6-8" diameter white oval shaped concretionary nodule, laying on side(sub-horizontal), hard	
									@ 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		@ 52' B: N60E, 20 NW	R-6	22	111.6	16.5	ML	@ 50' - Clayey SILTSTONE: dark gray, slightly moist, very stiff, some fine sand, some polished surfaces	
			GB @54': N55E, 3-5 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 @ 54' - Transitions to Clayey SAND, with fine undulatory sand beds, GB Attitude	AL
1330	55								@ 57' - Grades to massive SANDSTONE, olive green to gray/white, slightly moist, very dense, indistinct contact	
1325	60									



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SAMPLE TYPES:
 B BULK SAMPLE
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 MD MAXIMUM DENSITY
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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		

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number		Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	Logged by BPG Sampled by BPG DESCRIPTION	Type of Test	
	60			R-7		17	119.5	6.0	SM	@ 60' - SANDSTONE: gray to olive green, slightly moist, dense to very dense @ 62' - Concretionary nodule, white, hard, oval shaped, 6-8" (laying flat), subhorizontal, massive SANDSTONE below	DS #200	
36												
	65											
31												
	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											



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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

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			

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	Logged by BPG Sampled by BPG DESCRIPTION	Type of Test
1380	0	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	
	5									
	10									
	15									
	20									
	25									
1375										
1370										
1365										
1360										
1355	30									



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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

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		

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	Logged by BPG Sampled by BPG DESCRIPTION	Type of Test
1350	30								@ 33' - concretionary layer continuous around hole, concretions up to 8"	
	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 @48.5' C: N48E 12SE						@ 47 to 48.5' - faint zone of crossbedding, general bedding attitude taken @ 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								@ 56' - SANDSTONE: gray to olive green, slightly moist, very dense, thickly bedded to massive	
1330	55									
1325	60									



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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

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		

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	Logged by BPG Sampled by BPG DESCRIPTION	Type of Test
1323	60									
	65		@66.5' GB: N15E 9NW						@ 62' to 64' - concretionary nodules around hole, erratic, 3"-8" in size	
1318									@ 66.5' - general bedding attitude on fine gravel bed, continuous, 1"-2" thick	
	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 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	



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

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 :			
Hole Location : See Geotechnical Map						0'-25' - 3300 lbs. 25'-50' - 2200 lbs. 50'-80' - 1100 lbs. 80'-100' - 2200 lbs.			
Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	Type of Test
									Logged by BPG Sampled by BPG DESCRIPTION
1335	0								<u>Quaternary Colluvium - Qcol</u> @ 0-2.5' - Clayey SAND: dark gray, dry/desiccated, roots <u>Tertiary Silverado Formation - Tsi</u> @ 2.5' - Highly weathered SILTSTONE, fractured, soft to medium stiff, slightly moist to dry, caliche stringers throughout @ 5' - Silty Fine SANDSTONE to Sandy SILTSTONE: mottled gray, olive, white, reddish brown, slightly moist, dense to medium dense, very weathered @ 8' - SILTSTONE: gray to reddish brown, dry to slightly moist, very stiff, highly weathered/fractured @ 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 @ 18' - 6-8" SILTSTONE rip up clasts @ 20' - Interbedded SANDSTONE/SILTSTONE: olive green to gray and yellow brown, slightly moist, dense to very dense, gypsum filled joints @ 23' - General bedding attitude, along aligned rip up clasts, gradation to finer grained Sand @ 27' - Bedding attitude on indurated SANDSTONE bed @ 28' - SILTSTONE, dark gray, very stiff, slightly weathered/jointed, FeO staining, general bedding attitude
	5			R-1	6	100.5	5.4		
1330	10		GB: N80E, 19SE	R-2	8	121.6	4.9		
1325	15								
1320	20		@ 23' GB: N75E, 17SW	R-3	8	123.9	7.8		
1315	25								
1310	30		@ 27' B: N55W, 30SW @ 28' GB: N45W 28SW						

LGC
Geotechnical, Inc.

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SAMPLE TYPES:	TEST TYPES:
B BULK SAMPLE	DS DIRECT SHEAR
R RING SAMPLE	MD MAXIMUM DENSITY
G GRAB SAMPLE	SA SIEVE ANALYSIS
	S&H SIEVE AND HYDROMETER
	EI EXPANSION INDEX
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	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		

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	Logged by BPG Sampled by BPG DESCRIPTION	Type of Test
1305	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	
									@ 32' - SANDSTONE, less stiff, massive	
									@ 35' - Pisolithic Zone, very stiff SILTSTONE to 36'	
1300	35									
			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	
1295	40		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
			CB @44' N50W, 26SW	GB-2 @ 44'					@ 44' - CLAY bed: dark gray, slightly moist, approximately 1" thick around hole, very stiff to hard below	
									@ 45' - very hard drilling	
1290	45									
				R-6	31	111.6	6.4	SM	@ 50' - Silty SANDSTONE: light brown to olive gray, slightly moist, hard	DS #200
									@ 55' - Silty SANDSTONE: very dense, massive	
1285	50								@ 56' - Transtion from SANDSTONE to SILTSTONE, bedding attitude	
									@ 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	
1280	55		@ 56' B: N70W, 31S J: N20E, S75 J: N20W, 79S J: N45W, 50N							
	60									

	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

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		

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	Logged by BPG Sampled by BPG DESCRIPTION	Type of Test
1275	60			R-7	17	102.4	19.8	ML	@ 60' - Clayey SILTSTONE: dark gray, slightly moist, very stiff, fractured	
1270	65			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	85								Total Depth = 80' Backfilled with Cuttings on 9/29/2023	
1250	90									



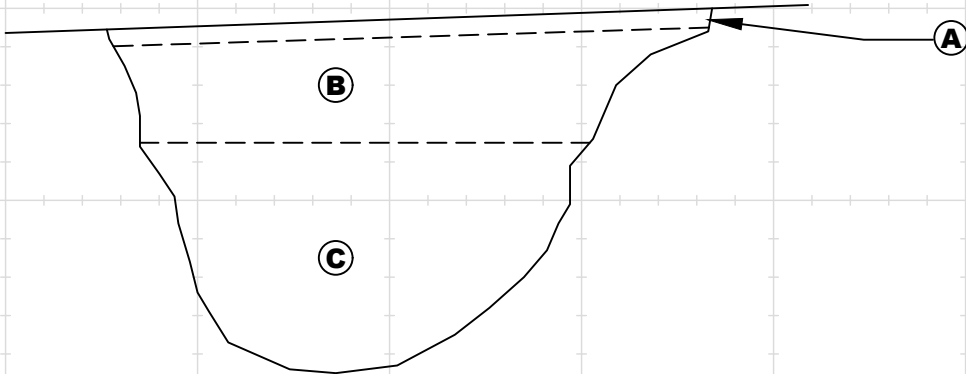
THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

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

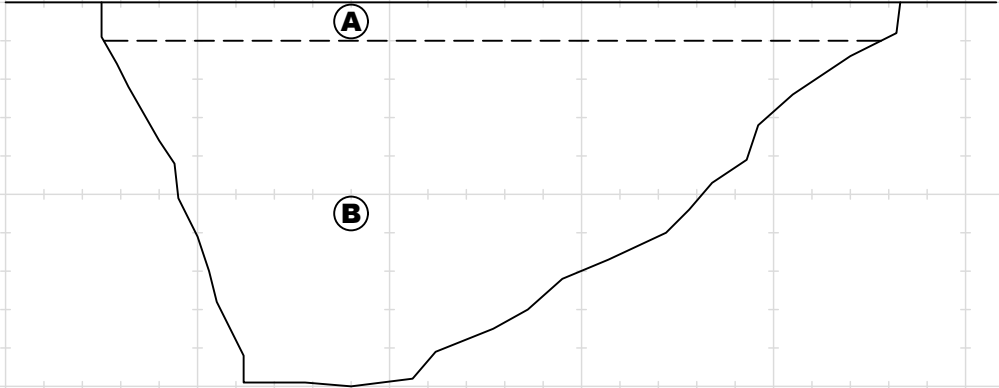
Project Name: EIP - Lake Elsinore			Logged By: MJG			Trench No: TP-1				
Project Number : 23160-01			Date : 9/26/2023			Engineering Properties:				
Equipment: Backhoe			Location: See Geotechnical Map							
Geologic Attitudes	Unit	SOIL DESCRIPTION:				GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
@ 4' GB: S50E 20SW	A	Quaternary Young Alluvial Channel Deposits (Qal) @ 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								
	C	Tertiary Silverado Formation (Tsi) @ 3.5' to T.D. - Interbedded SILTSTONE and SANDSTONE, gray and mottled light brown, dry, medium dense to dense, general bedding attitude taken								

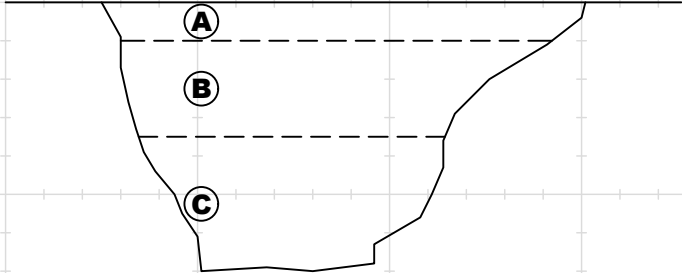
GRAPHICAL REPRESENTATION BELOW:
 Elevation : 1274 ' MSL
 Surface Slope: 2 deg.
 Trend: S34W



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

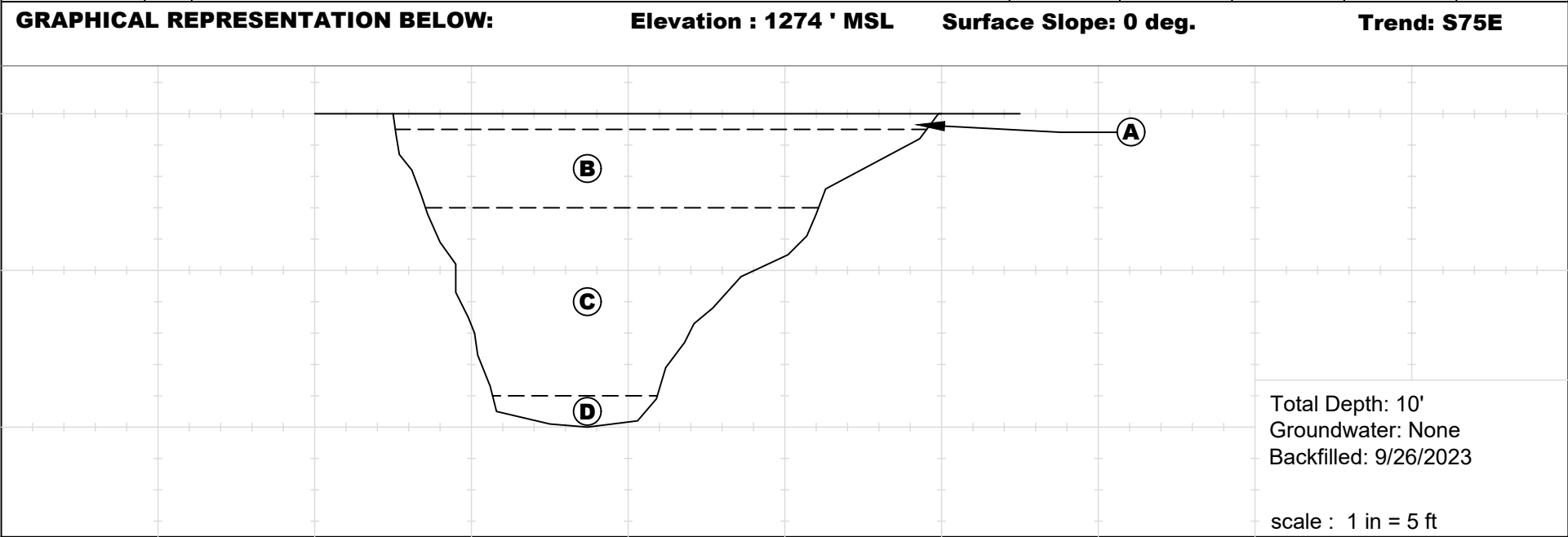
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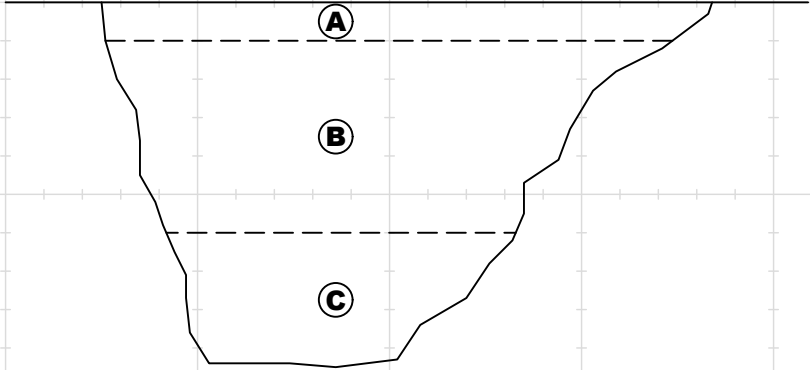
Project Name: EIP - Lake Elsinore			Logged By: MJG		Trench No: TP-2				
Project Number : 23160-01			Date : 9/26/2023		Engineering Properties:				
Equipment: Backhoe			Location: See Geotechnical Map						
Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)		
	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									
 Total Depth: 10' Groundwater: None Backfilled: 9/26/2023 scale : 1 in = 5 ft									

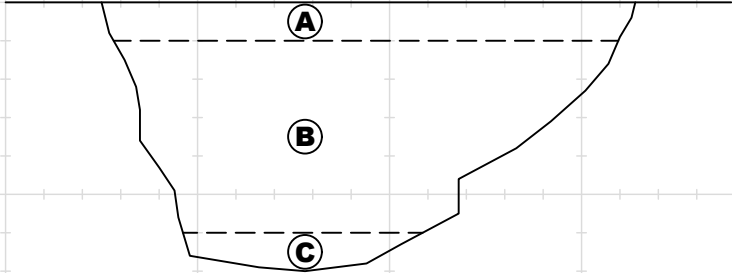
Project Name: EIP - Lake Elsinore			Logged By: MJG		Trench No: TP-3			
Project Number : 23160-01			Date : 9/26/2023		Engineering Properties:			
Equipment: Backhoe			Location: See Geotechnical Map					
Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)	
	A	Artificial Fill, Undocumented (afu)	afu		B-1 @ 0'-5'			
	B	@ 0' to 1' - SILT: dark brown to gray, loose, moist, vegetation at surface						
	C	@ 1' to 3.5' - Sandy CLAY: dark brown, moist, medium dense	Qal					
		Quaternary Young Alluvial Channel Deposits (Qal)						
		@ 3.5' to T.D. - Silty SAND: gray to brown, dry, very dense, indurated						
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								

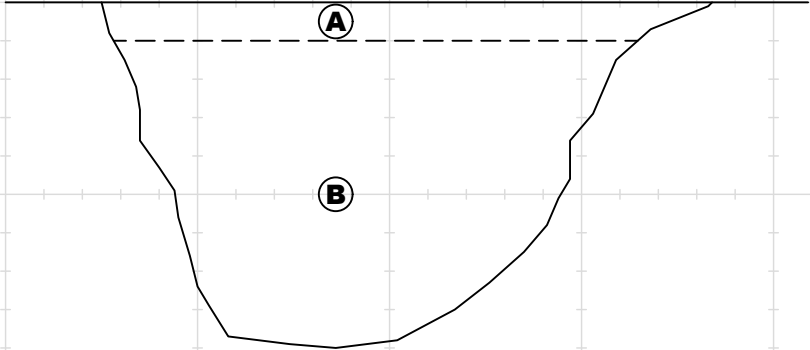
Project Name: EIP - Lake Elsinore	Logged By: MJG	Trench No: TP-4	
Project Number : 23160-01	Date : 9/26/2023	Engineering Properties:	
Equipment: Backhoe	Location: See Geotechnical Map		

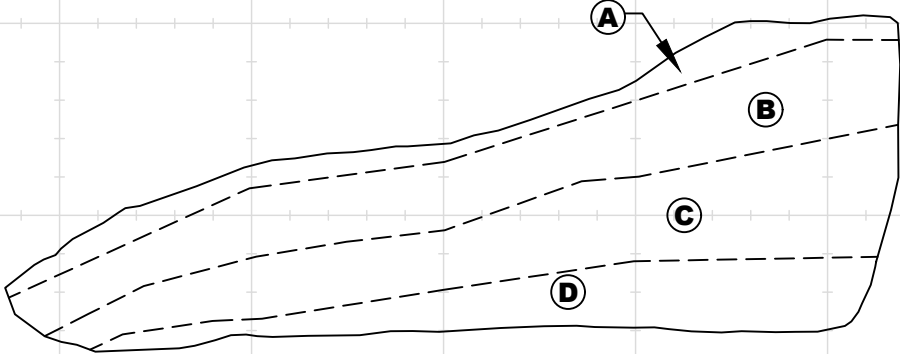
Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	Quaternary Young Alluvial Channel Deposits (Qal) @ 0' to 0.5' - SILT: dark gray to brown, dry, loose to medium dense, dead vegetation at surface	Qal				
	B	@ 0.5' to 3' - Sandy CLAY: dark brown, gray,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

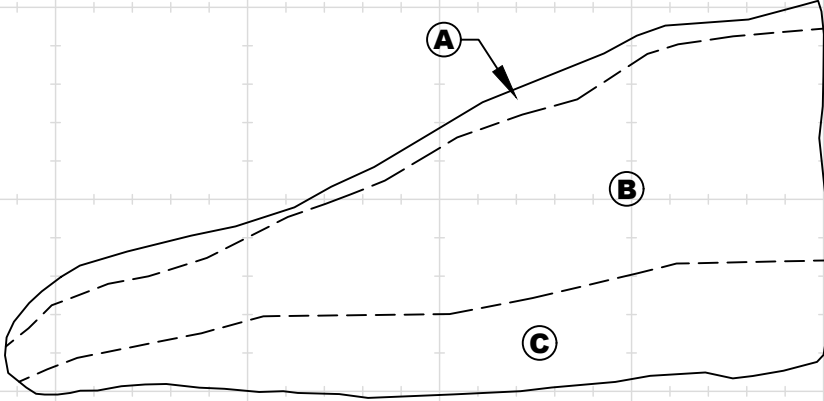


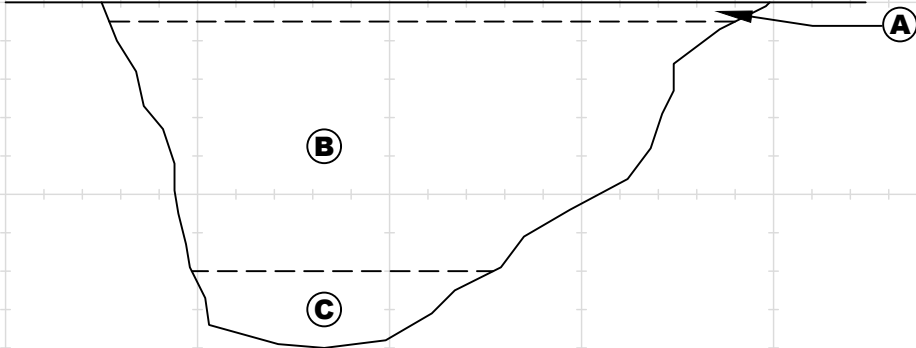
Project Name: EIP - Lake Elsinore		Logged By: MJG		Trench No: TP-5			
Project Number : 23160-01		Date : 9/26/2023		Engineering Properties:			
Equipment: Backhoe		Location: See Geotechnical Map					
Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	Quaternary Young Alluvial Channel Deposits (Qal) @ 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					
	C	Tertiary Silverado Formation (Tsi) @ 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							

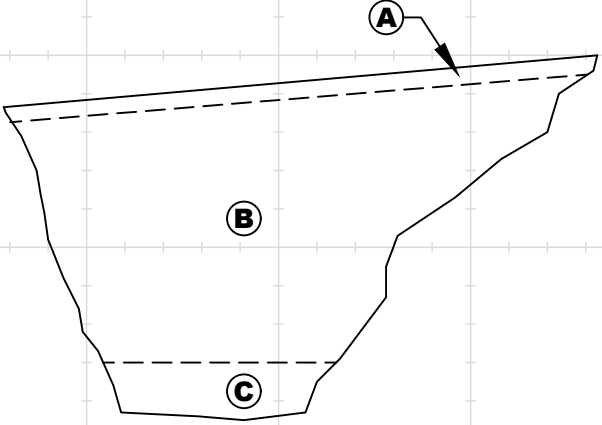
Project Name: EIP - Lake Elsinore			Logged By: MJG		Trench No: TP-6				
Project Number : 23160-01			Date : 9/26/2023		Engineering Properties:				
Equipment: Backhoe			Location: See Geotechnical Map						
Geologic Attitudes	Unit	SOIL DESCRIPTION:			GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
	A	<u>Quaternary young alluvial channel deposits (Qal)</u> @ 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							
		<u>Tertiary Silverado Formation (Tsi)</u>							
	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									

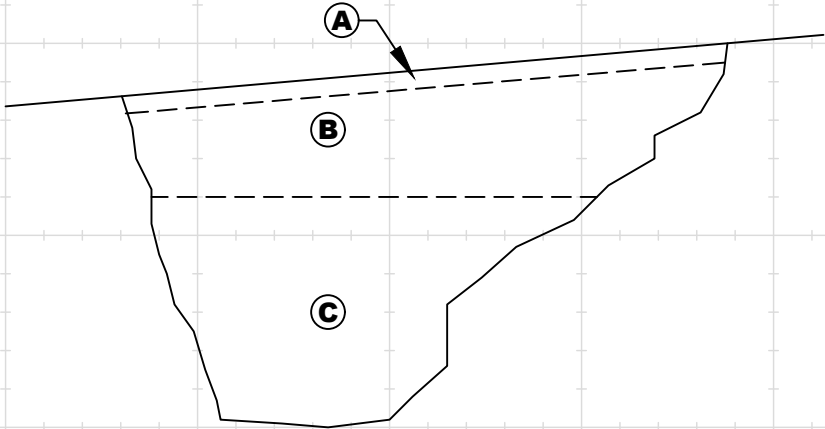
Project Name: EIP - Lake Elsinore			Logged By: MJG		Trench No: TP-7				
Project Number : 23160-01			Date : 9/26/2023		Engineering Properties:				
Equipment: Backhoe			Location: See Geotechnical Map						
Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)		
	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									

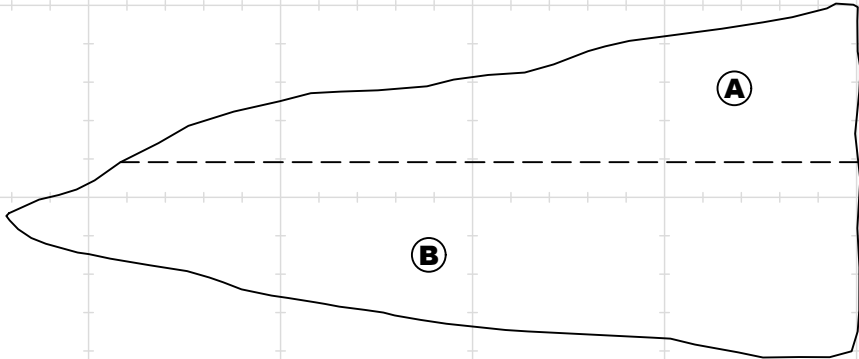
Project Name: EIP - Lake Elsinore		Logged By: MJG		Trench No: TP-8			
Project Number : 23160-01		Date : 9/26/2023		Engineering Properties:			
Equipment: Backhoe		Location: See Geotechnical Map					
Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
B:S75E 25S	A	<u>Quaternary Young Alluvial Channel Deposits (Qal)</u> @ 0' to 0.5' - SILT: light brown to gray, dry, loose, dry grass, some 2"-3" sub rounded cobbles	Qal				
	B	@ 0.5' to 4' - Sandy CLAY/Clayey SAND: dark brown, slightly moist to dry, dense					
	C	<u>Tertiary Silverado Formation (Tsi)</u> @ 4' to 6' - SANDSTONE: white, slightly moist, medium dense, some iron oxide					
	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							

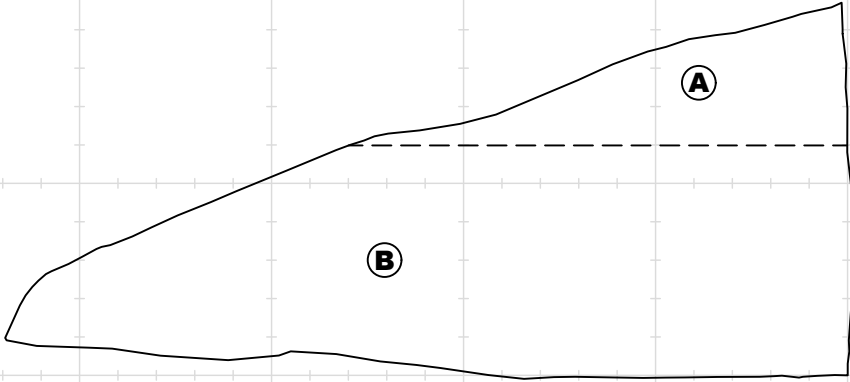
Project Name: EIP - Lake Elsinore		Logged By: MJG		Trench No: TP-9			
Project Number : 23160-01		Date : 9/26/2023		Engineering Properties:			
Equipment: Backhoe		Location: See Geotechnical Map					
Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	DRY DENSITY (PCF)
S35E 50SW	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					
	C	Tertiary Silverado Formation (Tsi) @ 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							

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 B C	Quaternary Young Alluvial Channel Deposits (Qal) @ 0' to 0.5' - SILT: light gray, dry, loose to medium dense, dead grass @ 0.5' to 7' - Clayey SAND: brownish gray, slightly moist, dense, indurated, 2" to 3" subrounded cobbles @ 7' to 9' - SAND with trace CLAY, brownish gray, slightly moist, medium dense, 2" to 3" subrounded cobbles	Qal						
GRAPHICAL REPRESENTATION BELOW:									
Elevation : 1291 ' MSL Surface Slope: 0 deg. Trend: N-S  Total Depth: 9' Groundwater: None Backfilled: 9/26/2023 scale : 1 in = 5 ft									

Project Name: EIP - Lake Elsinore			Logged By: MJG		Trench No: TP-11				
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 C	<u>Quaternary Young Alluvial Channel Deposits (Qal)</u> @ 0' to 0.5' - SILT: light gray overall, dry, medium dense @ 0.5' to 8' - Clayey SAND/Sandy CLAY: dark brownish gray, dry, dense, rootlets, indurated @ 8' to 9' - Clayey SAND: olive gray, slightly moist, medium dense to dense			Qal				
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									

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)
	A	<u>Quaternary Colluvium (Qcol)</u> @ 0' to 0.5' - SILT and Sandy CLAY: brownish gray, dry, medium dense to dense, dead grass, rounded 2"-3" cobbles		Qcol		B-1 @ 4'-10'		
	B	@ 0.5' to 4' - Clayey SAND: light brown, dry, dense, cracked/desiccated						
	C	<u>Tertiary Silverado Formation (Tsi)</u> @ 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								

Project Name: EIP - Lake Elsinore			Logged By: MJG		Trench No: TP-13				
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									

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)		
N69E 5SE	A	<u>Quaternary Colluvium (Qcol)</u> @ 0' to 4' - Clayey SAND: grayish brown, medium dense, dry, 2"-3" cobbles	Qcol						
	B	<u>Tertiary Silverado Formation (Tsi)</u> @ 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									

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 Distribution/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

APPENDIX C (Cont'd)

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

APPENDIX C (Cont'd)

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.

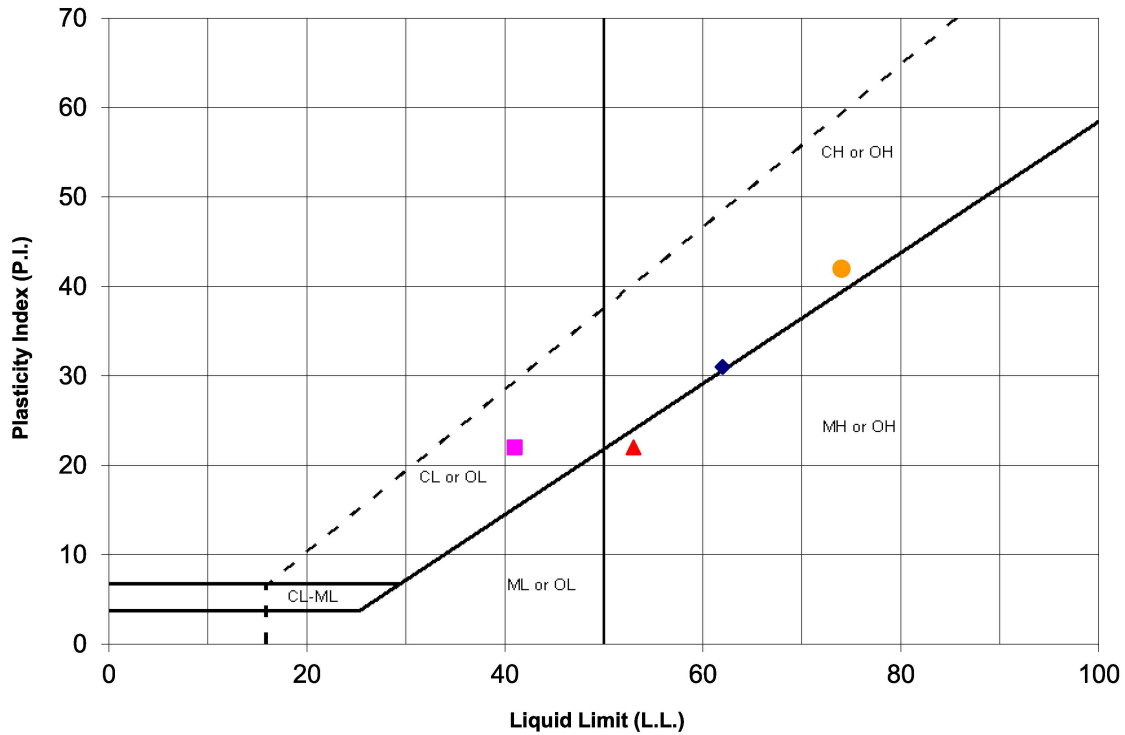
Sample Location	Sulfate Content (ppm)	Sulfate Exposure Class *
HS-6 @ 0-5 feet	86	S0
TP-3 @ 0-5 feet	226	S0

*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

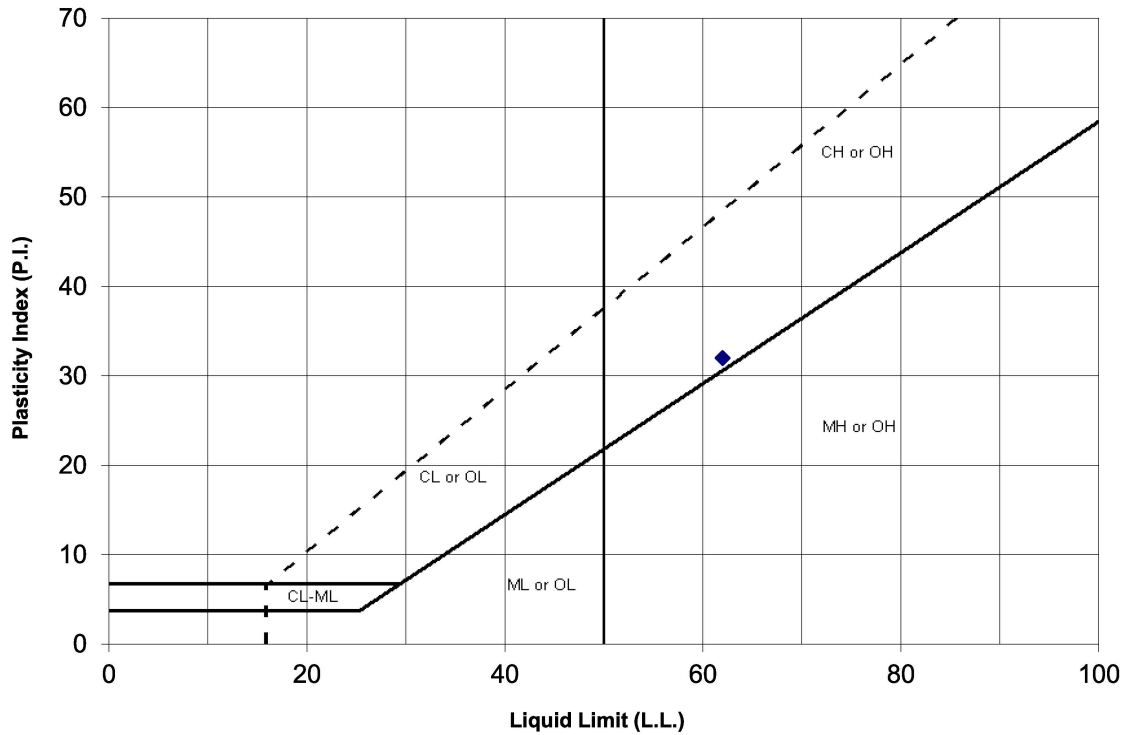


ATTERBERG LIMITS
(ASTM D 4318)

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



ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 23160-01

Date: Jan-24

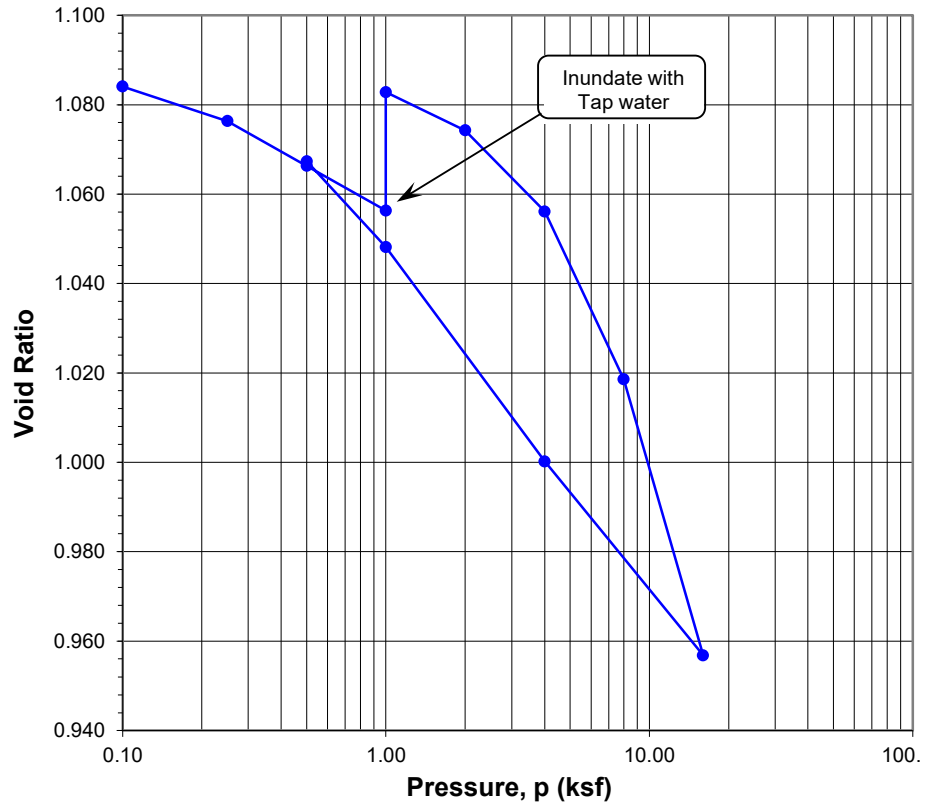
Baker St, Lake Elsinore

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS ASTM D 2435

Project Name: EIP Lake Elsinore
 Project No.: 23160-01
 Boring No.: HS-2
 Sample No.: R-3
 Soil Identification: Yellowish brown lean clay (CL)

Tested By: GB/JD Date: 10/11/23
 Checked By: J. Ward Date: 10/20/23
 Depth (ft.): 7.5
 Sample Type: Ring

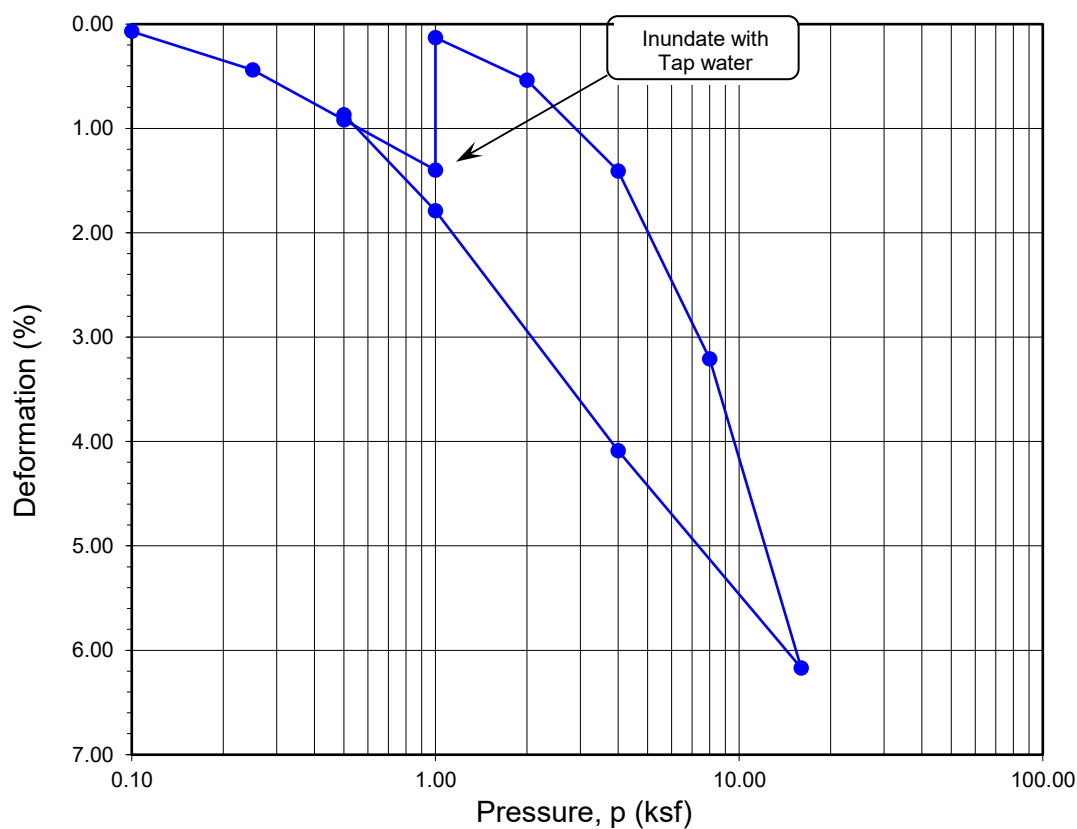
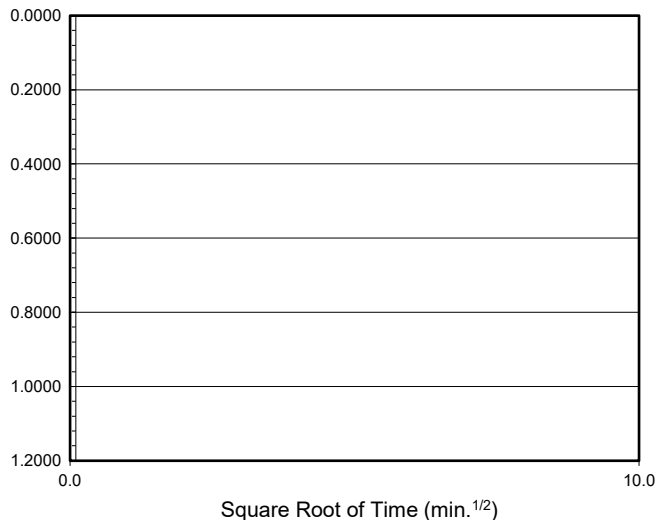
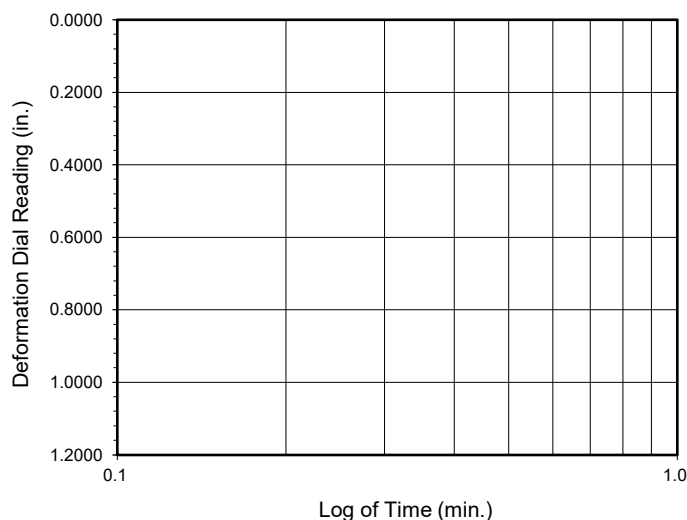
Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	178.31
Weight of Ring (g):	45.07
Height after consol. (in.):	0.9913
Before Test	
Wt. of Wet Sample+Cont. (g):	155.80
Wt. of Dry Sample+Cont. (g):	129.30
Weight of Container (g):	57.87
Initial Moisture Content (%)	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

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)		

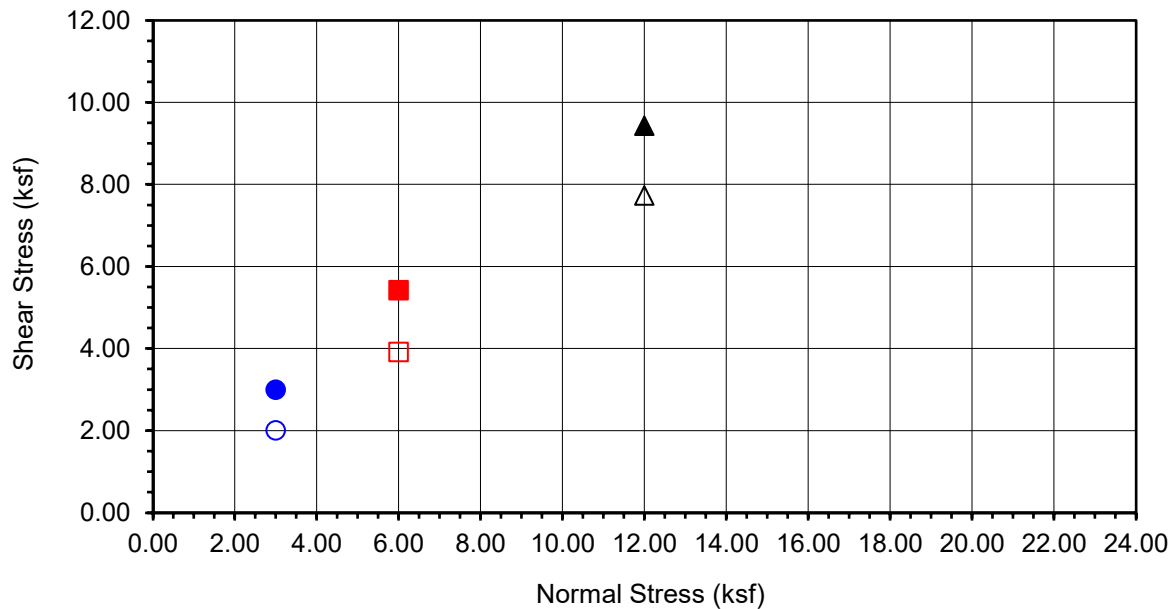
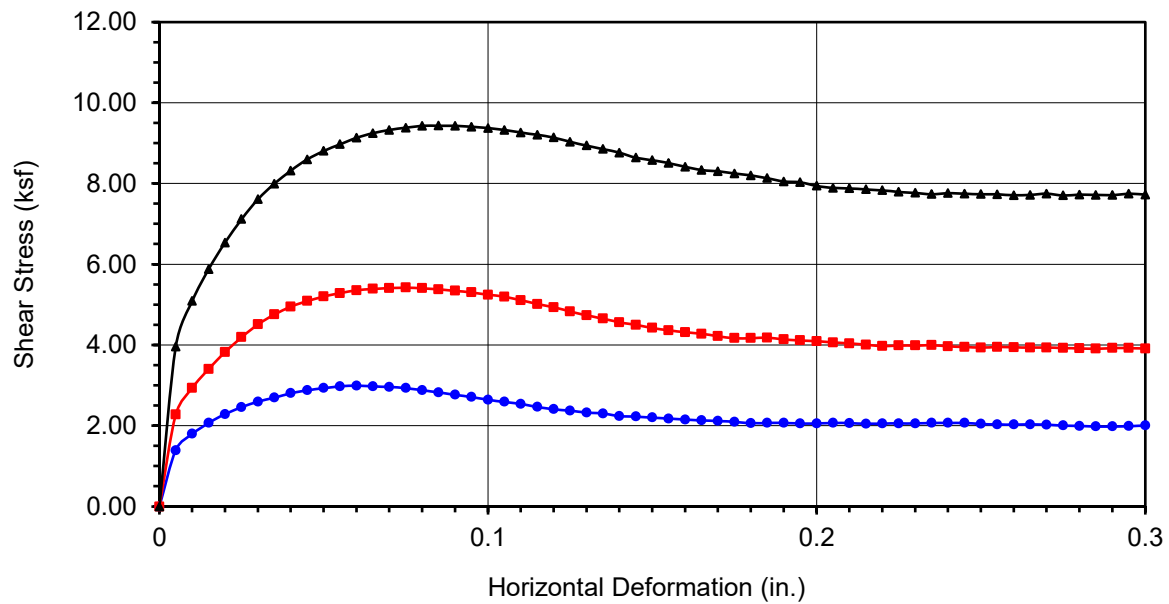
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	199.94	202.18	207.73
Weight of Ring(gm):	44.67	45.19	44.54

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
<u>Sample Type:</u>	
Ring	
<u>Soil Identification:</u>	
Olive gray silty, clayey sand (SC-SM)	

Normal Stress (kip/ft ²)	3.000	6.000	12.000
Peak Shear Stress (kip/ft ²)	● 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

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](#)

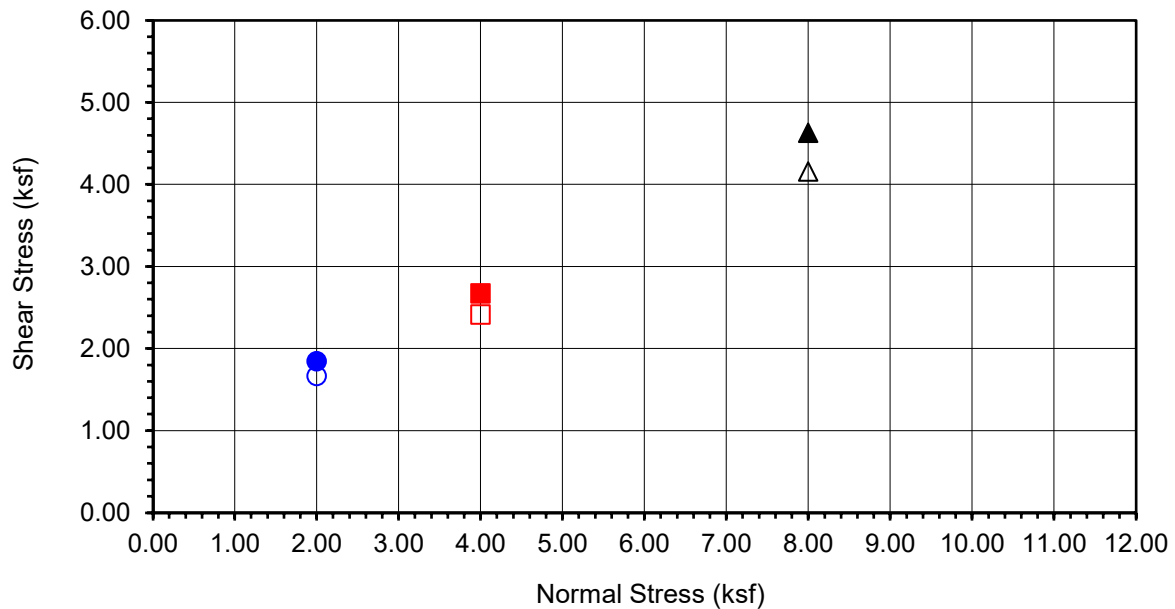
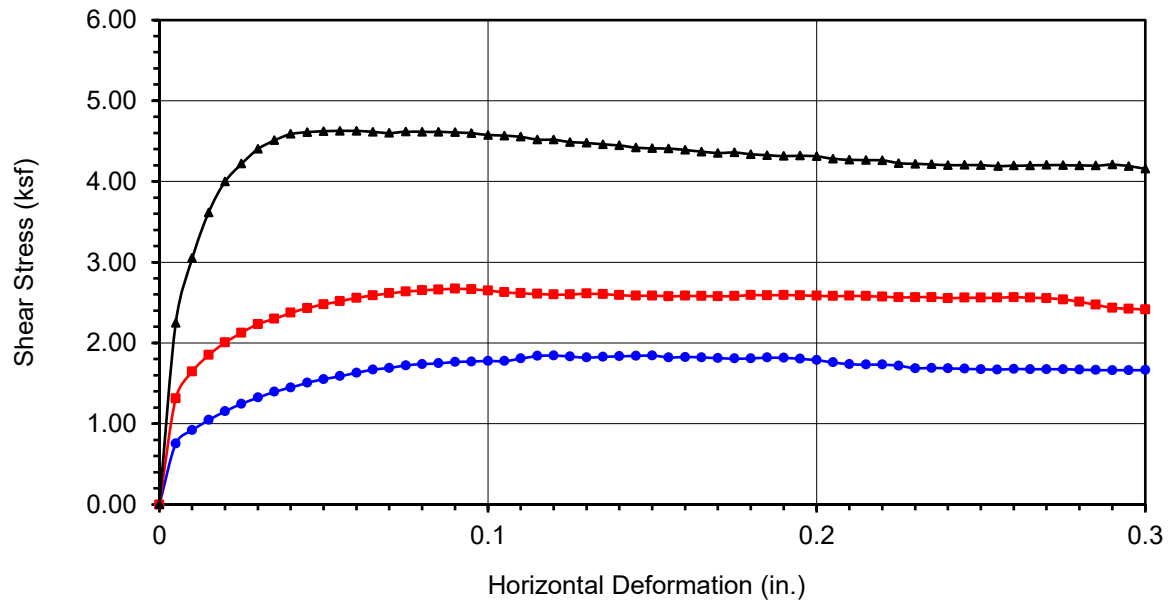
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	187.72	196.06	200.28
Weight of Ring(gm):	43.30	45.54	45.73

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
<u>Sample Type:</u>	
Ring	
<u>Soil Identification:</u>	
Olive lean clay with sand (CL)s	

Normal Stress (kip/ft ²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft ²)	● 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

DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name: [EIP Lake Elsinore](#)

Project No.: [23160-01](#)

Boring No.: [HS-8](#)

Sample No.: [R-5](#)

Soil Identification: [Strong brown lean clay \(CL\)](#)

Tested By: [G. Bathala](#)

Checked By: [J. Ward](#)

Sample Type: [Ring](#)

Depth (ft.): [15.0](#)

Date: [10/17/23](#)

Date: [10/20/23](#)

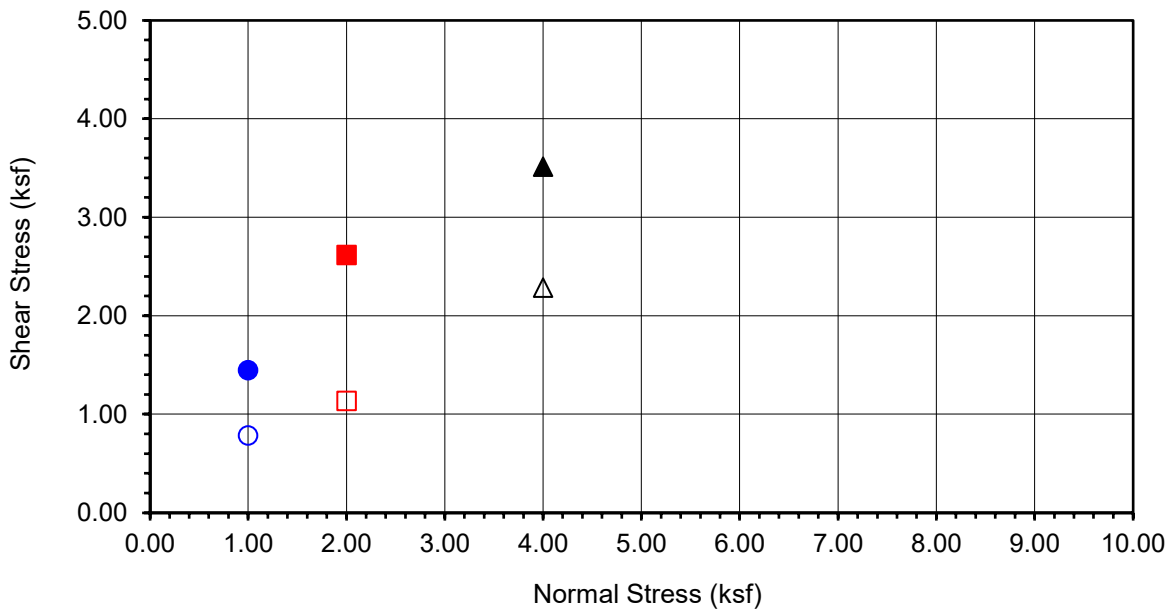
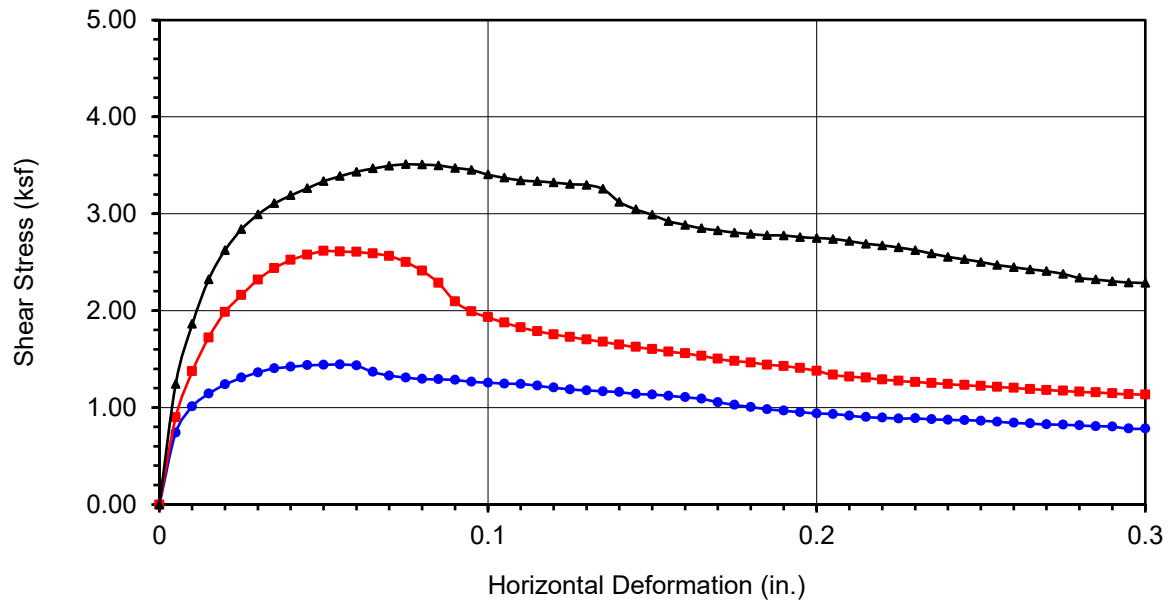
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	191.30	193.56	199.29
Weight of Ring(gm):	45.11	43.65	46.57

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
<u>Sample Type:</u>	
Ring	
<u>Soil Identification:</u>	
Strong brown lean clay (CL)	

Normal Stress (kip/ft ²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft ²)	● 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

DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name: [EIP Lake Elsinore](#)

Project No.: [23160-01](#)

Boring No.: [TP-3](#)

Sample No.: [B-1](#)

Soil Identification: [Grayish brown sandy lean clay s\(CL\)](#)

Tested By: [G. Bathala](#)

Checked By: [J. Ward](#)

Sample Type: [90% Remold](#)

Depth (ft.): [0-5](#)

Date: [10/16/23](#)

Date: [10/20/23](#)

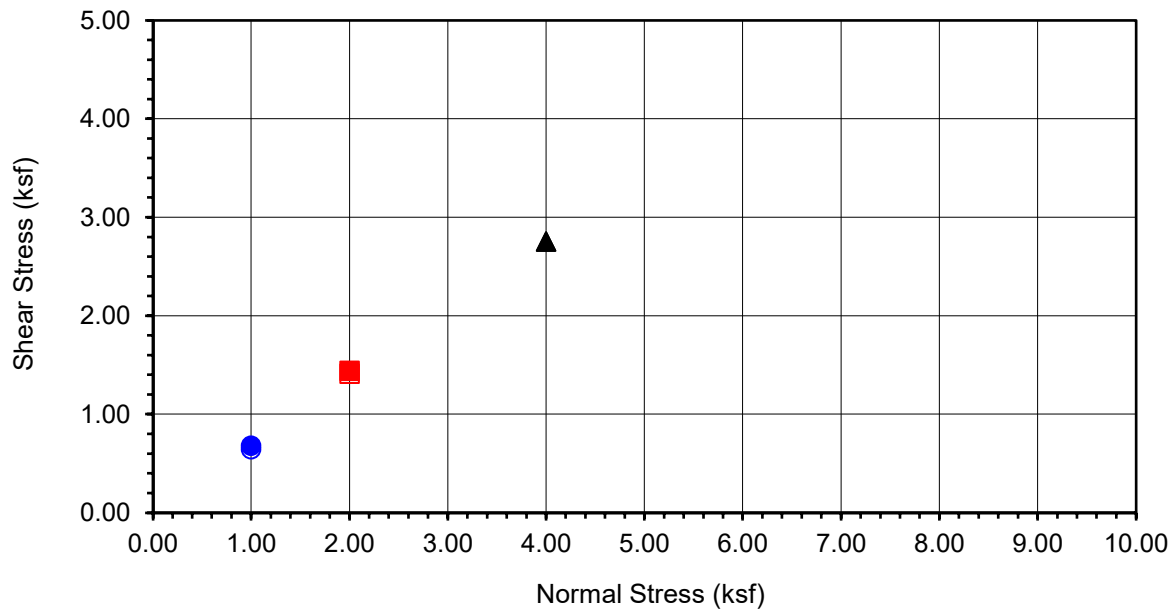
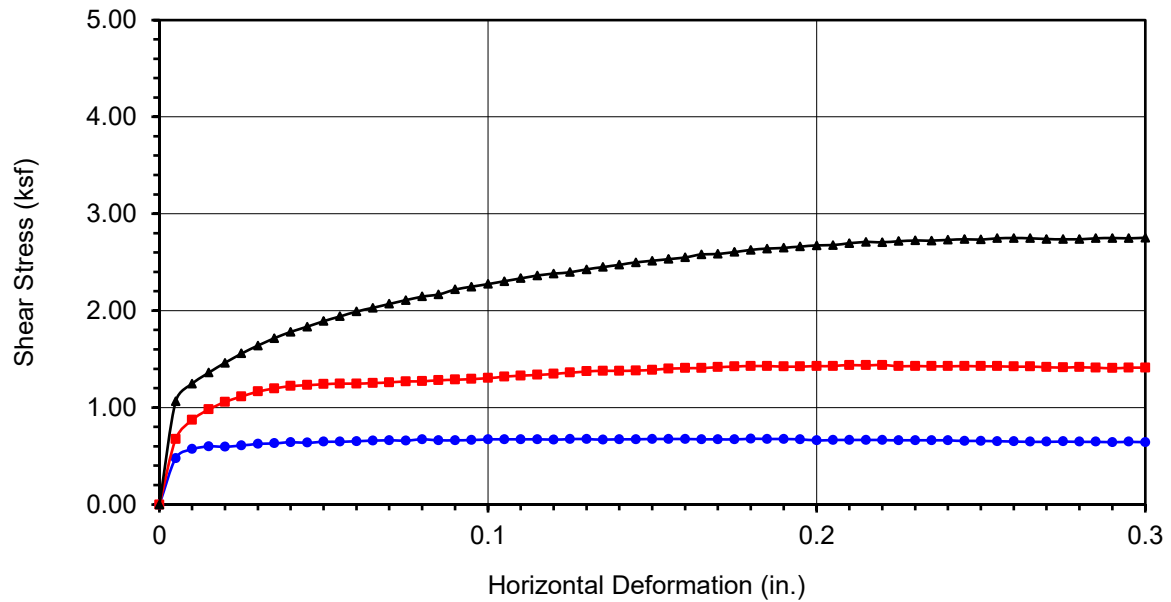
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	187.13	187.27	186.75
Weight of Ring(gm):	45.47	45.31	44.53

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
<u>Sample Type:</u>	
90% Remold	
<u>Soil Identification:</u>	
Grayish brown sandy lean clay s(CL)	

Normal Stress (kip/ft ²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft ²)	● 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

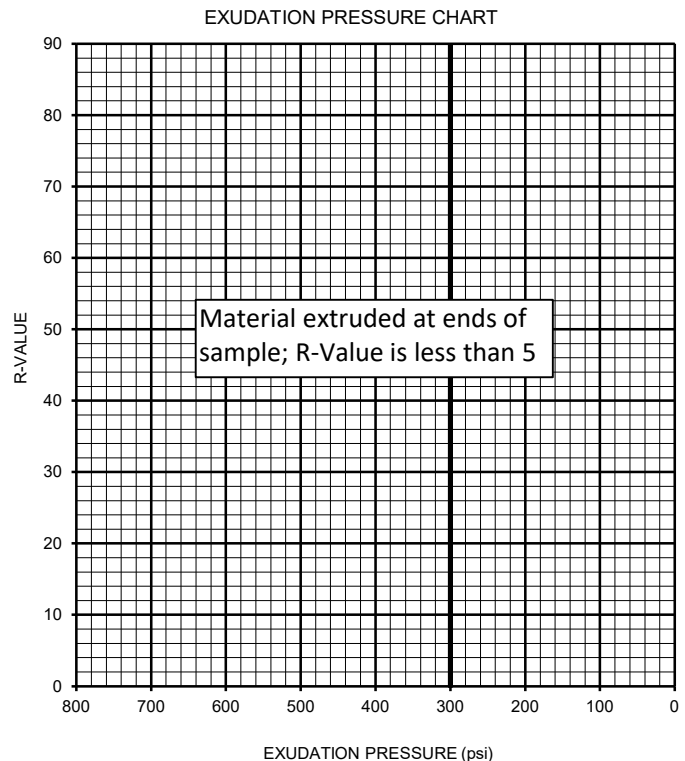
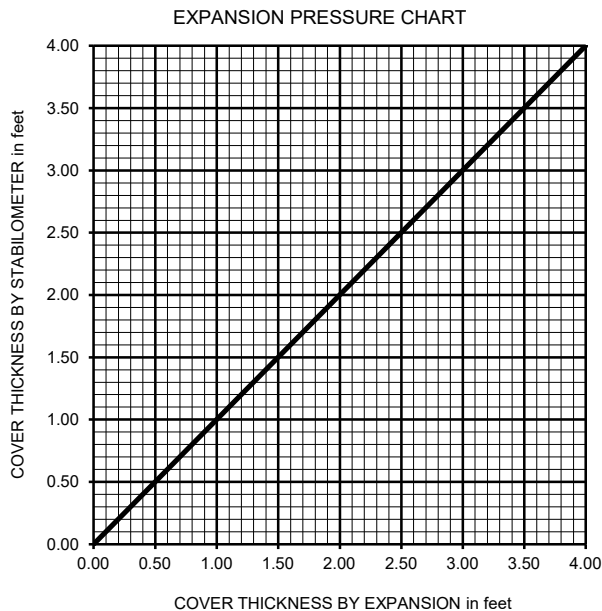
R-VALUE TEST RESULTS

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



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

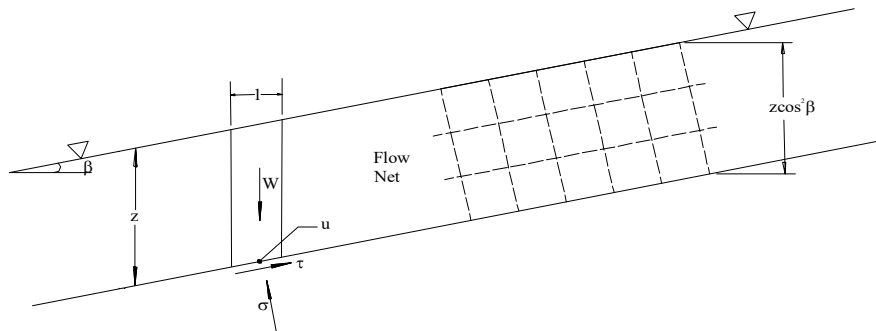
Appendix D
Slope Stability Analysis

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 4
(and steady seepage parallel to slope face)

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

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

Shear Stress Along Failure Plane

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

Pore Pressure Along Failure Plane

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

Resisting Shear Stress Along Failure Plane

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

FACTOR OF SAFETY

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

$$\text{FS} = 2.44$$



**SURFICIAL
STABILITY**

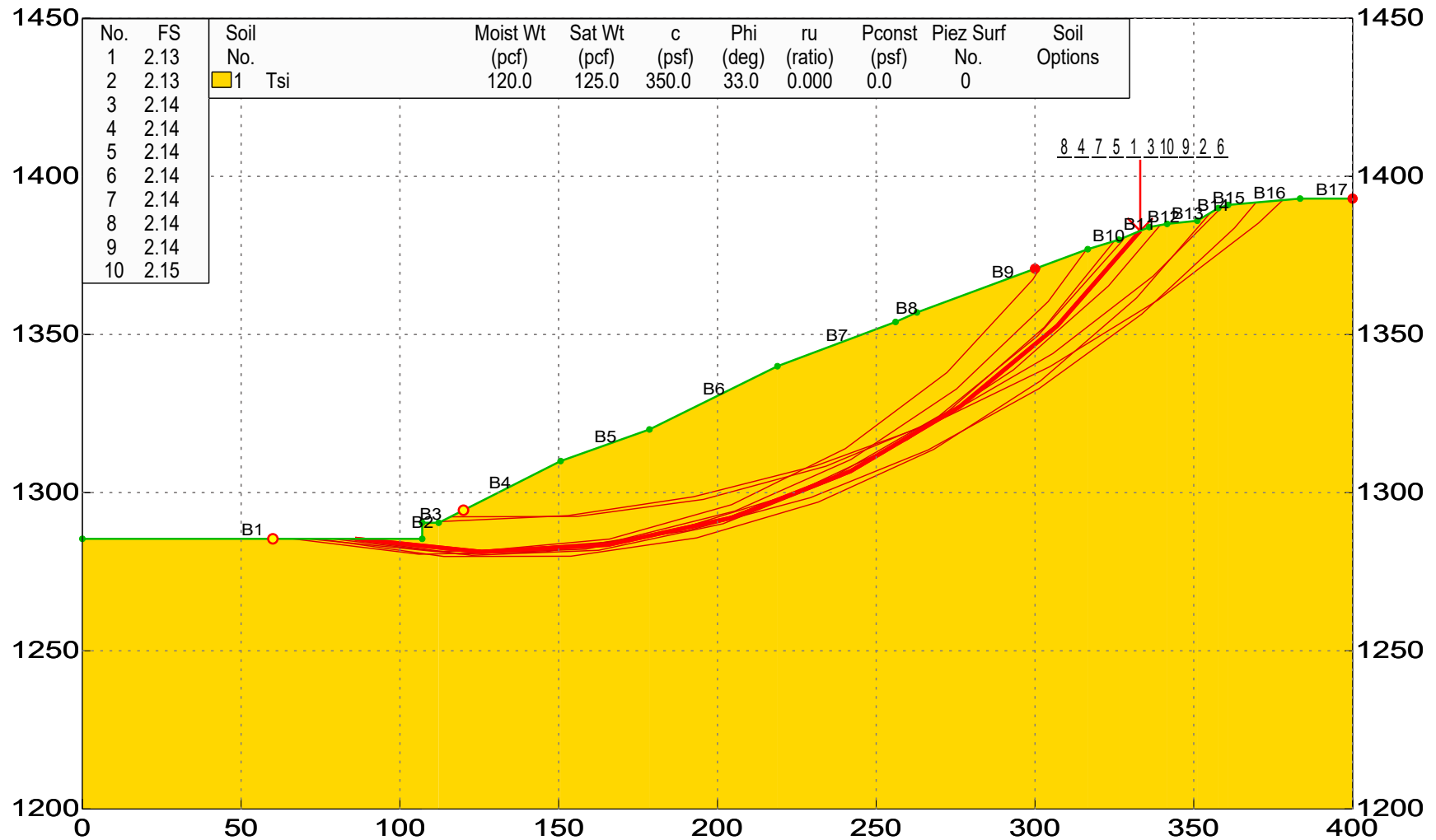
Project Name :	Baker Street
Project Number :	23160-01
Designed/Checked :	RLD
Date:	November 2023

EIP - Lake Elsinore

Section A-A' - Rotational (Static)

LGC Geotechnical / BPP

\\Section A - Static - Rotational.gsd



GEOSTASE FS = 2.13

Simplified Bishop Method

*** GEOSTASE(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	Moist	Saturated	Cohesion	Friction	Pore	Pressure
Water and Surface Option Description	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Ratio(ru)	Constant (psf)
1 Tsi 0 0	120.0	125.0	350.00	33.00	0.000	0.0

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

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

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 Length No. (ft)	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base
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	Ualpha	Earthquake		Distributed Load (lbs)
		Force Top (lbs)	Force Bot (lbs)	Force Hor (lbs)	Force Ver (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 Mobilized No. Stress * (psf)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Shear
1 180.01	-5.92	88.53	5.31	51.49	383.44	
1 180.01	-5.92	88.53	5.31	51.49	383.44	
2 200.68	-5.92	93.80	5.31	119.29	427.47	
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 Mobilized No. Force * (lbs)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Shear
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.

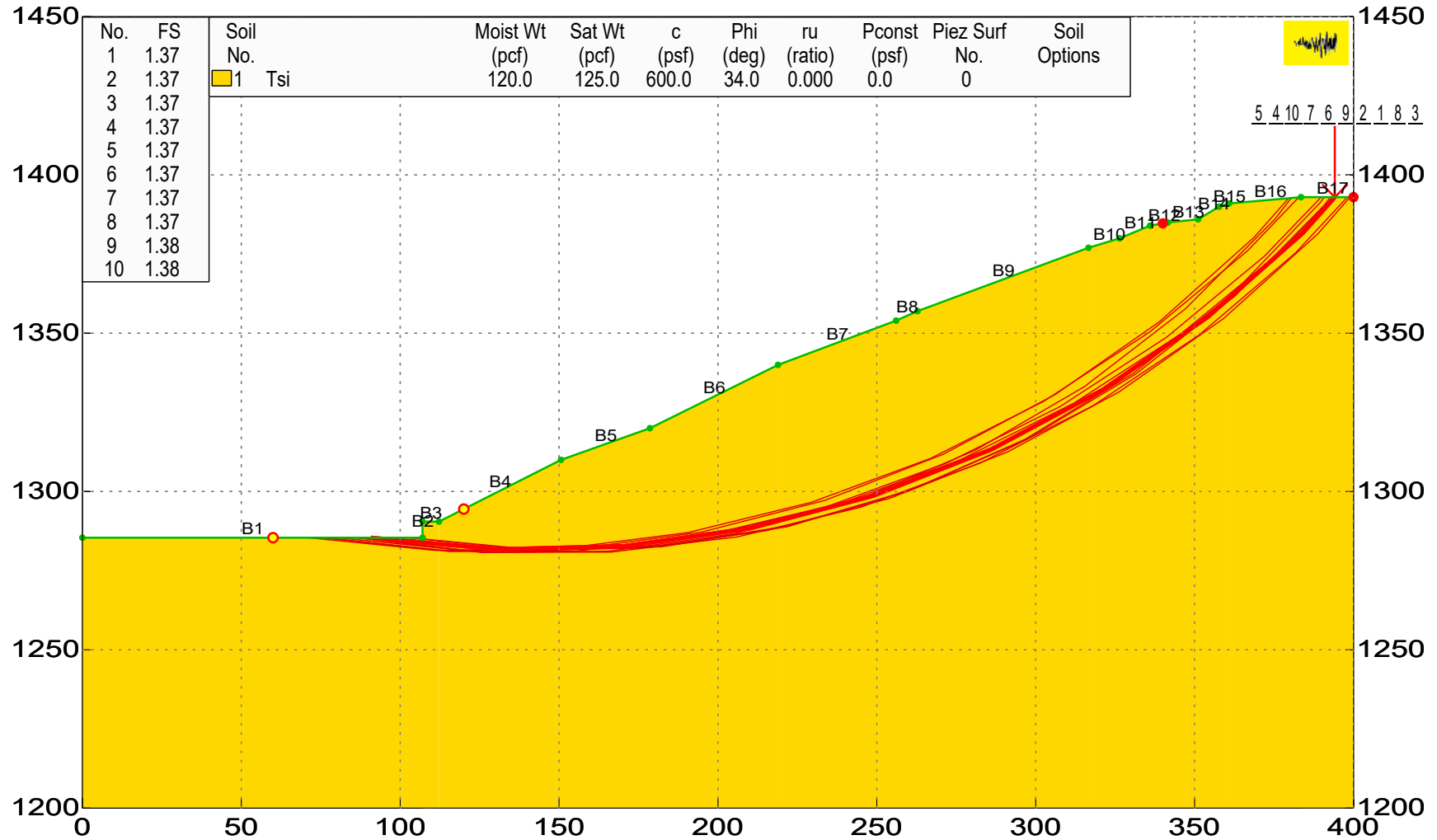
**** END OF GEOSTASE OUTPUT ****

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(R) ***

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** 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	Moist	Saturated	Cohesion	Friction	Pore	Pressure
Water and Surface Option Description	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Ratio(ru)	Constant (psf)
1 Tsi 0 0	120.0	125.0	600.00	34.00	0.000	0.0

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

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

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)	(ft)	(deg)	(deg)
1 5.44	5.42	0.25	93.46	1285.15	1285.40	-5.24	0.00
2 5.44	5.42	0.75	98.88	1284.65	1285.40	-5.24	0.00
3 5.44	5.42	1.24	104.29	1284.16	1285.40	-5.24	0.00
4 2.61	2.60	6.71	108.30	1283.79	1290.50	-5.24	0.00
5 2.61	2.60	6.95	110.90	1283.55	1290.50	-5.24	0.00
6 4.62	4.60	8.45	114.50	1283.22	1291.67	-5.24	26.92
7 4.62	4.60	11.20	119.09	1282.80	1294.00	-5.24	26.92
8 4.62	4.60	13.96	123.69	1282.38	1296.33	-5.24	26.92
9 4.62	4.60	16.71	128.29	1281.96	1298.67	-5.24	26.92
10 5.01	5.00	19.30	133.09	1281.81	1301.11	1.45	26.92
11 5.01	5.00	21.71	138.09	1281.93	1303.65	1.45	26.92
12 5.01	5.00	24.13	143.09	1282.06	1306.19	1.45	26.92
13 5.01	5.00	26.54	148.10	1282.19	1308.73	1.45	26.92
14 4.99	4.99	28.58	153.10	1282.31	1310.89	1.45	19.65
15 4.99	4.99	30.23	158.09	1282.44	1312.67	1.45	19.65
16 4.99	4.99	31.89	163.08	1282.57	1314.46	1.45	19.65
17 4.99	4.99	33.55	168.07	1282.69	1316.24	1.45	19.65
18 4.06	4.01	34.81	172.58	1283.04	1317.85	8.14	19.65
19 4.06	4.01	35.67	176.59	1283.62	1319.28	8.14	19.65
20 5.31	5.26	37.03	181.23	1284.28	1321.31	8.14	26.39
21 5.31	5.26	38.88	186.49	1285.03	1323.92	8.14	26.39
22 5.31	5.26	40.74	191.75	1285.78	1326.53	8.14	26.39
23 5.31	5.26	42.60	197.01	1286.54	1329.14	8.14	26.39

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 Mobilized No. Stress * (psf)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Shear
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 Mobilized No. Force * (lbs)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Shear
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.

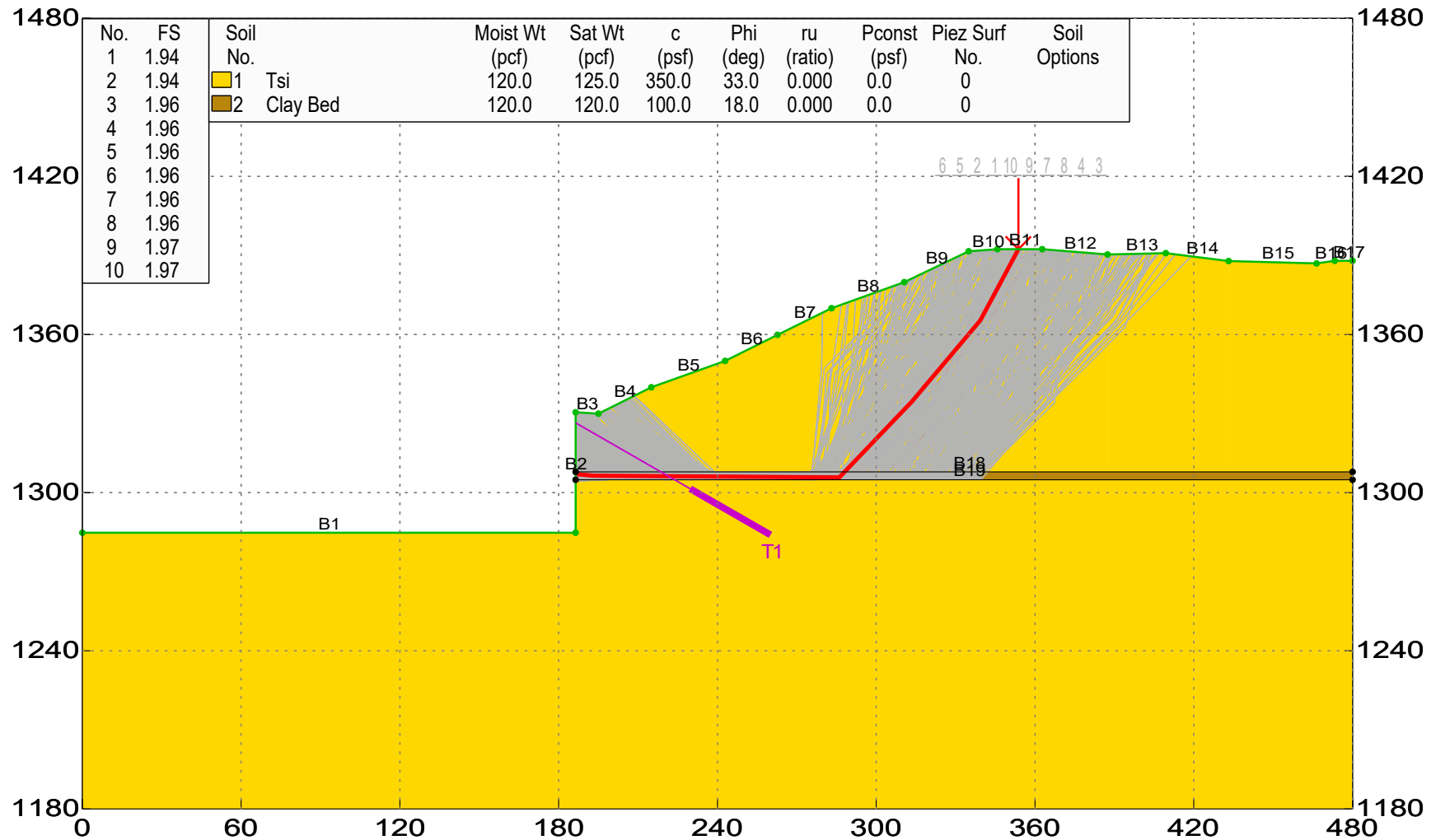
**** END OF GEOSTASE OUTPUT ****

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(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	Moist	Saturated	Cohesion	Friction	Pore	Pressure
Water and Surface Option Description	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Ratio(ru)	Constant (psf)
1 Tsi 0 0	120.0	125.0	350.00	33.00	0.000	0.0
2 Clay Bed 0 0	120.0	120.0	100.00	18.00	0.000	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

1.0000 Drained Shear Strength Reduction Factor applied after first 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

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

BLength (ft)	Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)
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35.0	1	186.40	1326.50	300000.0	5.0	30.00	50.0
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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 & ϕ 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 Length No. (ft)	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base
1 3.46	3.45	23.49	188.13	1306.91	1330.40	-5.02	-3.33	
2 3.46	3.45	23.59	191.58	1306.61	1330.20	-5.02	-3.33	
3 1.70	1.70	23.60	194.15	1306.45	1330.05	-0.40	-3.33	
4 5.00	5.00	24.82	197.50	1306.43	1331.25	-0.40	26.57	
5 5.00	5.00	27.36	202.50	1306.39	1333.75	-0.40	26.57	
6 5.00	5.00	29.89	207.50	1306.36	1336.25	-0.40	26.57	
7 5.00	5.00	32.43	212.50	1306.32	1338.75	-0.40	26.57	
8 4.65	4.65	34.55	217.32	1306.29	1340.83	-0.40	19.72	
9 4.65	4.65	36.24	221.98	1306.26	1342.50	-0.40	19.72	

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	Ualpha	Earthquake		Distributed Load (lbs)
		Force Top (lbs)	Force Bot (lbs)	Force Hor (lbs)	Force Ver (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 Mobilized No. Stress * (psf)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Shear
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 Mobilized No. Force * (lbs)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Shear
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 Cntr	Horiz Force	Vert Force	Result Force	Inclin(deg)	Moment@Base
------------	-------------	------------	--------------	-------------	-------------

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

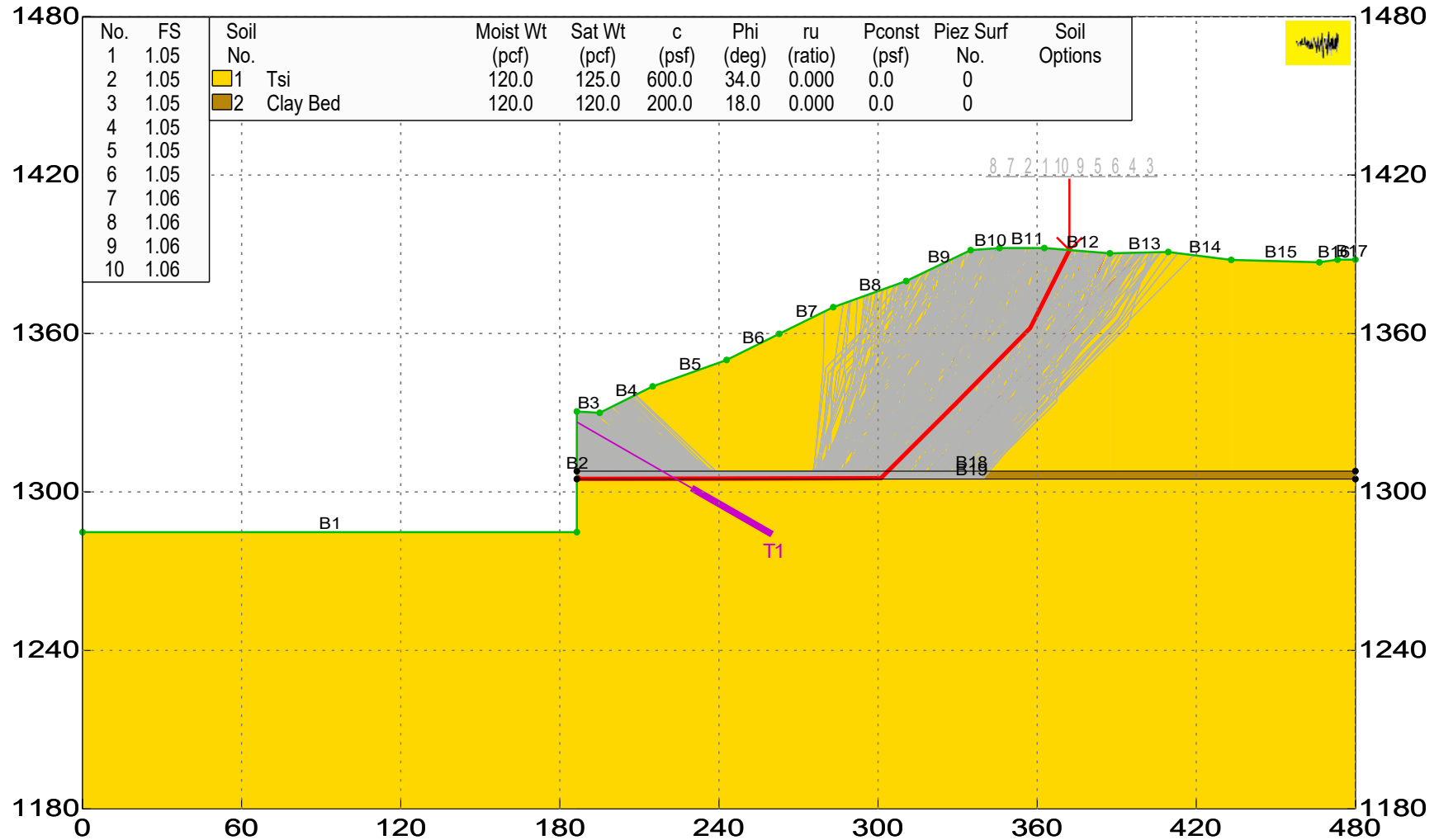
**** END OF GEOSTASE OUTPUT ****

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(R) ***

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** 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	Moist	Saturated	Cohesion	Friction	Pore	Pressure
Water and Surface Option Description	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Ratio(ru)	Constant (psf)
1 Tsi 0 0	120.0	125.0	600.00	34.00	0.000	0.0
2 Clay Bed 0 0	120.0	120.0	200.00	18.00	0.000	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

1.0000 Drained Shear Strength Reduction Factor applied after first 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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

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

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

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

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 Mobilized No. Force * (lbs)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Shear
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 Cntr No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base (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)

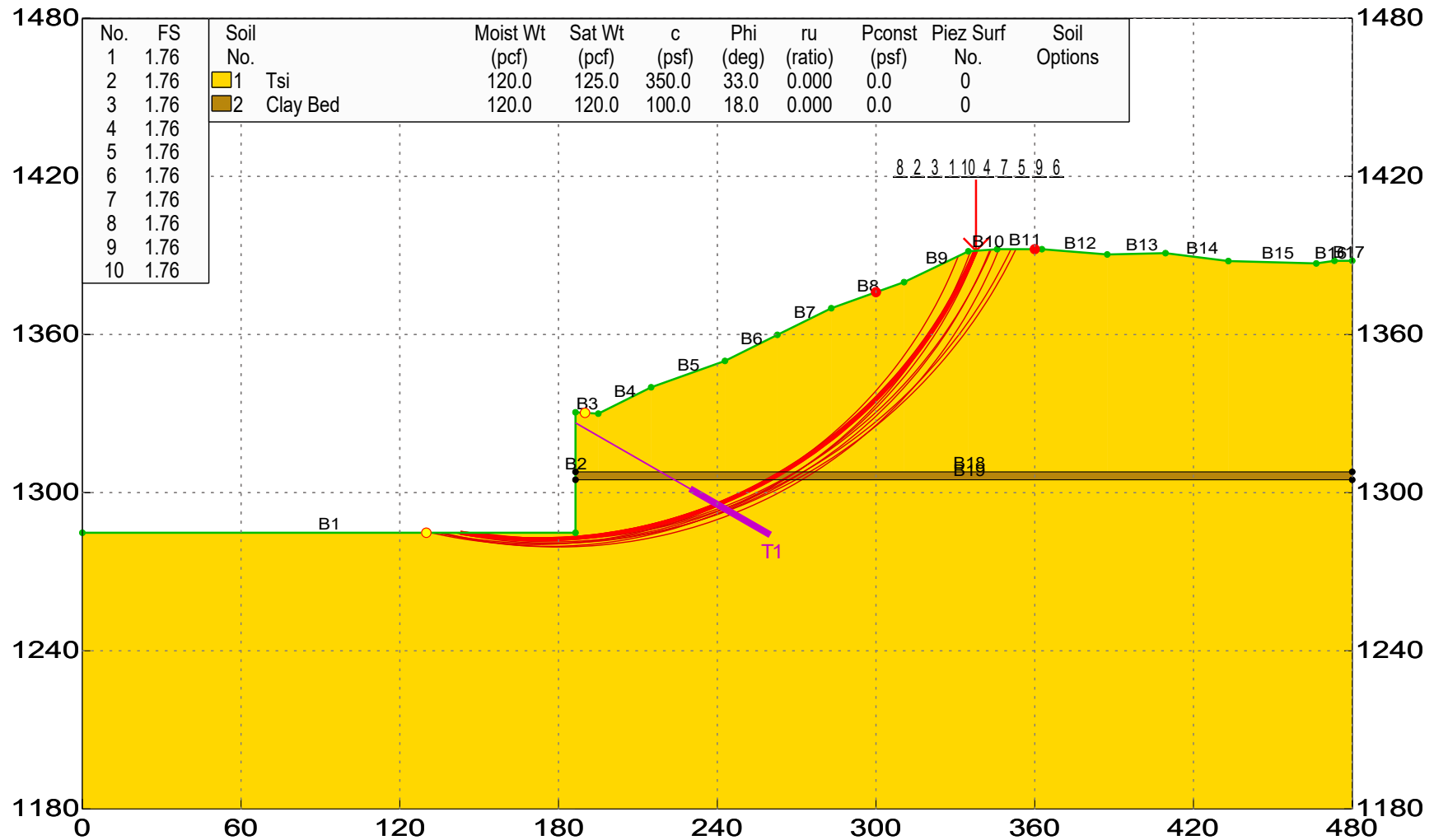
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

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

LGC Geotechnical / BPP

\Section B - Static - Rotational - Tieback.gsd



GEOSTASE FS = 1.76

Simplified Bishop Method

*** GEOSTASE(R) ***

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** 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	Moist	Saturated	Cohesion	Friction	Pore	Pressure
Water and Surface Option Description	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Ratio(ru)	Constant (psf)
1 Tsi 0 0	120.0	125.0	350.00	33.00	0.000	0.0
2 Clay Bed 0 0	120.0	120.0	100.00	18.00	0.000	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

1.0000 Drained Shear Strength Reduction Factor applied after first 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

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

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

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 Length No. (ft)	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base
1 3.00	2.96	0.24	144.33	1284.56	1284.80	-9.06	0.00	
2 3.00	2.97	0.68	147.30	1284.12	1284.80	-8.10	0.00	
3 3.00	2.98	1.08	150.27	1283.72	1284.80	-7.14	0.00	
4 3.00	2.98	1.43	153.25	1283.37	1284.80	-6.18	0.00	
5 3.00	2.99	1.73	156.24	1283.07	1284.80	-5.22	0.00	
6 3.00	2.99	1.98	159.23	1282.82	1284.80	-4.27	0.00	
7 3.00	3.00	2.17	162.22	1282.63	1284.80	-3.31	0.00	
8 3.00	3.00	2.32	165.22	1282.48	1284.80	-2.35	0.00	
9 3.00	3.00	2.42	168.22	1282.38	1284.80	-1.39	0.00	
10 3.00	3.00	2.47	171.22	1282.33	1284.80	-0.43	0.00	
11 3.00	3.00	2.47	174.22	1282.33	1284.80	0.52	0.00	
12 3.00	3.00	2.41	177.21	1282.39	1284.80	1.48	0.00	
13 3.00	3.00	2.31	180.21	1282.49	1284.80	2.44	0.00	
14 3.00	2.99	2.16	183.21	1282.64	1284.80	3.40	0.00	
15 1.70	1.69	2.00	185.55	1282.80	1284.80	4.36	0.00	
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	Ualpha	Earthquake		Distributed Load (lbs)
		Force Top (lbs)	Force Bot (lbs)	Force Hor (lbs)	Force Ver (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 Mobilized No. Stress * (psf)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Shear
1 222.91	-9.06	144.33	3.00	63.87	391.48	
1 222.91	-9.06	144.33	3.00	63.87	391.48	
2 242.38	-8.10	147.30	3.00	116.52	425.67	
2 242.38	-8.10	147.30	3.00	116.52	425.67	
3 259.29	-7.14	150.27	3.00	162.24	455.36	
3 259.29	-7.14	150.27	3.00	162.24	455.36	
4 273.68	-6.18	153.25	3.00	201.17	480.64	
4 273.68	-6.18	153.25	3.00	201.17	480.64	
5 285.61	-5.22	156.24	3.00	233.41	501.58	
5 285.61	-5.22	156.24	3.00	233.41	501.58	
6 295.10	-4.27	159.23	3.00	259.09	518.25	
6 295.10	-4.27	159.23	3.00	259.09	518.25	
7 302.21	-3.31	162.22	3.00	278.32	530.74	
7 302.21	-3.31	162.22	3.00	278.32	530.74	
8 306.98	-2.35	165.22	3.00	291.21	539.12	
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 Mobilized No. Force * (lbs)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Shear
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 Cntr No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base (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.

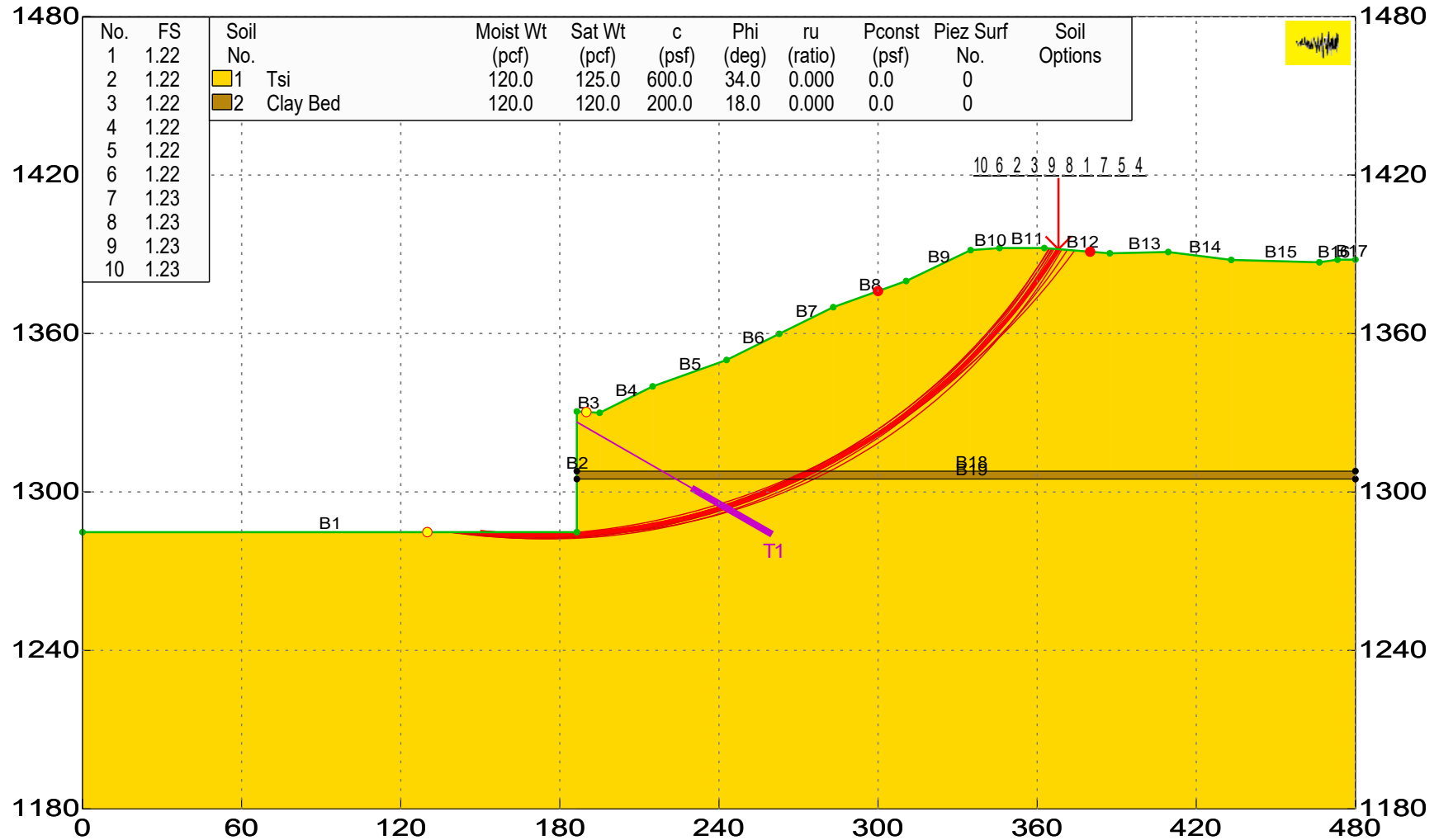
**** END OF GEOSTASE OUTPUT ****

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(R) ***

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** 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	Moist	Saturated	Cohesion	Friction	Pore	Pressure
Water and Surface Option Description	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Ratio(ru)	Constant (psf)
1 Tsi 0 0	120.0	125.0	600.00	34.00	0.000	0.0
2 Clay Bed 0 0	120.0	120.0	200.00	18.00	0.000	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

1.0000 Drained Shear Strength Reduction Factor applied after first 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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Considered.

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

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 Length No. (ft)	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base
1 3.00	2.99	0.14	151.49	1284.66	1284.80	-5.34	0.00	
2 3.00	2.99	0.40	154.48	1284.40	1284.80	-4.59	0.00	
3 3.00	2.99	0.62	157.47	1284.18	1284.80	-3.84	0.00	
4 3.00	3.00	0.80	160.47	1284.00	1284.80	-3.09	0.00	
5 3.00	3.00	0.94	163.47	1283.86	1284.80	-2.35	0.00	
6 3.00	3.00	1.05	166.46	1283.75	1284.80	-1.60	0.00	
7 3.00	3.00	1.11	169.46	1283.69	1284.80	-0.85	0.00	
8 3.00	3.00	1.14	172.46	1283.66	1284.80	-0.10	0.00	
9 3.00	3.00	1.12	175.46	1283.68	1284.80	0.64	0.00	
10 3.00	3.00	1.07	178.46	1283.73	1284.80	1.39	0.00	
11 3.00	3.00	0.98	181.46	1283.82	1284.80	2.14	0.00	
12 3.00	3.00	0.84	184.46	1283.96	1284.80	2.89	0.00	
13 0.45	0.44	0.75	186.18	1284.05	1284.80	3.63	0.00	
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	Ualpha	Earthquake		Distributed Load (lbs)
		Force Top (lbs)	Force Bot (lbs)	Force Hor (lbs)	Force Ver (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. Stress * (psf)	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Stress (psf)	Shear Strength (psf)	Shear
1 527.08	-5.34	151.49	3.00	63.80	643.03	
1 527.08	-5.34	151.49	3.00	63.80	643.03	
2 541.23	-4.59	154.48	3.00	89.40	660.30	
2 541.23	-4.59	154.48	3.00	89.40	660.30	
3 552.51	-3.84	157.47	3.00	109.80	674.06	
3 552.51	-3.84	157.47	3.00	109.80	674.06	
4 560.97	-3.09	160.47	3.00	125.09	684.37	
4 560.97	-3.09	160.47	3.00	125.09	684.37	
5 566.66	-2.35	163.47	3.00	135.38	691.32	
5 566.66	-2.35	163.47	3.00	135.38	691.32	
6 569.64	-1.60	166.46	3.00	140.78	694.96	
6 569.64	-1.60	166.46	3.00	140.78	694.96	
7 569.97	-0.85	169.46	3.00	141.37	695.36	
7 569.97	-0.85	169.46	3.00	141.37	695.36	
8 567.69	-0.10	172.46	3.00	137.26	692.58	
8 567.69	-0.10	172.46	3.00	137.26	692.58	
9 562.87	0.64	175.46	3.00	128.53	686.70	
9 562.87	0.64	175.46	3.00	128.53	686.70	
10 555.55	1.39	178.46	3.00	115.29	677.76	
10 555.55	1.39	178.46	3.00	115.29	677.76	
11 545.77	2.14	181.46	3.00	97.61	665.84	
11 545.77	2.14	181.46	3.00	97.61	665.84	
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 Mobilized No. Force * (lbs)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Shear
1 1581.23	-5.34	151.49	3.00	191.39	1929.09	
1 1581.23	-5.34	151.49	3.00	191.39	1929.09	
2 1623.70	-4.59	154.48	3.00	268.20	1980.90	
2 1623.70	-4.59	154.48	3.00	268.20	1980.90	
3 1657.53	-3.84	157.47	3.00	329.39	2022.17	
3 1657.53	-3.84	157.47	3.00	329.39	2022.17	
4 1682.90	-3.09	160.47	3.00	375.27	2053.12	
4 1682.90	-3.09	160.47	3.00	375.27	2053.12	
5 1699.97	-2.35	163.47	3.00	406.15	2073.95	
5 1699.97	-2.35	163.47	3.00	406.15	2073.95	
6 1708.92	-1.60	166.46	3.00	422.34	2084.87	
6 1708.92	-1.60	166.46	3.00	422.34	2084.87	
7 1709.91	-0.85	169.46	3.00	424.12	2086.07	
7 1709.91	-0.85	169.46	3.00	424.12	2086.07	
8 1703.08	-0.10	172.46	3.00	411.78	2077.75	
8 1703.08	-0.10	172.46	3.00	411.78	2077.75	
9 1688.61	0.64	175.46	3.00	385.60	2060.09	
9 1688.61	0.64	175.46	3.00	385.60	2060.09	
10 1666.64	1.39	178.46	3.00	345.86	2033.29	
10 1666.64	1.39	178.46	3.00	345.86	2033.29	
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 Cntr No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base (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)

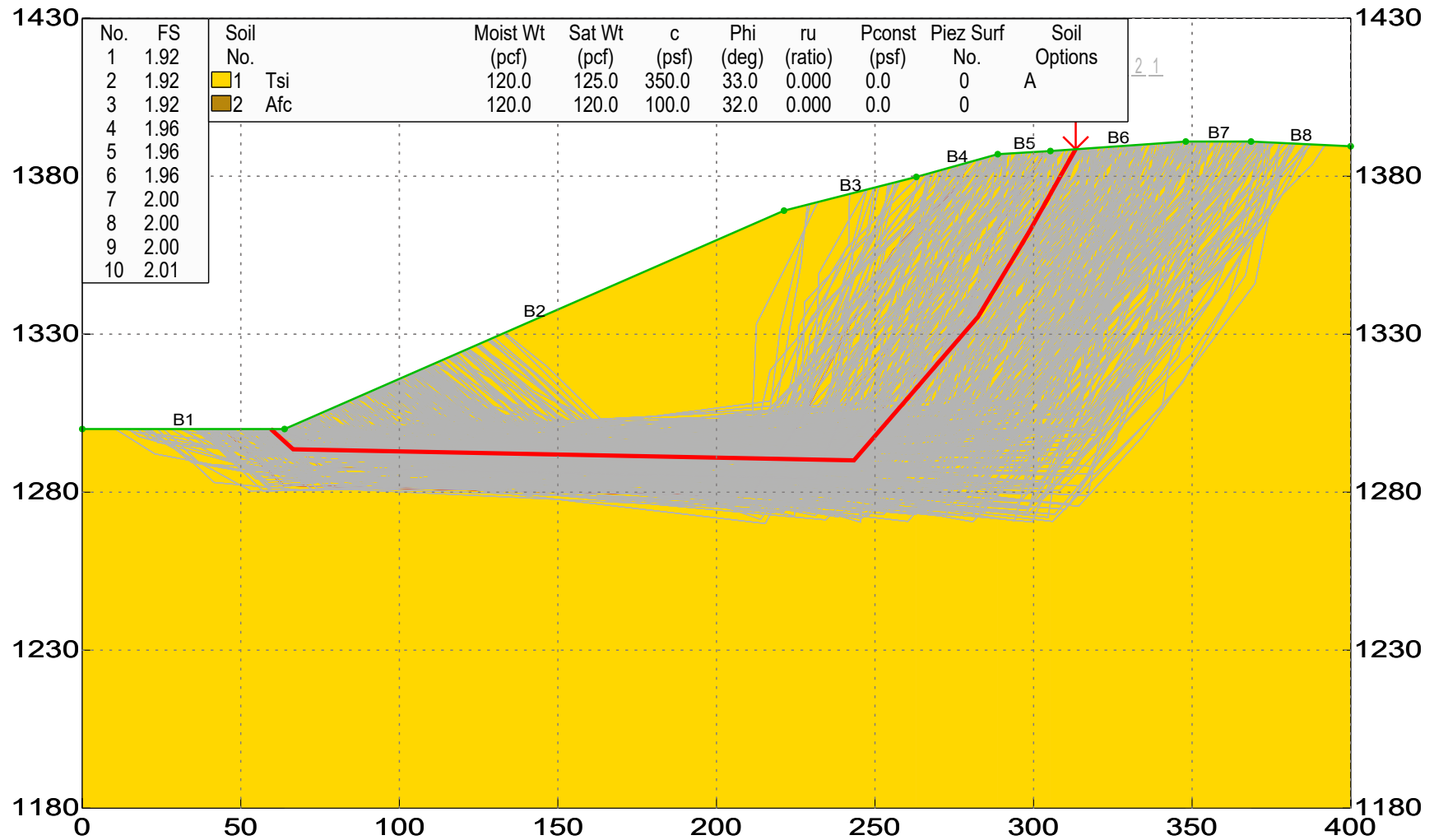
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

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

EIP - Lake Elsinore Section C-C' - Block (Static)

LGC Geotechnical / BPP

\Section C - Static - Block (No Keyway).gsd



GEOSTASE FS = 1.92

Simplified Janbu (Corrected) Method

*** GEOSTASE(R) ***

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** 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

Water Surface No.	Soil Number Water and Option Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)
1	Tsi 0	120.0	125.0	350.00	33.00	0.000	0.0
2	Afc 0	120.0	120.0	100.00	32.00	0.000	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. (psf)	BND No. Deflection (deg from Vert)	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)
1 250.000	18 0.00	224.700	372.600	250.000	280.900	372.700

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 & ϕ 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 Length No. (ft)	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base
1 5.90	4.37	1.99	61.62	1298.01	1300.00	-42.28	0.00	
2 3.67	2.72	5.80	65.16	1294.79	1300.60	-42.28	23.69	
3 4.99	4.99	8.78	69.01	1293.51	1302.29	-1.13	23.69	
4 4.99	4.99	11.07	74.01	1293.41	1304.48	-1.13	23.69	
5 4.99	4.99	13.36	79.00	1293.31	1306.67	-1.13	23.69	
6 4.99	4.99	15.65	83.99	1293.21	1308.86	-1.13	23.69	

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		Distributed Load (lbs)
				Hor (lbs)	Ver (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
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Mobilized No. Stress * (psf)	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Stress (psf)	Shear Strength (psf)	Shear
1 397.92	-42.28	61.62	5.90	626.71	756.99	
1 397.92	-42.28	61.62	5.90	626.71	756.99	
2 632.38	-42.28	65.16	3.67	1313.55	1203.03	
2 632.38	-42.28	65.16	3.67	1313.55	1203.03	
3 233.32	-1.13	69.01	4.99	1058.29	443.86	
3 233.32	-1.13	69.01	4.99	1058.29	443.86	
4 280.41	-1.13	74.01	4.99	1334.00	533.44	
4 280.41	-1.13	74.01	4.99	1334.00	533.44	
5 327.50	-1.13	79.00	4.99	1609.70	623.02	
5 327.50	-1.13	79.00	4.99	1609.70	623.02	
6 374.59	-1.13	83.99	4.99	1885.40	712.60	
6 374.59	-1.13	83.99	4.99	1885.40	712.60	
7 421.68	-1.13	88.98	4.99	2161.11	802.19	
7 421.68	-1.13	88.98	4.99	2161.11	802.19	
8 468.76	-1.13	93.98	4.99	2436.81	891.77	
8 468.76	-1.13	93.98	4.99	2436.81	891.77	
9 515.85	-1.13	98.97	4.99	2712.51	981.35	
9 515.85	-1.13	98.97	4.99	2712.51	981.35	
10 562.94	-1.13	103.96	4.99	2988.21	1070.93	
10 562.94	-1.13	103.96	4.99	2988.21	1070.93	
11 610.03	-1.13	108.96	4.99	3263.92	1160.51	
11 610.03	-1.13	108.96	4.99	3263.92	1160.51	

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 Mobilized No. Force * (lbs)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Shear
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

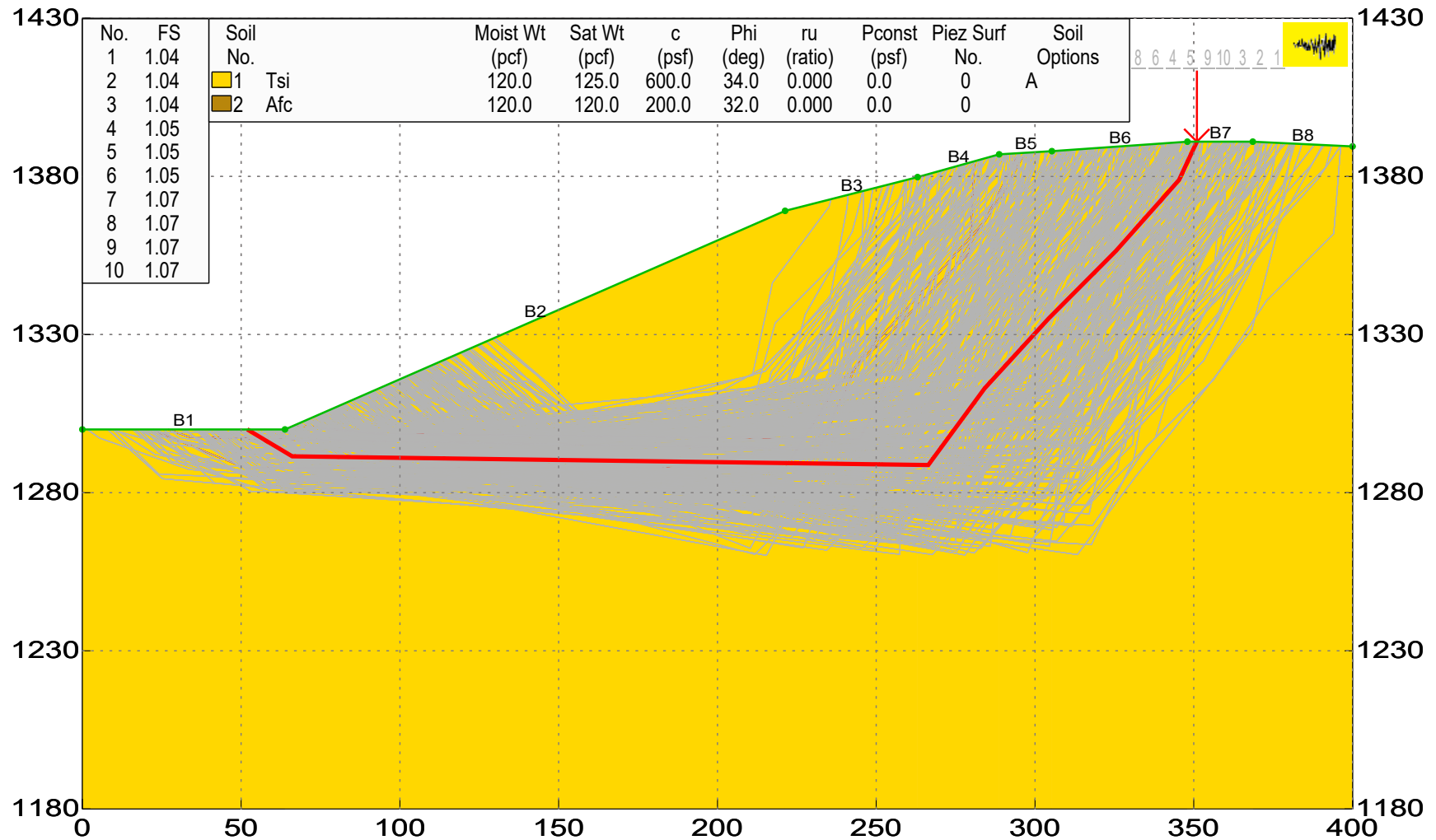
Janub's FS Corrected = 1.91564

**** 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(R) ***

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** 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 - 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

Water Surface No.	Soil Number Water and Option Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)
1 Tsi 0	0	120.0	125.0	600.00	34.00	0.000	0.0
2 Afc 0	0	120.0	120.0	200.00	32.00	0.000	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 Stress No. (psf)	BND No. Deflection (deg from Vert)	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)
1 250.000	18 0.00	224.700	372.600	250.000	280.900	372.700

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 Length No. (ft)	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base
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	Ualpha	Earthquake		Distributed Load (lbs)
		Force Top (lbs)	Force Bot (lbs)	Force Hor (lbs)	Force Ver (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 Mobilized No. Stress * (psf)	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Shear
1 1224.39	-30.95	54.89	6.92	1007.39	1279.49	
1 1224.39	-30.95	54.89	6.92	1007.39	1279.49	
2 1698.68	-30.95	60.83	6.92	1742.18	1775.11	
2 1698.68	-30.95	60.83	6.92	1742.18	1775.11	
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 Mobilized	Alpha	X-Coord.	Base	Effective	Available
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No. Force * (lbs)	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Force (lbs)	Shear Force (lbs)	Shear
1 8478.32	-30.95	54.89	6.92	6975.65	8859.84	
1 8478.32	-30.95	54.89	6.92	6975.65	8859.84	
2 11762.50	-30.95	60.83	6.92	12063.73	12291.79	
2 11762.50	-30.95	60.83	6.92	12063.73	12291.79	
3 5556.78	-30.95	64.94	2.65	6247.59	5806.82	
3 5556.78	-30.95	64.94	2.65	6247.59	5806.82	
4 2956.15	-0.79	68.58	5.01	6425.08	3089.17	
4 2956.15	-0.79	68.58	5.01	6425.08	3089.17	
5 3381.40	-0.79	73.59	5.01	7792.76	3533.56	
5 3381.40	-0.79	73.59	5.01	7792.76	3533.56	
6 3806.65	-0.79	78.59	5.01	9160.43	3977.94	
6 3806.65	-0.79	78.59	5.01	9160.43	3977.94	
7 4231.90	-0.79	83.60	5.01	10528.11	4422.33	
7 4231.90	-0.79	83.60	5.01	10528.11	4422.33	
8 4657.15	-0.79	88.61	5.01	11895.79	4866.71	
8 4657.15	-0.79	88.61	5.01	11895.79	4866.71	
9 5082.40	-0.79	93.62	5.01	13263.46	5311.10	
9 5082.40	-0.79	93.62	5.01	13263.46	5311.10	
10 5507.65	-0.79	98.62	5.01	14631.14	5755.48	
10 5507.65	-0.79	98.62	5.01	14631.14	5755.48	
11 5932.89	-0.79	103.63	5.01	15998.82	6199.87	
11 5932.89	-0.79	103.63	5.01	15998.82	6199.87	
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

Minimum Factor 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



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

Minimum Factor 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



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

Minimum Factor 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



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**

Minimum Factor 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



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**

Minimum Factor 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



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 sheepfoot 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

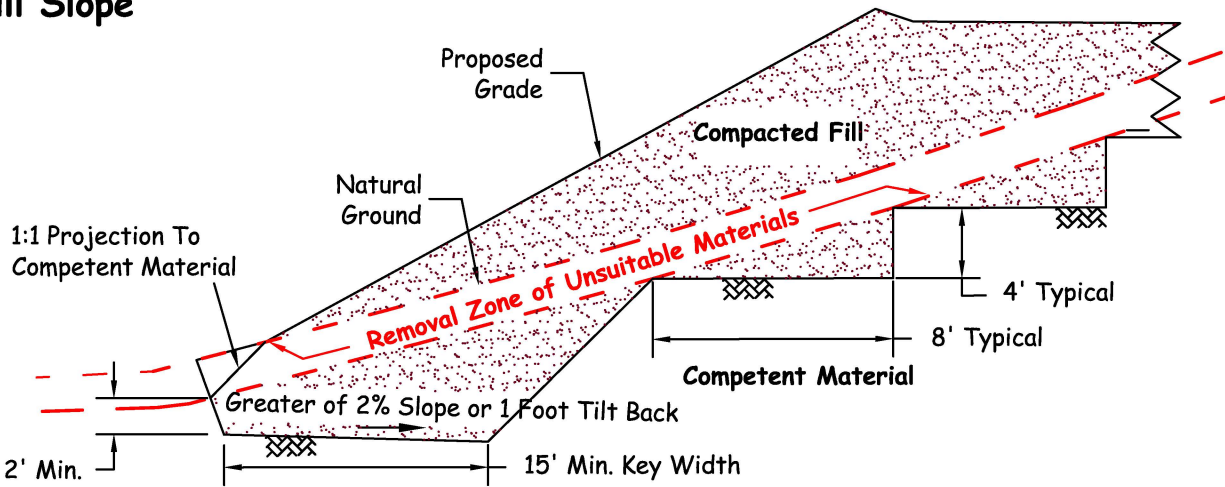
7.1 The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

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

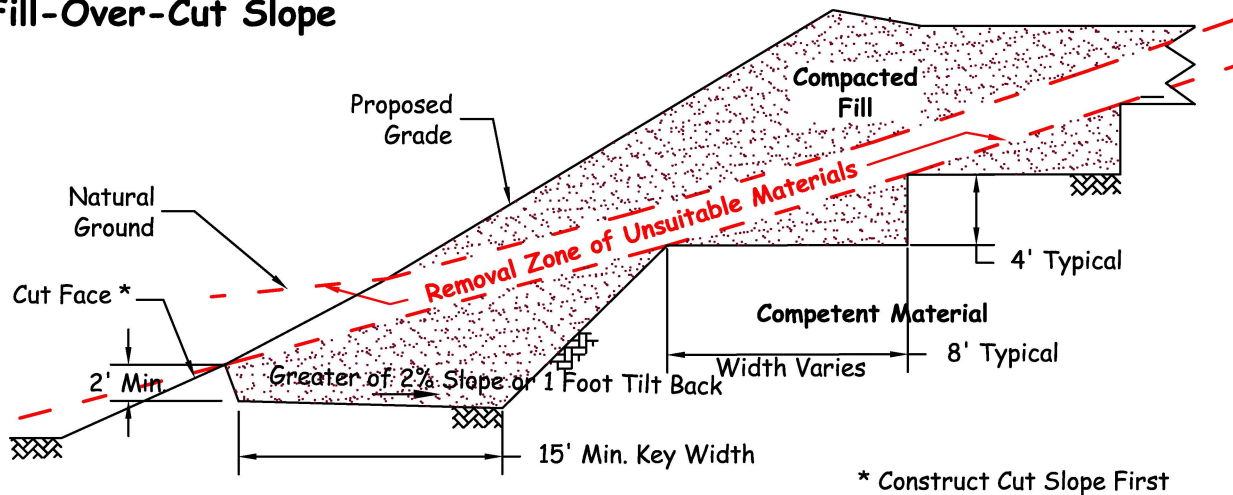
the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

- 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

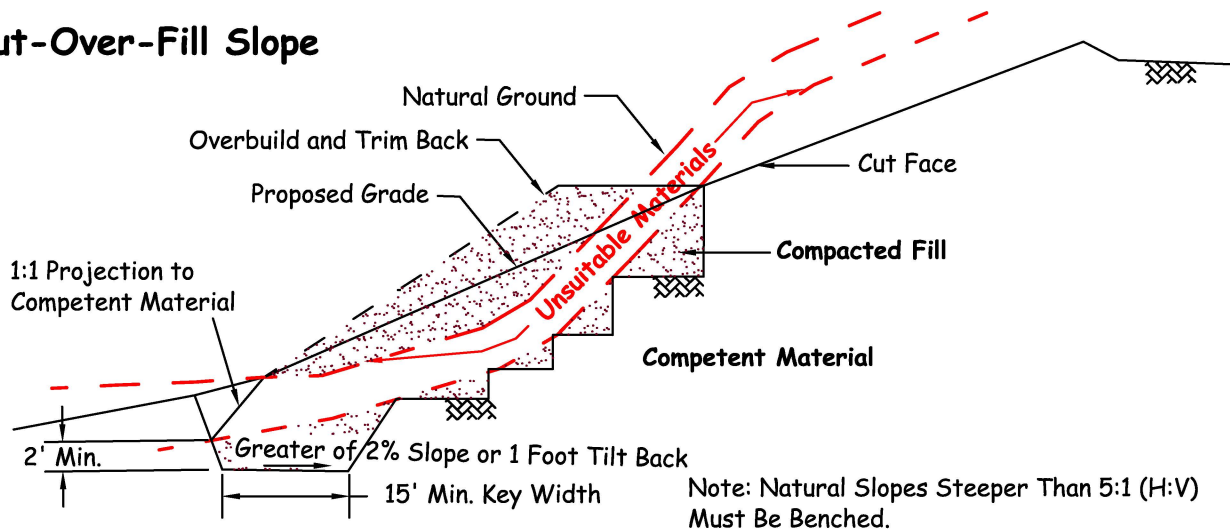


Fill-Over-Cut Slope

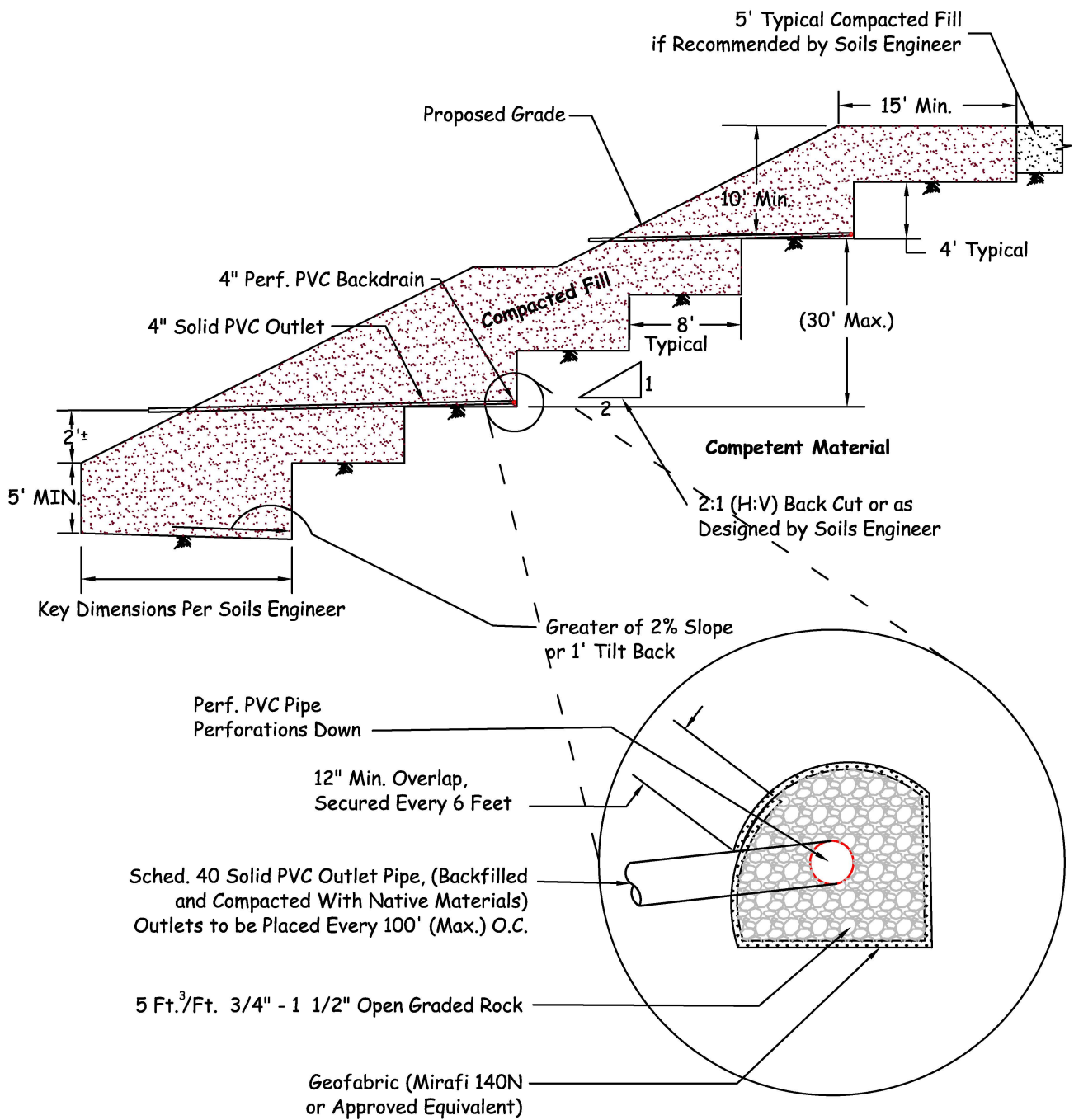


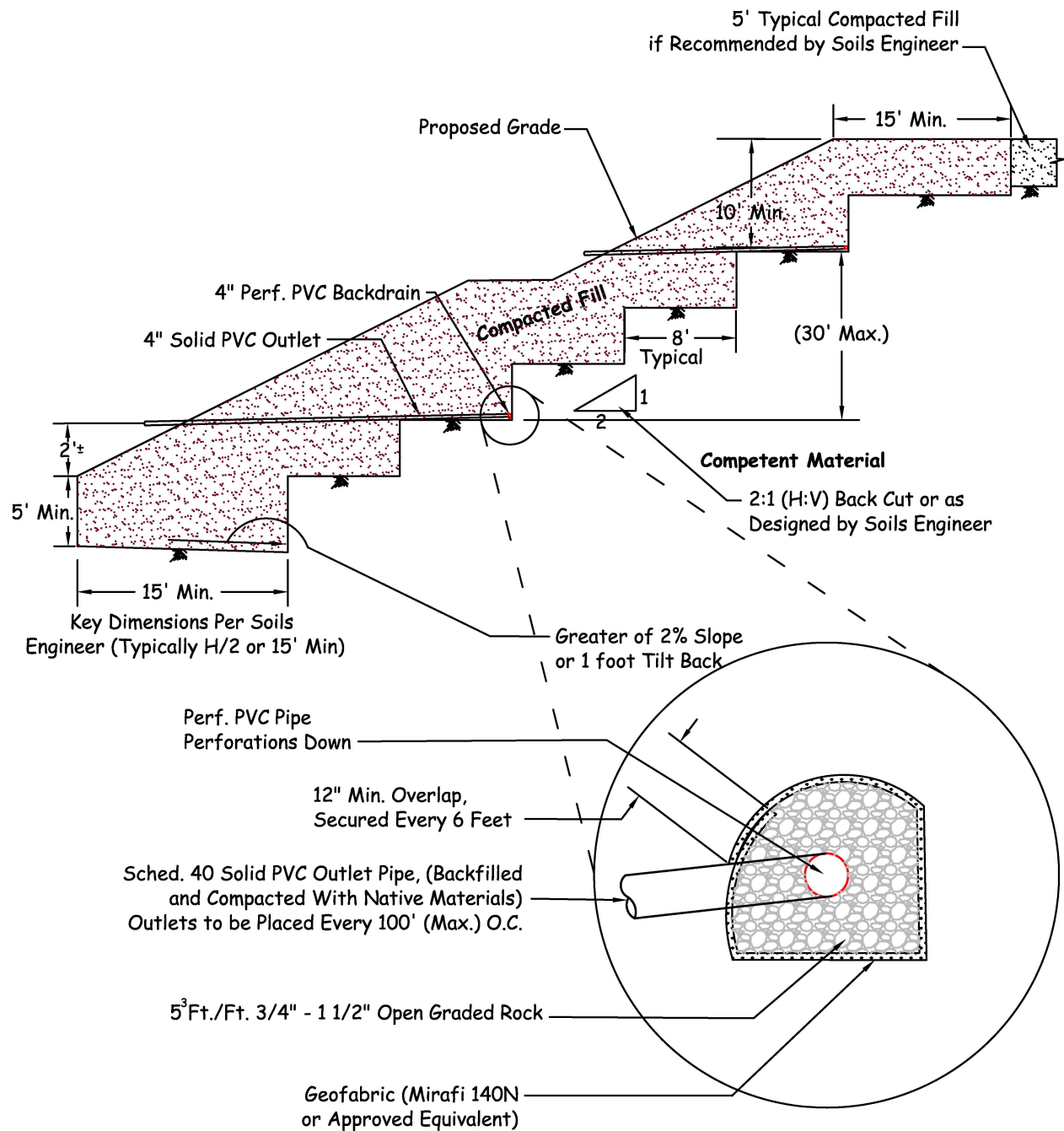
* Construct Cut Slope First

Cut-Over-Fill Slope

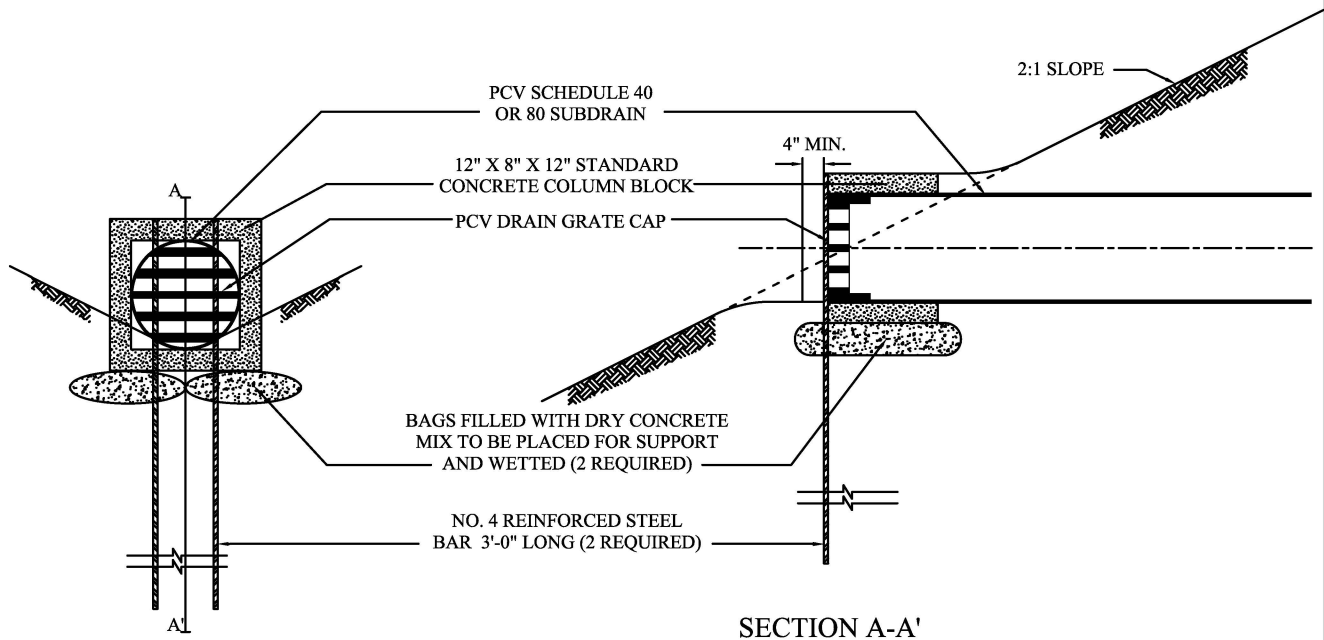


Note: Natural Slopes Steeper Than 5:1 (H:V) Must Be Benched.

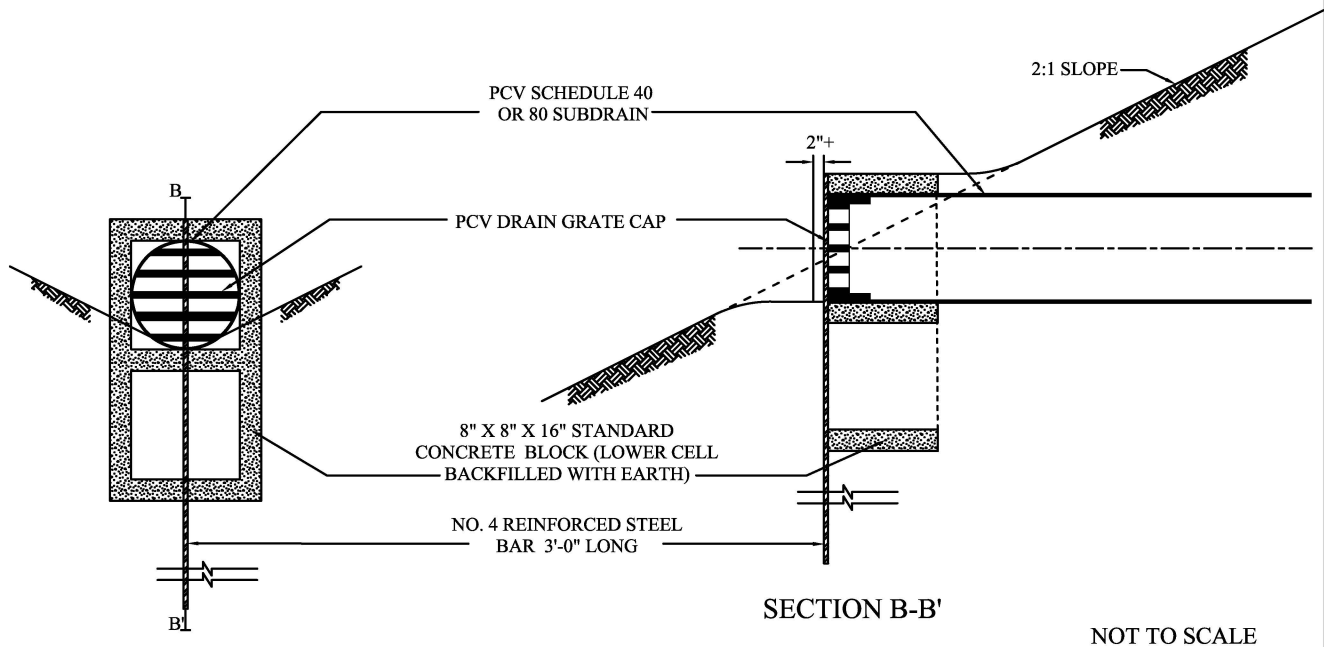




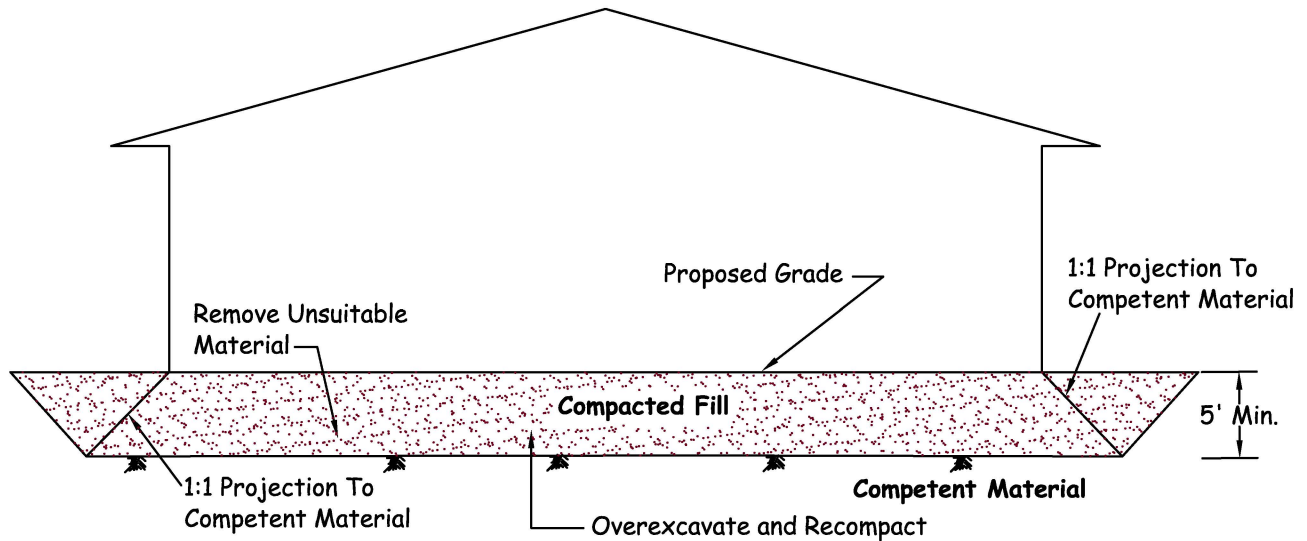
SUBDRAIN OUTLET MARKER -6" & 8" PIPE



SUBDRAIN OUTLET MARKER -4" PIPE



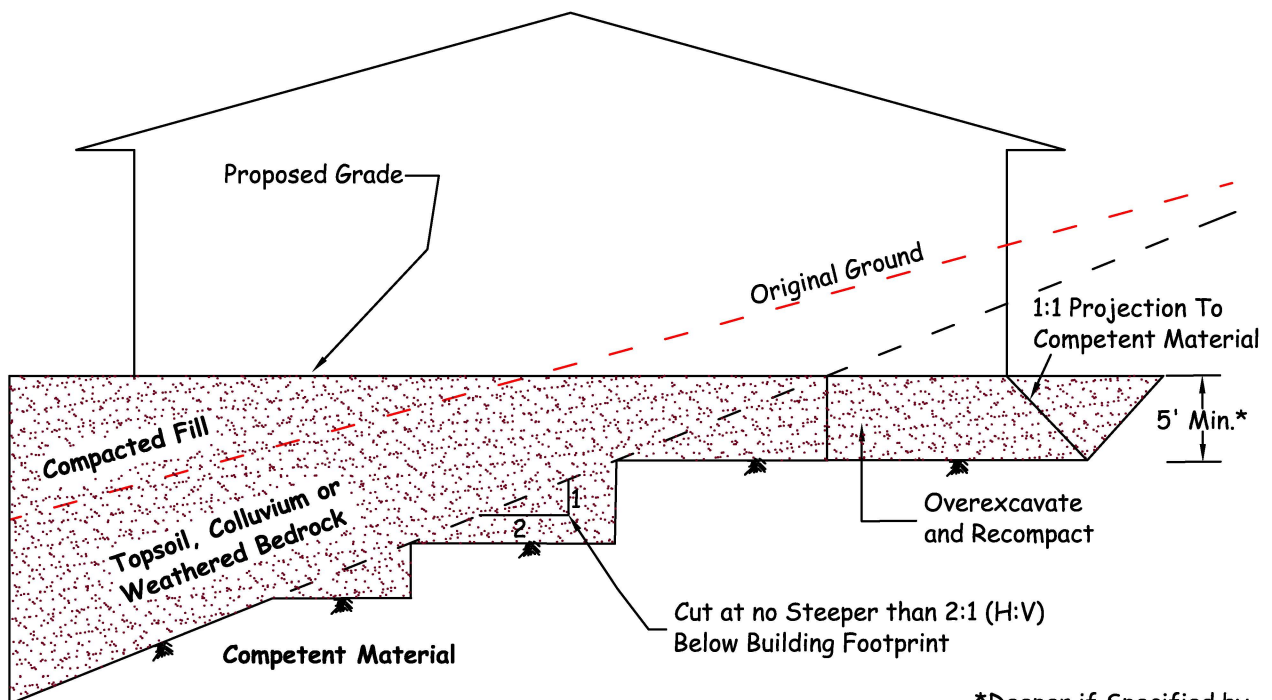
Cut Lot (Exposing Unsuitable Soils at Design Grade)



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.

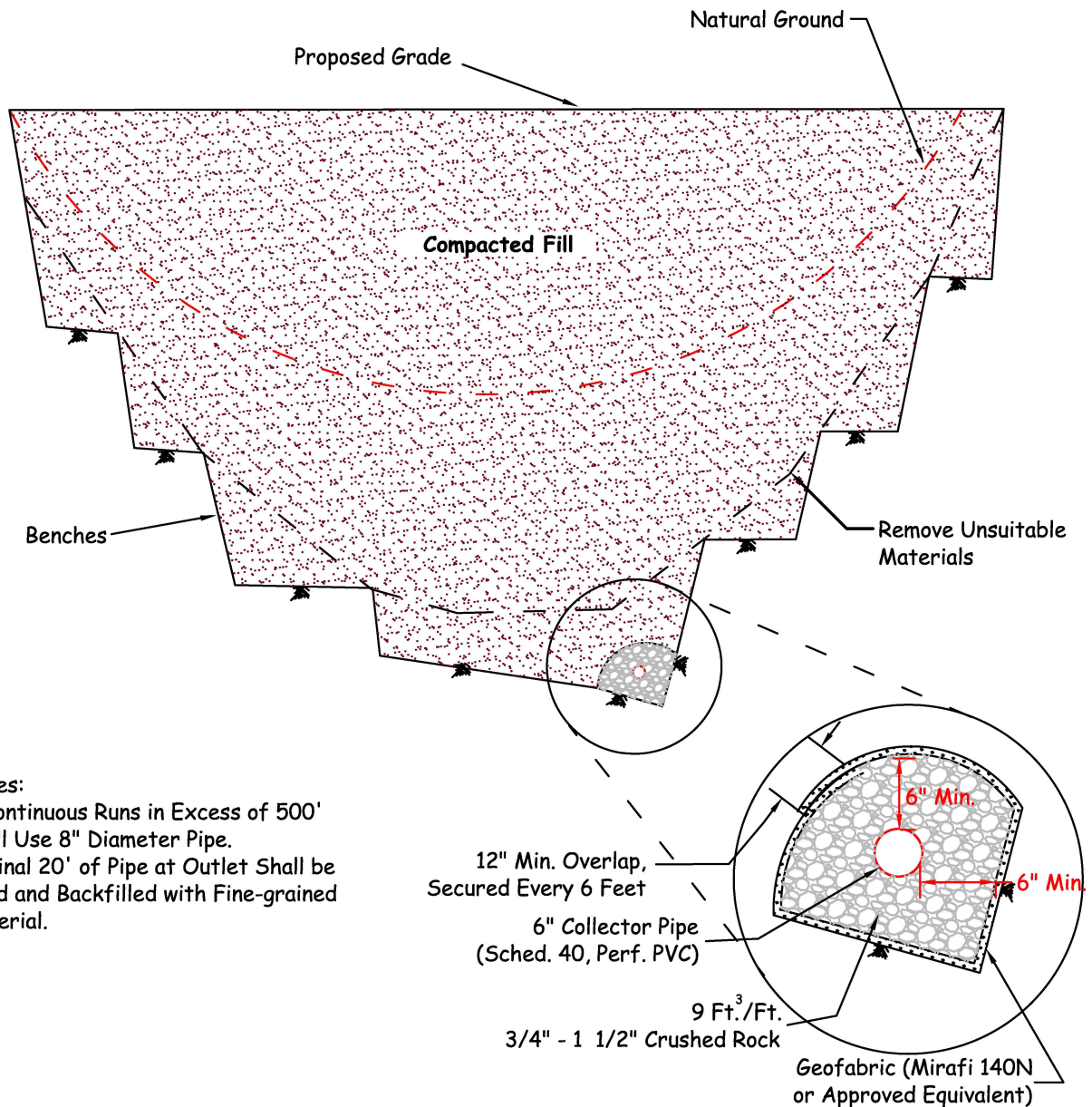
Cut/Fill Transition Lot



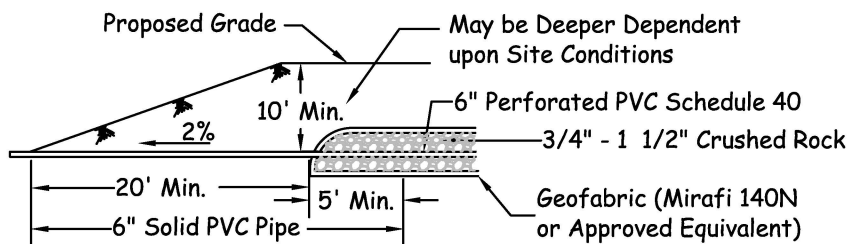
*Deeper if Specified by Soils Engineer

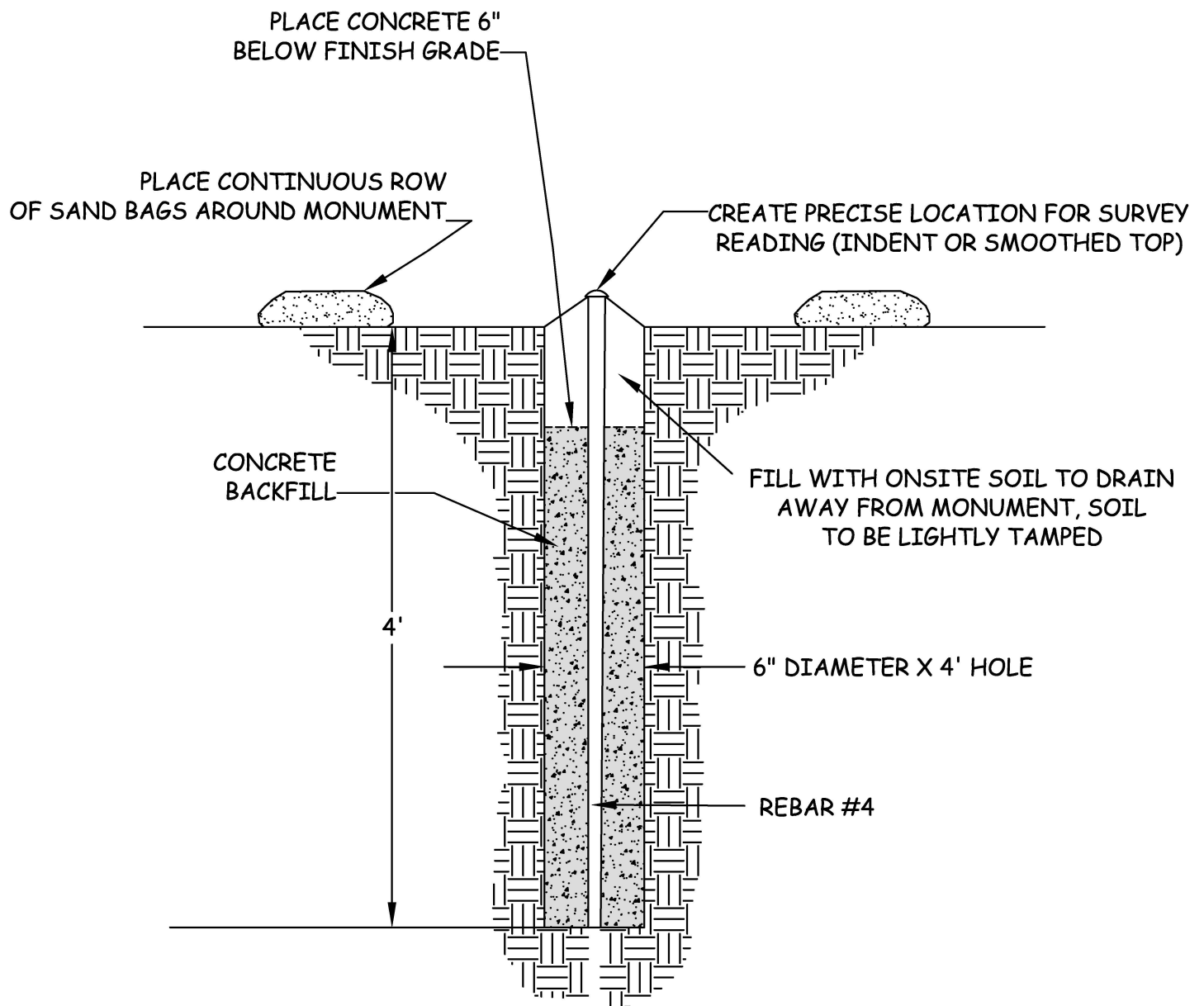


CUT AND TRANSITION LOT OVEREXCAVATION DETAIL

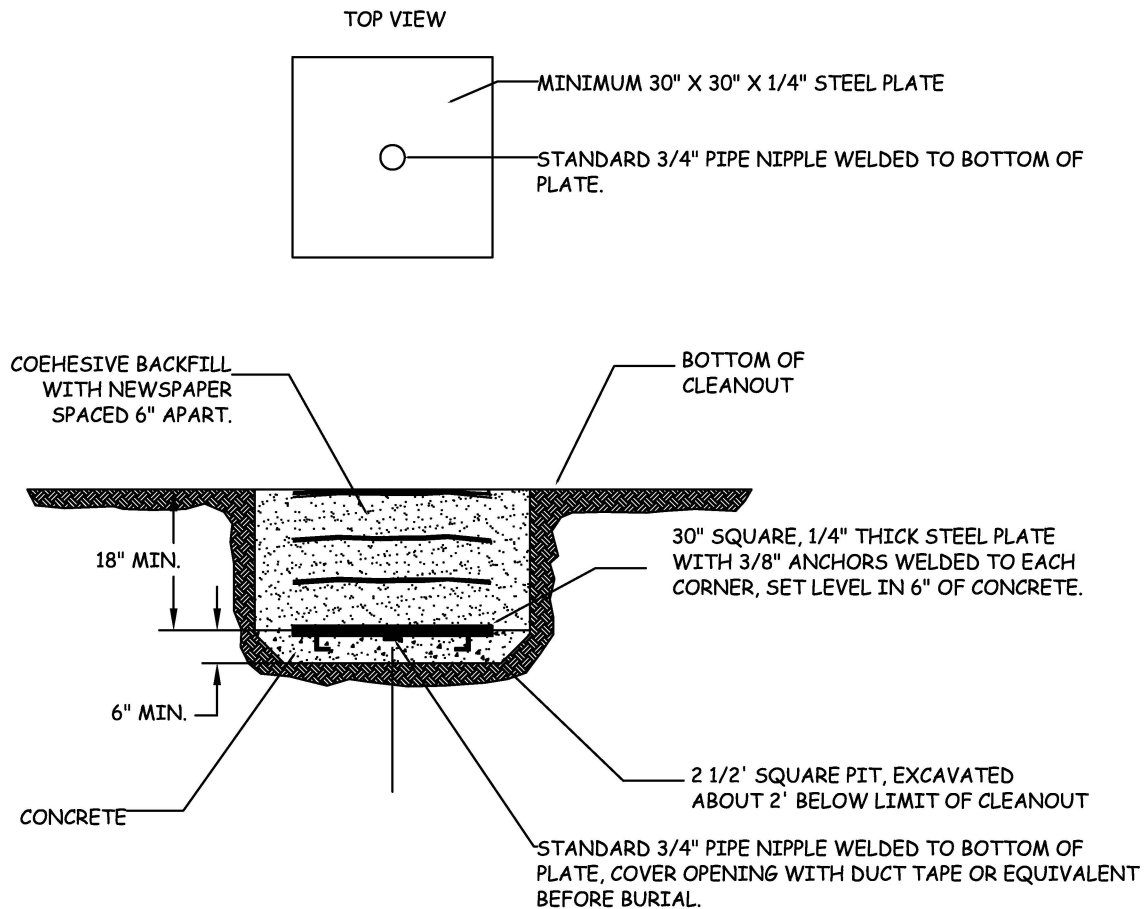


Proposed Outlet Detail

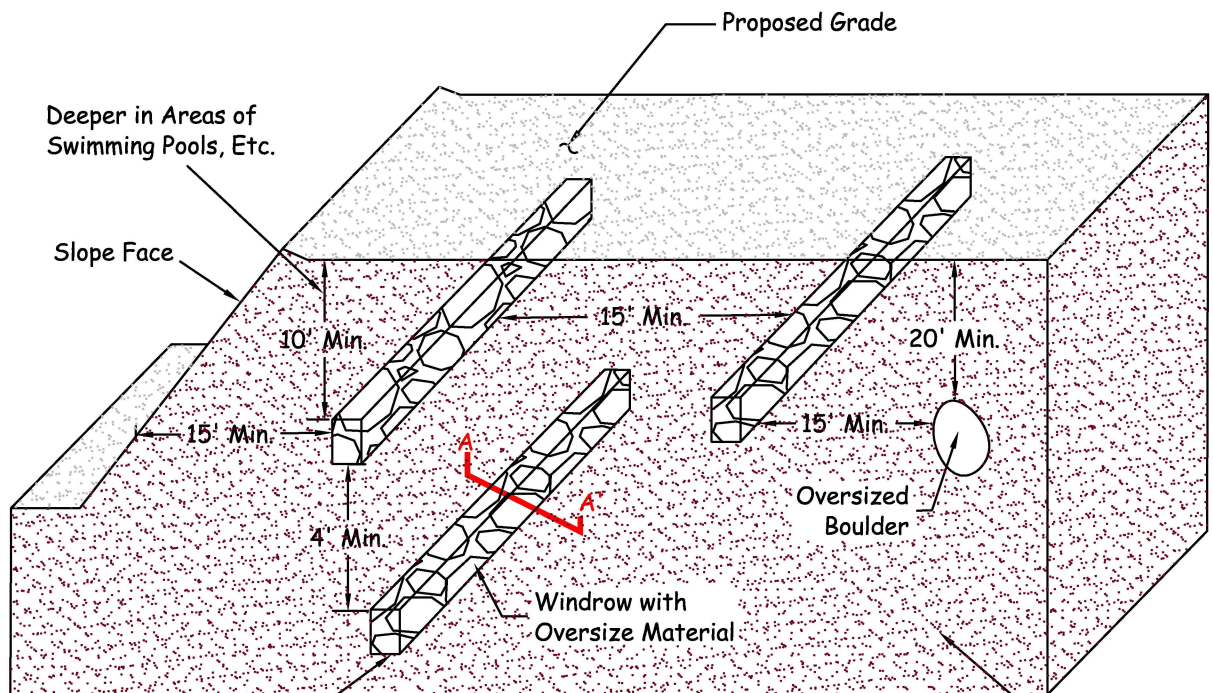




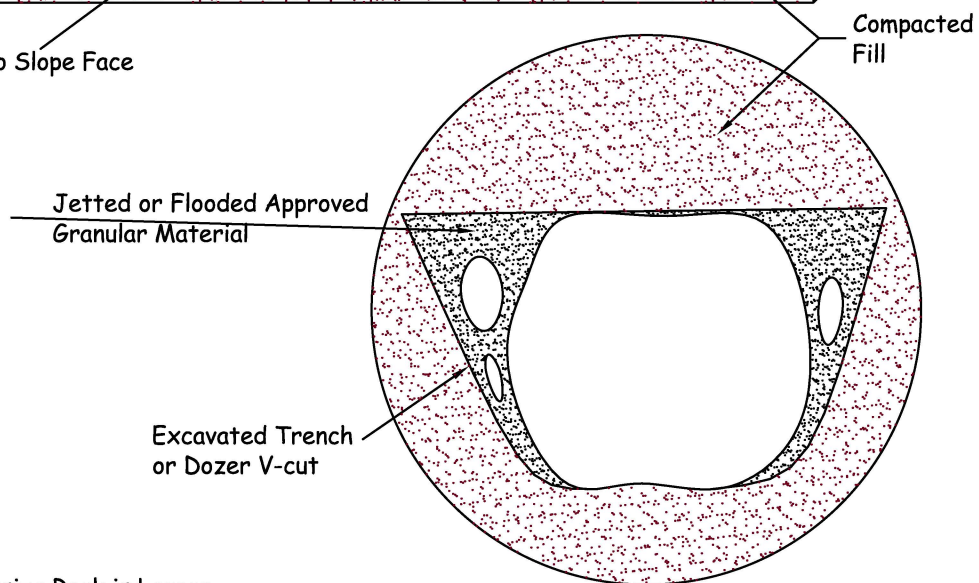
NO CONSTRUCTION EQUIPMENT WITHIN 25 FEET
OF ANY INSTALLED SETTLEMENT MONUMENTS



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 EXPLICITLY 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.

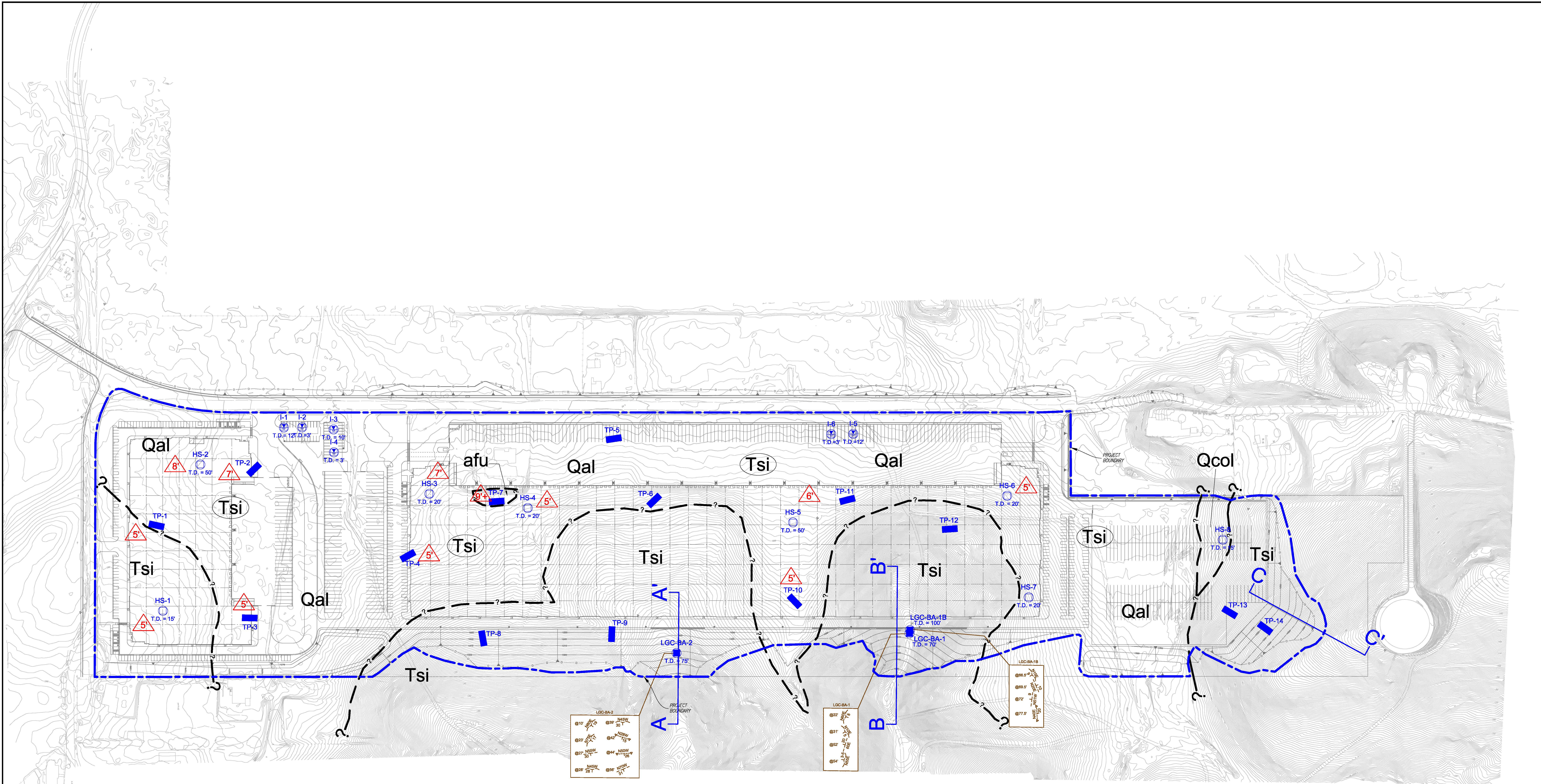


Windrow Parallel to Slope Face



Note: Oversize Rock is Larger than 8" in Maximum Dimension.

Section A-A'



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

LGC-BA-2
T.D. = 75'
Approximate Location of Large Diameter Bucket Auger Boring by LGC Geotechnical, With Total Depth in Feet

HS-8
T.D. = 18'
Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet

HS-9
T.D. = 14'
Approximate Location of Hollow Stem Auger Infiltration Boring by LGC Geotechnical, With Total Depth in Feet

TP-1
T.D. = 5'
Approximate Location of Exploratory Test Pit by LGC Geotechnical, With Total Depth in Feet

Estimated Remedial Grading Depth in Feet

Geotechnical Cross-Section Alignment

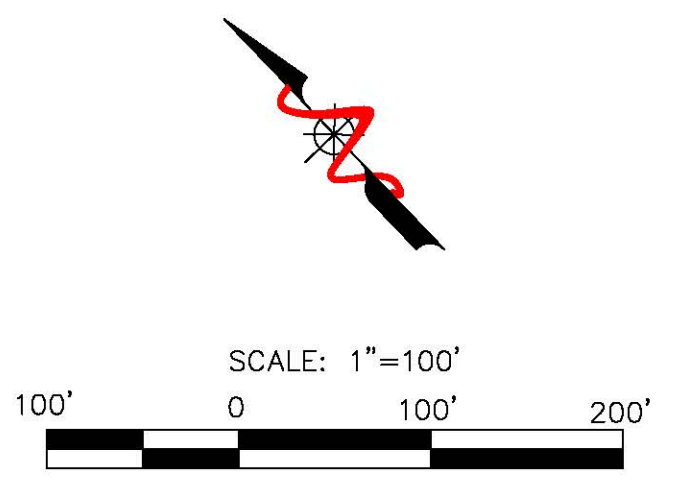
Approximate Limits of This Report

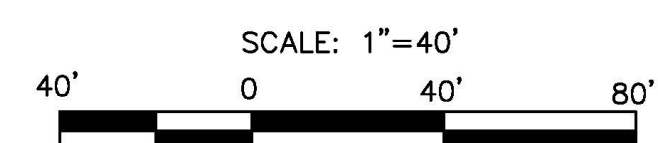
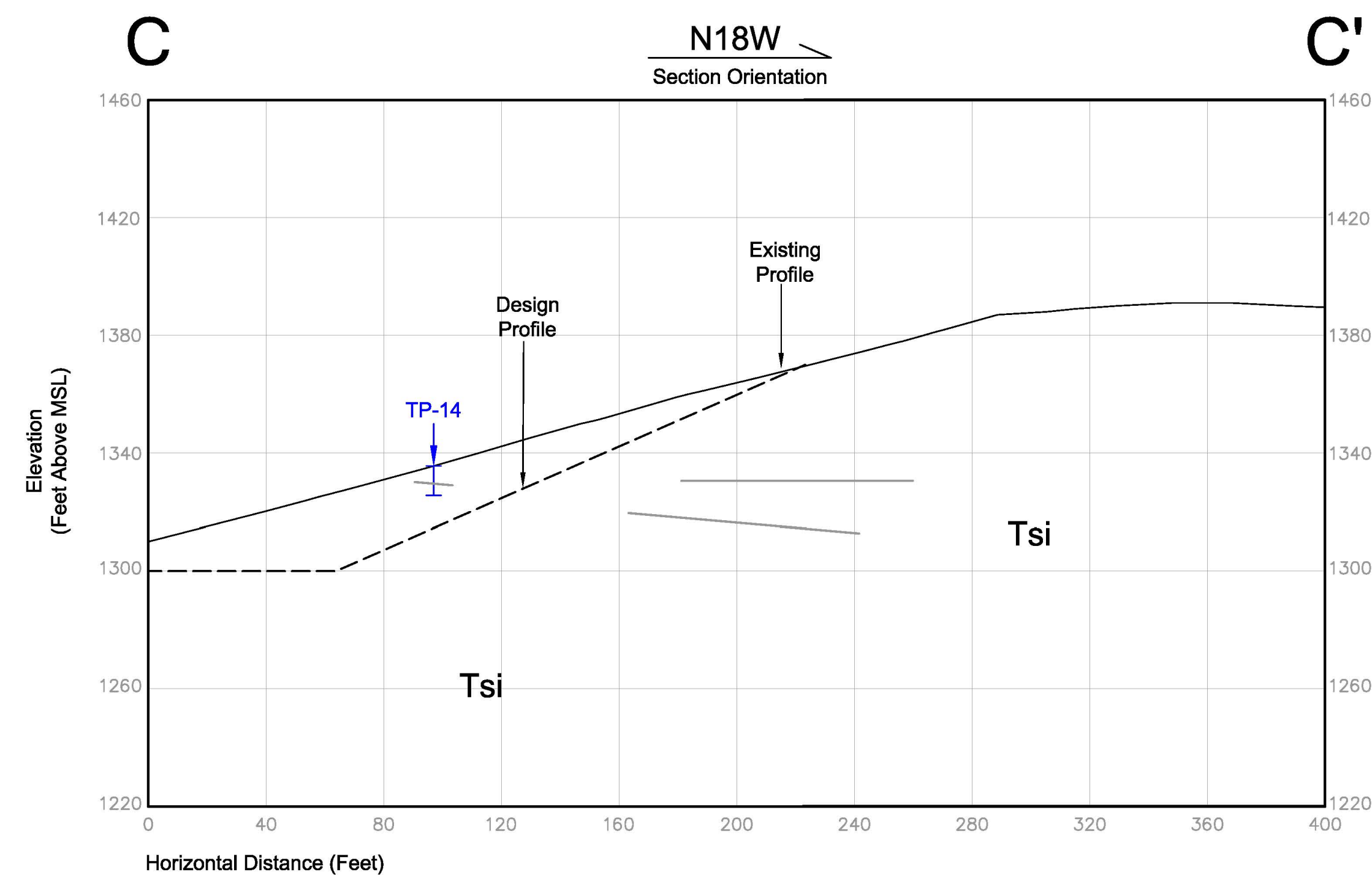
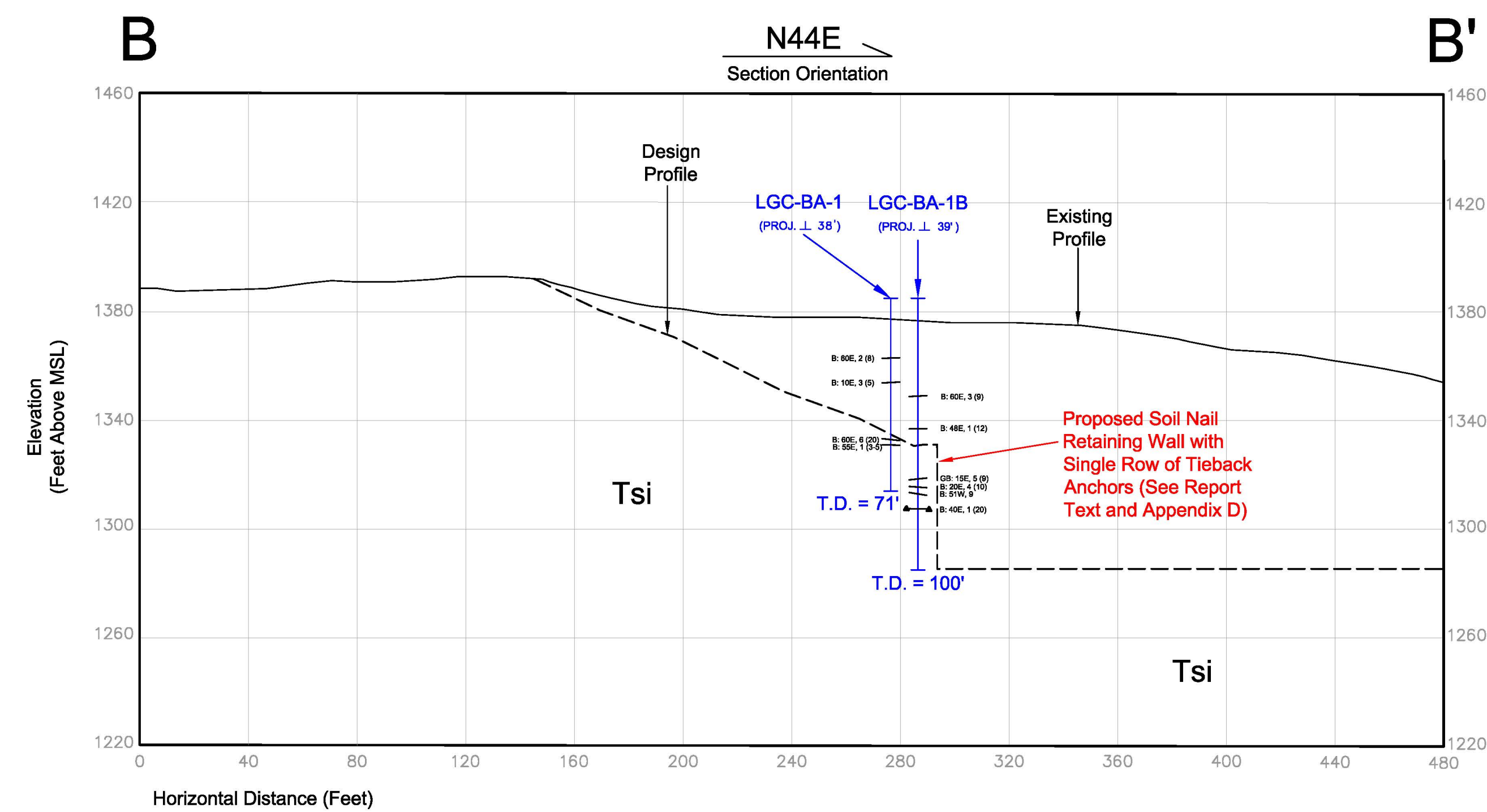
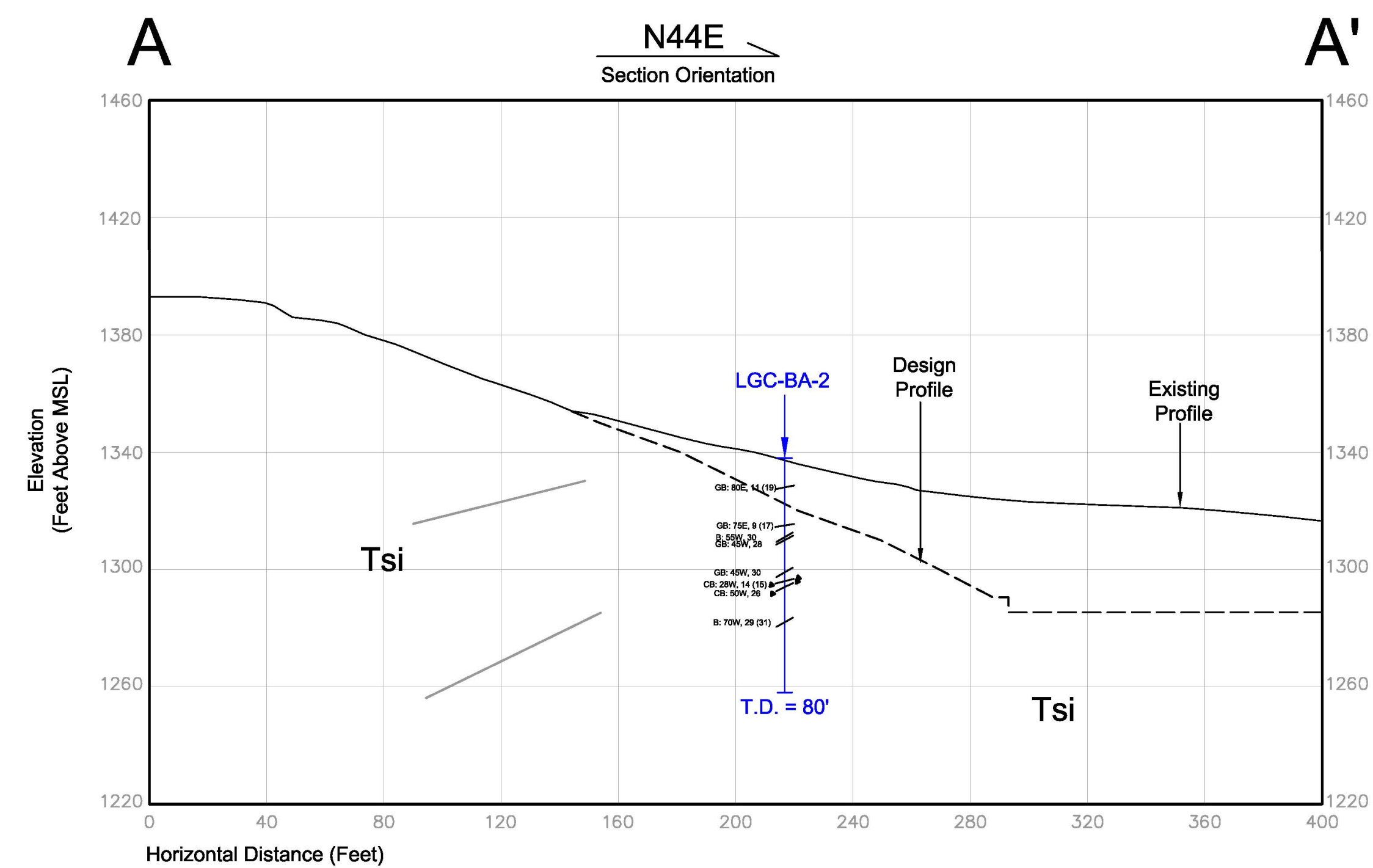
Geologic Attitudes (Dashed Where Subsurface)

General Bedding

Clay Bed

Bedding





LGC Geotechnical, Inc.
 131 Calle Iglesia, Ste. 200
 San Clemente, CA 92672
 TEL (949) 369-6141 FAX (949) 369-6142

Geotechnical Cross-Sections
A-A', B-B', and C-C'

PROJECT NAME	EIP - Lake Elsinore	
PROJECT NO.	23160-01	
ENG. / GEOL.	RLD / BPG	SHEET 2 of 2
SCALE	1" = 40'	
DATE	January 2024	