Appendix G
Geotechnical Report

ESA

April 18, 2023 Project No. 20080-01

Mr. Jon Conk
Project Dimensions, Inc.
4 Park Plaza, Suite 700
Irvine, California 92614

Subject: ***Geotechnical Conceptual Site Plan Review, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California***

Introduction

In accordance with your request, LGC Geotechnical, Inc. has prepared this letter regarding our geotechnical review of the revised Conceptual Site Plan (Fuscoe, 2023) for the proposed residential development to be located on portions of the existing Royal Vista Golf Course Rowland Heights, California.

LGC Geotechnical has performed geotechnical evaluations for the proposed development of the site (LGC Geotechnical, 2020 & 2021a) and provided a response to geotechnical review comments (LGC Geotechnical, 2021b).

Grading Plan Review

Based on our review of the most recent revised Conceptual Site Plan (Fuscoe, 2023), we understand that the plan has been revised to include a total of 360 residential units including 200 single family detached units, 58 duplex units, 30 triplex units, and 72 townhome units. Otherwise, the site plan is very similar to that previously reviewed as part of our site geotechnical evaluation (LGC Geotechnical, 2020 & 2021a). Therefore, the recommendations provided in our reports (LGC Geotechnical, 2020 & 2021a) remain valid and applicable.

It should be noted that the recommendation provided in our previous reports (LGC Geotechnical, 2020 & 2021a) should be considered approximate and conceptual. Once 40-scale grading plans have been prepared, LGC Geotechnical should review and analyze the site development plans in the context of the site geologic conditions. A comprehensive geotechnical report for the development of the site will be prepared at that time.

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.

Should you have any questions regarding this letter, please do not hesitate to contact this office.

Sincerely,

LGC Geotechnical, Inc.

Ryan Douglas, GE 3147
Project Engineer

Kevin B. Colson, CEG 2210
Vice President

KBC/RLD/amm

Attachments: References

Distribution: (1) Addressee (electronic copy)

References

LGC Geotechnical, 2020, Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated July 13, 2020.

_____, 2021a, Updated Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated July 26, 2021.

_____, 2021b, Response to Geotechnical Review Comments dated November 9, 2021 regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated December 23, 2021.

Fuscoe Engineering, Inc., 2023, Conceptual Site Plan, Royal Vista Residential & Parks Project, dated February 23, 2023.

July 26, 2021 Project No. 20080-01

Mr. Jon Conk
Project Dimensions, Inc.
4 Park Plaza, Suite 700
Irvine, California 92614

Subject: ***Updated Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California***

Introduction

In accordance with your request and authorization, LGC Geotechnical, Inc. has performed a preliminary geotechnical evaluation and feasibility study for the proposed residential development to be located on portions of the existing Royal Vista Golf Course in the City of Rowland Heights, California. We have prepared this report to present the findings of our study and our conclusions with regard to feasibility of site development from a geotechnical standpoint.

Site Description

The subject site consists of approximately 76 acres of the Royal Vista Golf Course proposed for residential development both east and west of Colima Road in Rowland Heights, California (Figure 1). Site elevations within the development areas range from 520 to 660 above mean sea-level (msl). The majority of the site is gently sloping. Some steeper slopes exist on portions of the perimeters of the site.

The site currently consists of a grass golf course and the driving range. Portions of the site also include trees and scattered brush. Golf cart paths traverse the site. A relatively small maintenance structure is located in the east central portion of the site. Several sand traps and two pond water hazards are present on the site.

We understand potential development of the site will include grading for and construction of approximately 321 residential units, associated interior drives, parking areas, water quality systems, and two recreational/open space planning areas. We understand that the residential units will include both detached, single-family structures and attached, townhome units. The Vesting Tentative Tract Map from Fuscoe Engineering (Fuscoe, 2021) was utilized as a base map for the Geotechnical Map (Sheet 1). It is anticipated that site grading will include constructing slopes of approximately 2:1 (horizontal to vertical) inclinations and relatively level pads for construction of buildings and streets.

Geotechnical Evaluation

The field portion of our evaluation included geologic mapping of the site and excavation of ten hollow-stem, auger borings and five large-diameter borings. All borings were excavated utilizing limited access, rubber-track mounted drill rigs. Three of the hollow-stem, auger borings (I-1 through I-3) were drilled approximately 5 to 6 feet below existing grade and used for infiltration testing. The deeper, hollow-stem, auger borings (HS-1 through HS-7) were excavated depths ranging from approximately 10 to 26.5 feet below existing grade. These deeper borings were excavated for geotechnical evaluation of the subsurface geologic conditions in the low-lying areas of the site. Large-diameter Borings BA-1 through BA-5 were drilled to depths of up to approximately 45 feet below existing grade, then entered and down-hole logged by a geologist from our firm. The large-diameter borings were excavated to evaluate areas of potential slope stability concern.

An LGC Geotechnical representative observed the drilling operations, logged the borings, and collected soil samples for laboratory testing. Driven soil samples were collected by means of the Standard Penetration Test (SPT) and Modified California Drive (MCD) sampler. The SPT sampler (1.4-inch ID) and MCD sampler (2.4-inch ID, 3.0-inch OD) were driven using a 140-pound hammer falling 30 inches to advance the sampler a total depth of 18 inches or until refusal. Bulk samples were also collected and logged for laboratory testing at select depths. The raw blow counts for each 6-inch increment of penetration were recorded on the boring logs. The borings were backfilled with cuttings and tamped for densification, to reduce surficial subsidence.

Infiltration testing was performed within three of the borings (I-1 through I-3) at depths ranging from approximately 5 to 6 feet below existing grade, per the direction of the civil engineer. An LGC Geotechnical staff engineer installed standpipes, backfilled the boring annulus with crushed rock, and pre-soaked the infiltration wells prior to testing. Infiltration testing was performed in accordance with the County of Los Angeles testing guidelines. The infiltration test wells were subsequently backfilled with native soils at the completion of testing.

The approximate locations of our subsurface explorations are provided on the Geotechnical Map (Sheet 1). The boring logs are provided in Appendix B.

Laboratory Testing

Representative driven and bulk samples were retained for laboratory testing during our field evaluation. Laboratory testing included in-situ moisture content and in-situ dry density, Atterberg limits, fines content, expansion potential, laboratory compaction, and corrosivity (sulfate, chloride, pH, and minimum resistivity).

A summary of the laboratory test results is provided in Appendix C.

- Dry density of the samples collected ranged from approximately 90 pounds per cubic foot (pcf) to 119 pcf, with an average of 103 pcf. Field moisture contents ranged from approximately 6 percent to 52 percent, with an average of 21 percent.
- Six Atterberg limit (liquid limit and plastic limit) tests were performed. Results indicated Plasticity Index values range from 5 to 39.

- Five fines content tests indicated fines contents (passing No. 200 sieve) ranging from approximately 41 to 93 percent. Based on the Unified Soils Classification System (USCS), the tested sample would be classified as "coarse-grained" and "fine-grained."
- Three direct shear tests were performed. The plots are provided in Appendix C.
- Expansion potential testing indicated an expansion index value of 56, corresponding to "Medium" expansion potential.
- Laboratory compaction testing of a bulk samples indicated a maximum dry density of 114.0 pcf and 116.0 pcf and optimum moisture content of 9.0 and 15.5 percent, respectively.
- Corrosion testing indicated a soluble sulfate content of approximately 0.05 percent, a chloride content of 144 parts per million (ppm), a pH value of 8.54, and a minimum resistivity value of 710 ohm-centimeters.

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

Field Infiltration Testing

Three shallow infiltration test wells were installed in Borings I-1 through I-3 to approximate depths of 5 to 6 feet below existing grade. The approximate infiltration test boring locations are shown on the Geotechnical Map (Sheet 1).

Estimation of infiltration rates was performed in general accordance with the "Boring Percolation Test Procedure" guidelines set forth by the County of Los Angeles (2017). The borings for the infiltration tests were excavated using a drill rig equipped with 8-inch diameter hollow-stem augers. A 3-inch diameter perforated PVC pipe was placed in the borehole above a thin layer of gravel and the annulus was backfilled with gravel. Infiltration tests were performed using relatively clean water, free of particulates, silt, etc. The infiltration wells were pre-soaked approximately 1 hour prior to testing. During the pre-test, water was added to the boring and was observed after 10 minutes and 30 minutes to determine the applicable test methodology. In infiltration test holes I-1 through I-3 water remained in the borings after 30 minutes. Therefore, the test procedure utilizing a thirty-minute reading interval was performed on both infiltration test holes (I-1 through I-3). Readings were taken a minimum of 8 times or until a "stabilized rate" was established. A "stabilized rate" is when the highest and lowest readings are within 10 percent of each other over three consecutive readings. At the completion of infiltration testing, the pipe was removed and backfilled with cuttings and tamped. Some settlement of the backfill should be expected.

Based on the County of Los Angeles testing guidelines (2017), the infiltration rate is calculated by dividing the volume of water discharged by the surface area of the test section (including the sidewalls and bottom of the boring) over a specific time period. The measured infiltration rate is taken as the average of the last three readings during which a "stabilized rate" is achieved. The measured infiltration rates are provided in Table 1 on the following page.

TABLE 1

Summary of Field Infiltration Testing

Infiltration Test Location	Approximate Infiltration Test Depth (ft)	Measured Infiltration Rate* (inch/hr.)
I-1	5	0.2
I-2	5	0.1
I-3	6	0.6

*Does Not Include Required Reduction Factors for Design.

Please note that the values provided in Table 1 do not include reduction factors associated with the test procedure, site variability, and long-term siltation plugging that are used to calculate the design infiltration rate. Infiltration test data is presented in Appendix D. Refer to the "Subsurface Water Infiltration" section below for recommendations regarding infiltration of stormwater.

Geotechnical Conditions

Based on the findings of our evaluation, the low-lying portions of the site consist of undocumented artificial fill, placed as part of original golf course construction in 1963. Documentation of the fill placement was not identified. It does not appear that the fill was placed as an engineered fill with geotechnical observation and testing during placement and compaction. It is also does not appear that appropriate remedial grading was performed to remove underlying compressible native soils (alluvium, colluvium and topsoil) prior to placement of the fill. For the purposes of this report, we have not differentiated the undocumented fill from the underlying alluvium, colluvium and topsoil as they are collectively considered compressible and should be removed to underlying bedrock material as part of site remedial grading. These materials were found to extend to depths of up to approximately 25 feet below existing grades in the low-lying areas of the site. These materials can be expected to thin as the site elevations rise to the perimeter slopes. Where observed, these materials generally consisted of silty to clayey sand and sandy clay that was moist to saturated.

The near-surface portion of the site slopes include topsoil and colluvial deposits and likely a thin veneer of undocumented fill in some areas. The colluvial deposits likely thicken toward lower portions of the slopes. The Soquel Member of the Puente Formation underlies these materials at shallow depth on the site slopes and at depth in the low-lying areas of the site, beneath the undocumented fill and underlying compressible native materials. The Soquel Member of the Puente Formation generally consists of massive, well-cemented, fine to coarse grained light brown to yellow sandstones that are locally interbedded with gray siltstones. In general, bedding in the area of the subject site regional bedding trends east-west to northwesterly and dipping toward the northeast (Dibblee, 2001).

What are believed to be "engineered" older fill materials are present in the upper portions of the site and in areas immediately adjacent to the site, associated with the adjacent residential developments.

As encountered during our subsurface evaluation, the Soquel Member of the Puente Formation consisted of gray to brown silty sandstone and sandy siltstone, with occasional concretionary beds and clay beds. Bedding was generally oriented east-west and dipped to the north.

Localized areas with significant amounts of perched groundwater within the older artificial fill and upper portions of the underlying native materials should be anticipated during site remedial grading. Historic high groundwater is mapped in a relatively small portion of the site adjacent to the intersection of East Walnut Drive and Bellavista Drive at a depth of 0 to 30 feet below existing grade (CGS, 2005a).

The site is not located within a mapped State of California Earthquake Fault Rupture Hazard Zone (Alquist-Priolo Special Studies Zone) and no known active or potentially active faults cross the site. The nearest known active or potentially active fault is the Whittier section of the Elsinore fault zone located approximately 3 miles (4.8 kilometers) southwest of the site.

No active or inactive faults are mapped in the vicinity of the site (Dibblee, 2001). No landslides were observed or have been mapped in the vicinity of the site (Dibblee, 2001). Some slopes along the southeastern most site boundary are located in a zone of potential seismically-induced landsliding (CGS, 2005b). A relatively small portion of the subject site, adjacent to the intersection of East Walnut Drive and Bellavista Drive, is located in a zone characterized as being potential susceptible to seismically-induced liquefaction (CGS, 2005b).

Conclusions and Recommendations

Based on the results of our preliminary geotechnical evaluation, it is our professional opinion that proposed development of the site is feasible from a geotechnical standpoint. However, significant remedial grading across the majority of the site will be required. This and the other geotechnical constraints and advantages of the site are discussed in the follow subsections.

Please note that the subject evaluation was focused on the geotechnical conditions of the site and feasibility of site development in consideration of the geologic constraints encountered. The intent of this study was to provide sufficient data to allow prospective developers to understand the site geologic conditions and how they will impact the proposed site development. Additional geotechnical analyses should be performed once 40-scale grading plans have been prepared, in order to provide design-level geotechnical recommendations. Additional field work and laboratory testing may be required. Additional and/or modified geotechnical recommendations may also be required. It is anticipated that the results of our feasibility evaluation, provided herein, will contribute data to that study.

1) Remedial Grading

The majority of the site is underlain by potentially compressible, older artificial fill, which in-turn is underlain by potentially compressible native soils. The depth of potentially compressible materials recommended for removal and recompaction during site remedial grading are estimated to be on the order of approximately 25 feet below existing grades in the low-lying areas of the site.

Areas of deep remedial grading adjacent to property lines and existing improvements should be anticipated and may require steep backcuts, temporary slot-cuts or temporary shoring.

Away from the low-lying areas of the site, the depths of remedial grading should be expected to thin to only a few feet below existing grade, as the site elevations rise.

These issues should be further evaluated at the 40-scale grading plan review phase of the project in order to provide design-level geotechnical recommendations. Additional subsurface evaluation; including backhoe test pits, Cone Penetrometer Soundings, and additional borings can be performed to refine the extent of site remedial grading.

2) Groundwater

Historic high groundwater is mapped in a relatively small portion of the site adjacent to the intersection of East Walnut Drive and Bellavista Drive at a depth of 0 to 30 feet below existing grade (CGS, 2005a). However, the vast majority of the subject site is not mapped as having a historic high groundwater table within 50 feet of the surface.

Localized areas of perched groundwater within the older artificial fill and upper portions of the underlying native materials were encountered and are anticipated during site remedial grading. Groundwater was encountered in five of the seven borings excavated in this area. Perched groundwater was encountered at depths as shallow as 2.5 feet below existing grade. It is our opinion that the perched groundwater has concentrated in the low-lying areas of the site within the older artificial fill above the underlying bedrock. Some of the native materials below the fill are also anticipated to be wet/saturated. Potential sources of the perched groundwater may be the golf course irrigation, leakage from the existing water ponds and precipitation/stormwater.

During grading, the contractor should anticipate wet removals that may need to be removed by top-loading dump trucks with an excavator rather than with scrapers. The need to dry out and/or mix the wet material removed with drying materials prior to fill placement should also be anticipated. Stabilization of wet/saturated removal areas may be necessary for equipment access and prior to placement of compacted fill. Localized, temporary construction dewatering may also be necessary to accomplish remedial grading.

These issues should be further evaluated at the 40-scale grading plan review phase of the project in order to provide design-level geotechnical recommendations. Additional subsurface evaluation; including backhoe test pits, Cone Penetrometer Soundings, and additional borings can be performed to refine the extent of site remedial grading.

Shallow groundwater conditions are generally not anticipated to impact the proposed development following grading of the site and implementation of geotechnical recommendations for controlling subsurface water (e.g., subdrains). Management of shallow post-grading groundwater by means of subdrains or similar subsurface drainage devices systems should be addressed during a 40-scale grading plan review. It should be noted localized areas of perched groundwater may form after the site is developed due to seasonal precipitation, irrigation, land use, etc.

3) *Slope Stability*

Some slopes along the southeastern most site boundary are located in a zone of potential seismically-induced landsliding (CGS, 2005b). No evidence of landslides was observed during our feasibility level site visit or are mapped in the vicinity of the site (Dibblee, 2001).

The preliminary soil shear strength parameters utilized in our slope stability analysis are based on laboratory testing of the onsite materials, laboratory data from adjacent developments, and published shear strength data (CGS, 2005a). Laboratory test results are provided in Appendix C.

Preliminary feasibility level global slope stability analyses were performed on critical cross-sections positioned throughout the site based on the proposed design profile. Slope stability analysis was performed using the computer program GSTABL7 with STEDwin version 2.005.3 (Gregory Geotechnical Software, 2013). Rotational surfaces were analyzed using Bishop's Modified Method. Potential block failure modes were analyzed using Janbu's Simplified Method. A minimum factor of safety of 1.5 and 1.1 is typically required for static and pseudo-static loading conditions, respectively.

Proposed permanent cut slopes constructed at a slope ratio of 2:1 (horizontal to vertical) or flatter are generally anticipated to be grossly stable, as long as they are constructed in accordance with the project geotechnical recommendations and are properly landscaped and maintained. Construction of stability fill slopes where there are designed cut slopes should be considered to reduce the potential for block and surficial failures and to facilitate planting.

Design fill slopes are anticipated to be both grossly and surficially stable as designed, as long as they are constructed in accordance with the project geotechnical recommendations and are properly landscaped and maintained.

To reduce the potential for surficial failures where design grades will result in "sliver" fill slopes, we recommend replacement with construction of stability fill slopes.

Preliminary slope stability analysis of slope modeled Geotechnical Cross-Section 4-4' in the Lot 5 area will require some form of stabilization (e.g., buttress, shear pins, etc.) to increase the safety factor to meet code requirements (refer to Sheet 1). Additional evaluation and analysis of this location should be performed to determine and design the appropriate method of slope stability mitigation at the 40-scale grading plan review phase of the project.

Tall, toe-of-slope retaining walls are proposed along the eastern edge of the proposed townhome neighborhood (Lot 3). Due to the proposed wall heights, with slopes above and in cut conditions, conventional retaining walls may not be appropriate or feasible. Consideration for "top-down construction" type retaining walls (e.g., nail walls, tieback walls, or pile and shotcrete walls) may be appropriate. Additional evaluation and analysis should be performed in this area once wall type has been determined and preliminary designs prepared. Additional subsurface evaluation may be warranted.

Please note, additional design level slope stability analysis will need to be performed once 40-scale rough grading plans have been prepared and more details are available regarding finalized slope and retaining wall configurations, etc. This additional evaluation may include additional

cross-sections and slope stability analysis. Other areas of slope stability concern may be identified.

4) *Seismicity*

The site is not located within a mapped State of California Earthquake Fault Rupture Hazard Zone (Alquist-Priolo Special Studies Zone) and there are no active or potentially active faults mapped on or in close vicinity of the site (Dibblee, 2001).

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. Parameters for seismic design in accordance with the current California Building Code should be provided in future geotechnical reports for the project.

5) *Liquefaction and Earthquake-Induced Landslides*

A relatively small portion of the subject site, adjacent to the intersection of East Walnut Drive and Bellavista Drive, is located in a zone characterized as being potential susceptible to seismically-induced liquefaction (CGS, 2005b). The majority of the site is anticipated to possess a low potential for liquefaction following expected remedial grading (removal of undocumented fill to suitable native materials/bedrock).

Some slopes along the southeastern most site boundary are located in a zone of potential seismically-induced landsliding (CGS, 2005b). Detailed slope stability analysis should be performed in this area during the 40-scale grading plan review phase of the project.

6) *Rippability and Oversized Material*

Although, site development plans are not yet available for our review, it is anticipated that proposed depth of cut for the proposed development will be relatively shallow. Hard rock material (e.g., granitics and volcanics), were not encountered in our evaluation and are not anticipated in the vicinity of the site. As such, rippability is generally not anticipated to be a significant issue during site grading with heavy duty construction equipment. Lighter equipment may have localized excavation difficulty in deeper cut areas into the site bedrock for excavation of trenches.

Generation of a surplus of oversized material (material larger than 8 inches in maximum dimension) during site grading is generally not be anticipated. Some localized oversized material may be encountered which could be difficult to excavate in narrow excavations (e.g., trenches and borings). Recommendations for appropriate handling of oversized materials should be provided in future geotechnical reports for the project.

7) *Temporary Excavations*

Excavations should be made in accordance with Cal/OSHA, as a general guideline. Excavation safety is the sole responsibility of the contractor. Recommendations for temporary slot-cuts and/or temporary shoring for excavations near property lines may be necessary in a future geotechnical report once grading plans are available, if necessary.

8) *Fill Placement*

In general, it appears that the onsite soils should be considered geotechnically suitable for reuse as compacted fill provided the soils are free of organics, oversized materials, and other deleterious material. Oversized materials may be placed in nonstructural areas or in structural fills if placed in accordance with the recommendations of the geotechnical consultant and local grading codes.

In general, the site contains soils that are not suitable for retaining wall backfill due to their fines content and expansion potential, therefore import of sandy soils will likely be required by the contractor for obtaining suitable backfill soil for planned site retaining walls. While some areas of potential "select" material, suitable for use as retaining wall backfill, may be present on the site, additional subsurface evaluation and laboratory testing would be needed to determine the viability of select grading of the material.

9) *Expansive Soils*

Based on the preliminary feasibility level laboratory testing, the onsite soils are expected to have a "Medium" expansion potential. Mitigation measures to reduce the potential impacts of expansive soils on building foundations, structures and non-structural flatwork will be recommended. Post-tensioned/stiffened building slab systems and pre-soaking of the subgrade for building slabs and non-structural flatwork should be anticipated due to site expansive soils.

10) *Corrosive Soils*

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. Soils are not considered corrosive per Caltrans criteria (Caltrans, 2018). 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.

11) *Subsurface Water Infiltration*

It should be noted that intentionally infiltrating storm water conflicts with the geotechnical engineering objective of directing surface water away from structures and 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. Distress in the form of movement of foundations and other improvements could occur as a result of soil saturation and loss of soil support of foundations and pavements, settlement, collapse, internal soil erosion, and/or expansion. Additionally, off-site properties and improvements may be subjected to seepage, springs, instability, movements of foundations or other impacts as a result of water infiltration and migration. Recommendations for subsurface water infiltration are provided below.

The design infiltration rate is determined by dividing the measured infiltration rate by a series of reduction factors including; test procedure (RF_t), site variability (RF_v) and long-term siltation plugging and maintenance (RF_s). Based on the Los Angeles County testing guidelines (2017), the reduction factor for long-term siltation plugging and maintenance (RF_s) is the purview of the infiltration system designer. The test procedure reduction factor and recommended site variability reduction factor applied to the measured infiltration rate is provided in Table 2 below. The design infiltration rate is the measured infiltration rate divided by the total reduction factor (RF_t x RF_v x RF_s).

TABLE 2

Shallow Surface Infiltration - Reduction Factors Applied to Measured Infiltration Rate

Consideration	Reduction Factor
Test procedure, boring percolation, RF_t	2
Site variability, number of tests, etc., RF_v	1.5
Long-term siltation plugging and maintenance, RF_s	Per Infiltration Designer
Total Reduction Factor, RF = RF_t x RF_v x RF_s	**TBD**

Per the requirements of the Los Angeles County testing guidelines (2017), subsurface materials shall have a design infiltration rate equal to or greater than 0.3 inches per hour. The test procedure and site variability considerations (RF_t and RF_v) result in a minimum reduction factor of 3 (not including long-term siltation plugging and maintenance). When total reduction factor is applied to the measured infiltration rates presented in Table 1, the resulting design infiltration rates are anticipated to be less than the minimum required by the County of Los Angeles for infiltration.

Based on the results of field infiltration testing indication of low design infiltration rates (less than the minimum County design infiltration rate), the presence of low permeability clays and silts, the anticipated finished subsurface conditions consisting of fine-grained artificial fill overlying dense bedrock and shallow groundwater, we strongly recommend against the intentional infiltration of stormwater into the subsurface soils.

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.

Our services were provided in order to form an opinion concerning the suitability of the proposed development relative to the geotechnical aspects of the site. The data and information provided in this report are based on observations made by representatives of our firm during a brief site visit. This report is not a warranty of the work performed by others.

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, and should not be relied upon after a period of 3 years.

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

Respectfully,

LGC Geotechnical, Inc.

Ryan L. Douglas, GE 3147
Project Engineer

Kevin B. Colson, CEG 2210
Vice President

KBC/RLD/ARN/amm

Attachments: Figure 1 – Site Location Map
Sheet 1 – Geotechnical Map
Sheet 2 – Geotechnical Cross Sections

Appendix A – References
Appendix B – Boring Logs
Appendix C – Laboratory Test Results
Appendix D – Infiltration Test Results

Distribution: (4) Addressee (3 wet-signed copies and 1 electronic copy)

LGC Geotechnical, Inc.

FIGURE 1
Site Location Map

PROJECT NAME	Royal Vista Golf Course
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	Not to Scale
DATE	July 2021

Appendix A
References

APPENDIX A

References

California Building Standards Commission, 2019, California Building Code, California Code of Regulations Title 24, Volumes 1 and 2, dated July 2019.

California Department of Conservation, Division of Mines and Geology [CDMG], 2000, Seismic Hazard Zone Report for the Prado Dam 7.5-Minute Quadrangle, Orange County, California, Seismic Hazard Zone Report 045, dated 2000

_____, 2003, State of California Earthquake Fault Zones, Prado Dam Quadrangle, Revised Official Map Effective: May 1, 2003

California Geological Survey (CGS), (Previously California Division of Mines and Geology), 2000, Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region, CDMG CD 2000-03.

_____, 2005a, Seismic Hazard Zone Report for the Yorba Linda 7.5-Minute Quadrangle, Los Angeles, Orange County, and Riverside Counties, California, Open File Report 010.

_____, 2005b, State of California Seismic Hazard Zones, Yorba Linda 7.5-Minute Quadrangle, Official Map, Released August 11, 2005.

_____, 2007, Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps, Special Publication 42, Interim Revision 2007.

Caltrans, 2018, California Department of Transportation Division of Engineering Services Material Engineering and Testing Services Corrosion Branch, Corrosion Guidelines, Version 3.0, dated March 2018.

County of Los Angeles, 2017, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, Department of Public Works Geotechnical and Materials Engineering Division, GS200.2, dated June 30, 2017.

Dibblee, Thomas W. Jr., 2001, Geologic Map of the Yorba Linda and Prado Dam Quadrangles (Eastern Puente Hills) Los Angeles, Orange, San Bernardino and Riverside Counties, California, March 2001.

Fuscoe Engineering, 2021, Vesting Tentative Tract Map No. 83534, Royal Vista Golf Course, County of Lost Angeles, California, dated July 7, 2021.

KTGY Architecture & Planning (KTGY), 2020, Site Plan, 5000 SF Lot Concept Design, Alt 1, Royal Vista, Los Angeles County, California, dated October 7, 2020.

LGC Geotechnical, Inc., 2020, Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California,

Project No. 20080-01, dated July 13, 2020.

Morton, D.M, 2004, Preliminary Geologic Map of the Santa Ana 30' x 60' Quadrangle, Southern California, Version 2.0, Open-File Report 99-172.

Appendix B
Boring Logs

Geotechnical Boring Log BA-1

Date : 1/11/2021	Page 1 of 2	**Drilling Company :** Peter Drilling	
Project Name : Royal Vista Golf Course		**Type of Rig :** Limited Access Track Rig	
Project Number : 20080-01		**Drop :** 30"	**Hole Diameter :** 24"
Elevation of Top of Hole : ~ 898 ' MSL		**Drive Weight :** 140lbs	
Hole Location : See Geotechnical Map			

Logged by ARN/KTM

Sampled by ARN

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							SM-SC	**@0' to 19' - Artificial Fill - Older (afo)** @0' - Silty to Clayey SAND: brown and light brown mottled, slightly moist to moist, loose to slightly dense; abundant siltstone and sandstone clasts mixed in a silty to clayey sand matrix; clasts approximately 1-2"	
				B-1						
815									@3' - Scattered maroon clay clasts; increased density below 3 feet	
	5									
810										
	10			R-1	10 35	112.8	11.0	ML	@10' - SILT with Sand: light olive brown, moist, very stiff; siltstone clasts in matrix of silty sand	DS
805									@14' - Clay layer: brown, ~8" thick	
	15									
				GB-1			16.6		@17' - Clay layers, several inches thick, moist, sandier material below, grab sample taken	
800									**@19' to T.D. - Tertiary Puente Formation (Tp)**	
	20			R-2	6 20	97.1	6.4	SM	Silty SANDSTONE and Sandy SILTSTONE: gray and orange brown, slightly moist, medium dense; distinct low angle bedding; interbeds range from laminations to beds several inches thick; abundant healed fractures; minor soft sediment deformation; occasional silty claystone interbeds	
			@22' - GB N54E, 20NW @22.5' - CB N55E, 13NW @24' - B N49E, 16NW						@20' - Silty SAND: red brown, slightly moist, medium dense @22' - Attitude on siltstone to sandstone contact @22.5' - Clay bed attitude, gray, ~$\frac{1}{4}$" thick, hard @24' - General bedding attitude @26' - Fluid escape structure, soft sediment deformation	
795										
	25									
			@28' - CB N60E, 33NW	GB-2					@28' - Silty clay bed attitude, paper thin, few old rootlets and iron oxide staining, grab sample taken	
790									@29.5' - Concretionary bed, ~6" thick, continuous around boring	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-1

Date : 1/11/2021	Page 2 of 2	**Drilling Company :** Peter Drilling	
Project Name : Royal Vista Golf Course		**Type of Rig :** Limited Access Track Rig	
Project Number : 20080-01		**Drop :** 30"	**Hole Diameter :** 24"
Elevation of Top of Hole : ~ 898 ' MSL		**Drive Weight :** 140lbs	
Hole Location : See Geotechnical Map			

Logged by ARN/KTM

Sampled by ARN/KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		@31' - CB N40E, 14NW	R-3	8 30	92.1	28.6	ML	@30' - Sandy SILTSTONE: gray with red orange, very moist, hard	
				GB-3			38.1		@31' - Clay bed attitude, olive green and white, very moist, grab sample taken	AL
815										
	35								@35' - Interbeds up to ~1' thick, mostly sandstone	
810									@39' - End of visual log	
	40			R-4	12 35	95.6	24.5		@40' - Sandy SILTSTONE: olive gray with red orange, very moist, hard	
805										
	45			R-2	8 28	90.2	25.4		@45' - Sandy SILTSTONE: gray and orange brown, very moist, hard	
800									**Total Depth = 46'** **No Ground Water Encountered** **Backfilled with Cuttings on 1/11/2021**	
	50									
795										
	55									
790										
									@39' - End of visual log	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

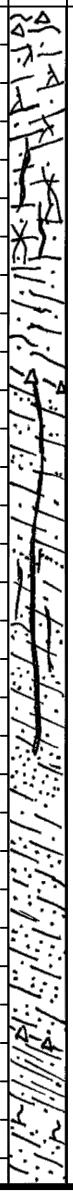
DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log BA-2

Date : 1/12/2021	Page 1 of 2	**Drilling Company :**	Peter Drilling
Project Name :	Royal Vista Golf Course	**Type of Rig :**	Limited Access Track Rig
Project Number :	20080-01	**Drop :** 30"	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 898 ' MSL	**Drive Weight :**	140lbs
Hole Location :	See Geotechnical Map		

Logged by ARN/KTM

Sampled by ARN/KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**@0' to T.D. - <u>Tertiary Puente Formation (Tp)</u>**	
								CL	@0' - Sandy clay, dark brown, moist, scattered rootlets; topsoil	
									@1' - Transition to bedrock, heavily weathered siltstone and sandstone, abundant fractures	
			@3' - GB N85W, 16NE						@1.5' - Sandstone and siltstone/claystone, well bedded, abundant iron oxide staining, healed fractures to ~7-feet	
815									@3' - General bedding attitude	
	5									
			@7' - GB N51E, 19NW						@7' - General bedding attitude on siltstone to sandstone contact, abundant soft sediment deformation	
810			@9.5' - CB N61E, 25 NW	GB-1			33.2		@9.5' - Attitude on sandy clay bed: olive gray, very moist, grab sample taken, ~6" thick, some infilled burrows	AL SA
	10			R-1	16 30	99.2	12.0	CH	@10' - CLAYSTONE to SILTSTONE with Sand: olive gray, slightly moist, hard	
805									@14' - Sheared silty sandstone beds, ~4" vertical offset, healed fractures, soft sediment deformation. Top of vertical fracture to 20' (non planar)	
	15									
800										
	20			R-2	15 35	107.8	10.6	SM	@20' - Silty SANDSTONE: light orange brown, moist, very dense; massive	
795										
	25			B-1						
			@27' - CB N85W, 17NE						@27' - Several claystone and siltstone interbeds; clay bed attitude on parting, smooth, polished. Decreased fractures below	
790									@29' - Fluid escape sedimentary structures	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-2

Date : 1/12/2021	Page 2 of 2	**Drilling Company :**	Peter Drilling
Project Name :	Royal Vista Golf Course	**Type of Rig :**	Limited Access Track Rig
Project Number :	20080-01	**Drop :** 30"	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 898 ' MSL	**Drive Weight :**	140lbs
Hole Location :	See Geotechnical Map		

Logged by ARN/KTM

Sampled by ARN/KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		@31' - B N85W, 20NE	R-3	22 40/4"	97.7	12.7	ML	@30' - SILTSTONE: pale olive, moist, hard @31' - Bedding attitude, thinly interbedded zone	DS
815										
	35		@36' - CB N85W, 21NE	GB-2			30.9		@36' - Attitude on bedding plane shear; clay with silt and trace sand: brown, very moist, stiff, waxy/polished surface; grab sample taken @37' - Concretion bed, ~8" thick, increased moisture to wet	
810										
	40			R-4	15 30	102.1	20.0	SC	@40' - Clayey SANDSTONE: gray with red orange, wet, very dense	
805										
	45			R-2	35 30	91.2	31.1	SC	@45' - Clayey SANDSTONE: gray with red orange, wet, very dense	
800									**Total Depth = 46'** **No Ground Water Encountered** **Backfilled with Cuttings on 1/12/2021**	
	50									
795										
	55									
790										

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-3

Date : 1/13/2021	Page 1 of 2	**Drilling Company :**	Peter Drilling
Project Name :	Royal Vista Golf Course	**Type of Rig :**	Limited Access Track Rig
Project Number :	20080-01	**Drop :** 30"	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 898 ' MSL	**Drive Weight :**	140lbs
Hole Location :	See Geotechnical Map		

Logged by ARN/KTM

Sampled by ARN

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**@0' to T.D. - <u>Tertiary Puente Formation (Tp)</u>** @0' - Sandy clay, dark brown, very moist, soft; topsoil @2' - Transition to bedrock, alternating sandstone and siltstone beds, abundant iron oxide and manganeese oxide staining, pervasive soft sediment deformation, healed bedrock fractures	
815			@3' - GB N85W, 14NW						@3' - General bedding attitude on siltstone bed	
	5									
			@7' - CB N75E, 14NW	GB-1			23.8		@7' - Clay bed attitude on bedding plane shear, ~$\frac{1}{4}$" sheared claystone, olive gray, very moist, hard with waxy sheared surfaces, rootlets; grab sample taken	
810										
	10			R-1 B-1	10 25	100.4	19.3	ML	@10' - Siltstone: light yellowish brown, very moist, hard; soft sediment deformation	DS
			@12' - GB N74E, 14 NW						@12' - General bedding attitude on claystone interbed	
805										
	15									
									@16' - Depositional fluid escape sedimentary structure, ~$\frac{1}{2}$" flame structure, clayey below	
			@18' - GB N80E, 16NW						@18' - General bedding sttitude on claystone bed, ~$\frac{1}{2}$" thick, green	
800										
	20			R-2	7 45	90.8	25.1		@20' - Sandy SILTSTONE: gray and red orange, very moist, hard	
			@22' - CB N75E, 15N						@22' - Clay bed attitude on very thin claystone bed, green, slightly waxy, just above concretionary bed	
795										
	25		@25' - CB N74E, 17NW						@25' - Clay bed attitude on bedding plane shear, slightly waxy, very thin, poorly developed	
				GB-2			27.9		@28' - Thin clay, ~$\frac{1}{4}$" thick, olive gray, very moist; grab sample taken	
790										

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-3

Date : 1/13/2021	Page 2 of 2	**Drilling Company :** Peter Drilling	
Project Name : Royal Vista Golf Course		**Type of Rig :** Limited Access Track Rig	
Project Number : 20080-01		**Drop :** 30"	**Hole Diameter :** 24"
Elevation of Top of Hole : ~ 898 ' MSL		**Drive Weight :** 140lbs	
Hole Location : See Geotechnical Map			

Logged by ARN/KTM

Sampled by ARN

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30			R-3	12 35	105.5	14.2	CL	@30' - Sandy CLAYSTONE: light brown and red orange, moist, hard; thinly bedded	
815										
	35		@35' - GB N82E, 15NW						@35' - Generalized bedding attitude on clayey sandstone bed, reddish maroon; alternated clay interbeds below @36' - Thin clay lenses	
810										
	40			R-4	10 45	101.1	16.4		@40' - Sandy CLAYSTONE: gray and red brown, moist, hard; concretionary bed ~$\frac{1}{4}$" thick @41' - End of visual log	
805										
	45			R-5	16 40/2"		8.7		@45' - Sandy CLAYSTONE: light gray and red orange, slightly moist, hard	
800									**Total Depth = 46'** **No Ground Water Encountered** **Backfilled with Cuttings on 1/13/2021**	
	50									
795										
	55									
790										

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-4

Date : 1/14/2021	Page 1 of 1	**Drilling Company :**	Peter Drilling
Project Name :	Royal Vista Golf Course	**Type of Rig :**	Limited Access Track Rig
Project Number :	20080-01	**Drop :** 30"	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 898 ' MSL	**Drive Weight :**	140lbs
Hole Location :	See Geotechnical Map		

Logged by ARN/KTM

Sampled by ARN/KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							CL	**@0' to T.D. - Undocumented Artificial Fill (afu)** @0' - Sandy clay, dark brown, very moist, scattered small rootlets to 3-feet	
815									@2.5' - Firmer material, medium brown with dark brown mottle; scattered gray clay blebs, and iron oxide-stained sand blebs	
	5								@4' - Sandy Clay to Clayey sand, scattered sand blebs ~1-2" in maximum dimension	
				GB-1			14.1		@8' - Sandy clay, dark gray brown, moist; grab sample taken	
810									@9' - Gradual color transition to gray brown and orange brown	
	10			R-1	7 8	107.4	16.8	SC	@10' - Clayey SAND: gray and red orange, very moist, medium dense	
				B-1						
805									@14' - Scattered globular concretions, ~1-inch in maximum dimension	
	15									
				GB-2					@16' - Clayey Sand and sandy clay; grab sample taken	
									@18' - Slightly sandier, occasional rootlet	
800									@19.5' - End of visual log; groundwater encountered	
	20			R-2	3 4	101.5	25.4	CL	@20' - Sandy CLAY: brown and light gray, wet, medium stiff	
795										
	25								**Total Depth = 30'** **Ground Water Encountered @ 19 feet** **Backfilled with Cuttings on 1/14/2021**	
790										
	30									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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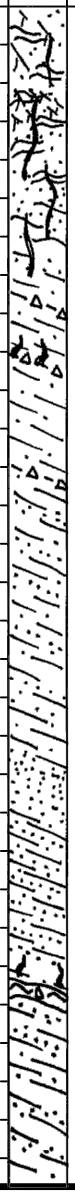
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log BA-5

Date : 1/14/2021 to 1/15/2021	Page 1 of 2	**Drilling Company :** Peter Drilling	
Project Name : Royal Vista Golf Course		**Type of Rig :** Limited Access Track Rig	
Project Number : 20080-01		**Drop :** 30"	**Hole Diameter :** 24"
Elevation of Top of Hole : ~ 898 ' MSL		**Drive Weight :** 140lbs	
Hole Location : See Geotechnical Map			

Logged by ARN/KTM

Sampled by ARN

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							CL	**@0' to T.D.' - <u>Tertiary Puente Formation (Tp)</u>** Sandy clay, dark brown, moist, scattered rootlets; topsoil/colluvium @2.5' - Sandy clay, abrupt transition to very stiff, abundant caliche, saprolite	
815			@6' - GB N/S, 8W						@4' - Bedrock	
	5								@5' - Clayey sandstone: gray and orange brown, dense, slightly moist, abundant vertical tension fractures, healed @6' - Generalized bedding attitude on sandy claystone bed, ~2.5"-thick, fractures above and below bed	
			@7.5' - CB N14E, 15NW	GB-1			28.1		@7.5' - Clay bed attitude on sandy claystone interbed; grab sample taken	
810			@9' - GB N2W, 11SW	GB-2			37.5		@9' - Generalized bedding attitude on clay with sand, rusty brown, very moist, ½" thick to 5" thick undulatory clay bed; grab sample taken; soft sediment deformation	
	10			B-1						
			@12' - CB N16E, 15NW						@12' - Attitude taken on clay, ~1" thick, fractures in overlying sandstone are clay filled	
805										
	15		@16' - GB N/S, 12W						@16' - General bedding attitude on iron oxide stained silty sand interbed	
800										
	20			R-1	5 25	106.2	8.5	SP	@20' - SANDSTONE: gray and red orange, moist, dense @22' - thinly interbedded siltstone and sandstone	
795										
	25			GB-3			47.6		@25' - Silt bed with clay clasts on undulatory clayey surface, soft sediment deformation; soft, silty sandstone below; grab sample taken	AL SA
790			@29' - B N10E, 13 W						@29' - Bedding attitude on siltstone interbeds	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-5

Date : 1/14/2021 to 1/15/2021	Page 2 of 2	**Drilling Company :** Peter Drilling	
Project Name : Royal Vista Golf Course		**Type of Rig :** Limited Access Track Rig	
Project Number : 20080-01		**Drop :** 30"	**Hole Diameter :** 24"
Elevation of Top of Hole : ~ 898 ' MSL		**Drive Weight :** 140lbs	
Hole Location : See Geotechnical Map			

Logged by ARN/KTM

Sampled by ARN

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30			R-2	15 35	99.7	23.7	SM	@30' - Silty SANDSTONE: gray and red orange, very moist, very dense	
815	35		@33' - GB N26E, 21NW	GB-4			51.6		@32' - Generalized bedding attitude on clay: gray brown, wet; grab sample taken; $\frac{1}{4}$" inch clay, claystone and siltstone rip-up clasts above black clayey sand @33' - Active seepage form sandstone bed	
810	40								@36' - End of visual log; ground water encountered	
				R-3	20 25	99.9	23.0	CL	@40' - Clayey SILTSTONE: dark gray, very moist, hard	
805	45								**Total Depth = 41'** **Ground Water Encountered @ 33'** **Backfilled with Cuttings on 1/15/2021**	
800	50									
795	55									
790										

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
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TEST TYPES:

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

Geotechnical Boring Log Borehole HS-1

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~521' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
520	0							**@0' to 20' Artificial Fill - Undocumented (afu):** @0' - Silty SAND: dark gray brown, moist; grass	
			R-1	6 9 11	108.1	8.7	SM	@2.5' - Silty SAND: dark gray brown, moist, medium dense; scattered roots/rootlets	-#200
515	5		SPT-1	5 4 5		12.7	ML	@5' - Sandy SILT: medium to dark brown, moist, stiff	
			R-2	3 7 10	111.5	18.8		@7.5' - Sandy SILT: brown, very moist, stiff	
510	10		SPT-2	4 5 7		18.4	CL-ML	@10' - Clayey SILT: light brown, very moist, stiff	AL
505	15		R-3	7 10 12	105.0	22.8	CL	@15' - CLAY: brown, stiff, wet	
500	20		SPT-3	8 10 14		32.0	ML	**@20' to T.D. Tertiary Puente Formation (Tp):** @20' Sandy SILT: light gray and light red-orange, wet, very stiff	
495	25		R-4	21 50/3"	96.2	25.2	SM	@25' Silty SAND: gray with red-orange staining, wet, very dense	
	30							Total Depth = 26.5' Groundwater Encountered at Approximately 9' Backfilled with Cuttings on 6/9/2020	

LGC Geotechnical, Inc.

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

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-2

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~523' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 15' Artificial Fill - Undocumented (afu):** @0' - CLAY: dark brown, moist; grass	
520			SPT-1	6 8 10		17.1	CL	@2.5' - CLAY: dark brown, moist, very stiff; scattered rootlets	AL
	5		R-1	11 19 25	113.0	16.4		@5' - CLAY: gray brown, moist, very stiff	
515			SPT-2	5 8 9		18.1		@7.5' - Sandy CLAY: olive brown, very moist, very stiff	
	10		R-2	15 20 26	98.9	26.9	MH	@10' - SILT: blue gray and rusty brown, very moist, very stiff	
510									
	15		SPT-3	10 25 50		27.9	SM	**@15' to T.D. Tertiary Puente Formation (Tp):** @15' - SANDSTONE: bluegray and red orange, wet, very dense	
505								Total Depth = 16.5' Groundwater Not Encountered Backfilled with Cuttings on 6/9/2020	
	20								
500									
	25								
495									
	30								

LGC Geotechnical, Inc.

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

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-3

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~548' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 20' Artificial Fill - Undocumented (afu):** @0' - Sandy CLAY: olive gray, moist; grass	
545			R-1	9 13 15	111.8	17.4	CL	@2.5' - Sandy CLAY: olive gray, moist, very stiff; mottled coloration; scattered rootlets	
	5		SPT-1	3 3 5		19.2		@5' - Sandy CLAY: tan and gray, very moist, medium stiff	
540			R-2	5 6 8	105.9	20.8	SM	@7.5' - Silty SAND: olive gray, wet, medium dense	
	10		SPT-2	4 2 3		22.5		@10' - Silty SAND: olive gray, wet, loose	
535									
	15		R-3	4 4 15	98.3	25.7	ML	@15' - Sandy SILT: olive gray with red orange, wet, stiff	
530									
	20		SPT-3	50/3"		18.0	SM	**@20' to T.D. Tertiary Puente Formation (Tp):** @20' - Silty SAND: light gray and light red-orange, wet, very dense	
525								Total Depth = 21.5' Groundwater Encountered at Approximately 4' Backfilled with Cuttings on 6/9/2020	
	25								
520									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

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

TEST TYPES:

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-4

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~550' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 7.5' Artificial Fill - Undocumented (afu):** @0' - Sandy CLAY: dark brown, very moist; grass	
			R-1	3 2 6	104.2	21.0	SC	@2.5' - Clayey SAND: brown, wet, loose; scattered rootlets	-#200, AL, MD
545	5		SPT-1	5 6 10		18.6	ML	@5' - Sandy SILT: dark olive gray, wet, very stiff	
								@7.5' to T.D. Tertiary Puente Formation (Tp):	
			R-2	15 14 8	106.6	19.3	ML	@7.5' - Sandy SILT: light gray brown with red orange, wet, stiff	
540	10		SPT-2	6 9 10		28.4		@10' - Sandy SILT: gray and red orange, wet, very stiff	
535	15		R-3	13 14 44	90.4	30.7	MH	@15' - Sandy SILT: light gray with red-orange, wet, hard; well bedded; healed jointing	
								Total Depth = 16.5' Groundwater Encountered at Approximately 2.5' Backfilled with Cuttings on 6/9/2020	
530	20								
525	25								
	30								

LGC Geotechnical, Inc.

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

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-5

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~564' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 2.5' Artificial Fill - Undocumented (afu):**	
								@0' - Sandy SILT: dark reddish brown, moist; grass	
								@2.5' to T.D. Tertiary Puente Formation (Tp):	
			SPT-1	11 35 40		9.8	SM	@2.5' - Silty SAND: light brown, moist, very dense	
560									
	5		R-1	43 50/4"	106.7	8.6		@5' - Silty SAND: light brown, moist, very dense	
			SPT-2	27 50/6"		14.5		@7.5' - Silty SAND: rusty brown, very moist, very dense	
555									
	10		R-2	50/4"				@10' - Silty SAND: rusty brown, moist, very dense	
								Total Depth = 10'	
								Groundwater Not Encountered	
								Backfilled with Cuttings on 6/9/2020	
550									
	15								
545									
	20								
540									
	25								
535									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

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

TEST TYPES:

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-6

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~601' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
600	0	B-1						**@0' to 15' Artificial Fill - Undocumented (afu):** @0' - Sandy SILT: dark brown, moist; grass	-#200, CR, EI, MD
			R-1	2 2 3	93.8	26.2	ML	@2.5' - Sandy SILT: gray brown, very moist, soft; scattered rootlets	
595	5		SPT-1	P 1 3		24.0		@5' - Sandy SILT: dark brown, wet, soft	
			R-2	3 4 7	104.1	21.3		@7.5' - Sandy SILT: gray brown, wet, medium stiff; scattered organics/old leaves	
590	10		SPT-2	4 6 9		18.8	CL	@10' - Sandy CLAY: gray brown, very moist to wet, stiff	
585	15		R-3	7 16 29	107.7	18.6	SM	@15' - Silty SAND: blue gray and red-orange, wet, dense	
580	20		SPT-3	38 40 50/5"		21.7		@20' - Silty SAND: tan and red-orange, wet, very dense	
575	25							Total Depth = 21.5' Groundwater Encountered at Approximately 5' Backfilled with Cuttings on 6/9/2020	
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
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G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-7

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~638' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 25' Artificial Fill - Undocumented (afu):** @0' - Sandy SILT: dark gray, moist; grass	
635			SPT-1	3 4 6		15.9	ML	@2.5' - Sandy SILT: dark gray, very moist, stiff	
	5		R-1	12 20 24	117.3	16.4	CL	@5' - CLAY with Sand: dark gray, moist, very stiff	
630			SPT-2	9 12 14		16.6		@7.5' - Sandy CLAY: dark gray, moist, very stiff; abundant rootlets	
	10		R-2	31 31 15	119.3	12.4	SC	@10' - Clayey SAND: brown, very moist, dense; minor orange and yellow mottle	
625									
	15		SPT-3	7 10 12		17.2		@15' - Clayey SAND: blue gray and red-orange, very moist, medium dense	
620									
	20		R-3	16 22 23	104.7	22.0	CL	@20' - Sandy CLAY: blue gray and red orange, very moist, very stiff	
615								@22' - harder drilling	
	25		SPT-4	15 35 50/3"		25.1	SM	**@25' to T.D. Tertiary Puente Formation (Tp):** @25' - Silty SAND: blue gray and red-orange, wet, very dense	
610								Total Depth = 26.5' Groundwater Encountered at Approximately 23' Backfilled with Cuttings on 6/9/2020	
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

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

TEST TYPES:

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

Last Edited: 7/7/2020

Appendix C
Laboratory Test Results

APPENDIX C

Laboratory Test Results

The laboratory testing program was directed towards providing quantitative data relating to the relevant engineering properties of the soils. 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 driven samples obtained from the test borings. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined from SPT or disturbed samples.

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 was dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D6913 (sieve) or ASTM D422 (sieve and hydrometer).

Sample Location	Description	% Passing # 200 Sieve
HS-1 @ 2.5 ft	Silty SAND	41
HS-4 @ 1-5 ft	Clayey SAND	49
HS-6 @ 1-5 ft	Sandy SILT	50
BA-2 @ 9.5 ft	Fat CLAY	67
BA-5 @ 25 ft	Fat CLAY	93

Expansion Index: The expansion potential of a selected representative sample was evaluated by the Expansion Index Test per ASTM D4829.

Sample Location	Expansion Index	Expansion Potential*
HS-6 @ 1-5 ft	56	Medium

* Per ASTM D4829

Laboratory Test Results

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined per ASTM 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.

Sample Location	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Soil Classification
HS-1 @ 10 ft	24	19	5	CL-ML
HS-2 @ 2.5 ft	40	14	26	CL
HS-4 @ 1-5 ft	26	14	12	CL
BA-1 @ 31 ft	64	27	37	CH
BA-2 @ 9.5 ft	58	33	25	MH
BA-5 @ 25 ft	61	22	39	CH

Direct Shear: Three direct shear tests were performed on undisturbed samples, which were 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 plots are provided in this Appendix.

Laboratory Compaction: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557. The results of this tests are presented in the table below.

Sample Location	Sample Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
HS-4 @ 1-5 ft	Dark Brown Clayey SAND	114.0	9.0
HS-6 @ 1-5 ft	Grayish Dark Brown Sandy SILT	116.0	15.5

Laboratory Test Results

Soluble Sulfates: The soluble sulfate content of a selected sample was determined by standard geochemical methods (CTM 417). The test results are presented in the table below.

Sample Location	Sulfate Content (%)
HS-6 @ 1-5 ft	< 0.05

Chloride Content: Chloride content was tested per CTM 422. The results are presented below.

Sample Location	Chloride Content (ppm)
HS-6 @ 1-5 ft	144

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.

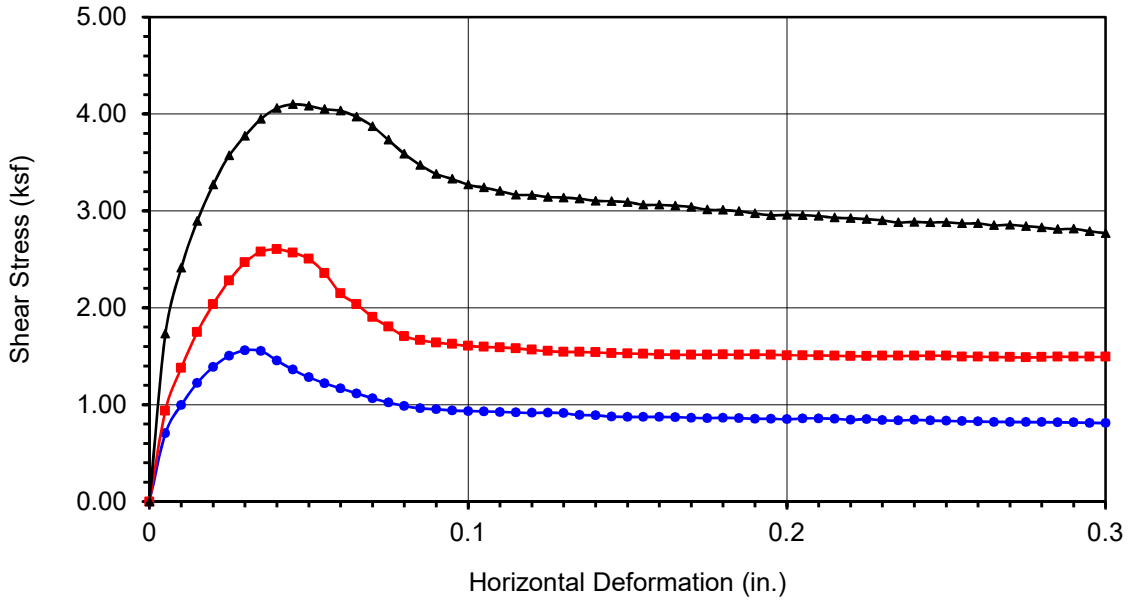
Sample Location	pH	Minimum Resistivity (ohms-cm)
HS-6 @ 1-5 ft	8.54	710

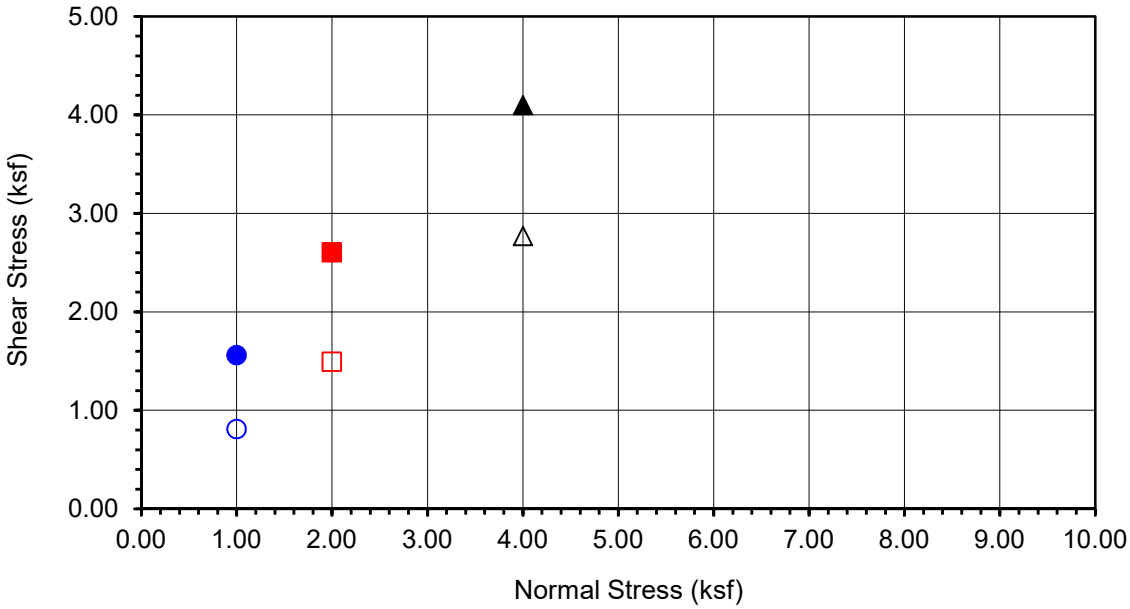
DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Rowland Heights	Tested By:	G. Bathala	Date:	01/25/21
Project No.:	20080-01	Checked By:	J. Ward	Date:	02/16/21
Boring No.:	BA-1	Sample Type:	Ring		
Sample No.:	R-1	Depth (ft.):	10.0		
Soil Identification:	Light olive brown siltstone with sand (ML)s				

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	193.01	194.90	196.45
Weight of Ring(gm):	43.92	45.44	46.08
Before Shearing			
Weight of Wet Sample+Cont.(gm):	179.29	179.29	179.29
Weight of Dry Sample+Cont.(gm):	165.03	165.03	165.03
Weight of Container(gm):	35.69	35.69	35.69
Vertical Rdg.(in): Initial	0.0000	0.2443	0.2282
Vertical Rdg.(in): Final	-0.0020	0.2507	0.2379
After Shearing			
Weight of Wet Sample+Cont.(gm):	222.10	222.18	217.53
Weight of Dry Sample+Cont.(gm):	197.67	197.91	193.66
Weight of Container(gm):	64.89	66.08	61.21
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-1**
Depth (ft)	**10**

Sample Type:

Ring

Soil Identification:
Light olive brown siltstone with sand (ML)s

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.562	■ 2.603	▲ 4.099
Shear Stress @ End of Test (ksf)	○ 0.811	□ 1.493	△ 2.770
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 (%)	11.03	11.03	11.03
Dry Density (pcf)	111.7	112.0	112.6
Saturation (%)	58.4	58.9	60.0
Soil Height Before Shearing (in.)	0.9980	0.9936	0.9903
Final Moisture Content (%)	18.4	18.4	18.0

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 20080-01

Rowland Heights

01-21

DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Rowland Heights	Tested By:	G. Bathala	Date:	01/26/21
Project No.:	20080-01	Checked By:	J. Ward	Date:	02/16/21
Boring No.:	BA-2	Sample Type:	Ring		
Sample No.:	R-3	Depth (ft.):	30.0		
Soil Identification:	Pale olive siltstone (ML)				

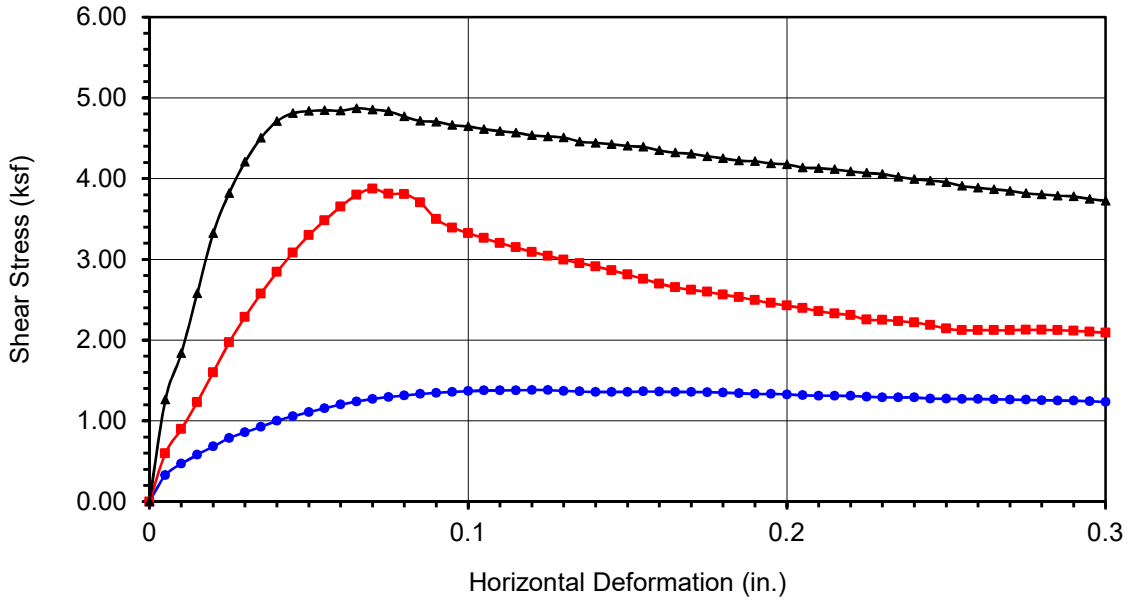
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	167.87	182.57	185.86
Weight of Ring(gm):	45.60	45.78	46.08

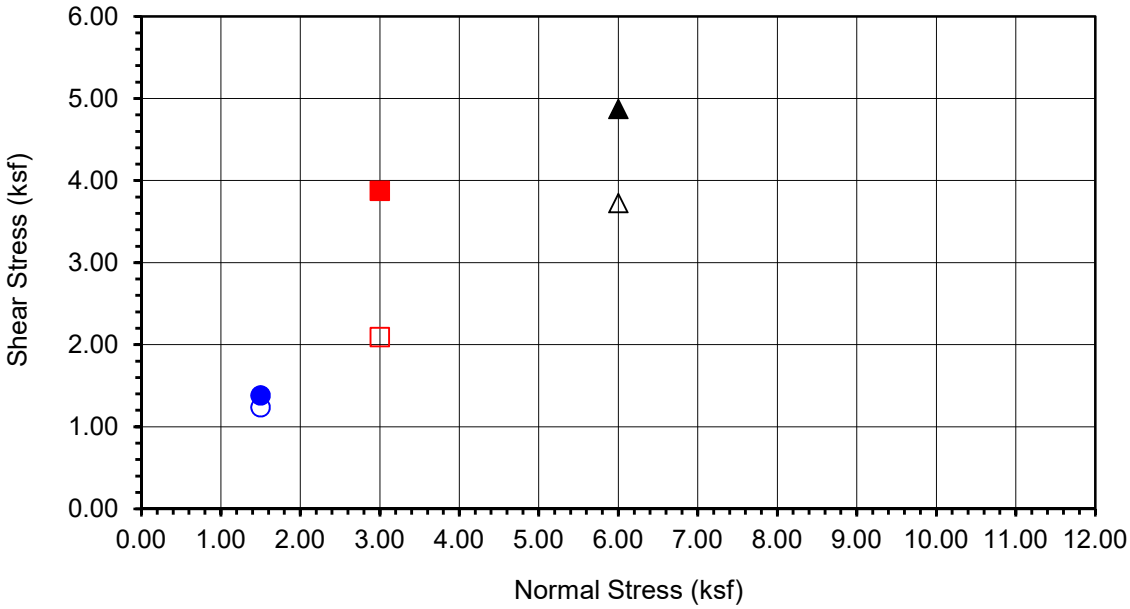
Before Shearing

Weight of Wet Sample+Cont.(gm):	182.19	182.19	182.19
Weight of Dry Sample+Cont.(gm):	169.12	169.12	169.12
Weight of Container(gm):	65.89	65.89	65.89
Vertical Rdg.(in): Initial	0.2583	0.2471	0.0000
Vertical Rdg.(in): Final	0.2681	0.2571	-0.0145

After Shearing

Weight of Wet Sample+Cont.(gm):	195.59	198.27	196.98
Weight of Dry Sample+Cont.(gm):	166.36	162.23	167.67
Weight of Container(gm):	60.94	59.13	52.64
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-3**
Depth (ft)	**30**

Sample Type:

Ring

Soil Identification:
Pale olive siltstone (ML)

Normal Stress (kip/ft²)	1.500	3.000	6.000
Peak Shear Stress (kip/ft²)	● 1.383	■ 3.873	▲ 4.870
Shear Stress @ End of Test (ksf)	○ 1.236	□ 2.091	△ 3.725
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 (%)	12.66	12.66	12.66
Dry Density (pcf)	90.3	101.0	103.2
Saturation (%)	39.4	51.1	54.0
Soil Height Before Shearing (in.)	0.9902	0.9900	0.9855
Final Moisture Content (%)	27.7	35.0	25.5

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 20080-01

Rowland Heights

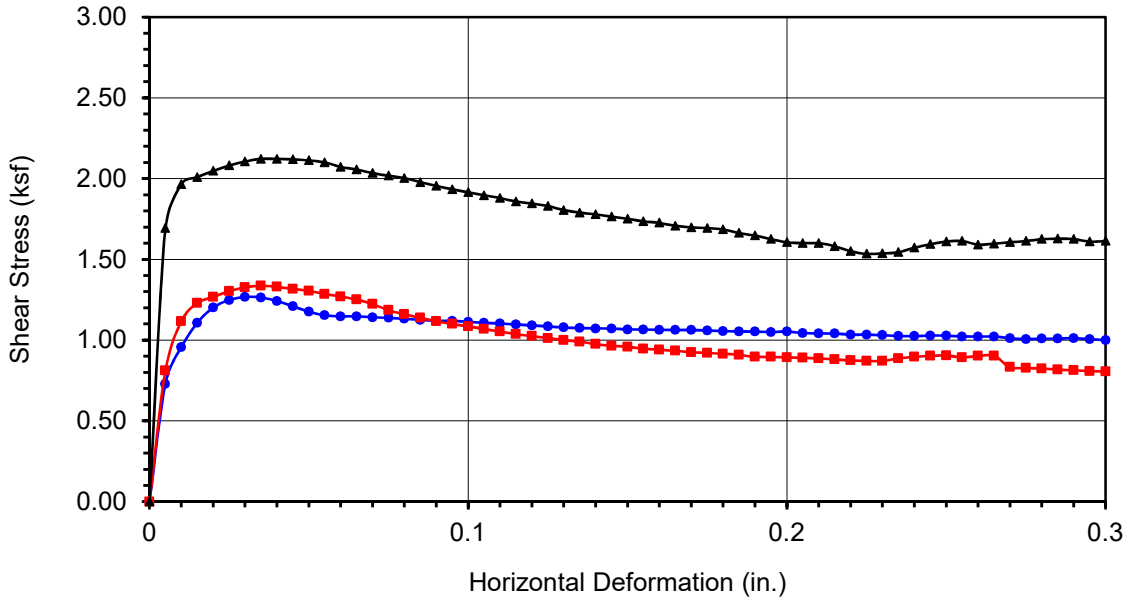
01-21

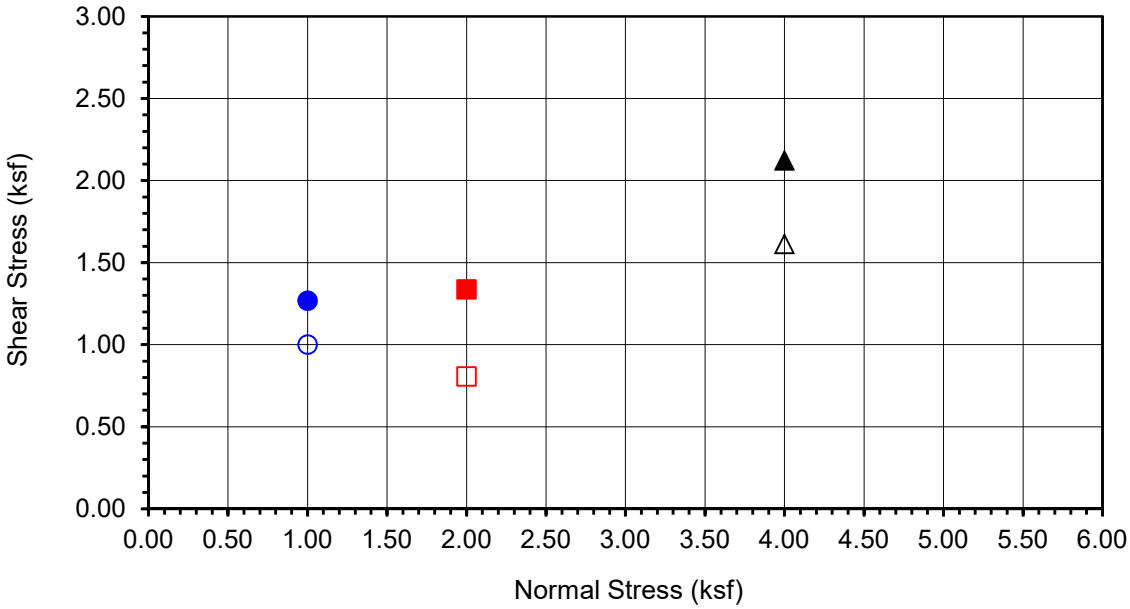
DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Rowland Heights	Tested By:	G. Bathala	Date:	01/26/21
Project No.:	20080-01	Checked By:	J. Ward	Date:	02/16/21
Boring No.:	BA-3	Sample Type:	Ring		
Sample No.:	R-1	Depth (ft.):	10.0		
Soil Identification:	Light yellowish brown siltstone (ML)				

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	179.69	191.42	193.39
Weight of Ring(gm):	42.46	45.81	46.11
Before Shearing			
Weight of Wet Sample+Cont.(gm):	164.30	164.30	164.30
Weight of Dry Sample+Cont.(gm):	144.07	144.07	144.07
Weight of Container(gm):	39.42	39.42	39.42
Vertical Rdg.(in): Initial	0.0000	0.2793	0.2647
Vertical Rdg.(in): Final	-0.0047	0.2884	0.2779
After Shearing			
Weight of Wet Sample+Cont.(gm):	209.70	216.32	210.82
Weight of Dry Sample+Cont.(gm):	181.54	186.39	178.65
Weight of Container(gm):	64.89	66.08	61.70
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**BA-3**
Sample No.	**R-1**
Depth (ft)	**10**

Sample Type:

Ring

Soil Identification:
Light yellowish brown siltstone (ML)

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.267	■ 1.336	▲ 2.122
Shear Stress @ End of Test (ksf)	○ 1.000	□ 0.805	△ 1.613
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 (%)	19.33	19.33	19.33
Dry Density (pcf)	95.6	101.5	102.6
Saturation (%)	68.5	79.0	81.3
Soil Height Before Shearing (in.)	0.9953	0.9909	0.9868
Final Moisture Content (%)	24.1	24.9	27.5

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 20080-01

Rowland Heights

01-21

Appendix D
Infiltration Test Results

Infiltration Test Data Sheet

LGC Geotechnical, Inc

131 Calle Iglesia Suite A, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Royal Vista
Project Number: 20080-01
Date: 1/20/2021
Location: I-1

Test hole dimensions (if circular)	
Boring Depth (feet)*:	5
Boring Diameter (inches):	6
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

Pre-Soak /Pre-Test

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)	Comments
PS-1	7:35	7:45	10.0	3.20	3.33	0.13	
PS-2	7:45	7:55	10.0	3.33	3.43	0.1	
Pre-Test	7:55	8:05	10.0	3.43	3.53	0.1	

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, Δt (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, ΔD (feet)	Surface Area of Test Section (feet ^2)	Raw Percolation Rate (in/hr)
1	8:06	8:36	30.0	3.53	3.70	0.17	2.51	0.3
2	8:37	9:07	30.0	3.47	3.59	0.12	2.60	0.2
3	9:07	9:37	30.0	3.44	3.54	0.10	2.65	0.2
4	9:38	10:08	30.0	3.54	3.67	0.13	2.49	0.2
5	10:09	10:39	30.0	3.42	3.51	0.09	2.68	0.2
6	10:40	11:10	30.0	3.51	3.62	0.11	2.54	0.2
7	11:11	11:41	30.0	3.33	3.40	0.07	2.82	0.1
8	11:42	12:12	30.0	3.40	3.49	0.09	2.71	0.2
9								
10								
11								
12								

Measured Infiltration Rate	**0.2**
Reduction Factor	TBD

Sketch:

Notes:

Based on Guidelines from: LA County dated 06/2017

Spreadsheet Revised on: 12/23/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc

131 Calle Iglesia Suite A, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Royal Vista
Project Number: 20080-01
Date: 1/20/2021
Location: I-2

Test hole dimensions (if circular)	
Boring Depth (feet)*:	5.1
Boring Diameter (inches):	6
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

Pre-Soak /Pre-Test

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)	Comments
PS-1	8:15	8:25	10.0	3.77	3.78	0.01	
PS-2	8:25	8:35	10.0	3.78	3.78	0	
Pre-Test	8:35	8:45	10.0	3.78	3.79	0.01	

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, Δt (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, ΔD (feet)	Surface Area of Test Section (feet ^2)	Raw Percolation Rate (in/hr)
1	8:46	9:16	30.0	3.79	3.83	0.04	2.25	0.1
2	9:17	9:47	30.0	3.51	3.55	0.04	2.69	0.1
3	9:48	10:18	30.0	3.55	3.60	0.05	2.63	0.1
4	10:19	10:49	30.0	3.60	3.65	0.05	2.55	0.1
5	10:50	11:20	30.0	3.65	3.69	0.04	2.47	0.1
6	11:21	11:51	30.0	3.69	3.72	0.03	2.41	0.1
7	11:52	12:22	30.0	2.65	2.71	0.06	4.04	0.1
8	12:23	12:53	30.0	2.71	2.76	0.05	3.95	0.1
9								
10								
11								
12								

Measured Infiltration Rate	**0.1**
Reduction Factor	TBD

Sketch:

Notes:

Based on Guidelines from: LA County dated 06/2017

Spreadsheet Revised on: 12/23/2019

Infiltration Test Data Sheet

LGC Geotechnical, Inc

131 Calle Iglesia Suite A, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Royal Vista
Project Number: 20080-01
Date: 1/20/2021
Location: I-3

Test hole dimensions (if circular)	
Boring Depth (feet)*:	6.2
Boring Diameter (inches):	6
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

Pre-Soak /Pre-Test

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)	Comments
PS-1	8:55	9:05	10.0	3.80	4.03	0.23	
PS-2	9:05	9:15	10.0	4.03	4.22	0.19	
Pre-Test	9:15	9:25	10.0	4.22	4.41	0.19	

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, Δt (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, ΔD (feet)	Surface Area of Test Section (feet ^2)	Raw Percolation Rate (in/hr)
1	9:26	9:56	30.0	3.56	4.14	0.58	4.34	0.6
2	9:57	10:27	30.0	3.48	4.05	0.57	4.47	0.6
3	10:28	10:58	30.0	3.50	4.01	0.51	4.44	0.5
4	10:59	11:29	30.0	3.44	3.98	0.54	4.53	0.6
5	11:30	12:00	30.0	3.44	4.00	0.56	4.53	0.6
6	12:01	12:31	30.0	3.48	4.02	0.54	4.47	0.6
7	12:31	13:01	30.0	3.31	3.85	0.54	4.74	0.5
8	13:02	13:32	30.0	3.49	4.04	0.55	4.45	0.6
9								
10								
11								
12								

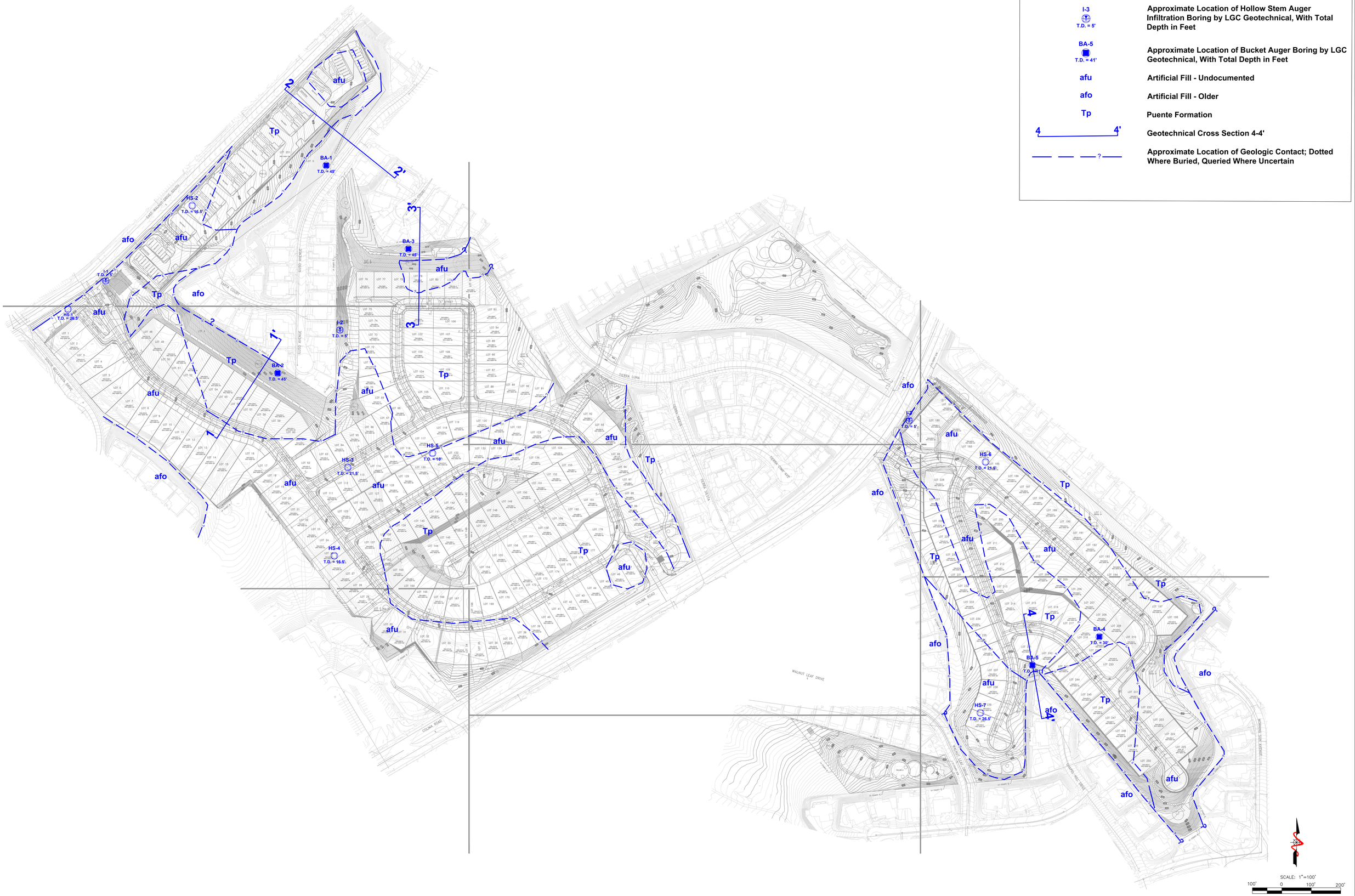
Measured Infiltration Rate	**0.6**
Reduction Factor	TBD

Sketch:

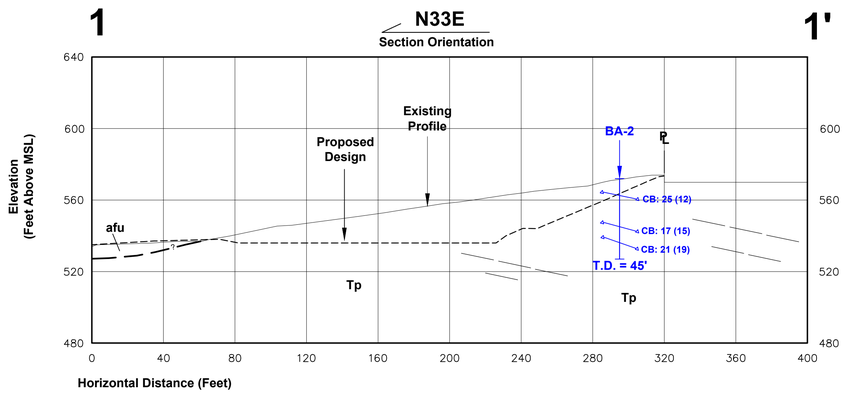
Notes:

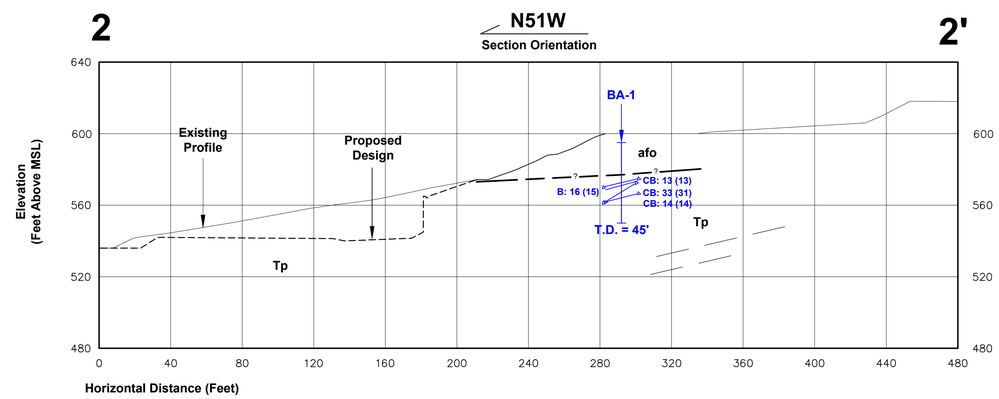
Based on Guidelines from: LA County dated 06/2017

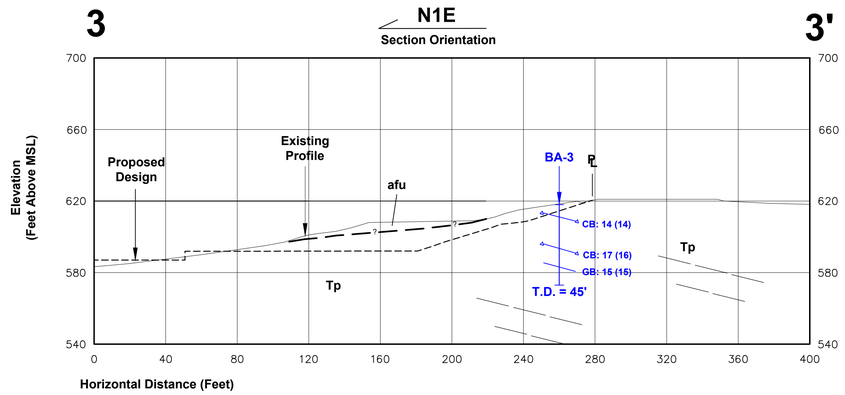
Spreadsheet Revised on: 12/23/2019

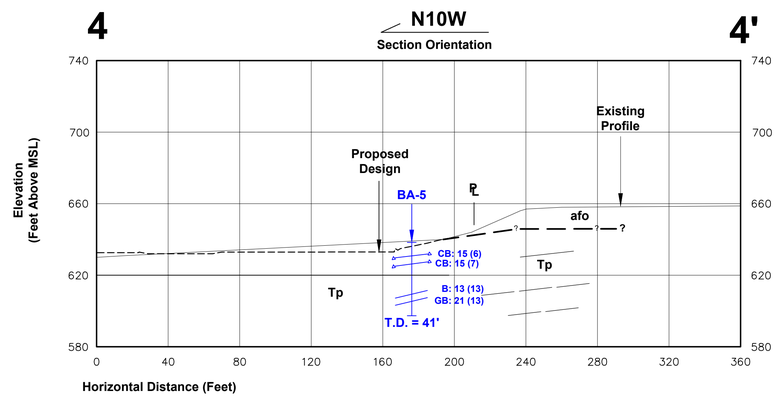


LGC Geotechnical, Inc.	LGC Geotechnical, Inc. 131 Calle Iglesia, Ste. 200 San Clemente, CA 92672 TEL (949) 369-6141 FAX (949) 369-6142	**Geotechnical Map**	CLIENT: Project Dimensions	CIVIL ENGINEER: Fuscoe Engineering	PROJECT NAME: Project Dimensions - Royal Vista PROJECT NO.: 20080-01 ENG. / GEOL.: RLD / KBC SCALE: 1" = 100' DATE: July 2021 **SHEET 1 of 2**









SCALE: 1"=40'
40' 0 40' 80'

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

Geotechnical Cross Sections
1-1' through 4-4'

PROJECT NAME	Royal Vista Golf Course
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1"=40'
DATE	July 2021

SHEET 2 of 2

May 1, 2023 Project No. 20080-01

Mr. Jon Conk
Project Dimensions, Inc.
4 Park Plaza, Suite 700
Irvine, California 92614

Subject: ***Geotechnical Addendum Report and Response to Geotechnical Review Comments Regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, Los Angeles County, California***

Introduction

In accordance with your request, LGC Geotechnical, Inc. has prepared this geotechnical addendum report and response to geotechnical review comments dated December 27, 2022, regarding the proposed residential development to be located on portions of the existing Royal Vista Golf Course in the Rowland Heights area of Los Angeles County, California. The provided review comments (Los Angeles County, 2022) are primarily based on our Summary of Geotechnical Evaluation and Feasibility Study (LGC Geotechnical, 2020), our Updated Summary of Geotechnical Evaluation and Feasibility Study (LGC Geotechnical, 2021a) and our first Response to Review Comments (LGC Geotechnical, 2021b).

This response-report should be considered as part of the project design documents in conjunction with our previous geotechnical reports (refer to references). In the case of conflict, the recommendations contained herein should supersede those provided in our previous reports. The remaining recommendations provided in our previous geotechnical reports remain valid and applicable.

Additional Subsurface Geotechnical Evaluation

A supplemental geotechnical evaluation has been performed to gather more data for the site. The focus on the study was gathering subsurface data in the southeastern portion of the site to evaluate potential slope stability concerns. Three large-diameter borings (BA-6 through BA-8) were drilled by Peter Drilling & Contracting, Inc. under subcontract to LGC Geotechnical. All borings were excavated utilizing a limited access, rubber-track mounted drill rig. The depth of the borings ranged from approximately 23 to 29 feet below existing grade. An LGC Geotechnical representative observed the drilling operations, surface logged the borings, and collected soil samples for laboratory testing. The borings were then then entered and down-hole logged by a geologist from our firm.

Driven soil samples were collected by means of the Modified California Drive (MCD) sampler generally obtained at 10-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 MCD sampler was driven using a 140-pound hammer falling approximately 30 inches to advance the sampler a total depth of 12 inches or until refusal. The raw blow counts for each 6-inch increment of penetration were recorded on the boring logs. Bulk samples were also collected at select depths for laboratory testing. At the completion of drilling, the borings were backfilled with cuttings and tamped.

The approximate locations of our subsurface explorations are provided on the Geotechnical Map (Sheet 1). The boring logs are provided in Appendix B.

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, Atterberg Limits, direct shear, and torsional ring shear.

The following is a summary of the laboratory test results.

- Dry density of the samples collected ranged from approximately 95 pounds per cubic foot (pcf) to 114 pcf, with an average of 103 pcf. Field moisture contents ranged from approximately 15 percent to 26 percent, with an average of 21 percent.
- One Atterberg Limits (liquid limit and plastic limit) test was performed. Results indicated a Plasticity Index value of 32.2. The plot is provided in Appendix C.
- Direct shear tests were performed on select driven samples. The plots are provided in Appendix C.
- Torsional ring shear tests were performed on a grab sample of site clay materials. The plots are provided in Appendix C.

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.

Geotechnical Conditions

Based on the findings of our study, a known ancient landslide that partially reactivated in southeast of the site in 1995, is present below the southeastern portion of the subject site. The California Geological Survey (CGS) Landslide Inventory database depicts a landslide as underlying Morning Sun Avenue and the residences thereon, and a portion of the residential development to the east (refer to Figure 2, Landslide Regional Map, rear of text). Recent exploration indicates the limits of the landslide extends further to the northwest than shown on the CGS map, below the existing streets and properties on portions of Morning Sun Avenue and Shepherd Hill Road, and onto the subject site (Geotechnical Map, Sheet 1).

LGC Geotechnical was the geotechnical consultant of record for the South Pointe Residential Development located east of Morning Sun Avenue, that was rough graded in 2015. At that time, we reviewed information relative to reactivation of the Morning Sun Landslide, as it impacted the 1600

block of Morning Sun Avenue and the rear yards of the 1700 block. A portion of Morning Sun Avenue was destroyed by the landslide, blocking vehicular access to residents in the affected area (Leighton, 2003). The landslide was not encountered during the grading of the South Pointe development, as it had been previously removed during mitigation of the Morning Sun Landslide.

During the recent exploration borings at the site, borings BA-6, BA-7, and BA-8 were downhole logged by a geologist. Heavy groundwater seepage was encountered in each of the borings, and some caving of boreholes prevented full logging of the borings. Material observed in boring BA-6 was highly sheared and saturated landslide debris, generally lacking structure. Boring BA-7 was successfully logged to total depth, however, and the landslide material was observed to be competent, block-glide landslide over bedrock of the Tertiary Puente Formation. The Soquel Member of the Puente Formation was thinly interbedded siltstone and sandstone with few clay beds, as observed in boring BA-7. The ruptured surface was generally parallel to bedding in the formation, dipping 9 to 13 degrees west to northwest. Boring BA-8 was highly saturated and caving landslide in the upper portion, however the sample at 20 feet in depth appeared to be bedrock (not observed directly).

The approximate extent of the onsite portion of the landslide is depicted on our Geotechnical Map, Sheet 1. Geotechnical cross-section(s) have been generated to model the landslide, refer to Sheet 2. Slope stability analysis has been performed on the generated cross-sections to evaluate the stability of the proposed development, as discussed in the sections below.

Preliminary Shear Strength Parameters

The preliminary soil shear strength parameters presented in Table 1 below page were utilized in our feasibility level slope stability analysis and are based on our recent laboratory testing, our previous laboratory testing (references), laboratory testing of nearby site materials (Leighton, 2010) and published shear strength data (CGS, 2005a). Soil shear strength was increased (generally below composite peak) for select temporary and seismic loading conditions, where supported by laboratory test data. Laboratory test results are provided in Appendix C.

Table 1

Preliminary Soil Shear Strength Parameters for Feasibility Slope Stability Analysis

Soil Type	Static		Seismic	
	ϕ (Degrees)	**Cohesion (psf)**	**ϕ (Degrees)**	**Cohesion (psf)**
Existing Fill (afo)	32	150	34	200
Compacted Fill (af)*	32	200	34	200
Puente Formation – Across Bedding* **	32	400	34	400
Landslide Debris	32	400	34	400
Landslide Rupture Surface*	10	0	10	0
Clay Bed*	10	250	12	300

*Uses data from nearby site
**Uses Data from Yorba Linda Quadrangle

Feasibility Level Slope Stability Analysis

Preliminary feasibility level global slope stability analyses were performed on critical Cross-Section 7-7' positioned in the southeast region of the site near Lot 225 based on the proposed design profile. Slope stability analysis was performed using the computer program GSTABL7 with STEDwin version 2.005.3 (Gregory Geotechnical Software, 2013). Potential block failure modes were analyzed using Janbu's Simplified Method. Slope stability analysis was performed for static and pseudo-static (seismic) loading conditions. A minimum factor of safety of 1.5 and 1.1 is typically required for static and seismic loading conditions.

Based on the preliminary site plans and feasibility level mitigation measures proposed along the subject slope (e.g., buttress, shear pins, tiebacks, etc.), slope stability analysis indicates global factors of safety greater than 1.5 and 1.1 for static and seismic loading conditions, respectively. Feasibility level slope stability analysis for Cross Section 7-7' is provided in Appendix D. Preliminary zone of necessitated mitigation is presented on the Geotechnical Map, Sheet 1.

Conclusions and Recommendations

Based on the results of our preliminary geotechnical evaluation, it is our professional opinion that proposed development of the site is feasible from a geotechnical standpoint. However, significant remedial grading across the majority of the site will be required, including with regard to slope stability issues related to the subject landslide.

It should be noted that there is no indication that that the ancient landslide beneath the subject site or adjacent homes or streets has moved historically, other than the offsite area in 1995, discussed above.

Please note that the subject evaluation was focused on the geotechnical conditions of the site and feasibility of site development in consideration of the geologic constraints encountered. The intent of this study was to provide sufficient data to allow prospective developers to understand the site geologic conditions and how they will impact the proposed site development. Additional geotechnical analyses should be performed once 40-scale grading plans have been prepared, in order to provide design-level geotechnical recommendations. Additional fieldwork and laboratory testing may be required. Additional and/or modified geotechnical recommendations may also be required. It is anticipated that the results of our feasibility evaluation, provided herein, will contribute data to that study.

Preliminary slope stability analysis of the proposed grading within the landslide area will require some form of stabilization (e.g., buttress, shear pins, tiebacks, etc.) to increase the safety factor to meet code requirements, refer to the Geotechnical Map, Sheet 1, for preliminary zone of mitigation needed with regard to the subject landslide. Additional evaluation and analysis of this area should be performed to determine and design the appropriate method of slope stability mitigation at the 40-scale grading plan review phase of the project.

Please note, additional design level slope stability analysis will need to be performed once 40-scale rough grading plans have been prepared and more details are available regarding finalized slope and retaining wall configurations, etc. This additional evaluation may include additional cross-sections and slope stability analysis. Other areas of slope stability concern may be identified.

Geotechnical Review Dated December 27, 2022

For your convenience, the geotechnical review comments have been repeated below along with our responses. A copy of the review sheet is provided in Appendix E.

Comment No. G1

"The CGS Landslide Inventory database shows a landslide mapped in the vicinity of the easterly cul-de-sac of "J" Street and Lots 209 and 210. As previously requested, provide a geologic cross-section(s) at a 1:1 (H:V) scale that transects the most critical slope(s). Include the existing and proposed grades, previous subsurface explorations, subsurface geology, and apparent/true bedrock bedding dip. Additional subsurface data may be required to characterize the area. Provide additional slope stability analyses and mitigation recommendations as necessary."

Response to Comment No. G1

Acknowledged. The requested evaluation has been performed and our findings, conclusions and preliminary recommendations are provided herein.

Comment No. G2

"In addition to comment G1, please provide additional subsurface data for Lots 209 and 210. Is the landslide that CGS mapped still present or was it removed during rough grading of the golf course or nearby tract 27141? GMED has files for tract 27141 which can be reviewed at the request of the geotechnical consultant."

Response to Comment No. G2

The requested evaluation has been performed and our findings, conclusions and preliminary recommendations are provided herein. The landslide is present on the site and the approximate limits have been estimated on the attached Geotechnical Map (Sheet 1) and Geotechnical Cross Sections (Sheet 2).

Comment No. S1

"Additional slope stability may be required once on-site geology has been determined. See comment G-1."

Response to Comment No. S1

Acknowledged. Feasibility level slope stability analysis has been performed as part of this evaluation. Additional evaluation and slope stability analysis should be performed to determine and design the appropriate method of slope stability mitigation at the 40-scale grading plan review phase of the project.

Comment No. S2

"Please submit documents in response to this review using the EPIC-LA system at the following URL: https://epicla.lacounty.qov/SelfService/#/home. "

Response to Comment No. S2

Acknowledged.

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.

Should you have any questions regarding this report, please do not hesitate to contact this office.

Sincerely,

LGC Geotechnical, Inc.

Ryan Douglas, GE 3147
Project Engineer

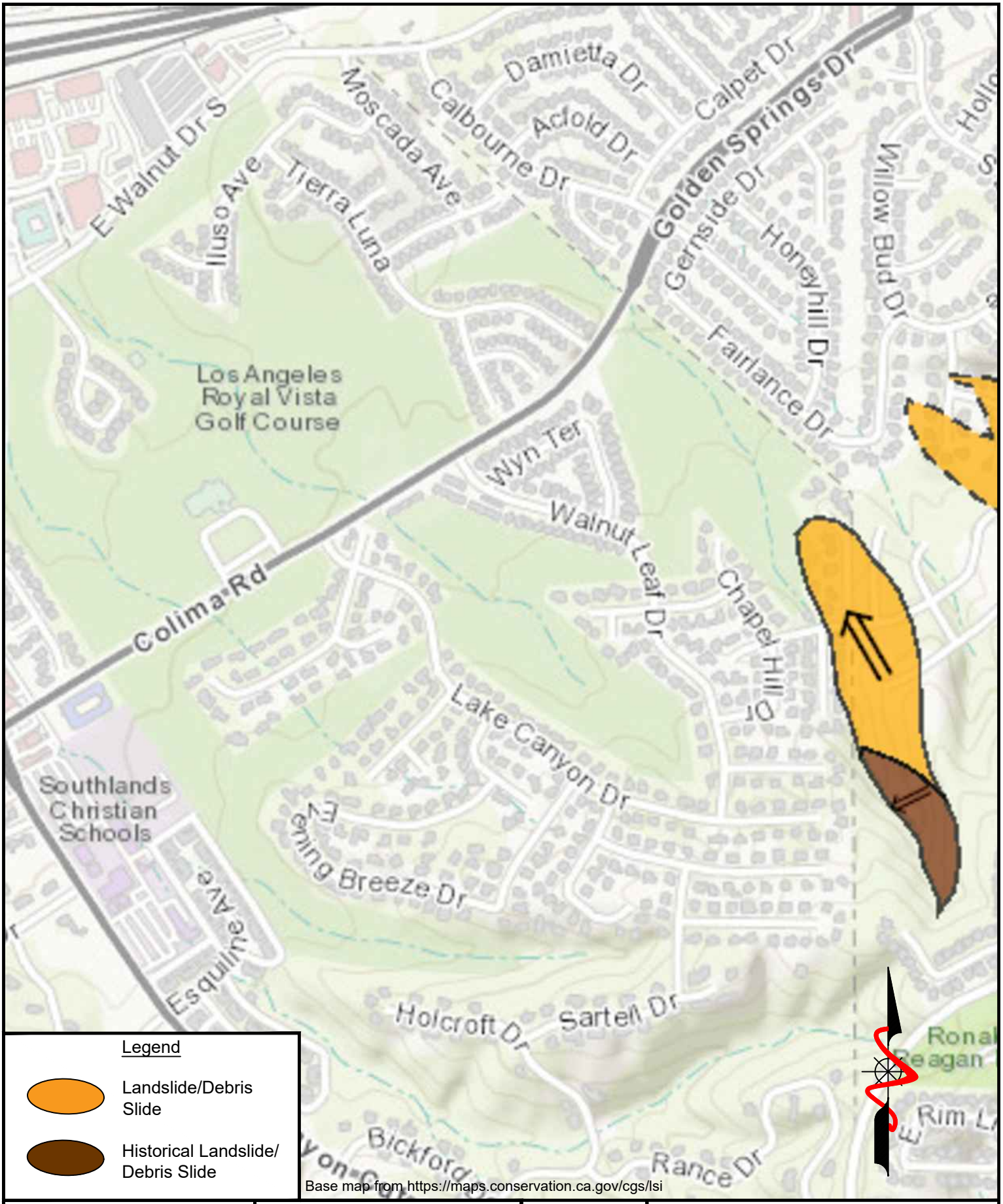
Kevin B. Colson, CEG 2210
Vice President

KBC/RLD/ala

Attachments: Figure 1 – Site Location Map
Figure 2 – Landslide Regional Map
Appendix A – References
Appendix B – Field Exploration Logs
Appendix C – Laboratory Test Results
Appendix D – Slope Stability Analysis
Appendix E – Los Angeles County Public Works – Geotechnical Review Sheet dated December 27, 2022
Sheet 1 – Geotechnical Map
Sheet 2 – Geotechnical Cross Sections 6-6' through 8-8'

Distribution: (4) Addressee (3 wet-signed copies and 1 electronic copy)

LGC Geotechnical, Inc.	**FIGURE 1** **Site Location Map**	PROJECT NAME: Royal Vista Golf Course PROJECT NO.: 20080-01 ENG. / GEOL.: RLD / KBC SCALE: Not to Scale DATE: May 2023



Base map from https://maps.conservation.ca.gov/cgs/lsi

LGC Geotechnical, Inc.

FIGURE 2
Landslide Regional Map

PROJECT NAME	Project Dimensions - Royal Vista
PROJECT NO.	20080-01
ENG. / GEOL.	RLD/KBC
SCALE	Not to Scale
DATE	May 2023

Appendix A
References

APPENDIX A

References

California Geological Survey (CGS), (Previously California Division of Mines and Geology), 2000, Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region, CDMG CD 2000-03.

_____, 2005a, Seismic Hazard Zone Report for the Yorba Linda 7.5-Minute Quadrangle, Los Angeles, Orange County, and Riverside Counties, California, Open File Report 010.

_____, 2005b, State of California Seismic Hazard Zones, Yorba Linda 7.5-Minute Quadrangle, Official Map, Released August 11, 2005.

_____, 2007, Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps, Special Publication 42, Interim Revision 2007.

County of Los Angeles, 2013, Department of Public Works, Manual for Preparation of Geotechnical Reports, July 1, 2013.

Leighton and Associates, Inc. (Leighton), 2003, Geotechnical Due Diligence Review for the Proposed Development of the Sasak-Patel Property, Tract 51253, Morning Sun Avenue, North of Shepard Hills Road, City of Diamond Bar, California, Project No. 021060-001, November 24, 2003

_____, 2020, Supplemental Geotechnical Investigation and Grading Plan Review, Proposed South Pointe West Residential Development, Tract 63626, Between Morning Sun Drive and Larkstone Drive, City of Diamond Bar, California, Project No. 021060-006, dated September 10, 2010.

LGC Geotechnical, 2020, Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated July 13, 2020.

_____, 2021a, Updated Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated July 26, 2021.

_____, 2021b, Response to Geotechnical Review Comments dated November 9, 2021 regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated December 23, 2021.

Los Angeles County Public Works, 2022, Geotechnical and Materials Engineering Division, Geologic and Soils Engineering Review Sheet, PCA GMTR / A866, EPIC LA RPPL2021007149, dated December 27, 2022.

Appendix B
Field Exploration Logs

Geotechnical Boring Log BA-6

Date : 3/23/2023	Page 1 of 1	**Drilling Company :**	Peter Drilling
Project Name :	Royal Vista Golf Course	**Type of Rig :**	Limited Access Track Rig
Project Number :	20080-01	**Drop :** 12"	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 690' MSL	**Drive Weight :**	140lbs
Hole Location :	See Geotechnical Map		

Logged by HPB

Sampled by HBP

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0			B-1					**@0' to T.D.' - <u>Quaternary Landslide (Qls)</u>:** Sandy clay, dark brown, wet, soft, scattered rootlets; topsoil/colluvium.	
			GB@2' N69E, 6N GB@4' N88E, 9N						@0.5' - Sandy CLAY w/ Silt: orange to yellowish brown, wet, slightly stiff, gravels and cobbles, light gray sand pods, rootlets. Seepage. @2' - General Bedding Attitude: sandbed, light gray, wet, friable, semi-continuous, cobbles, gravels, rootlets and minor belling below. @4' - General Bedding Attitude: sandbed, light gray, wet, friable, concretion below. @4.5' - Sandy CLAY w/ Silt: olive brown, wet, slightly stiff, gravels and cobbles, sand pods. @8' - End of visual log. Highly saturated, friable material peeling off side walls below. Seepage.	
685	5									
680	10			R-1	5 12	95.4	25.5	CL-SM	@8' - CLAY: dark gray, very moist, soft to slightly stiff, plastic, organic-rich, some silt, orange mottling.	DS
675	15								@13' - SILT w/ some Clay: olive brown to grayish brown, very moist, soft to slightly stiff. @17' - Sandy SILT w/ some Clay: olive brown to grayish brown, very moist, slightly stiff.	
670	20			R-2	4 8	98.5	22.5	ML-SM	@20' - Sandy SILT to Silty SAND: dark gray, very moist, slightly stiff.	
665	25								**Total Depth = 23'** **Continuous seepage from 2' to T.D.** **Backfilled with cuttings and tamped on 3/23/2023**	
660										

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-7

Date : 3/24/2023	Page 1 of 1	**Drilling Company :**	Peter Drilling
Project Name :	Royal Vista Golf Course	**Type of Rig :**	Limited Access Track Rig
Project Number :	20080-01	**Drop :** 12"	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 677' MSL	**Drive Weight :**	140lbs
Hole Location :	See Geotechnical Map		

Logged by HPB/KTM

Sampled by HBP

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0			B-1					**@0' to 18' - <u>Quaternary Landslide (Qls)</u>:** Sandy CLAY, dark brown, moist, scattered rootlets; topsoil/colluvium. @ 2' - Sandy CLAY, moderate brown to orange, wet, friable, rootlets, no structure, no layers. @ 4' - Sandy clay: dark brown, wet, loose to medium dense, abundant roots. @ 5' - Thinly interbedded, grayish brown and orange oxide, siltstone and fine sandstone, 0.25" to 5" thick interbeds, planar.	
672	5									
			B@8' N08W, 10W						@ 8' - Bedding attitude: SANDSTONE pinching upward in frame structure. @ 9' - Clayey SILTSTONE and SANDSTONE interbeds: layers of orange siltstone partially cemented, slightly fractured, roots along bed. @ 10' - Bedding attitude: dark brown 1" thick SANDSTONE interbed, no sign of offset or shearing. @ 13' - Bedding attitude: SANDSTONE beds are weeping.	
667	10		B@10' N10E, 13W	R-1	8 30	100.4	20.8	SC		
			B@13' N08E, 12W							
662	15									
			B@16' N18E, 9W						@ 16' - Bedding attitude SANDSTONE and SILTSTONE: light gray, orange and brown, thin to very thin interbeds, Clayey SILTSTONE, very moist to wet, dense, iron oxide, manganese oxide. @ 18' - Rupture surface attitude: 2" thick zone of CLAY, soft, wet, Silt interbedded, very thin bluish gray polished clay at base, sheared, seepage, maybe flexural slip, slightly undulatory.	
			RS@18' N22E, 10W	GB-1						TS
657	20		CB@20' N16E, 10W	R-2	22 50/5	113.9	14.8	SM	**@ 18' to T.D. - <u>Tertiary Puente Formation (Tp)</u>:** Sandy CLAY, dark brown, moist, stiff to medium dense. @ 20' - Clay Bed attitude: thin, light gray Clayey interbed. Below crossbedding, SANDSTONE interbeds with Silty CLAY, grades to darker color. @ 20' - Sandy SILTSTONE: orange and brown, slightly moist, hard. End of visual log. @ 24' - SILTSTONE: gray to brownish gray, slightly moist, hard. @ 25' - Color changes to dark grayish brown to brownish gray, unoxidized. @ 26' - Standing water during logging. @ 29' - Concretion, refusal.	
652	25									
647									**Total Depth = 29'** **Continuous seepage from 2' to T.D.** **Backfilled with cuttings and tamped on 3/24/2023**	

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

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G	GRAB SAMPLE

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

Geotechnical Boring Log BA-8

Date : 3/27/2023	Page 1 of 1	**Drilling Company :**	Peter Drilling
Project Name :	Royal Vista Golf Course	**Type of Rig :**	Limited Access Track Rig
Project Number :	20080-01	**Drop :** 12"	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 652' MSL	**Drive Weight :**	140lbs
Hole Location :	See Geotechnical Map		

Logged by HPB/KTM

Sampled by HBP

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0			B-1					**@0' to 20' - <u>Quaternary Landslide (Qls)</u>:** Sandy clay, dark brown, moist, scattered rootlets; fill and topsoil/colluvium. @ 1.5' to 3' - Silty CLAY, mottled dark brown to light brown, wet, soft, rootlets, sand. @ 3' - Cluster of electrical wires, not in service.	
647	5								@ 5' - Gradational change to Clayey SANDSTONE: brown with dark brown vertical fractures, iron oxide pods, wet, medium dense.	
									@ 8' to 10' - Decrease Clay, friable Sandstone	
642	10		GB@11' EW, 9S	R-1	6 9	108.5	19.7	CL	@ 10' - Silty Sand and SANDSTONE, yellowish brown to light olive brown, wet, slightly stiff, manganese oxide, iron oxide. @ 11' - General bedding attitude: roots, white clay, not continuous, material is Clayey SILT, wet, slightly stiff.	DS
637	15								@ 15' - Standing water just below highly fractured concretion. 1' to 2' thick. End of visual log. @ 17' - Silty SAND: light olive brown, orange mottled, wet, stiff. Groundwater encountered.	
632	20			R-2	20 25	99.8	22.9	SM	**@ 20' - <u>Possible Tertiary Puente Formation (Tp)</u>:** Sandy CLAY, dark brown, very moist, very stiff. @ 20' - Silty SAND: yellowish brown to light olive brown, wet, very stiff, orange mottling, fine SANDSTONE and Clayey SILTSTONE interbeds. Shoe had very thin bluish CLAY with charcoal roots along bedding. @ 24.5' - Refusal.	
627	25								**Total Depth = 24.5'** **Groundwater encountered @ 17'** **Backfilled with cuttings on 3/27/2023**	
622										

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Appendix C
Laboratory Test Results

APPENDIX C

Laboratory Test Results

The laboratory testing program was directed towards providing quantitative data relating to the relevant engineering properties of the soils. 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 driven samples obtained from the test borings. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined.

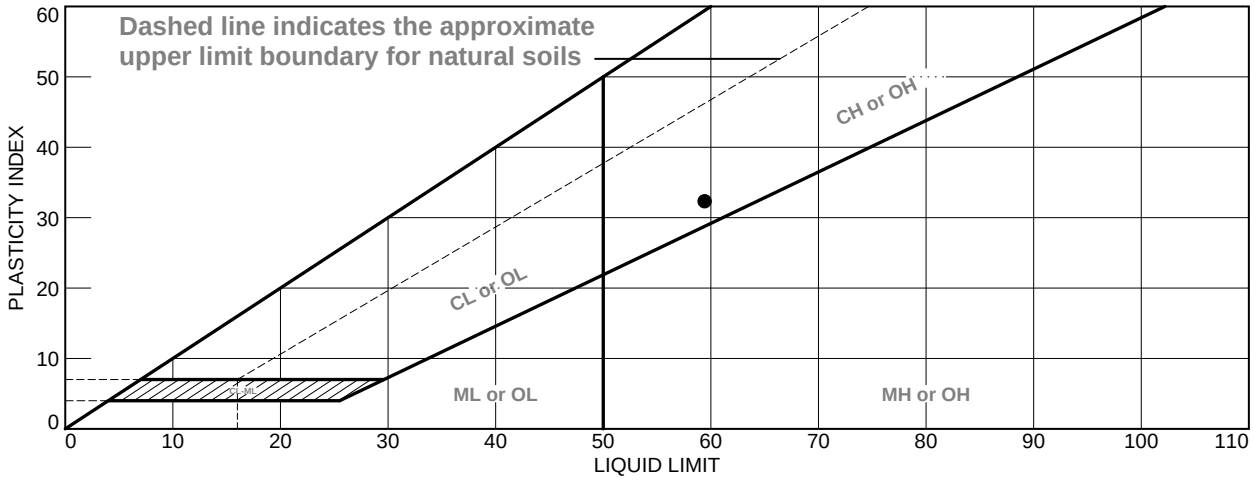
Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined per ASTM D4318 for engineering classification of fine-grained material and presented in the table below. The USCS soil classification indicated in the table below is based on the portion of sample passing the No. 40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

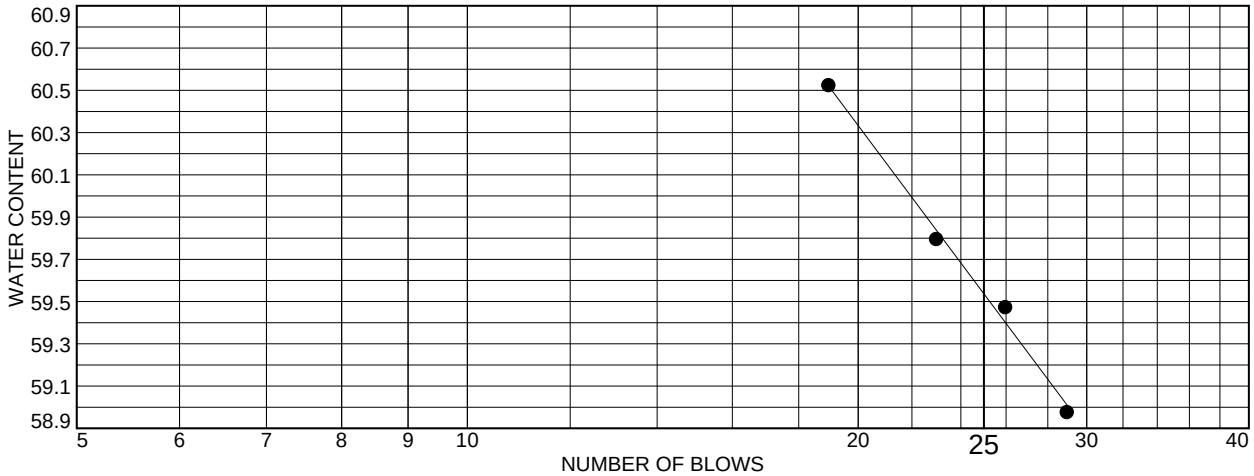
Sample Location	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Soil Classification
BA-7 @ 18ft	59.5	27.3	32.2	CH

Direct Shear: Direct shear tests were performed on selected driven samples, which were 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 direct shear plots are provided in this Appendix.

Torsional Ring Shear for Fully Softened Shear Strength: A drained, fully softened torsional ring shear test and a drained, residual torsional ring shear test was performed on site clay grab sample (BA-7 @ 18 ft). The sample was tested under various normal loads (1.5, 3, and 6 ksf) using a torsional ring-shear testing apparatus (ASTM D7608). The plots are presented in this Appendix.

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown Fat CLAY	59.5	27.3	32.2			

Project No. 040-019 **Client:** LGC Geotechnical

Project: Royal Vista - 20080-01

●**Source of Sample:** BA-7 **Depth:** 18 **Sample Number:** G-1

Remarks:

●This material contained some weakly cemented fine sand-sized aggregates that were in the prepared specimen but would break down enough during manual manipulation that almost100% of the material passed the #200 sieve.

Benchmark Geotechnical Labs, LLC

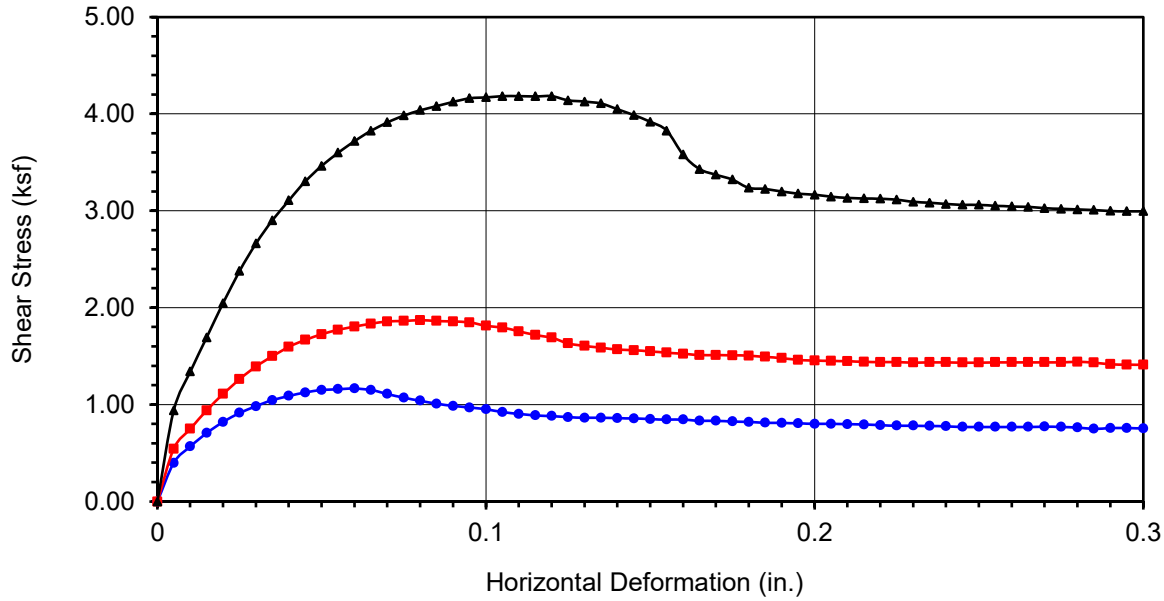
Figure

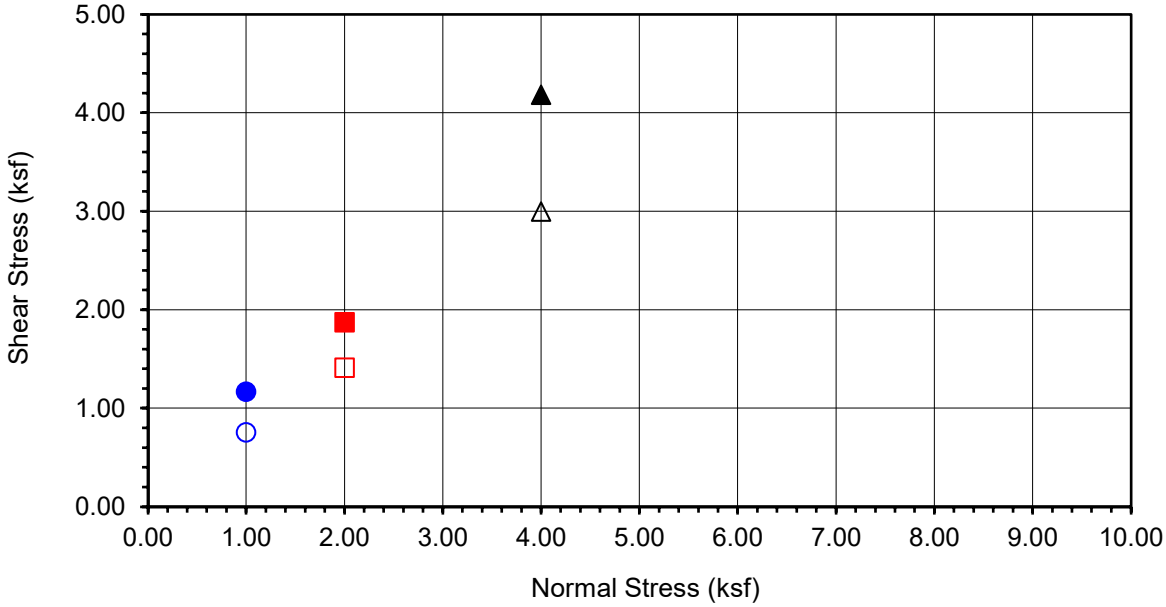
DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Royal Vista	Tested By:	G. Bathala	Date:	03/30/23
Project No.:	20080-01	Checked By:	J. Ward	Date:	04/13/23
Boring No.:	BA-6	Sample Type:	Ring		
Sample No.:	R-1	Depth (ft.):	10.0		
Soil Identification:	Olive yellow silty clay (CL-ML)				

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	191.17	194.08	195.45
Weight of Ring(gm):	42.82	46.57	44.23
Before Shearing			
Weight of Wet Sample+Cont.(gm):	185.32	185.32	185.32
Weight of Dry Sample+Cont.(gm):	162.98	162.98	162.98
Weight of Container(gm):	68.54	68.54	68.54
Vertical Rdg.(in): Initial	0.2447	0.2710	0.0000
Vertical Rdg.(in): Final	0.2609	0.2900	-0.0267
After Shearing			
Weight of Wet Sample+Cont.(gm):	202.31	206.36	206.95
Weight of Dry Sample+Cont.(gm):	172.48	180.26	177.09
Weight of Container(gm):	55.97	61.48	57.24
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**BA-6**
Sample No.	**R-1**
Depth (ft)	**10**

Sample Type:

Ring

Soil Identification:
Olive yellow silty clay (CL-ML)

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.166	■ 1.871	▲ 4.184
Shear Stress @ End of Test (ksf)	○ 0.755	□ 1.412	△ 2.996
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 (%)	23.66	23.66	23.66
Dry Density (pcf)	99.8	99.2	101.7
Saturation (%)	92.6	91.4	97.2
Soil Height Before Shearing (in.)	0.9838	0.9810	0.9733
Final Moisture Content (%)	25.6	22.0	24.9

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 20080-01

Royal Vista

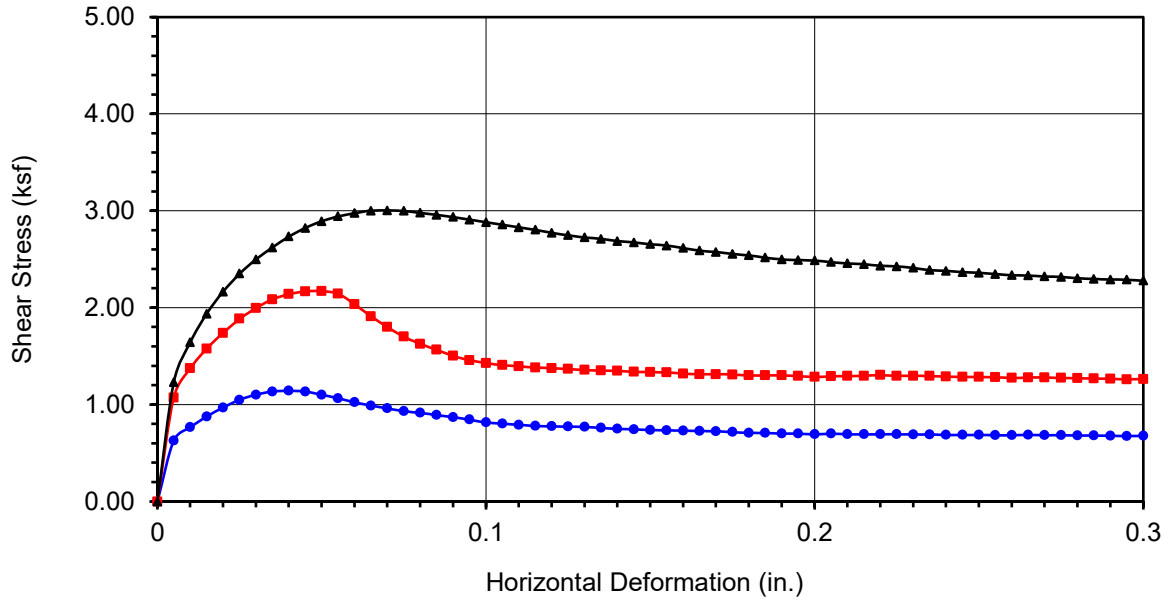
03-23

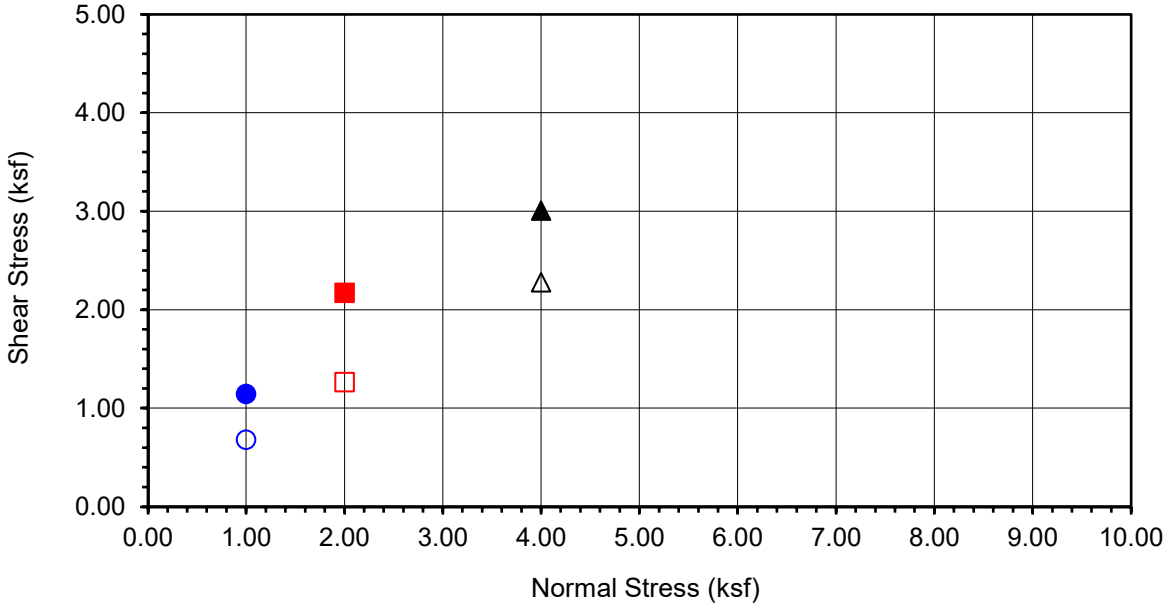
DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Royal Vista	Tested By:	G. Bathala	Date:	04/03/23
Project No.:	20080-01	Checked By:	J. Ward	Date:	04/13/23
Boring No.:	BA-8	Sample Type:	Ring		
Sample No.:	R-1	Depth (ft.):	10.0		
Soil Identification:	Olive lean clay (CL)				

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	198.64	202.50	203.17
Weight of Ring(gm):	44.58	45.14	45.42
Before Shearing			
Weight of Wet Sample+Cont.(gm):	217.74	217.74	217.74
Weight of Dry Sample+Cont.(gm):	198.23	198.23	198.23
Weight of Container(gm):	58.73	58.73	58.73
Vertical Rdg.(in): Initial	0.0000	0.2608	0.2501
Vertical Rdg.(in): Final	-0.0094	0.2688	0.2658
After Shearing			
Weight of Wet Sample+Cont.(gm):	216.79	233.58	222.38
Weight of Dry Sample+Cont.(gm):	191.89	210.31	196.94
Weight of Container(gm):	60.19	74.33	64.15
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**BA-8**
Sample No.	**R-1**
Depth (ft)	**10**

Sample Type:

Ring

Soil Identification:
Olive lean clay (CL)

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.144	■ 2.172	▲ 3.005
Shear Stress @ End of Test (ksf)	○ 0.679	□ 1.264	△ 2.279
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 (%)	13.99	13.99	13.99
Dry Density (pcf)	112.4	114.8	115.1
Saturation (%)	75.6	80.7	81.3
Soil Height Before Shearing (in.)	0.9906	0.9920	0.9843
Final Moisture Content (%)	18.9	17.1	19.2

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 20080-01

Royal Vista

04-23

DS BA-8, R-1 @ 10

BENCHMARK GEOTECHNICAL LABS

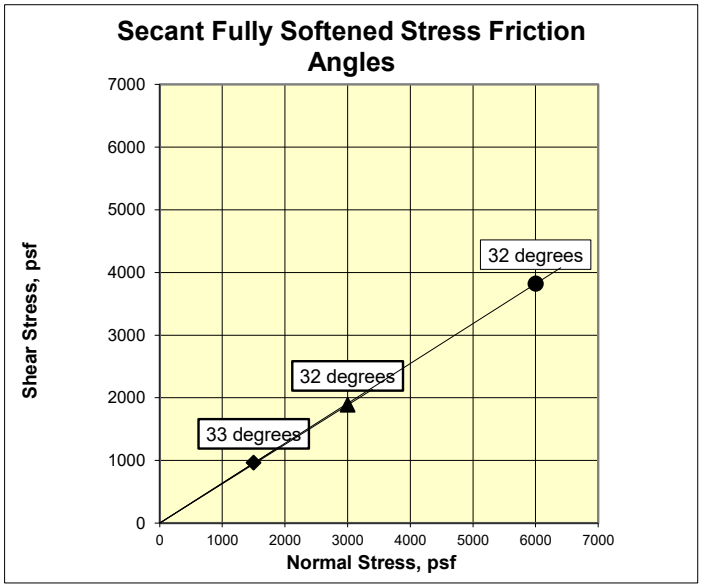
Drained Fully Softened Torsional Shear Strength (ASTM D7608)

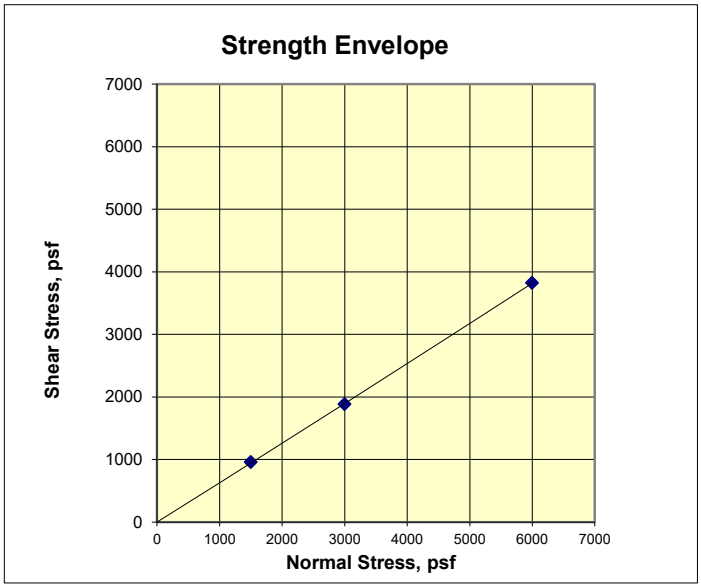
BGL Job No.:	040-019	**Boring:**	BA-7	**Date:**	4/6/2023	**Clay, %:**	
Client:	LGC Geotechnical	**Sample:**	G-1	**By:**	PJ	**LL:**	59.5
Project Name:	Royal Vista	**Depth (ft):**	18	**Checked:**	PJ	**PL:**	27.3
Project Number:	20080-01	**Test Type:**	Reconstituted Fully Softened	**Sample Preparation:**			<#40

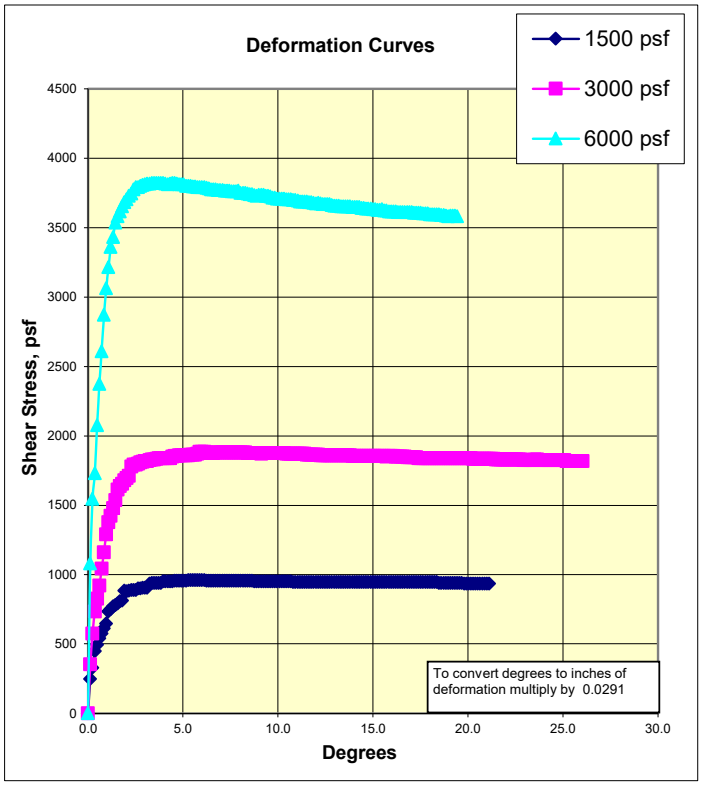
Soil Type: Brown Fat CLAY

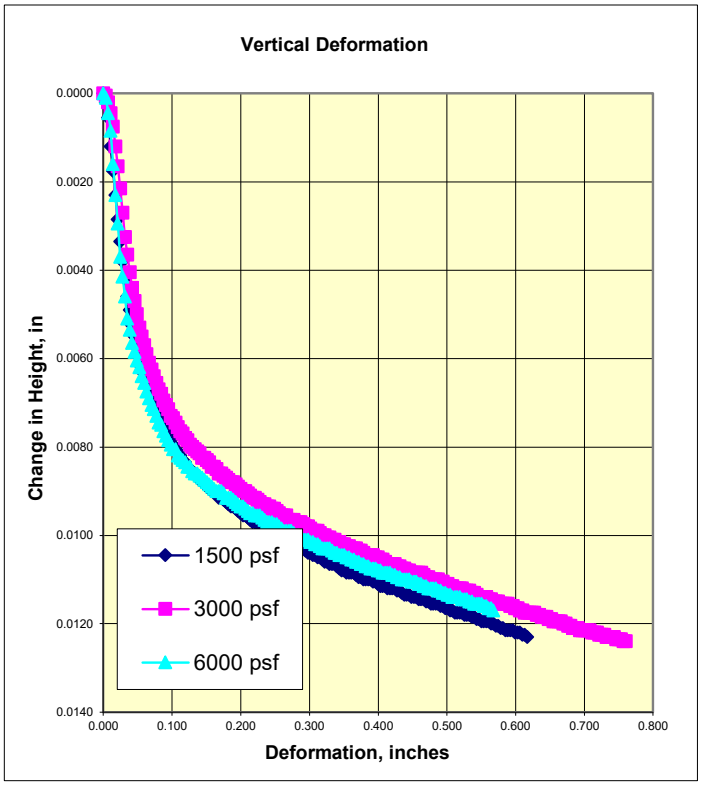
Normal Stress, psf	1500	3000	6000
Secant Phi, deg.:	33	32	32

Remarks: This material contained some weakly cemented fine sand-sized aggregates that were in the prepared specimen but would break down enough during manual manipulation that almost100% of the material passed the #200 sieve.









BENCHMARK GEOTECHNICAL LABS

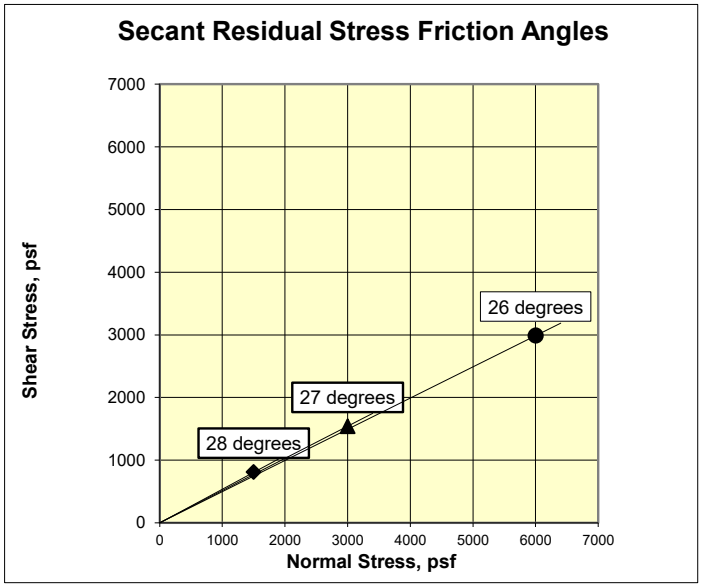
Drained Residual Torsional Shear Strength (ASTM D6467)

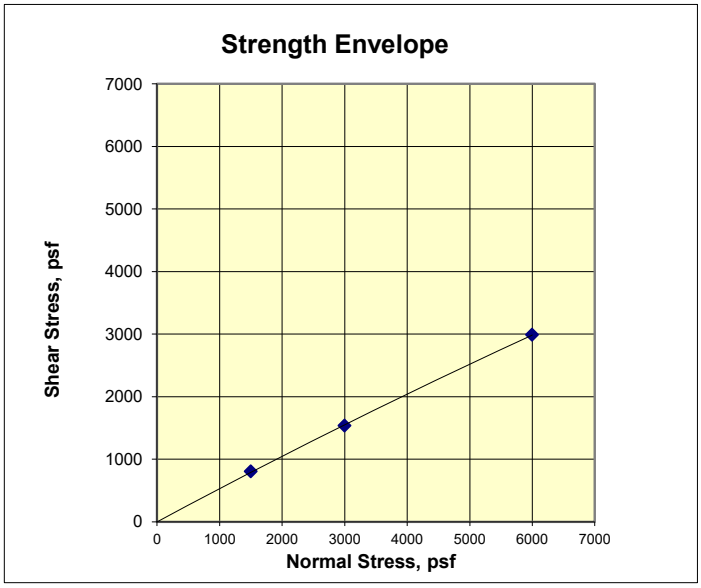
BGL Job No.:	040-019	**Boring:**	BA-7	**Date:**	4/6/2023	**Clay, %:**	
Client:	LGC Geotechnical	**Sample:**	G-1	**By:**	PJ	**LL:**	59.5
Project Name:	Royal Vista	**Depth (ft):**	18	**Checked:**	PJ	**PL:**	27.3
Project Number:	20080-01	**Test Type:**	Reconstituted Residual			**Sample Preparation:**	<#40

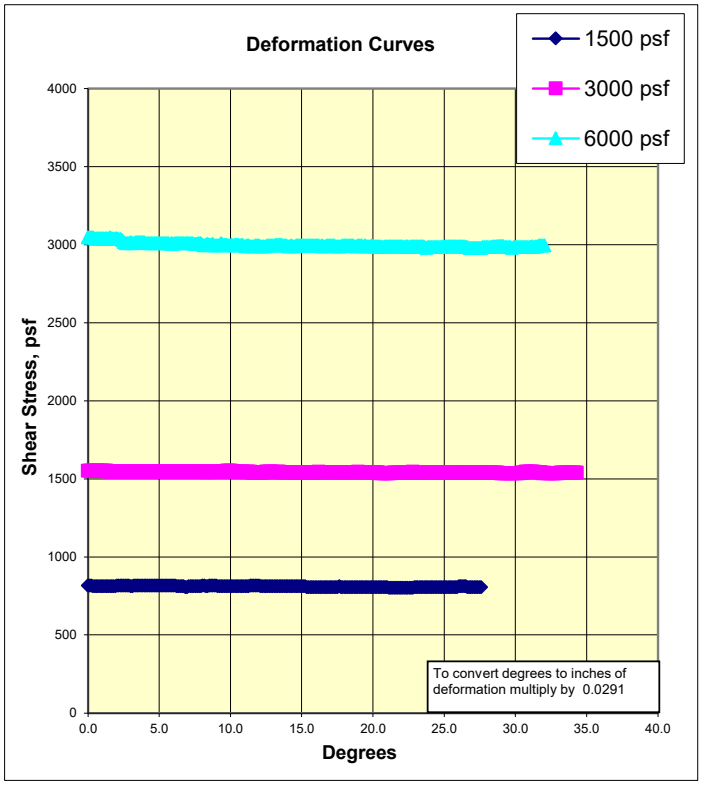
Soil Type: Brown Fat CLAY

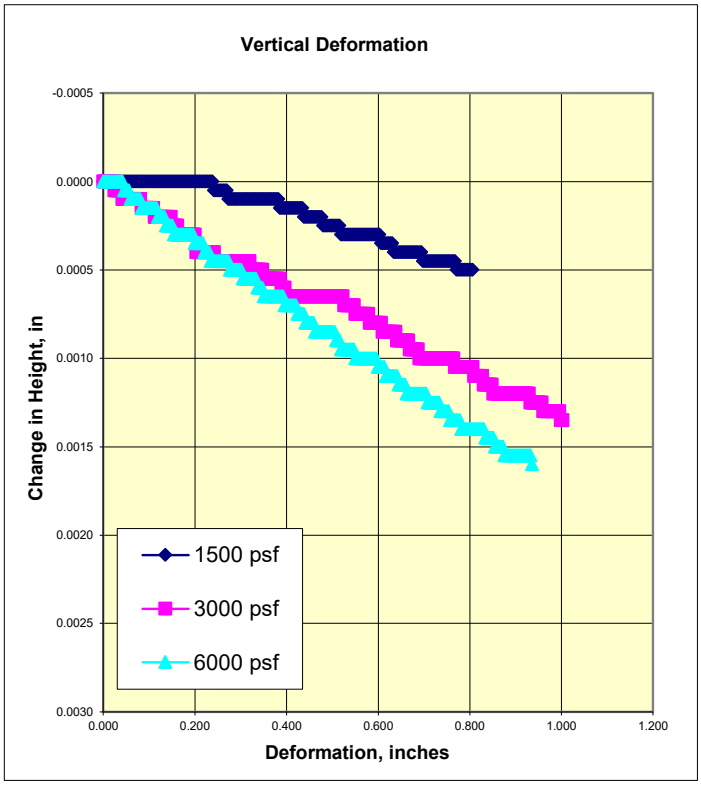
Normal Stress, psf	1500	3000	6000
Secant Phi, deg.:	28	27	26

Remarks: A small friction correction was applied to each point.This material contained some weakly cemented fine sand-sized aggregates that were in the prepared specimen but would break down enough during manual manipulation that almost100% of the material passed the #200 sieve.









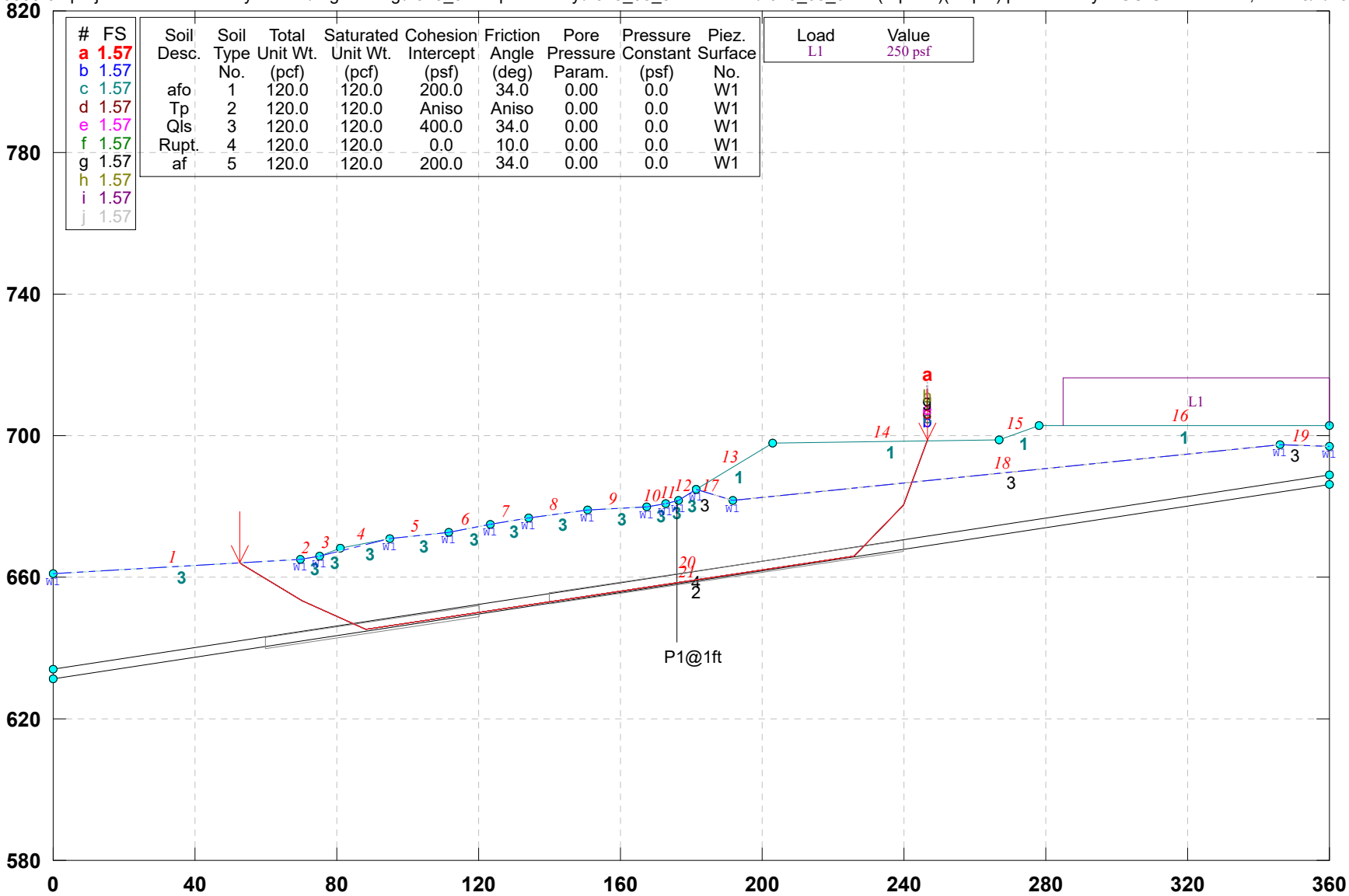
Appendix D
Slope Stability Analysis

Summary of Slope Stability Analysis

Cross-Section	Factor of Safety	Description
7-7’	1.57	Stage 1 (Existing Condition - Shear Pin)
	1.26	Stage 2 (Temporary Staging Pad)
	1.54	Stage 3 (Temporary Staging Pad - Tieback)
	1.55	Stage 4 (Temporary Cut - Rupture Surface)
	1.25	Stage 4 (Temporary Cut - Along Bedding)
	1.72	Stage 5 (Final Condition - Along Bedding (Static))
	1.70	Stage 5 (Final Condition - Rupture Surface (Static))
	1.14	Stage 5 (Final Conidition - Seismic)

Royal Vista / 20080-01 / Section 7-7' / Static / block / butress pins and tb's

z:\2020\20080-01 project dimensions - royal vista\engineering\2023_04 slope stability\2023_05_01 section 7\2023_05_01 x7(rupture)(step 1).pl2 Run By: LGC Geotechnical, Inc. 5/1/2023 05:29PM



#	FS
a	1.57
b	1.57
c	1.57
d	1.57
e	1.57
f	1.57
g	1.57
h	1.57
i	1.57
j	1.57

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
afo	1	120.0	120.0	200.0	34.0	0.00	0.0	W1
Tp	2	120.0	120.0	Aniso	Aniso	0.00	0.0	W1
Qls	3	120.0	120.0	400.0	34.0	0.00	0.0	W1
Rupt.	4	120.0	120.0	0.0	10.0	0.00	0.0	W1
af	5	120.0	120.0	200.0	34.0	0.00	0.0	W1

Load	Value
L1	250 psf

GSTABL7 v.2 FSmin=1.57

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 5/1/2023
Time of Run: 05:30PM
Run By: LGC Geotechnical, Inc.
Input Data Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(rupture)(Step 1).in
Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(rupture)(Step 1).OUT
Unit System: English
Plotted Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(rupture)(Step 1).PLT
PROBLEM DESCRIPTION: Royal Vista / 20080-01 / Section 7-7' /
Static / block / butress pins and tb's
BOUNDARY COORDINATES
16 Top Boundaries

21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	661.00	69.80	665.00	3
2	69.80	665.00	75.00	666.00	3
3	75.00	666.00	81.20	668.00	3
4	81.20	668.00	94.90	670.90	3
5	94.90	670.90	111.70	672.90	3
6	111.70	672.90	123.30	674.80	3
7	123.30	674.80	134.00	676.90	3
8	134.00	676.90	150.80	678.90	3
9	150.80	678.90	167.60	679.90	3
10	167.60	679.90	173.00	680.90	3
11	173.00	680.90	176.30	681.90	3
12	176.30	681.90	181.30	684.90	3
13	181.30	684.90	202.80	697.90	1
14	202.80	697.90	267.00	698.90	1
15	267.00	698.90	278.10	702.80	1
16	278.10	702.80	360.00	702.80	1
17	181.30	684.90	191.90	681.50	3
18	191.90	681.50	345.90	697.30	3
19	345.90	697.30	360.00	697.20	3
20	0.00	634.20	360.00	689.10	4
21	0.00	631.20	360.00	686.10	2

User Specified Y-Origin = 580.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	200.0	34.0	0.00	0.0	1
2	120.0	120.0	400.0	34.0	0.00	0.0	1
3	120.0	120.0	400.0	34.0	0.00	0.0	1
4	120.0	120.0	0.0	10.0	0.00	0.0	1
5	120.0	120.0	200.0	34.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 15 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	661.00
2	69.80	665.00
3	75.00	666.00
4	94.90	670.90
5	111.70	672.90
6	123.30	674.80
7	134.00	676.90
8	150.80	678.90
9	167.60	679.90
10	173.00	680.90

11	176.30	681.90
12	181.30	684.90
13	191.90	681.50
14	345.90	697.30
15	360.00	697.20

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	285.00	360.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
EARTHQUAKE DATA HAS BEEN SUPPRESSED
EARTHQUAKE DATA HAS BEEN SUPPRESSED
PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)
1	176.00	681.81	12000.0	1.0	90.00	40.0

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	60.00	641.52	120.00	650.50	3.00
2	140.00	654.00	240.00	668.90	3.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 9.961 FS Min = 1.571 FS Ave = 2.379
Standard Deviation = 0.998 Coefficient of Variation = 41.96 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.712	664.021
2	52.970	663.858
3	70.065	653.478
4	88.326	645.322
5	226.029	665.911
6	239.958	680.262
7	246.479	698.580

Factor of Safety
*** 1.571 ***
Individual data on the 23 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.3	2.7	0.0	1.7	0.	0.	0.0	0.0	0.0
2	16.8	11652.3	0.0	7077.2	0.	0.	0.0	0.0	0.0
3	0.3	364.4	0.0	217.7	0.	0.	0.0	0.0	0.0
4	4.9	7787.7	0.0	4356.0	0.	0.	0.0	0.0	0.0
5	6.2	12730.5	0.0	6945.4	0.	0.	0.0	0.0	0.0
6	3.2	7910.5	0.0	4287.3	0.	0.	0.0	0.0	0.0
7	3.9	10767.1	0.0	5879.9	0.	0.	0.0	0.0	0.0
8	6.6	19240.2	0.0	9781.2	0.	0.	0.0	0.0	0.0
9	16.8	49067.8	0.0	25618.6	0.	0.	0.0	0.0	0.0
10	11.6	33639.1	0.0	17455.7	0.	0.	0.0	0.0	0.0

11	10.7	31456.6	0.0	16232.5	0.	0.	0.0	0.0	0.0
12	16.8	49378.1	0.0	25780.6	0.	0.	0.0	0.0	0.0
13	16.8	47338.2	0.0	24845.6	0.	0.	0.0	0.0	0.0
14	5.4	14788.4	0.0	7646.5	0.	0.	0.0	0.0	0.0
15	3.3	9175.8	0.0	4621.6	0.	0.	0.0	0.0	0.0
16	5.0	14730.5	0.0	6719.9	0.	0.	0.0	0.0	0.0
17	10.6	35729.5	0.0	14782.4	0.	0.	0.0	0.0	0.0
18	10.9	43140.4	0.0	13981.3	0.	0.	0.0	0.0	0.0
19	23.2	94514.7	0.0	28628.4	0.	0.	0.0	0.0	0.0
20	3.1	11599.1	0.0	4939.1	0.	0.	0.0	0.0	0.0
21	10.8	30663.6	0.0	10740.6	0.	0.	0.0	0.0	0.0
22	2.3	4110.8	0.0	1301.0	0.	0.	0.0	0.0	0.0
23	4.2	3015.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.712	664.021
2	52.970	663.858
3	70.065	653.478
4	88.326	645.322
5	226.029	665.911
6	239.958	680.262
7	246.479	698.580

Factor of Safety
*** 1.571 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.712	664.021
2	52.970	663.858
3	70.065	653.478
4	88.326	645.322
5	226.029	665.911
6	239.958	680.262
7	246.479	698.580

Factor of Safety
*** 1.571 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.712	664.021
2	52.970	663.858
3	70.065	653.478
4	88.326	645.322
5	226.029	665.911
6	239.958	680.262
7	246.479	698.580

Factor of Safety
*** 1.571 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.712	664.021
2	52.970	663.858
3	70.065	653.478
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5	226.029	665.911
6	239.958	680.262
7	246.479	698.580

Factor of Safety
*** 1.571 ***

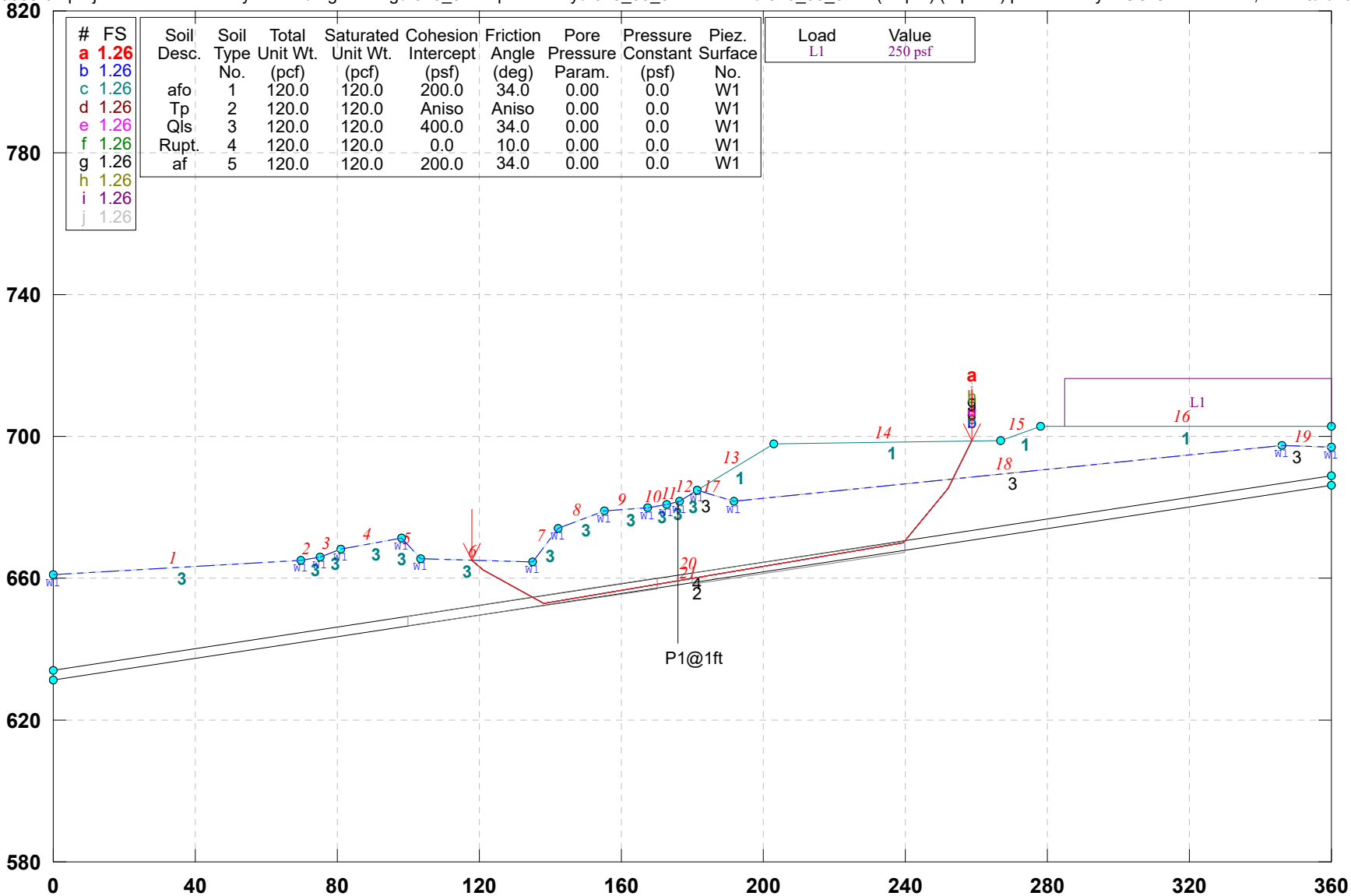
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.712	664.021
2	52.970	663.858
3	70.065	653.478
4	88.326	645.322
5	226.029	665.911
6	239.958	680.262

```
    7        246.479      698.580
       Factor of Safety
      ***    1.571   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         52.712      664.021
    2         52.970      663.858
    3         70.065      653.478
    4         88.326      645.322
    5        226.029      665.911
    6        239.958      680.262
    7        246.479      698.580
       Factor of Safety
      ***    1.571   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         52.712      664.021
    2         52.970      663.858
    3         70.065      653.478
    4         88.326      645.322
    5        226.029      665.911
    6        239.958      680.262
    7        246.479      698.580
       Factor of Safety
      ***    1.571   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         52.712      664.021
    2         52.970      663.858
    3         70.065      653.478
    4         88.326      645.322
    5        226.029      665.911
    6        239.958      680.262
    7        246.479      698.580
       Factor of Safety
      ***    1.571   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         52.712      664.021
    2         52.970      663.858
    3         70.065      653.478
    4         88.326      645.322
    5        226.029      665.911
    6        239.958      680.262
    7        246.479      698.580
       Factor of Safety
      ***    1.571   ***
          **** END OF GSTABL7 OUTPUT ****
```

Royal Vista / 20080-01 / Section 7-7' / Static / block / butress pins and tb's

z:\2020\20080-01 project dimensions - royal vista\engineering\2023_04 slope stability\2023_05_01 section 7\2023_05_01 x7(step 2) (rupture).pl2 Run By: LGC Geotechnical, Inc. 5/1/2023 05:27PM



GSTABL7 v.2 FSmin=1.26

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 5/1/2023
Time of Run: 05:27PM
Run By: LGC Geotechnical, Inc.
Input Data Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 2) (Rupture).in
Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 2) (Rupture).OUT
Unit System: English
Plotted Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 2) (Rupture).PLT
PROBLEM DESCRIPTION: Royal Vista / 20080-01 / Section 7-7' /
Static / block / butress pins and tb's
BOUNDARY COORDINATES
16 Top Boundaries

21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	661.00	69.80	665.00	3
2	69.80	665.00	75.00	666.00	3
3	75.00	666.00	81.20	668.00	3
4	81.20	668.00	98.20	671.30	3
5	98.20	671.30	103.70	665.40	3
6	103.70	665.40	134.80	664.80	3
7	134.80	664.80	142.30	674.00	3
8	142.30	674.00	155.40	679.20	3
9	155.40	679.20	167.60	679.90	3
10	167.60	679.90	173.00	680.90	3
11	173.00	680.90	176.30	681.90	3
12	176.30	681.90	181.30	684.90	3
13	181.30	684.90	202.80	697.90	1
14	202.80	697.90	267.00	698.90	1
15	267.00	698.90	278.10	702.80	1
16	278.10	702.80	360.00	702.80	1
17	181.30	684.90	191.90	681.50	3
18	191.90	681.50	345.90	697.30	3
19	345.90	697.30	360.00	697.20	3
20	0.00	634.20	360.00	689.10	4
21	0.00	631.20	360.00	686.10	2

User Specified Y-Origin = 580.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	200.0	34.0	0.00	0.0	1
2	120.0	120.0	400.0	34.0	0.00	0.0	1
3	120.0	120.0	400.0	34.0	0.00	0.0	1
4	120.0	120.0	0.0	10.0	0.00	0.0	1
5	120.0	120.0	200.0	34.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 16 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	661.00
2	69.80	665.00
3	75.00	666.00
4	81.20	668.00
5	98.20	671.30
6	103.70	665.40
7	134.80	664.80
8	142.30	674.00
9	155.40	679.20
10	167.60	679.90

11	173.00	680.90
12	176.30	681.90
13	181.30	684.90
14	191.90	681.50
15	345.90	697.30
16	360.00	697.20

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	285.00	360.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
EARTHQUAKE DATA HAS BEEN SUPPRESSED
EARTHQUAKE DATA HAS BEEN SUPPRESSED
PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)
1	176.00	681.81	12000.0	1.0	90.00	40.0

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	648.02	170.00	658.49	3.00
2	180.00	660.00	240.00	668.94	3.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 8.710 FS Min = 1.263 FS Ave = 1.932
Standard Deviation = 0.698 Coefficient of Variation = 36.15 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	118.122	665.122
2	120.856	662.554
3	138.362	652.883
4	239.337	670.115
5	252.110	685.505
6	258.964	698.775

Factor of Safety
*** 1.263 ***
Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.7	412.6	0.0	294.3	0.	0.	0.0	0.0	0.0
2	13.9	10427.9	0.0	6193.7	0.	0.	0.0	0.0	0.0
3	0.1	161.3	0.0	67.1	0.	0.	0.0	0.0	0.0
4	3.4	5446.4	0.0	2263.6	0.	0.	0.0	0.0	0.0
5	3.9	8678.0	0.0	3202.7	0.	0.	0.0	0.0	0.0
6	13.1	34469.2	0.0	16945.6	0.	0.	0.0	0.0	0.0
7	12.2	33259.5	0.0	17516.2	0.	0.	0.0	0.0	0.0
8	5.4	14299.0	0.0	7417.9	0.	0.	0.0	0.0	0.0
9	3.3	8840.3	0.0	4467.3	0.	0.	0.0	0.0	0.0
10	5.0	14169.4	0.0	6485.3	0.	0.	0.0	0.0	0.0

11	10.6	34330.3	0.0	14127.6	0.	0.	0.0	0.0	0.0
12	10.9	41404.3	0.0	13116.5	0.	0.	0.0	0.0	0.0
13	36.5	136737.1	0.0	40252.7	0.	0.	0.0	0.0	0.0
14	0.6	1864.4	0.0	859.2	0.	0.	0.0	0.0	0.0
15	12.2	29953.6	0.0	10577.2	0.	0.	0.0	0.0	0.0
16	1.2	1709.5	0.0	174.0	0.	0.	0.0	0.0	0.0
17	5.7	3703.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	118.122	665.122
2	120.856	662.554
3	138.362	652.883
4	239.337	670.115
5	252.110	685.505
6	258.964	698.775

Factor of Safety
*** 1.263 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
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Factor of Safety
*** 1.263 ***

Failure Surface Specified By 6 Coordinate Points

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Factor of Safety
*** 1.263 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
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Factor of Safety
*** 1.263 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
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2	120.856	662.554
3	138.362	652.883
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5	252.110	685.505
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Factor of Safety
*** 1.263 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
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Factor of Safety
*** 1.263 ***

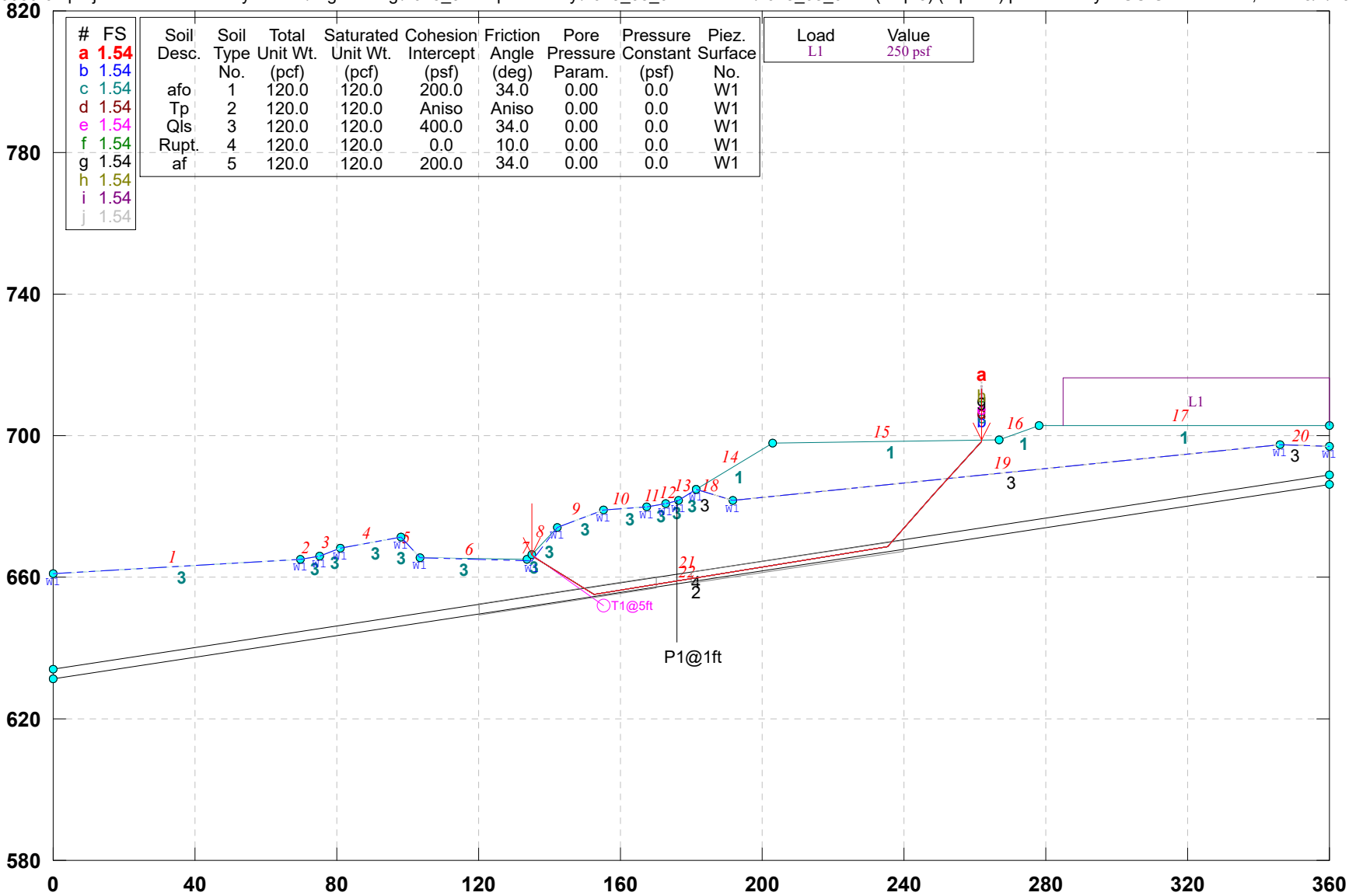
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	118.122	665.122
2	120.856	662.554
3	138.362	652.883
4	239.337	670.115
5	252.110	685.505

```
    6        258.964      698.775
       Factor of Safety
      ***    1.263   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        118.122      665.122
    2        120.856      662.554
    3        138.362      652.883
    4        239.337      670.115
    5        252.110      685.505
    6        258.964      698.775
       Factor of Safety
      ***    1.263   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        118.122      665.122
    2        120.856      662.554
    3        138.362      652.883
    4        239.337      670.115
    5        252.110      685.505
    6        258.964      698.775
       Factor of Safety
      ***    1.263   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        118.122      665.122
    2        120.856      662.554
    3        138.362      652.883
    4        239.337      670.115
    5        252.110      685.505
    6        258.964      698.775
       Factor of Safety
      ***    1.263   ***
          **** END OF GSTABL7 OUTPUT ****
```

Royal Vista / 20080-01 / Section 7-7' / Static / block / butress pins and tb's

z:\2020\20080-01 project dimensions - royal vista\engineering\2023_04 slope stability\2023_05_01 section 7\2023_05_01 x7(step 3) (rupture).pl2 Run By: LGC Geotechnical, Inc. 5/1/2023 05:32PM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
afo	1	120.0	120.0	200.0	34.0	0.00	0.0	W1
Tp	2	120.0	120.0	Aniso	Aniso	0.00	0.0	W1
Qls	3	120.0	120.0	400.0	34.0	0.00	0.0	W1
Rupt.	4	120.0	120.0	0.0	10.0	0.00	0.0	W1
af	5	120.0	120.0	200.0	34.0	0.00	0.0	W1

GSTABL7 v.2 FSmin=1.54

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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```
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        5/1/2023
Time of Run:              05:32PM
Run By:                   LGC Geotechnical, Inc.
Input Data Filename:      Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineerin
g\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 3) (rupture).in
Output Filename:          Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineerin
g\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 3) (rupture).OUT
Unit System:              English
Plotted Output Filename:  Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineerin
g\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 3) (rupture).PLT
PROBLEM DESCRIPTION:  Royal Vista / 20080-01 / Section 7-7' /
                      Static / block / butress pins and tb's
BOUNDARY COORDINATES
   17 Top   Boundaries
```

22 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	661.00	69.80	665.00	3
2	69.80	665.00	75.00	666.00	3
3	75.00	666.00	81.20	668.00	3
4	81.20	668.00	98.20	671.30	3
5	98.20	671.30	103.70	665.40	3
6	103.70	665.40	133.60	664.90	3
7	133.60	664.90	134.80	666.30	3
8	134.80	666.30	142.30	674.00	3
9	142.30	674.00	155.40	679.20	3
10	155.40	679.20	167.60	679.90	3
11	167.60	679.90	173.00	680.90	3
12	173.00	680.90	176.30	681.90	3
13	176.30	681.90	181.30	684.90	3
14	181.30	684.90	202.80	697.90	1
15	202.80	697.90	267.00	698.90	1
16	267.00	698.90	278.10	702.80	1
17	278.10	702.80	360.00	702.80	1
18	181.30	684.90	191.90	681.50	3
19	191.90	681.50	345.90	697.30	3
20	345.90	697.30	360.00	697.20	3
21	0.00	634.20	360.00	689.10	4
22	0.00	631.20	360.00	686.10	2

User Specified Y-Origin = 580.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	200.0	34.0	0.00	0.0	1
2	120.0	120.0	400.0	34.0	0.00	0.0	1
3	120.0	120.0	400.0	34.0	0.00	0.0	1
4	120.0	120.0	0.0	10.0	0.00	0.0	1
5	120.0	120.0	200.0	34.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 16 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	661.00
2	69.80	665.00
3	75.00	666.00
4	81.20	668.00
5	98.20	671.30
6	103.70	665.40
7	134.80	664.80
8	142.30	674.00
9	155.40	679.20

10	167.60	679.90
11	173.00	680.90
12	176.30	681.90
13	181.30	684.90
14	191.90	681.50
15	345.90	697.30
16	360.00	697.20

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	285.00	360.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.

EARTHQUAKE DATA HAS BEEN SUPPRESSED

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Method
1	134.80	666.30	270000.0	5.0	35.00	25.0	2

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming A Uniform Distribution Of Load Horizontally Between Individual
Tiebacks. Force Method 1 Considers Only Tangential Tieback Forces.
Force Method 2 Considers Both Tangential and Normal Tieback Forces.
Force Method 3 Considers Only Normal Tieback Forces.
Force Method 4 Limits Normal and Tangential Tieback-Force Distribution
to 1.5 Times the Tieback Inclination, or to 30 Degrees Below (Left of)
the Tieback-Failure Surface Intersection, Whichever is Greater.

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)
1	176.00	681.81	12000.0	1.0	90.00	40.0

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

Janbus Empirical Coef is being used for the case of c & phi both > 0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.

5000 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	120.00	651.00	170.00	658.49	3.00
2	180.00	660.00	240.00	668.94	3.00

WARNING! The factor of safety calculation did not converge in 20 iterations.

The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	117.98	665.16
2	131.48	652.37
3	198.67	664.06
4	212.55	678.47
5	217.59	697.82
6	217.73	698.13

Factor of Safety for the Preceding Surface is Between NaN and NaN

WARNING! The factor of safety calculation did not converge in 20 iterations.

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	117.26	665.17
2	130.48	652.14
3	211.30	663.98
4	212.39	683.95

```
    5        219.32      698.16
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        130.25      664.96
    2        139.18      660.41
    3        158.94      657.29
    4        228.45      666.69
    5        237.49      684.53
    6        249.77      698.63
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         88.77      669.47
    2         99.01      660.13
    3        118.57      655.99
    4        138.53      654.63
    5        191.77      661.20
    6        205.73      675.53
    7        217.99      691.33
    8        221.74      698.20
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        122.54      665.08
    2        127.01      660.78
    3        146.12      654.89
    4        207.21      664.86
    5        211.10      684.48
    6        224.61      698.24
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        117.83      665.16
    2        121.63      661.44
    3        140.52      654.86
    4        219.36      666.43
    5        233.12      680.94
    6        247.09      695.26
    7        250.36      698.64
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        110.95      665.28
    2        128.89      658.88
    3        148.63      655.68
    4        182.81      659.94
    5        196.49      674.53
    6        210.56      688.74
    7        213.01      698.06
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
```

```
   No.        (ft)        (ft)
    1        122.26      665.09
    2        134.63      652.72
    3        186.75      659.83
    4        200.37      674.48
    5        214.09      689.03
    6        220.12      698.17
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        124.35      665.05
    2        132.17      657.57
    3        152.11      656.03
    4        184.29      661.43
    5        195.45      678.03
    6        204.58      695.82
    7        205.54      697.94
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        127.68      665.00
    2        129.49      663.28
    3        147.60      654.79
    4        233.95      669.18
    5        239.13      688.50
    6        240.69      698.49
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         91.18      669.94
    2        106.78      661.81
    3        123.67      651.10
    4        234.30      668.53
    5        236.83      688.37
    6        238.65      698.46
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        121.42      665.10
    2        134.59      661.40
    3        153.94      656.38
    4        238.75      670.21
    5        252.54      684.70
    6        259.29      698.78
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.13      664.97
    2        130.90      663.30
    3        149.66      656.35
    4        184.51      661.77
    5        198.27      676.28
    6        209.47      692.85
    7        211.34      698.03
Factor of Safety for the Preceding Surface is Between NaN   and NaN
```

WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	88.91	669.50
2	94.15	664.41
3	113.70	660.18
4	132.34	652.93
5	220.09	665.56
6	232.90	680.93
7	245.37	696.56
8	245.63	698.57

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	122.31	665.09
2	132.94	656.52
3	152.92	655.70
4	237.05	668.38
5	250.76	682.95
6	264.24	697.72
7	264.52	698.86

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	104.41	665.39
2	104.90	665.21
3	123.37	657.54
4	143.13	654.43
5	192.26	662.55
6	205.79	677.27
7	212.54	696.10
8	212.81	698.06

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	133.84	665.17
2	150.04	654.24
3	226.56	667.97
4	240.69	682.13
5	247.13	698.59

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	93.06	670.30
2	97.44	666.46
3	113.42	654.43
4	133.28	652.04
5	231.65	667.23
6	244.04	682.93
7	253.46	698.69

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

```
    1        107.75      665.33
    2        107.79      665.31
    3        123.09      652.43
    4        190.47      662.38
    5        201.61      678.99
    6        215.70      693.19
    7        219.58      698.16
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         94.13      670.51
    2         99.79      664.96
    3        119.61      662.26
    4        137.65      653.62
    5        216.03      663.89
    6        218.52      683.74
    7        230.95      698.34
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        133.95      665.31
    2        144.94      654.33
    3        232.39      666.58
    4        246.43      680.83
    5        255.62      698.59
    6        255.67      698.72
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         96.28      670.93
    2        110.42      656.80
    3        129.60      651.13
    4        235.56      669.67
    5        246.37      686.50
    6        253.57      698.69
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
  #################### SOME LINES SKIPPED ####################
      Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Attempted =  5000
      WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
      Did Not Converge in 20 Iterations.
      Number of Trial Surfaces with Non-Converged FS = 3486
      Number of Trial Surfaces With Valid FS = 1514
      Percentage of Trial Surfaces With Non-Valid FS Solutions
      of the Total Attempted =  69.7 %
      Statistical Data On All Valid FS Values:
         FS Max =   8.781   FS Min =   1.539   FS Ave =   2.348
         Standard Deviation =    0.895   Coefficient of Variation =   38.13 %
      Failure Surface Specified By  7 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        134.948      666.452
          2        135.833      665.654
          3        152.712      654.925
```

4	235.280	668.444
5	248.249	683.668
6	261.918	698.269
7	262.012	698.822

Factor of Safety
*** 1.539 ***

Individual data on the 18 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.7	55.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.2	35.4	0.0	2.4	0.	0.	0.0	0.0	0.0
3	6.5	5495.4	0.0	2152.6	0.	0.	0.0	0.0	0.0
4	7.2	13877.6	0.0	7968.9	0.	0.	0.0	0.0	0.0
5	3.3	8402.0	0.0	4824.7	0.	0.	0.0	0.0	0.0
6	2.7	7587.6	0.0	3726.0	0.	0.	0.0	0.0	0.0
7	12.2	33944.3	0.0	17856.7	0.	0.	0.0	0.0	0.0
8	5.4	14641.6	0.0	7587.1	0.	0.	0.0	0.0	0.0
9	3.3	9061.7	0.0	4574.0	0.	0.	0.0	0.0	0.0
10	5.0	14522.1	0.0	6639.3	0.	0.	0.0	0.0	0.0
11	10.6	35146.7	0.0	14521.8	0.	0.	0.0	0.0	0.0
12	10.9	42341.3	0.0	13592.9	0.	0.	0.0	0.0	0.0
13	32.5	126156.1	0.0	37794.9	0.	0.	0.0	0.0	0.0
14	1.6	5582.1	0.0	2553.3	0.	0.	0.0	0.0	0.0
15	11.4	29359.3	0.0	10556.8	0.	0.	0.0	0.0	0.0
16	3.7	5823.9	0.0	613.9	0.	0.	0.0	0.0	0.0
17	9.9	6881.4	0.0	0.0	0.	0.	0.0	0.0	0.0
18	0.1	3.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.948	666.452
2	135.833	665.654
3	152.712	654.925
4	235.280	668.444
5	248.249	683.668
6	261.918	698.269
7	262.012	698.822

Factor of Safety
*** 1.539 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.948	666.452
2	135.833	665.654
3	152.712	654.925
4	235.280	668.444
5	248.249	683.668
6	261.918	698.269
7	262.012	698.822

Factor of Safety
*** 1.539 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.948	666.452
2	135.833	665.654
3	152.712	654.925
4	235.280	668.444
5	248.249	683.668
6	261.918	698.269
7	262.012	698.822

Factor of Safety
*** 1.539 ***

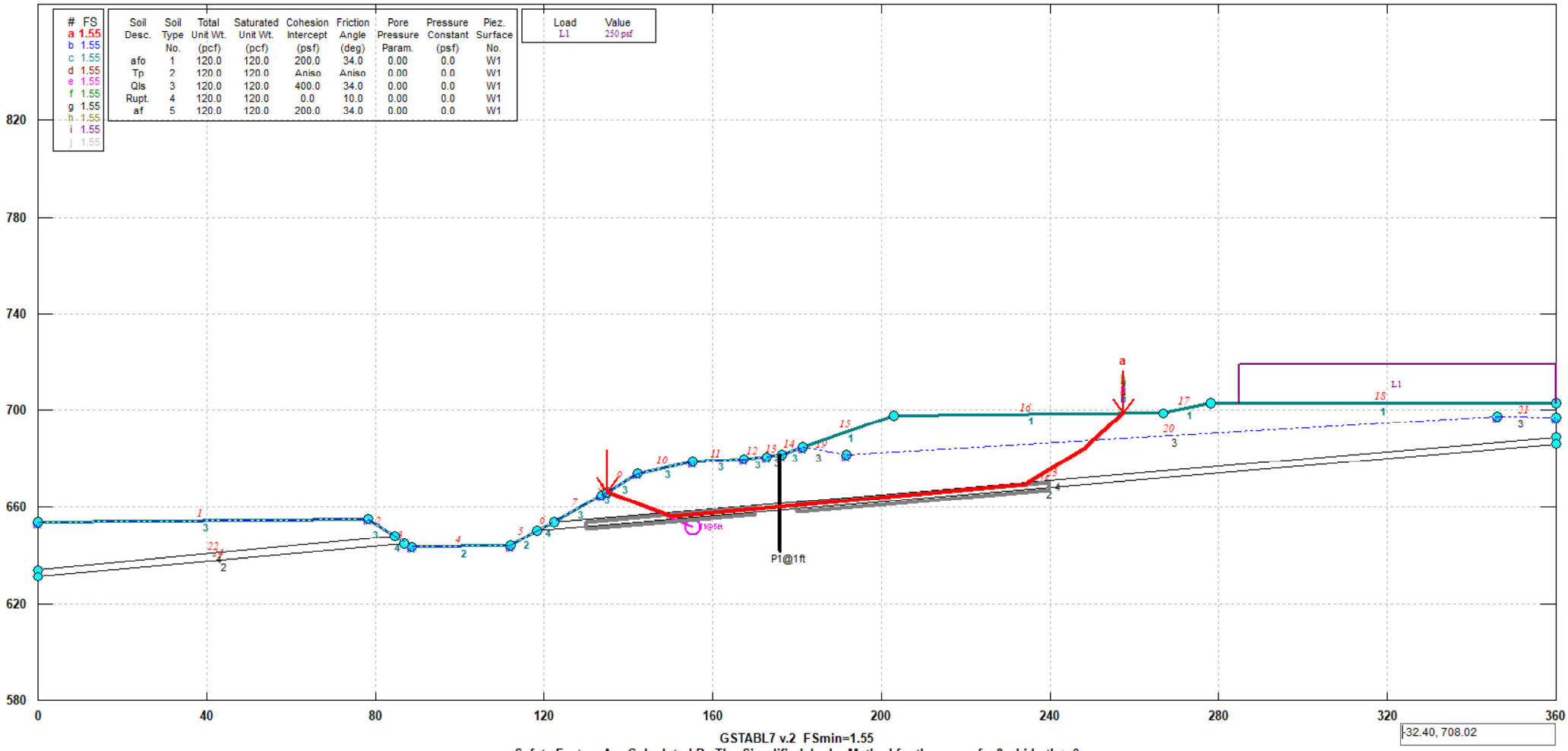
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.948	666.452
2	135.833	665.654

```
    3        152.712      654.925
    4        235.280      668.444
    5        248.249      683.668
    6        261.918      698.269
    7        262.012      698.822
       Factor of Safety
      ***    1.539   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        134.948      666.452
    2        135.833      665.654
    3        152.712      654.925
    4        235.280      668.444
    5        248.249      683.668
    6        261.918      698.269
    7        262.012      698.822
       Factor of Safety
      ***    1.539   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        134.948      666.452
    2        135.833      665.654
    3        152.712      654.925
    4        235.280      668.444
    5        248.249      683.668
    6        261.918      698.269
    7        262.012      698.822
       Factor of Safety
      ***    1.539   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        134.948      666.452
    2        135.833      665.654
    3        152.712      654.925
    4        235.280      668.444
    5        248.249      683.668
    6        261.918      698.269
    7        262.012      698.822
       Factor of Safety
      ***    1.539   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        134.948      666.452
    2        135.833      665.654
    3        152.712      654.925
    4        235.280      668.444
    5        248.249      683.668
    6        261.918      698.269
    7        262.012      698.822
       Factor of Safety
      ***    1.539   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        134.948      666.452
    2        135.833      665.654
    3        152.712      654.925
    4        235.280      668.444
    5        248.249      683.668
    6        261.918      698.269
    7        262.012      698.822
       Factor of Safety
      ***    1.539   ***
          **** END OF GSTABL7 OUTPUT ****
```

Royal Vista / 20080-01 / Section 7-7' / Static / block / butress pins and tb's

z:\2020\20080-01 project dimensions - royal vista\engineering\2023_04 slope stability\2023_05_01 section 7\2023_05_01 x7(step 4) (rupture).pl2 Run By: LGC Geotechnical, Inc. 5/1/2023 06:12PM



#	FS
a	1.55
b	1.55
c	1.55
d	1.55
e	1.55
f	1.55
g	1.55
h	1.55
i	1.55
j	1.55

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
afo	1	120.0	120.0	200.0	34.0	0.00	0.0	W1
Tp	2	120.0	120.0	Aniso	Aniso	0.00	0.0	W1
Qls	3	120.0	120.0	400.0	34.0	0.00	0.0	W1
Rupt.	4	120.0	120.0	0.0	10.0	0.00	0.0	W1
af	5	120.0	120.0	200.0	34.0	0.00	0.0	W1

Load	Value
L1	250 psf

GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 5/1/2023
Time of Run: 05:36PM
Run By: LGC Geotechnical, Inc.
Input Data Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 4) (Rupture).in
Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 4) (Rupture).OUT
Unit System: English
Plotted Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 4) (Rupture).PLT
PROBLEM DESCRIPTION: Royal Vista / 20080-01 / Section 7-7' /
Static / block / butress pins and tb's
BOUNDARY COORDINATES
18 Top Boundaries

26 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	654.00	78.50	655.30	3
2	78.50	655.30	84.70	647.80	3
3	84.70	647.80	88.70	643.50	4
4	88.70	643.50	112.20	643.90	2
5	112.20	643.90	118.40	650.00	2
6	118.40	650.00	122.40	653.70	4
7	122.40	653.70	133.60	664.90	3
8	133.60	664.90	134.80	666.30	3
9	134.80	666.30	142.30	674.00	3
10	142.30	674.00	155.40	679.20	3
11	155.40	679.20	167.60	679.90	3
12	167.60	679.90	173.00	680.90	3
13	173.00	680.90	176.30	681.90	3
14	176.30	681.90	181.30	684.90	3
15	181.30	684.90	202.80	697.90	1
16	202.80	697.90	267.00	698.90	1
17	267.00	698.90	278.10	702.80	1
18	278.10	702.80	360.00	702.80	1
19	181.30	684.90	191.90	681.50	3
20	191.90	681.50	345.90	697.30	3
21	345.90	697.30	360.00	697.20	3
22	0.00	634.20	84.70	647.80	4
23	122.40	653.70	360.00	689.10	4
24	0.00	631.20	87.00	645.00	2
25	118.40	650.00	360.00	686.10	2
26	0.00	0.00	0.00	0.00	0

User Specified Y-Origin = 580.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	200.0	34.0	0.00	0.0	1
2	120.0	120.0	400.0	34.0	0.00	0.0	1
3	120.0	120.0	400.0	34.0	0.00	0.0	1
4	120.0	120.0	0.0	10.0	0.00	0.0	1
5	120.0	120.0	200.0	34.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 15 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	654.00
2	78.50	655.30
3	88.70	643.50
4	112.20	643.90
5	133.60	664.90

6	134.80	666.30
7	142.30	674.00
8	155.40	679.20
9	167.60	679.90
10	173.00	680.90
11	176.30	681.90
12	181.30	684.90
13	191.90	681.50
14	345.90	697.30
15	360.00	697.20

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	285.00	360.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
EARTHQUAKE DATA HAS BEEN SUPPRESSED
EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)
1 Tieback Load(s) Specified

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Method
1	134.80	666.30	270000.0	5.0	35.00	25.0	2

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming A Uniform Distribution Of Load Horizontally Between Individual
Tiebacks. Force Method 1 Considers Only Tangential Tieback Forces.
Force Method 2 Considers Both Tangential and Normal Tieback Forces.
Force Method 3 Considers Only Normal Tieback Forces.
Force Method 4 Limits Normal and Tangential Tieback-Force Distribution
to 1.5 Times the Tieback Inclination, or to 30 Degrees Below (Left of)
the Tieback-Failure Surface Intersection, Whichever is Greater.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)
1	176.00	681.81	12000.0	1.0	90.00	40.0

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	130.00	652.50	170.00	658.49	3.00
2	180.00	660.00	240.00	668.94	3.00

WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	130.47	661.77
2	139.19	653.52
3	198.67	664.06
4	212.55	678.47
5	217.59	697.82
6	217.73	698.13

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	130.15	661.45

```
    2        138.39      653.33
    3        211.30      663.98
    4        212.39      683.95
    5        219.32      698.16
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        133.47      664.77
    2        141.39      660.74
    3        161.15      657.62
    4        228.45      666.69
    5        237.49      684.53
    6        249.77      698.63
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        125.59      656.89
    2        144.82      655.57
    3        191.77      661.20
    4        195.91      680.77
    5        209.39      695.54
    6        211.82      698.04
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        133.15      664.45
    2        145.99      655.20
    3        211.34      664.65
    4        217.65      683.63
    5        222.14      698.20
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        125.45      656.75
    2        136.06      654.51
    3        186.49      661.82
    4        198.85      677.54
    5        211.40      693.11
    6        215.85      698.10
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        132.95      664.25
    2        144.42      655.47
    3        198.09      664.16
    4        204.55      683.08
    5        211.73      698.04
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        133.95      665.31
    2        143.64      655.72
```

```
    3        225.04      665.82
    4        230.11      685.16
    5        241.77      698.51
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        132.48      663.78
    2        143.67      653.38
    3        186.53      659.49
    4        200.25      674.04
    5        211.28      690.73
    6        214.94      698.09
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        133.30      664.60
    2        133.97      663.96
    3        152.08      655.46
    4        233.95      669.18
    5        239.13      688.50
    6        240.69      698.49
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        125.75      657.05
    2        132.94      652.49
    3        234.30      668.53
    4        243.54      686.27
    5        245.10      698.56
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        130.07      661.37
    2        141.96      658.28
    3        161.95      657.82
    4        215.83      666.78
    5        221.23      686.03
    6        232.98      698.37
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        135.11      666.62
    2        148.04      653.81
    3        215.59      666.21
    4        219.51      685.83
    5        224.10      698.23
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.09      660.39
    2        137.57      652.68
    3        209.60      665.15
```

```
    4        220.36      682.01
    5        227.92      698.29
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        133.37      664.67
    2        144.55      655.36
    3        231.21      666.55
    4        243.68      682.18
    5        245.79      698.57
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        130.47      661.77
    2        136.35      657.03
    3        156.34      656.22
    4        237.05      668.38
    5        250.76      682.95
    6        264.24      697.72
    7        264.52      698.86
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        127.54      658.84
    2        128.75      658.34
    3        148.50      655.24
    4        192.26      662.55
    5        198.90      681.41
    6        212.44      696.13
    7        213.13      698.06
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.40      660.70
    2        137.39      654.69
    3        200.67      664.34
    4        213.85      679.38
    5        226.24      695.08
    6        228.16      698.29
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        127.08      658.38
    2        132.47      653.84
    3        190.47      662.38
    4        199.07      680.44
    5        210.21      697.05
    6        211.19      698.03
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        134.41      665.85
```

```
    2        145.83      654.43
    3        209.57      664.71
    4        218.21      682.75
    5        220.31      698.17
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.27      659.57
    2        134.61      654.44
    3        199.19      662.85
    4        202.89      682.51
    5        216.94      696.74
    6        218.34      698.14
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.01      659.31
    2        133.90      653.46
    3        223.44      665.55
    4        225.68      685.42
    5        226.37      698.27
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        132.94      664.24
    2        139.23      662.59
    3        158.65      657.81
    4        194.70      660.73
    5        208.79      674.93
    6        209.30      694.92
    7        211.99      698.04
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
  #################### SOME LINES SKIPPED ####################
      Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Attempted =  5000
      WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
      Did Not Converge in 20 Iterations.
      Number of Trial Surfaces with Non-Converged FS = 3065
      Number of Trial Surfaces With Valid FS = 1935
      Percentage of Trial Surfaces With Non-Valid FS Solutions
      of the Total Attempted =  61.3 %
      Statistical Data On All Valid FS Values:
         FS Max =   6.616   FS Min =   1.545   FS Ave =   2.315
         Standard Deviation =    0.717   Coefficient of Variation =   30.95 %
      Failure Surface Specified By  5 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        135.116      666.624
          2        150.115      655.853
          3        234.166      669.523
          4        247.809      684.147
          5        257.513      698.752
             Factor of Safety
            ***    1.545   ***
           Individual data on the    15  slices
                     Water  Water     Tie     Tie     Earthquake
                     Force  Force    Force   Force       Force   Surcharge
```

Slice No.	Width (ft)	Weight (lbs)	Top (lbs)	Bot (lbs)	Norm (lbs)	Tan (lbs)	Hor (lbs)	Ver (lbs)	Load (lbs)
1	7.2	5403.6	0.0	2571.8	0.	0.	0.0	0.0	0.0
2	5.5	10376.2	0.0	6190.7	0.	0.	0.0	0.0	0.0
3	2.3	5465.0	0.0	3260.5	0.	0.	0.0	0.0	0.0
4	5.3	13869.7	0.0	6809.7	0.	0.	0.0	0.0	0.0
5	12.2	31982.1	0.0	16821.6	0.	0.	0.0	0.0	0.0
6	5.4	13779.3	0.0	7139.0	0.	0.	0.0	0.0	0.0
7	3.3	8536.6	0.0	4308.2	0.	0.	0.0	0.0	0.0
8	5.0	13729.2	0.0	6275.7	0.	0.	0.0	0.0	0.0
9	10.6	33476.5	0.0	13680.4	0.	0.	0.0	0.0	0.0
10	10.9	40639.0	0.0	12698.4	0.	0.	0.0	0.0	0.0
11	31.4	117330.1	0.0	34038.3	0.	0.	0.0	0.0	0.0
12	0.9	3060.4	0.0	1297.9	0.	0.	0.0	0.0	0.0
13	12.7	32400.8	0.0	10746.2	0.	0.	0.0	0.0	0.0
14	2.2	3386.5	0.0	381.6	0.	0.	0.0	0.0	0.0
15	7.5	5028.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.116	666.624
2	150.115	655.853
3	234.166	669.523
4	247.809	684.147
5	257.513	698.752

Factor of Safety
*** 1.545 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.116	666.624
2	150.115	655.853
3	234.166	669.523
4	247.809	684.147
5	257.513	698.752

Factor of Safety
*** 1.545 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.116	666.624
2	150.115	655.853
3	234.166	669.523
4	247.809	684.147
5	257.513	698.752

Factor of Safety
*** 1.545 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.116	666.624
2	150.115	655.853
3	234.166	669.523
4	247.809	684.147
5	257.513	698.752

Factor of Safety
*** 1.545 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.116	666.624
2	150.115	655.853
3	234.166	669.523
4	247.809	684.147
5	257.513	698.752

Factor of Safety
*** 1.545 ***

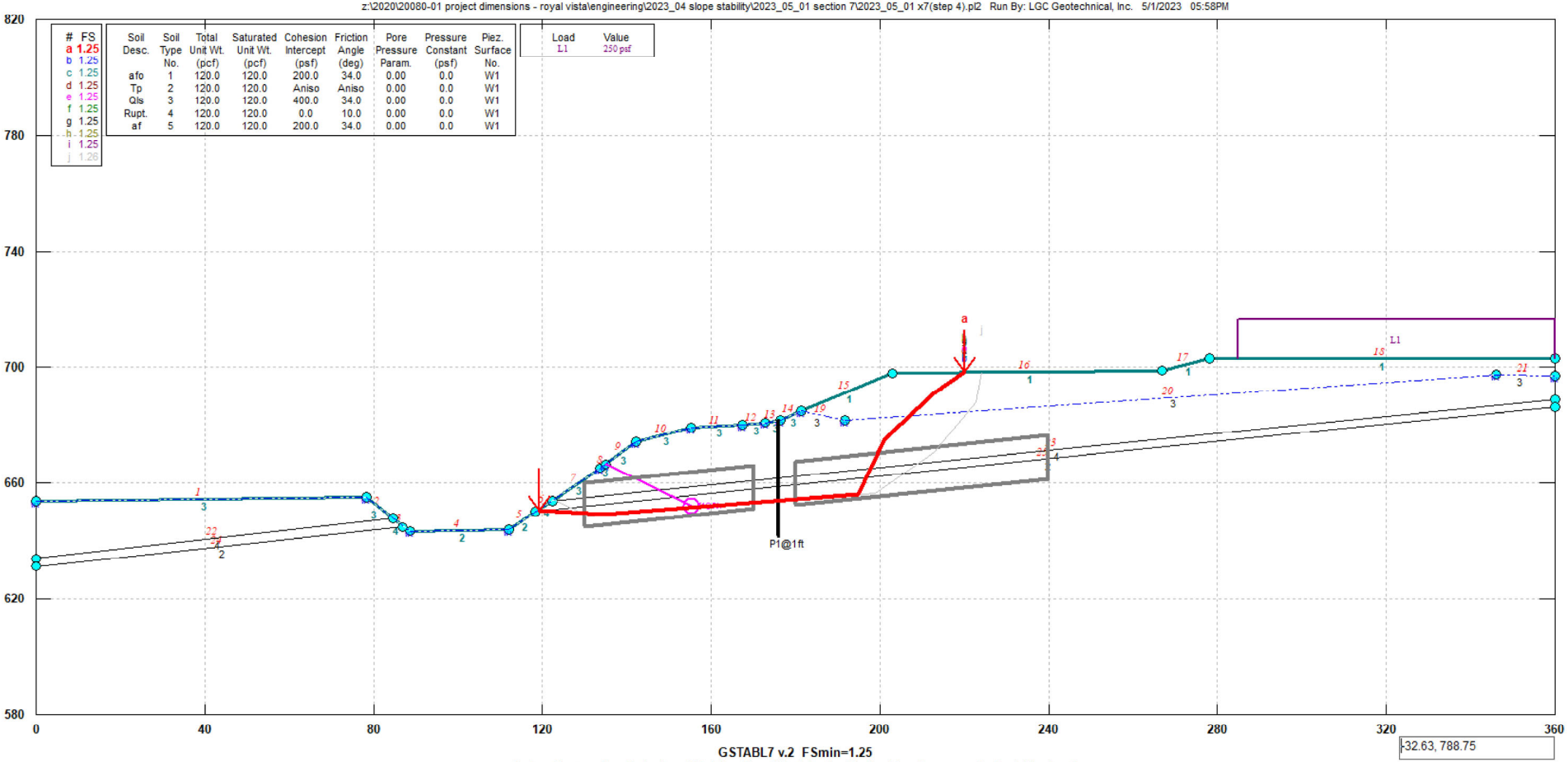
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

```
    1        135.116      666.624
    2        150.115      655.853
    3        234.166      669.523
    4        247.809      684.147
    5        257.513      698.752
       Factor of Safety
      ***    1.545   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        135.116      666.624
    2        150.115      655.853
    3        234.166      669.523
    4        247.809      684.147
    5        257.513      698.752
       Factor of Safety
      ***    1.545   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        135.116      666.624
    2        150.115      655.853
    3        234.166      669.523
    4        247.809      684.147
    5        257.513      698.752
       Factor of Safety
      ***    1.545   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        135.116      666.624
    2        150.115      655.853
    3        234.166      669.523
    4        247.809      684.147
    5        257.513      698.752
       Factor of Safety
      ***    1.545   ***
          **** END OF GSTABL7 OUTPUT ****
```

Royal Vista / 20080-01 / Section 7-7' / Static / block / butress pins and tb's

z:\2020\20080-01 project dimensions - royal vista\engineering\2023_04 slope stability\2023_05_01 section 7\2023_05_01 x7(step 4).pl2 Run By: LGC Geotechnical, Inc. 5/1/2023 05:58PM



GSTABL7 v.2 FSmin=1.25

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 5/1/2023
Time of Run: 05:39PM
Run By: LGC Geotechnical, Inc.
Input Data Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 4).in
Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 4).OUT
Unit System: English
Plotted Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 4).PLT
PROBLEM DESCRIPTION: Royal Vista / 20080-01 / Section 7-7' /
Static / block / butress pins and tb's
BOUNDARY COORDINATES
18 Top Boundaries

26 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	654.00	78.50	655.30	3
2	78.50	655.30	84.70	647.80	3
3	84.70	647.80	88.70	643.50	4
4	88.70	643.50	112.20	643.90	2
5	112.20	643.90	118.40	650.00	2
6	118.40	650.00	122.40	653.70	4
7	122.40	653.70	133.60	664.90	3
8	133.60	664.90	134.80	666.30	3
9	134.80	666.30	142.30	674.00	3
10	142.30	674.00	155.40	679.20	3
11	155.40	679.20	167.60	679.90	3
12	167.60	679.90	173.00	680.90	3
13	173.00	680.90	176.30	681.90	3
14	176.30	681.90	181.30	684.90	3
15	181.30	684.90	202.80	697.90	1
16	202.80	697.90	267.00	698.90	1
17	267.00	698.90	278.10	702.80	1
18	278.10	702.80	360.00	702.80	1
19	181.30	684.90	191.90	681.50	3
20	191.90	681.50	345.90	697.30	3
21	345.90	697.30	360.00	697.20	3
22	0.00	634.20	84.70	647.80	4
23	122.40	653.70	360.00	689.10	4
24	0.00	631.20	87.00	645.00	2
25	118.40	650.00	360.00	686.10	2
26	0.00	0.00	0.00	0.00	0

User Specified Y-Origin = 580.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	200.0	34.0	0.00	0.0	1
2	120.0	120.0	400.0	34.0	0.00	0.0	1
3	120.0	120.0	400.0	34.0	0.00	0.0	1
4	120.0	120.0	0.0	10.0	0.00	0.0	1
5	120.0	120.0	200.0	34.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 15 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	654.00
2	78.50	655.30
3	88.70	643.50
4	112.20	643.90
5	133.60	664.90

6	134.80	666.30
7	142.30	674.00
8	155.40	679.20
9	167.60	679.90
10	173.00	680.90
11	176.30	681.90
12	181.30	684.90
13	191.90	681.50
14	345.90	697.30
15	360.00	697.20

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	285.00	360.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
EARTHQUAKE DATA HAS BEEN SUPPRESSED
EARTHQUAKE DATA HAS BEEN SUPPRESSED
TIEBACK LOAD(S)
1 Tieback Load(s) Specified

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Method
1	134.80	666.30	270000.0	5.0	35.00	25.0	2

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming A Uniform Distribution Of Load Horizontally Between Individual
Tiebacks. Force Method 1 Considers Only Tangential Tieback Forces.
Force Method 2 Considers Both Tangential and Normal Tieback Forces.
Force Method 3 Considers Only Normal Tieback Forces.
Force Method 4 Limits Normal and Tangential Tieback-Force Distribution
to 1.5 Times the Tieback Inclination, or to 30 Degrees Below (Left of)
the Tieback-Failure Surface Intersection, Whichever is Greater.
PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)
1	176.00	681.81	12000.0	1.0	90.00	40.0

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	130.00	652.50	170.00	658.49	15.00
2	180.00	660.00	240.00	668.94	15.00

WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	129.75	661.05
2	139.19	652.11
3	198.67	669.18
4	212.55	683.59
5	216.33	698.11

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	133.38	664.68
2	147.50	661.41

3	234.46	667.42
4	237.25	687.23
5	248.51	698.61

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	128.88	660.18
2	139.83	649.96
3	191.44	663.57
4	204.10	679.05
5	214.92	695.87
6	216.92	698.12

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	130.40	661.70
2	133.82	660.04
3	218.98	669.99
4	224.37	689.25
5	232.09	698.36

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	129.35	660.65
2	142.38	657.90
3	161.48	651.99
4	232.00	661.87
5	244.36	677.59
6	256.92	693.16
7	261.97	698.82

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.69	666.17
2	144.42	658.72
3	198.09	670.00
4	204.55	688.93
5	208.90	698.00

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	125.28	656.58
2	131.87	650.40
3	233.52	671.73
4	247.60	685.94
5	250.93	698.65

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.14	662.44
2	141.71	651.88
3	186.75	655.14

4	200.37	669.79
5	214.09	684.34
6	223.26	698.22

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.63	662.93
2	135.75	658.99
3	155.69	657.46
4	184.29	664.59
5	195.45	681.18
6	204.04	697.92

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.17	662.47
2	146.16	660.19
3	213.12	663.20
4	216.59	682.89
5	223.79	698.23

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.78	663.08
2	137.52	658.37
3	233.79	661.62
4	236.62	681.41
5	245.08	698.56

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	132.19	663.49
2	151.18	657.52
3	234.94	673.87
4	241.56	692.74
5	244.77	698.55

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	128.89	660.19
2	143.86	655.81
3	209.79	667.48
4	218.01	685.72
5	224.94	698.24

Factor of Safety for the Preceding Surface is Between NaN and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	127.78	659.08
2	139.87	654.37
3	220.09	663.93
4	224.32	683.48
5	238.25	697.83

```
    6        238.77      698.46
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        130.77      662.07
    2        145.10      660.99
    3        219.50      664.75
    4        231.10      681.04
    5        231.80      698.35
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        121.77      653.12
    2        124.88      652.49
    3        144.74      650.15
    4        194.47      667.20
    5        208.61      681.34
    6        208.73      697.99
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        133.78      665.11
    2        151.49      662.84
    3        224.16      670.97
    4        231.29      689.66
    5        236.71      698.43
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        124.35      655.65
    2        130.32      654.90
    3        234.59      662.36
    4        247.55      677.59
    5        258.68      694.21
    6        262.42      698.83
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        134.38      665.82
    2        147.17      660.80
    3        164.93      651.61
    4        180.57      654.05
    5        194.29      668.59
    6        208.39      682.78
    7        210.10      698.01
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        132.57      663.87
    2        140.85      659.75
    3        216.40      670.60
    4        229.64      685.59
```

```
     5        236.80      698.43
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        124.30      655.60
    2        130.95      651.64
    3        220.19      671.66
    4        232.48      687.44
    5        235.76      698.41
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        127.32      658.62
    2        138.37      649.39
    3        196.97      661.06
    4        204.44      679.62
    5        208.75      697.99
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        127.47      658.77
    2        141.82      650.12
    3        212.71      662.27
    4        220.36      680.75
    5        234.48      694.92
    6        235.92      698.42
Factor of Safety for the Preceding Surface is Between NaN   and NaN
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  #################### SOME LINES SKIPPED ####################
      Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Attempted =  5000
      WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
      Did Not Converge in 20 Iterations.
      Number of Trial Surfaces with Non-Converged FS = 2488
      Number of Trial Surfaces With Valid FS = 2512
      Percentage of Trial Surfaces With Non-Valid FS Solutions
      of the Total Attempted =  49.8 %
      Statistical Data On All Valid FS Values:
         FS Max =   8.818   FS Min =   1.249   FS Ave =   3.042
         Standard Deviation =    1.049   Coefficient of Variation =   34.47 %
      Failure Surface Specified By  6 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        119.107      650.654
          2        134.519      649.514
          3        194.718      655.974
          4        201.348      674.843
          5        213.057      691.057
          6        220.039      698.169
             Factor of Safety
            ***    1.249   ***
           Individual data on the    20  slices
                     Water  Water     Tie     Tie     Earthquake
                     Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
```

1	2.5	360.7	0.0	152.7	0.	0.	0.0	0.0	0.0
2	0.8	289.4	0.0	121.3	0.	0.	0.0	0.0	0.0
3	11.2	12504.8	0.0	4976.3	0.	0.	0.0	0.0	0.0
4	0.9	1752.2	0.0	650.3	0.	0.	0.0	0.0	0.0
5	0.3	559.9	0.0	208.4	0.	0.	0.0	0.0	0.0
6	7.5	18183.4	0.0	7069.7	0.	0.	0.0	0.0	0.0
7	13.1	40162.1	0.0	19574.6	0.	0.	0.0	0.0	0.0
8	12.2	39734.4	0.0	20746.4	0.	0.	0.0	0.0	0.0
9	5.4	17526.2	0.0	9014.0	0.	0.	0.0	0.0	0.0
10	3.3	10921.6	0.0	5471.6	0.	0.	0.0	0.0	0.0
11	5.0	17480.6	0.0	7932.1	0.	0.	0.0	0.0	0.0
12	10.6	41978.5	0.0	17819.6	0.	0.	0.0	0.0	0.0
13	2.8	12288.4	0.0	4542.9	0.	0.	0.0	0.0	0.0
14	2.0	8404.9	0.0	8692.1	0.	0.	0.0	0.0	0.0
15	1.1	4269.4	0.0	3992.7	0.	0.	0.0	0.0	0.0
16	3.5	10884.3	0.0	8074.1	0.	0.	0.0	0.0	0.0
17	1.5	3764.9	0.0	1030.7	0.	0.	0.0	0.0	0.0
18	4.5	9694.7	0.0	1374.3	0.	0.	0.0	0.0	0.0
19	5.8	7567.0	0.0	0.0	0.	0.	0.0	0.0	0.0
20	7.0	2933.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	119.107	650.654
2	134.519	649.514
3	194.718	655.974
4	201.348	674.843
5	213.057	691.057
6	220.039	698.169

Factor of Safety
*** 1.249 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	119.107	650.654
2	134.519	649.514
3	194.718	655.974
4	201.348	674.843
5	213.057	691.057
6	220.039	698.169

Factor of Safety
*** 1.249 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	119.107	650.654
2	134.519	649.514
3	194.718	655.974
4	201.348	674.843
5	213.057	691.057
6	220.039	698.169

Factor of Safety
*** 1.249 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	119.107	650.654
2	134.519	649.514
3	194.718	655.974
4	201.348	674.843
5	213.057	691.057
6	220.039	698.169

Factor of Safety
*** 1.249 ***

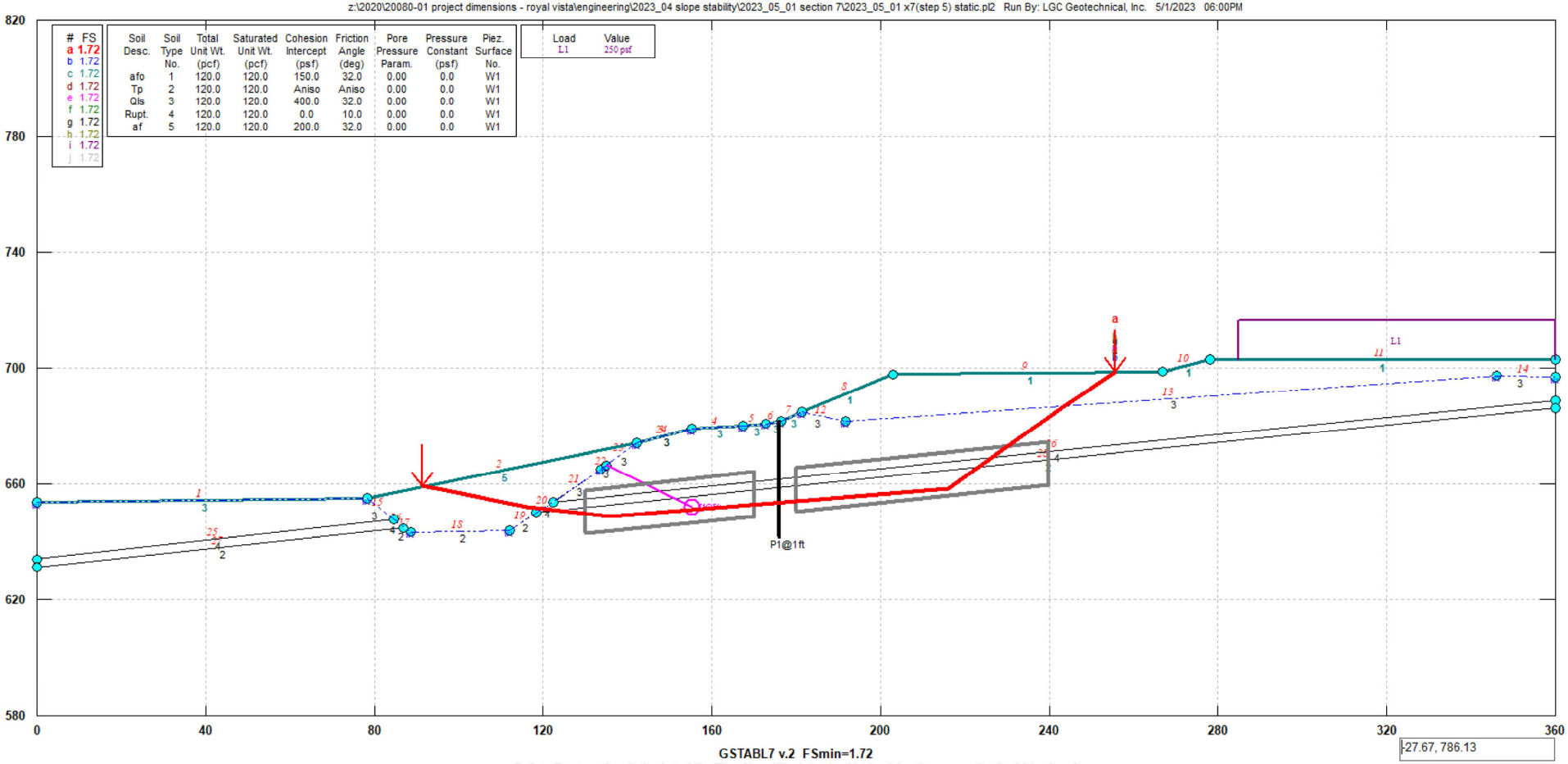
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	119.107	650.654
2	134.519	649.514
3	194.718	655.974

```
    4        201.348      674.843
    5        213.057      691.057
    6        220.039      698.169
       Factor of Safety
      ***    1.249   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        119.107      650.654
    2        134.519      649.514
    3        194.718      655.974
    4        201.348      674.843
    5        213.057      691.057
    6        220.039      698.169
       Factor of Safety
      ***    1.249   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        119.107      650.654
    2        134.519      649.514
    3        194.718      655.974
    4        201.348      674.843
    5        213.057      691.057
    6        220.039      698.169
       Factor of Safety
      ***    1.249   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        119.107      650.654
    2        134.519      649.514
    3        194.718      655.974
    4        201.348      674.843
    5        213.057      691.057
    6        220.039      698.169
       Factor of Safety
      ***    1.249   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        122.988      654.288
    2        130.925      648.331
    3        198.702      656.392
    4        212.838      670.540
    5        222.792      687.887
    6        224.218      698.234
       Factor of Safety
      ***    1.260   ***
          **** END OF GSTABL7 OUTPUT ****
```

Royal Vista / 20080-01 / Section 7-7' / Static / block / butress pins and tb's

z:\2020\20080-01 project dimensions - royal vista\engineering\2023_04 slope stability\2023_05_01 section 7\2023_05_01 x7(step 5) static.pl2 Run By: LGC Geotechnical, Inc. 5/1/2023 06:00PM



GSTABL7 v.2 FSmin=1.72

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 5/1/2023
Time of Run: 05:46PM
Run By: LGC Geotechnical, Inc.
Input Data Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 5) Static.in
Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 5) Static.OUT
Unit System: English
Plotted Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 5) Static.PLT
PROBLEM DESCRIPTION: Royal Vista / 20080-01 / Section 7-7' /
Static / block / butress pins and tb's

BOUNDARY COORDINATES
11 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	654.00	78.50	655.30	3
2	78.50	655.30	142.30	674.00	5
3	142.30	674.00	155.40	679.20	3
4	155.40	679.20	167.60	679.90	3
5	167.60	679.90	173.00	680.90	3
6	173.00	680.90	176.30	681.90	3
7	176.30	681.90	181.30	684.90	3
8	181.30	684.90	202.80	697.90	1
9	202.80	697.90	267.00	698.90	1
10	267.00	698.90	278.10	702.80	1
11	278.10	702.80	360.00	702.80	1
12	181.30	684.90	191.90	681.50	3
13	191.90	681.50	345.90	697.30	3
14	345.90	697.30	360.00	697.20	3
15	78.50	655.30	84.70	647.80	3
16	84.70	647.80	87.00	645.00	4
17	87.00	645.00	88.70	643.50	2
18	88.70	643.50	112.20	643.90	2
19	112.20	643.90	118.40	650.00	2
20	118.40	650.00	122.40	653.70	4
21	122.40	653.70	133.60	664.90	3
22	133.60	664.90	134.80	666.30	3
23	134.80	666.30	142.30	674.00	3
24	142.30	674.00	155.40	679.20	3
25	0.00	634.20	84.70	647.80	4
26	122.40	653.70	360.00	689.10	4
27	0.00	631.20	87.00	645.00	2
28	118.40	650.00	360.00	686.10	2
29	0.00	0.00	0.00	0.00	0
30	0.00	0.00	0.00	0.00	0

User Specified Y-Origin = 580.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	150.0	32.0	0.00	0.0	1
2	120.0	120.0	400.0	32.0	0.00	0.0	1

3	120.0	120.0	400.0	32.0	0.00	0.0	1
4	120.0	120.0	0.0	10.0	0.00	0.0	1
5	120.0	120.0	200.0	32.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	32.00
2	10.0	250.00	10.00
3	90.0	400.00	32.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 15 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	654.00
2	78.50	655.30
3	88.70	643.50
4	112.20	643.90
5	133.60	664.90
6	134.80	666.30
7	142.30	674.00
8	155.40	679.20
9	167.60	679.90
10	173.00	680.90
11	176.30	681.90
12	181.30	684.90
13	191.90	681.50
14	345.90	697.30
15	360.00	697.20

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	285.00	360.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
TIEBACK LOAD(S)
1 Tieback Load(s) Specified

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Method
1	134.80	666.30	270000.0	5.0	35.00	25.0	2

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks Assuming A Uniform Distribution Of Load Horizontally Between Individual Tiebacks. Force Method 1 Considers Only Tangential Tieback Forces.
Force Method 2 Considers Both Tangential and Normal Tieback Forces.
Force Method 3 Considers Only Normal Tieback Forces.
Force Method 4 Limits Normal and Tangential Tieback-Force Distribution to 1.5 Times the Tieback Inclination, or to 30 Degrees Below (Left of) the Tieback-Failure Surface Intersection, Whichever is Greater.
PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)

```
   1     176.00   681.81    12000.0     1.0      90.00       40.0
NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
       Assuming A Uniform Distribution Of Load Horizontally Between
       Individual Piers/Piles.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  20.0
Box        X-Left     Y-Left    X-Right    Y-Right      Height
No.         (ft)       (ft)       (ft)       (ft)        (ft)
 1         130.00     650.50     170.00     656.49      15.00
 2         180.00     658.00     240.00     666.94      15.00
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        127.09      669.54
    2        139.65      656.99
    3        235.34      671.69
    4        235.49      691.69
    5        237.12      698.43
Factor of Safety for the Preceding Surface is Between****** and******
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        130.44      670.52
    2        144.28      656.80
    3        163.62      651.71
    4        180.71      663.09
    5        181.23      683.09
    6        184.40      686.78
Factor of Safety for the Preceding Surface is Between11.223 and******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.78      670.04
    2        132.67      667.23
    3        146.91      653.18
    4        224.67      662.63
    5        229.91      681.93
    6        243.43      696.67
    7        243.43      698.53
Factor Of Safety For The Preceding Specified Surface =-50.387
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        140.22      673.39
    2        147.23      669.32
    3        161.93      655.76
    4        201.50      655.35
    5        201.56      675.35
    6        210.44      693.27
    7        215.27      698.09
Factor of Safety for the Preceding Surface is Between 9.801 and 9.789
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
```

```
    1        120.30      667.55
    2        127.12      665.10
    3        142.93      652.85
    4        182.14      665.23
    5        188.62      684.15
    6        196.90      694.33
Factor Of Safety For The Preceding Specified Surface =-13.533
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        124.99      668.93
    2        138.60      658.88
    3        188.89      664.39
    4        196.71      682.80
    5        205.97      697.95
Factor Of Safety For The Preceding Specified Surface =*******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.86      670.06
    2        139.93      659.00
    3        203.07      668.53
    4        212.72      686.04
    5        219.87      698.17
Factor Of Safety For The Preceding Specified Surface =*******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        124.24      668.71
    2        131.64      664.22
    3        150.53      657.68
    4        182.18      653.54
    5        185.19      673.31
    6        192.02      691.38
Factor Of Safety For The Preceding Specified Surface =-35.411
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        130.61      670.57
    2        143.11      659.19
    3        163.01      657.17
    4        209.44      668.97
    5        220.58      685.58
    6        220.65      698.18
Factor Of Safety For The Preceding Specified Surface = -2.834
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        108.73      664.16
    2        122.27      653.98
    3        142.27      653.90
    4        182.21      655.75
    5        190.84      673.79
    6        191.29      690.94
Factor of Safety for the Preceding Surface is Between****** and******
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
```

```
    1        115.26      666.07
    2        120.41      663.50
    3        139.38      657.18
    4        221.93      666.09
    5        224.55      685.92
    6        224.61      698.24
Factor of Safety for the Preceding Surface is Between-3.863 and 3.894
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        117.92      666.85
    2        125.34      660.38
    3        143.99      653.16
    4        182.91      663.76
    5        187.08      683.33
    6        187.50      688.65
Factor Of Safety For The Preceding Specified Surface =-21.112
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        120.73      667.68
    2        123.72      667.21
    3        140.97      657.10
    4        189.52      666.88
    5        193.76      686.43
    6        193.83      692.48
Factor of Safety for the Preceding Surface is Between****** and******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        110.85      664.78
    2        116.36      660.60
    3        134.02      651.22
    4        189.40      658.05
    5        194.50      677.39
    6        194.53      692.90
Factor Of Safety For The Preceding Specified Surface = -0.115
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.01      669.81
    2        137.06      664.77
    3        156.67      660.84
    4        180.60      654.26
    5        182.12      674.20
    6        195.12      689.39
    7        197.01      694.40
Factor Of Safety For The Preceding Specified Surface =-26.844
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        122.96      668.33
    2        139.25      656.73
    3        181.65      658.78
    4        184.62      678.56
    5        198.05      693.37
    6        201.31      697.00
Factor Of Safety For The Preceding Specified Surface =-23.214
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
```

```
Failure Surface Defined By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.46      670.24
    2        140.86      658.85
    3        223.56      668.69
    4        235.77      684.53
    5        235.81      698.41
Factor Of Safety For The Preceding Specified Surface = -2.010
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.39      669.92
    2        132.90      665.42
    3        147.43      651.68
    4        184.32      664.79
    5        197.72      679.64
    6        200.83      696.71
Factor Of Safety For The Preceding Specified Surface =-19.318
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.14      670.14
    2        141.46      661.29
    3        160.19      654.29
    4        186.47      662.15
    5        186.79      682.15
    6        200.70      696.52
    7        200.71      696.63
Factor of Safety for the Preceding Surface is Between 1.049 and-2.908
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        118.52      667.03
    2        135.00      656.60
    3        185.71      664.72
    4        190.19      684.21
    5        201.84      697.32
Factor Of Safety For The Preceding Specified Surface =*******
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        114.16      665.75
    2        119.68      663.22
    3        135.61      651.13
    4        216.98      667.78
    5        223.50      686.69
  #################### SOME LINES SKIPPED ####################
      Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Attempted =  5000
      WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
      Did Not Converge in 20 Iterations.
      Number of Trial Surfaces with Non-Converged FS =   56
      Number of Trial Surfaces with Misleading FS =  171
      Number of Trial Surfaces With Valid FS = 4773
      Percentage of Trial Surfaces With Non-Valid FS Solutions
      of the Total Attempted =   4.5 %
      Statistical Data On All Valid FS Values:
         FS Max = 274.869   FS Min =   1.717   FS Ave =   7.531
```

Standard Deviation = 16.030 Coefficient of Variation = 212.84 %

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
3	116.099	651.829
4	135.857	648.728
5	216.061	658.198
6	229.895	672.641
7	243.851	686.967
8	255.587	698.722

Factor of Safety

*** 1.717 ***

Individual data on the 24 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.9	1004.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	19.1	19816.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	3.6	6619.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.1	102.9	0.0	0.1	0.	0.	0.0	0.0	0.0
5	2.6	5307.6	0.0	197.2	0.	0.	0.0	0.0	0.0
6	0.8	1662.2	0.0	132.8	0.	0.	0.0	0.0	0.0
7	10.4	25012.6	0.0	4909.1	0.	0.	0.0	0.0	0.0
8	1.2	3259.8	0.0	896.2	0.	0.	0.0	0.0	0.0
9	1.1	2935.5	0.0	894.9	0.	0.	0.0	0.0	0.0
10	6.4	18515.0	0.0	6496.0	0.	0.	0.0	0.0	0.0
11	13.1	41402.7	0.0	20203.4	0.	0.	0.0	0.0	0.0
12	12.2	40690.6	0.0	21271.1	0.	0.	0.0	0.0	0.0
13	5.4	17888.1	0.0	9211.1	0.	0.	0.0	0.0	0.0
14	3.3	11124.3	0.0	5579.8	0.	0.	0.0	0.0	0.0
15	5.0	17760.9	0.0	8069.0	0.	0.	0.0	0.0	0.0
16	10.6	42466.1	0.0	18084.3	0.	0.	0.0	0.0	0.0
17	10.9	50510.0	0.0	17762.4	0.	0.	0.0	0.0	0.0
18	13.3	64588.3	0.0	21454.6	0.	0.	0.0	0.0	0.0
19	7.1	31078.5	0.0	14379.5	0.	0.	0.0	0.0	0.0
20	3.4	12630.6	0.0	5349.5	0.	0.	0.0	0.0	0.0
21	3.3	10732.4	0.0	4193.5	0.	0.	0.0	0.0	0.0
22	13.8	30988.9	0.0	7834.8	0.	0.	0.0	0.0	0.0
23	0.1	206.8	0.0	0.0	0.	0.	0.0	0.0	0.0
24	11.7	8149.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
3	116.099	651.829
4	135.857	648.728
5	216.061	658.198
6	229.895	672.641
7	243.851	686.967
8	255.587	698.722

Factor of Safety

*** 1.717 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
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Factor of Safety

*** 1.717 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
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Factor of Safety
*** 1.717 ***

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Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
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Factor of Safety
*** 1.717 ***

Failure Surface Specified By 8 Coordinate Points

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1	91.145	659.006
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4	135.857	648.728
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Factor of Safety
*** 1.717 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
3	116.099	651.829
4	135.857	648.728
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7	243.851	686.967
8	255.587	698.722

Factor of Safety
*** 1.717 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
3	116.099	651.829
4	135.857	648.728
5	216.061	658.198
6	229.895	672.641
7	243.851	686.967
8	255.587	698.722

Factor of Safety
*** 1.717 ***

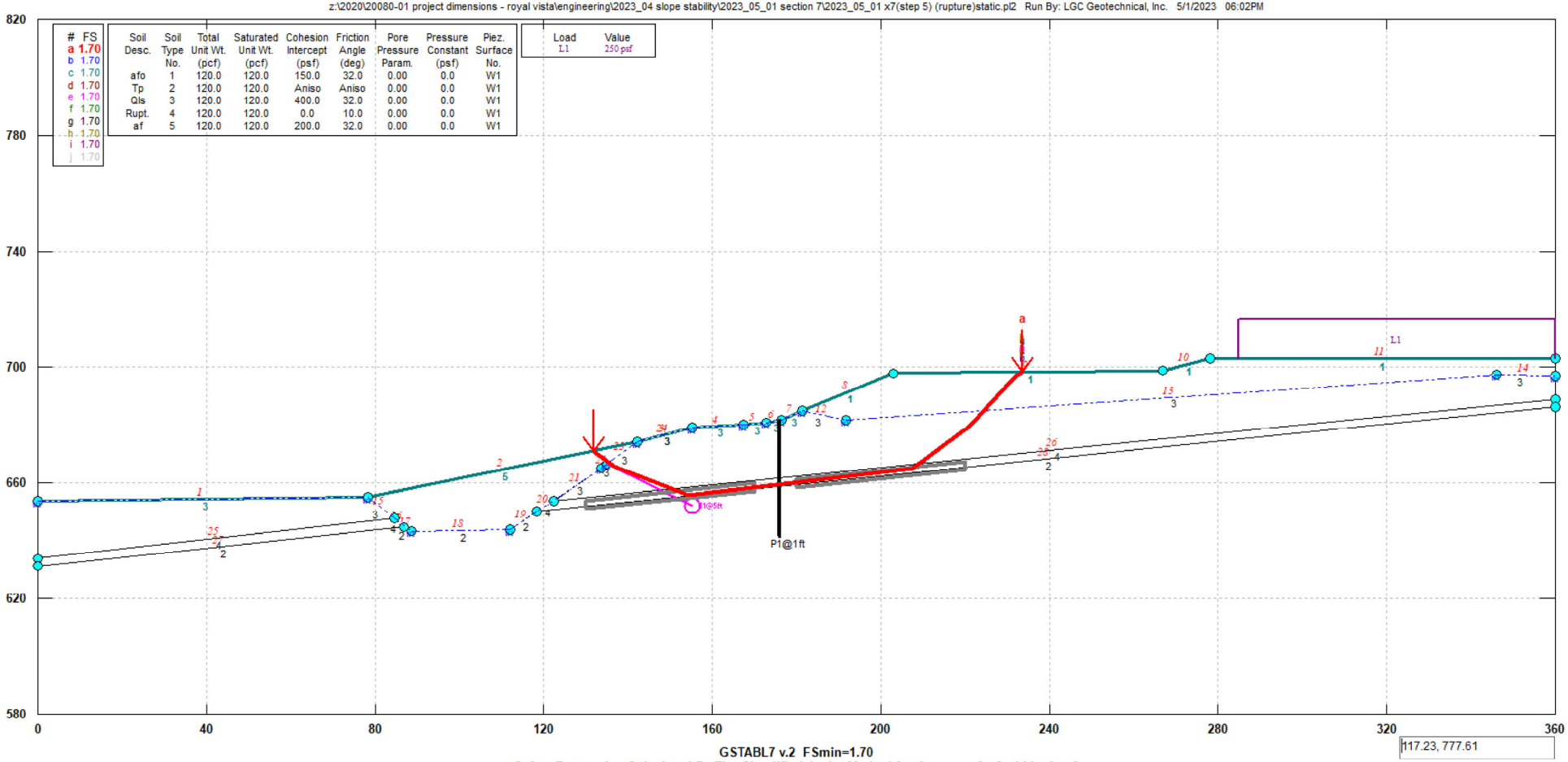
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
3	116.099	651.829

```
    4        135.857      648.728
    5        216.061      658.198
    6        229.895      672.641
    7        243.851      686.967
    8        255.587      698.722
       Factor of Safety
      ***    1.717   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         91.145      659.006
    2         97.041      657.896
    3        116.099      651.829
    4        135.857      648.728
    5        216.061      658.198
    6        229.895      672.641
    7        243.851      686.967
    8        255.587      698.722
       Factor of Safety
      ***    1.717   ***
          **** END OF GSTABL7 OUTPUT ****
```

Royal Vista / 20080-01 / Section 7-7' / Static / block / butress pins and tb's

z:\2020\20080-01 project dimensions - royal vista\engineering\2023_04 slope stability\2023_05_01 section 7\2023_05_01 x7(step 5) (rupture)static.pl2 Run By: LGC Geotechnical, Inc. 5/1/2023 06:02PM



GSTABL7 v.2 FSmin=1.70

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 5/1/2023
Time of Run: 05:42PM
Run By: LGC Geotechnical, Inc.
Input Data Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 5) (Rupture)Static.in
Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 5) (Rupture)Static.OUT
Unit System: English
Plotted Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 5) (Rupture)Static.PLT
PROBLEM DESCRIPTION: Royal Vista / 20080-01 / Section 7-7' /
Static / block / butress pins and tb's

BOUNDARY COORDINATES
11 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	654.00	78.50	655.30	3
2	78.50	655.30	142.30	674.00	5
3	142.30	674.00	155.40	679.20	3
4	155.40	679.20	167.60	679.90	3
5	167.60	679.90	173.00	680.90	3
6	173.00	680.90	176.30	681.90	3
7	176.30	681.90	181.30	684.90	3
8	181.30	684.90	202.80	697.90	1
9	202.80	697.90	267.00	698.90	1
10	267.00	698.90	278.10	702.80	1
11	278.10	702.80	360.00	702.80	1
12	181.30	684.90	191.90	681.50	3
13	191.90	681.50	345.90	697.30	3
14	345.90	697.30	360.00	697.20	3
15	78.50	655.30	84.70	647.80	3
16	84.70	647.80	87.00	645.00	4
17	87.00	645.00	88.70	643.50	2
18	88.70	643.50	112.20	643.90	2
19	112.20	643.90	118.40	650.00	2
20	118.40	650.00	122.40	653.70	4
21	122.40	653.70	133.60	664.90	3
22	133.60	664.90	134.80	666.30	3
23	134.80	666.30	142.30	674.00	3
24	142.30	674.00	155.40	679.20	3
25	0.00	634.20	84.70	647.80	4
26	122.40	653.70	360.00	689.10	4
27	0.00	631.20	87.00	645.00	2
28	118.40	650.00	360.00	686.10	2
29	0.00	0.00	0.00	0.00	0
30	0.00	0.00	0.00	0.00	0

User Specified Y-Origin = 580.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	150.0	32.0	0.00	0.0	1
2	120.0	120.0	400.0	32.0	0.00	0.0	1

3	120.0	120.0	400.0	32.0	0.00	0.0	1
4	120.0	120.0	0.0	10.0	0.00	0.0	1
5	120.0	120.0	200.0	32.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	32.00
2	10.0	250.00	10.00
3	90.0	400.00	32.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.

(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 15 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	654.00
2	78.50	655.30
3	88.70	643.50
4	112.20	643.90
5	133.60	664.90
6	134.80	666.30
7	142.30	674.00
8	155.40	679.20
9	167.60	679.90
10	173.00	680.90
11	176.30	681.90
12	181.30	684.90
13	191.90	681.50
14	345.90	697.30
15	360.00	697.20

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	285.00	360.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)

Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)

Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

EARTHQUAKE DATA HAS BEEN SUPPRESSED

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Method
1	134.80	666.30	270000.0	5.0	35.00	25.0	2

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks Assuming A Uniform Distribution Of Load Horizontally Between Individual Tiebacks. Force Method 1 Considers Only Tangential Tieback Forces. Force Method 2 Considers Both Tangential and Normal Tieback Forces. Force Method 3 Considers Only Normal Tieback Forces. Force Method 4 Limits Normal and Tangential Tieback-Force Distribution to 1.5 Times the Tieback Inclination, or to 30 Degrees Below (Left of) the Tieback-Failure Surface Intersection, Whichever is Greater.

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)

```
   1     176.00   681.81    12000.0     1.0      90.00       40.0
NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
       Assuming A Uniform Distribution Of Load Horizontally Between
       Individual Piers/Piles.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  20.0
Box        X-Left     Y-Left    X-Right    Y-Right      Height
No.         (ft)       (ft)       (ft)       (ft)        (ft)
 1         130.00     652.50     170.00     658.49       3.00
 2         180.00     660.00     220.00     665.96       3.00
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        125.98      669.22
    2        135.05      664.19
    3        153.29      655.98
    4        208.11      665.09
    5        208.76      685.07
    6        209.06      698.00
Factor Of Safety For The Preceding Specified Surface =*******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        117.46      666.72
    2        124.35      659.88
    3        143.58      654.39
    4        181.37      660.48
    5        185.29      680.10
    6        188.73      689.40
Factor Of Safety For The Preceding Specified Surface =-34.602
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        102.94      662.46
    2        105.28      660.12
    3        124.88      656.14
    4        144.74      653.80
    5        189.65      662.45
    6        189.79      682.45
    7        191.94      691.34
Factor Of Safety For The Preceding Specified Surface = -0.481
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        120.33      667.56
    2        139.23      662.59
    3        158.65      657.81
    4        189.80      660.00
    5        203.89      674.20
    6        204.40      694.19
    7        207.66      697.98
Factor Of Safety For The Preceding Specified Surface =*******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
```

```
   No.        (ft)        (ft)
    1        130.24      670.46
    2        141.63      659.94
    3        161.59      658.61
    4        187.19      660.75
    5        191.80      680.21
    6        195.60      693.55
Factor Of Safety For The Preceding Specified Surface =-12.806
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        124.37      668.75
    2        129.33      663.93
    3        147.75      656.15
    4        180.47      660.85
    5        190.03      678.41
    6        203.79      692.92
    7        206.76      697.96
Factor Of Safety For The Preceding Specified Surface =-40.938
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        122.48      668.19
    2        132.68      664.86
    3        150.94      656.72
    4        182.02      660.13
    5        185.29      679.86
    6        185.98      687.73
Factor Of Safety For The Preceding Specified Surface =-15.592
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        122.81      668.29
    2        131.64      662.94
    3        150.53      656.40
    4        181.45      659.26
    5        184.46      679.03
    6        188.28      689.12
Factor Of Safety For The Preceding Specified Surface =-17.509
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        126.46      669.36
    2        132.12      667.85
    3        147.02      654.50
    4        182.31      660.79
    5        195.66      675.68
    6        204.04      693.84
    7        208.18      697.98
Factor Of Safety For The Preceding Specified Surface =-25.071
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        116.18      666.35
    2        117.65      665.73
    3        131.84      651.64
    4        201.35      664.52
    5        210.87      682.11
    6        211.07      698.03
Factor of Safety for the Preceding Surface is Between****** and 7.469
```

The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	128.72	670.02
2	136.85	663.74
3	155.87	657.56
4	188.82	661.58
5	194.92	680.63
6	206.84	696.69
7	207.77	697.98

Factor Of Safety For The Preceding Specified Surface =-42.226
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	124.42	668.76
2	128.15	667.43
3	144.58	656.02
4	188.46	662.59
5	202.42	676.92
6	203.68	696.88
7	203.86	697.92

Factor Of Safety For The Preceding Specified Surface =*******
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	109.46	664.37
2	122.27	654.74
3	142.27	654.65
4	181.47	659.70
5	190.11	677.74
6	190.44	690.42

Factor of Safety for the Preceding Surface is Between44.171 and******
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	112.45	665.25
2	120.41	661.28
3	139.38	654.96
4	207.96	664.53
5	210.57	684.36
6	210.63	698.02

Factor of Safety for the Preceding Surface is Between-1.067 and 0.550
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	119.25	667.24
2	125.34	661.93
3	143.99	654.71
4	181.94	661.36
5	186.10	680.92
6	186.68	688.15

Factor Of Safety For The Preceding Specified Surface =-18.544
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	125.63	669.11
2	136.44	660.57
3	156.10	656.89

```
    4        183.43      659.09
    5        194.70      675.60
    6        199.37      695.05
    7        201.17      696.92
Factor Of Safety For The Preceding Specified Surface =*******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        131.72      670.90
    2        146.04      658.12
    3        165.99      656.70
    4        180.90      661.61
    5        194.09      676.64
    6        202.83      694.63
    7        205.51      697.94
Factor Of Safety For The Preceding Specified Surface =-11.245
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        114.10      665.73
    2        115.36      664.82
    3        130.25      651.46
    4        182.97      660.66
    5        191.41      678.78
    6        191.49      691.06
Factor Of Safety For The Preceding Specified Surface = -0.215
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        124.12      668.67
    2        131.38      662.74
    3        149.81      654.97
    4        188.07      659.72
    5        189.23      679.68
    6        189.41      689.81
Factor of Safety for the Preceding Surface is Between****** and******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.89      670.07
    2        130.26      669.38
    3        144.41      655.25
    4        187.28      659.74
    5        200.71      674.57
    6        203.04      694.43
    7        203.38      697.91
Factor Of Safety For The Preceding Specified Surface =*******
  #################### SOME LINES SKIPPED ####################
      Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Attempted =  5000
      WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
      Did Not Converge in 20 Iterations.
      Number of Trial Surfaces with Non-Converged FS =   64
      Number of Trial Surfaces with Misleading FS =  275
      Number of Trial Surfaces With Valid FS = 4661
      Percentage of Trial Surfaces With Non-Valid FS Solutions
      of the Total Attempted =   6.8 %
      Statistical Data On All Valid FS Values:
         FS Max = 228.457   FS Min =   1.703   FS Ave =   9.769
```

Standard Deviation = 19.106 Coefficient of Variation = 195.57 %

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.751	670.908
2	137.017	665.650
3	154.187	655.394
4	207.449	664.995
5	221.153	679.561
6	231.786	696.501
7	233.392	698.377

Factor of Safety

*** 1.703 ***

Individual data on the 18 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.8	1131.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.4	1017.4	0.0	138.6	0.	0.	0.0	0.0	0.0
3	5.3	5803.1	0.0	2059.9	0.	0.	0.0	0.0	0.0
4	7.8	14423.9	0.0	8142.0	0.	0.	0.0	0.0	0.0
5	4.1	10417.9	0.0	5880.7	0.	0.	0.0	0.0	0.0
6	1.2	3414.2	0.0	1681.2	0.	0.	0.0	0.0	0.0
7	12.2	33434.8	0.0	17637.3	0.	0.	0.0	0.0	0.0
8	5.4	14321.8	0.0	7441.9	0.	0.	0.0	0.0	0.0
9	3.3	8837.7	0.0	4473.3	0.	0.	0.0	0.0	0.0
10	5.0	14141.6	0.0	6483.2	0.	0.	0.0	0.0	0.0
11	10.6	34176.0	0.0	14073.0	0.	0.	0.0	0.0	0.0
12	10.9	41110.6	0.0	12983.6	0.	0.	0.0	0.0	0.0
13	4.6	18609.9	0.0	5360.3	0.	0.	0.0	0.0	0.0
14	1.5	5817.6	0.0	2370.9	0.	0.	0.0	0.0	0.0
15	12.2	36613.9	0.0	11931.3	0.	0.	0.0	0.0	0.0
16	3.3	6367.1	0.0	955.8	0.	0.	0.0	0.0	0.0
17	7.3	6694.9	0.0	0.0	0.	0.	0.0	0.0	0.0
18	1.6	178.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 7 Coordinate Points

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1	131.751	670.908
2	137.017	665.650
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Factor of Safety
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Failure Surface Specified By 7 Coordinate Points

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Factor of Safety
*** 1.703 ***
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2	137.017	665.650
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4	207.449	664.995
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Factor of Safety
*** 1.703 ***
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.751	670.908
2	137.017	665.650
3	154.187	655.394
4	207.449	664.995
5	221.153	679.561
6	231.786	696.501
7	233.392	698.377

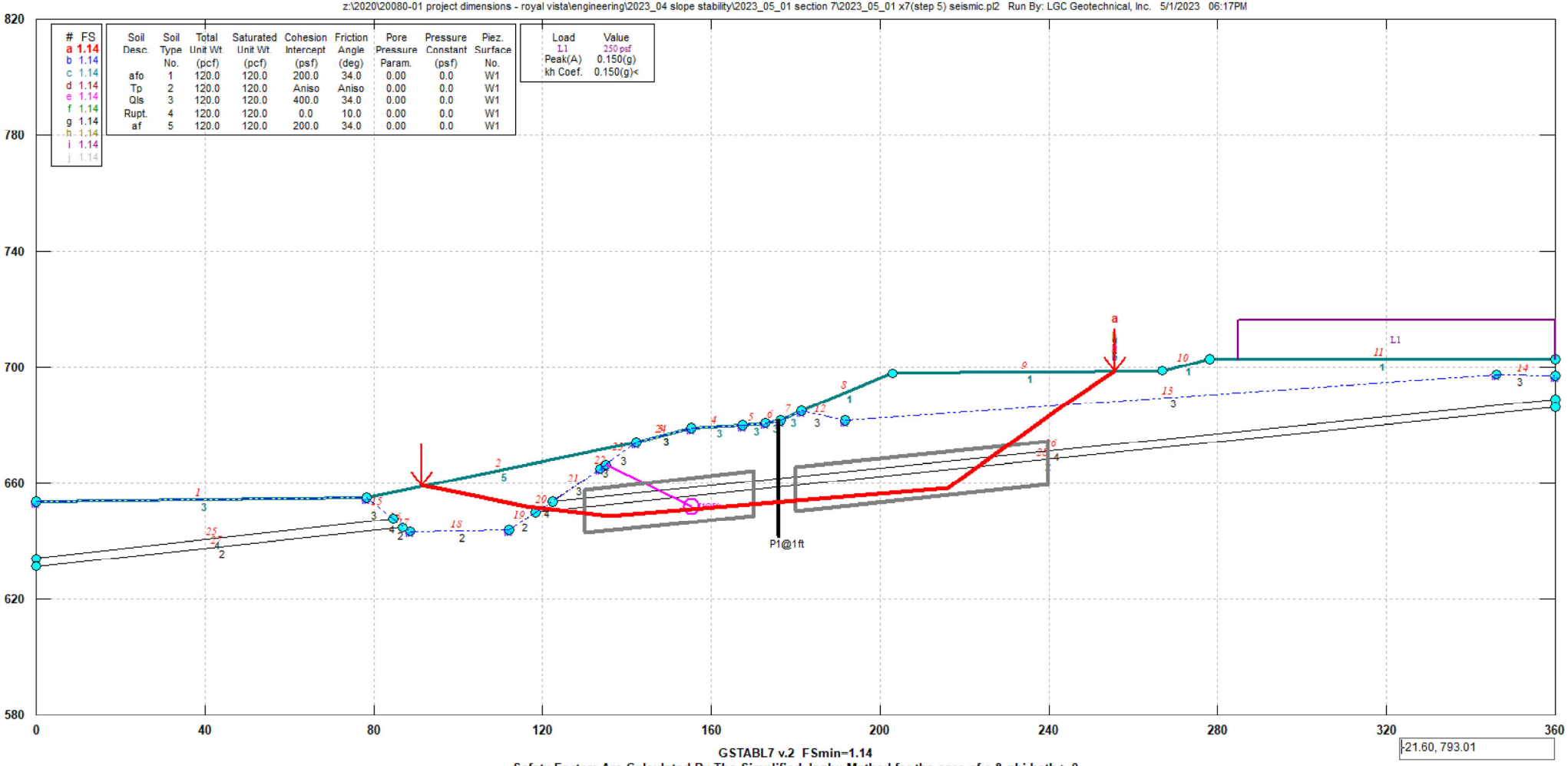
Factor of Safety
*** 1.703 ***
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.751	670.908
2	137.017	665.650
3	154.187	655.394
4	207.449	664.995
5	221.153	679.561

```
6        231.786      696.501
7        233.392      698.377
   Factor of Safety
  ***    1.703   ***
      **** END OF GSTABL7 OUTPUT ****
```

Royal Vista / 20080-01 / Section 7-7' / Seismic / block / butress pins and tb's

z:\2020\20080-01 project dimensions - royal vista\engineering\2023_04 slope stability\2023_05_01 section 7\2023_05_01 x7(step 5) seismic.pl2 Run By: LGC Geotechnical, Inc. 5/1/2023 06:17PM



GSTABL7 v.2 FSmin=1.14

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 5/1/2023
Time of Run: 05:49PM
Run By: LGC Geotechnical, Inc.
Input Data Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 5) Seismic.in
Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 5) Seismic.OUT
Unit System: English
Plotted Output Filename: Z:\2020\20080-01 Project Dimensions - Royal Vista\Engineering\2023_04 Slope Stability\2023_05_01 Section 7\2023_05_01 x7(Step 5) Seismic.PLT
PROBLEM DESCRIPTION: Royal Vista / 20080-01 / Section 7-7' /
Seismic / block / butress pins and tb's
BOUNDARY COORDINATES
11 Top Boundaries

30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	654.00	78.50	655.30	3
2	78.50	655.30	142.30	674.00	5
3	142.30	674.00	155.40	679.20	3
4	155.40	679.20	167.60	679.90	3
5	167.60	679.90	173.00	680.90	3
6	173.00	680.90	176.30	681.90	3
7	176.30	681.90	181.30	684.90	3
8	181.30	684.90	202.80	697.90	1
9	202.80	697.90	267.00	698.90	1
10	267.00	698.90	278.10	702.80	1
11	278.10	702.80	360.00	702.80	1
12	181.30	684.90	191.90	681.50	3
13	191.90	681.50	345.90	697.30	3
14	345.90	697.30	360.00	697.20	3
15	78.50	655.30	84.70	647.80	3
16	84.70	647.80	87.00	645.00	4
17	87.00	645.00	88.70	643.50	2
18	88.70	643.50	112.20	643.90	2
19	112.20	643.90	118.40	650.00	2
20	118.40	650.00	122.40	653.70	4
21	122.40	653.70	133.60	664.90	3
22	133.60	664.90	134.80	666.30	3
23	134.80	666.30	142.30	674.00	3
24	142.30	674.00	155.40	679.20	3
25	0.00	634.20	84.70	647.80	4
26	122.40	653.70	360.00	689.10	4
27	0.00	631.20	87.00	645.00	2
28	118.40	650.00	360.00	686.10	2
29	0.00	0.00	0.00	0.00	0
30	0.00	0.00	0.00	0.00	0

User Specified Y-Origin = 580.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	200.0	34.0	0.00	0.0	1
2	120.0	120.0	400.0	34.0	0.00	0.0	1
3	120.0	120.0	400.0	34.0	0.00	0.0	1
4	120.0	120.0	0.0	10.0	0.00	0.0	1
5	120.0	120.0	200.0	34.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 15 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	654.00

2	78.50	655.30
3	88.70	643.50
4	112.20	643.90
5	133.60	664.90
6	134.80	666.30
7	142.30	674.00
8	155.40	679.20
9	167.60	679.90
10	173.00	680.90
11	176.30	681.90
12	181.30	684.90
13	191.90	681.50
14	345.90	697.30
15	360.00	697.20

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	285.00	360.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Method
1	134.80	666.30	270000.0	5.0	35.00	25.0	2

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Tiebacks
Assuming A Uniform Distribution Of Load Horizontally Between Individual
Tiebacks. Force Method 1 Considers Only Tangential Tieback Forces.
Force Method 2 Considers Both Tangential and Normal Tieback Forces.
Force Method 3 Considers Only Normal Tieback Forces.
Force Method 4 Limits Normal and Tangential Tieback-Force Distribution
to 1.5 Times the Tieback Inclination, or to 30 Degrees Below (Left of)
the Tieback-Failure Surface Intersection, Whichever is Greater.

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)
1	176.00	681.81	12000.0	1.0	90.00	40.0

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	130.00	650.50	170.00	656.49	15.00
2	180.00	658.00	240.00	666.94	15.00

WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	130.44	670.52
2	144.28	656.80
3	163.62	651.71
4	180.71	663.09
5	181.23	683.09
6	184.40	686.78

Factor of Safety for the Preceding Surface is Between 1.340 and-3.951

```
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        130.61      670.57
    2        143.11      659.19
    3        163.01      657.17
    4        209.44      668.97
    5        220.58      685.58
    6        220.65      698.18
Factor of Safety for the Preceding Surface is Between-4.534 and-4.653
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        115.26      666.07
    2        120.41      663.50
    3        139.38      657.18
    4        221.93      666.09
    5        224.55      685.92
    6        224.61      698.24
Factor of Safety for the Preceding Surface is Between-6.010 and******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        110.85      664.78
    2        116.36      660.60
    3        134.02      651.22
    4        189.40      658.05
    5        194.50      677.39
    6        194.53      692.90
Factor Of Safety For The Preceding Specified Surface = -0.140
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.01      669.81
    2        137.06      664.77
    3        156.67      660.84
    4        180.60      654.26
    5        182.12      674.20
    6        195.12      689.39
    7        197.01      694.40
Factor Of Safety For The Preceding Specified Surface =*******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.46      670.24
    2        140.86      658.85
    3        223.56      668.69
    4        235.77      684.53
    5        235.81      698.41
Factor Of Safety For The Preceding Specified Surface = -2.796
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.14      670.14
    2        141.46      661.29
    3        160.19      654.29
    4        186.47      662.15
    5        186.79      682.15
```

```
    6        200.70      696.52
    7        200.71      696.63
Factor of Safety for the Preceding Surface is Between****** and******
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        130.61      670.57
    2        143.11      659.19
    3        163.01      657.17
    4        209.44      668.97
    5        220.58      685.58
    6        220.65      698.18
Factor of Safety for the Preceding Surface is Between-4.534 and-4.653
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        115.26      666.07
    2        120.41      663.50
    3        139.38      657.18
    4        221.93      666.09
    5        224.55      685.92
    6        224.61      698.24
Factor of Safety for the Preceding Surface is Between-6.010 and******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        110.85      664.78
    2        116.36      660.60
    3        134.02      651.22
    4        189.40      658.05
    5        194.50      677.39
    6        194.53      692.90
Factor Of Safety For The Preceding Specified Surface = -0.140
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.01      669.81
    2        137.06      664.77
    3        156.67      660.84
    4        180.60      654.26
    5        182.12      674.20
    6        195.12      689.39
    7        197.01      694.40
Factor Of Safety For The Preceding Specified Surface =*******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.46      670.24
    2        140.86      658.85
    3        223.56      668.69
    4        235.77      684.53
    5        235.81      698.41
Factor Of Safety For The Preceding Specified Surface = -2.796
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.14      670.14
    2        141.46      661.29
```

```
    3        160.19      654.29
    4        186.47      662.15
    5        186.79      682.15
    6        200.70      696.52
    7        200.71      696.63
Factor of Safety for the Preceding Surface is Between****** and******
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        130.61      670.57
    2        143.11      659.19
    3        163.01      657.17
    4        209.44      668.97
    5        220.58      685.58
    6        220.65      698.18
Factor of Safety for the Preceding Surface is Between-4.534 and-4.653
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        115.26      666.07
    2        120.41      663.50
    3        139.38      657.18
    4        221.93      666.09
    5        224.55      685.92
    6        224.61      698.24
Factor of Safety for the Preceding Surface is Between-6.010 and******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        110.85      664.78
    2        116.36      660.60
    3        134.02      651.22
    4        189.40      658.05
    5        194.50      677.39
    6        194.53      692.90
Factor Of Safety For The Preceding Specified Surface = -0.140
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.01      669.81
    2        137.06      664.77
    3        156.67      660.84
    4        180.60      654.26
    5        182.12      674.20
    6        195.12      689.39
    7        197.01      694.40
Factor Of Safety For The Preceding Specified Surface =*******
The Factor Of Safety For The Trial Failure Surface Defined
By The Coordinates Listed Below Is Misleading.
Failure Surface Defined By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        129.46      670.24
    2        140.86      658.85
    3        223.56      668.69
    4        235.77      684.53
    5        235.81      698.41
Factor Of Safety For The Preceding Specified Surface = -2.796
WARNING! The factor of safety calculation did not converge in 20 iterations.
The Trial Failure Surface In Question Is Defined
By The Following  7 Coordinate Points
  Point      X-Surf      Y-Surf
```

```
    No.        (ft)        (ft)
     1        129.14      670.14
     2        141.46      661.29
     3        160.19      654.29
     4        186.47      662.15
     5        186.79      682.15
     6        200.70      696.52
     7        200.71      696.63
  Factor of Safety for the Preceding Surface is Between****** and******
  WARNING! The factor of safety calculation did not converge in 20 iterations.
  The Trial Failure Surface In Question Is Defined
  By The Following  6 Coordinate Points
    Point      X-Surf      Y-Surf
     No.        (ft)        (ft)
     1        130.61      670.57
     2        143.11      659.19
     3        163.01      657.17
     4        209.44      668.97
     5        220.58      685.58
     6        220.65      698.18
  Factor of Safety for the Preceding Surface is Between-4.534 and-4.653
  WARNING! The factor of safety calculation did not converge in 20 iterations.
  The Trial Failure Surface In Question Is Defined
  By The Following  6 Coordinate Points
    Point      X-Surf      Y-Surf
     No.        (ft)        (ft)
     1        115.26      666.07
     2        120.41      663.50
     3        139.38      657.18
     4        221.93      666.09
     5        224.55      685.92
     6        224.61      698.24
  Factor of Safety for the Preceding Surface is Between-6.010 and******
  The Factor Of Safety For The Trial Failure Surface Defined
  By The Coordinates Listed Below Is Misleading.
    #################### SOME LINES SKIPPED ####################
        Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Evaluated. They Are
        Ordered - Most Critical First.
        * * Safety Factors Are Calculated By The Simplified Janbu Method * *
        Total Number of Trial Surfaces Attempted =  5000
        WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
        Did Not Converge in 20 Iterations.
        Number of Trial Surfaces with Non-Converged FS =   33
        Number of Trial Surfaces with Misleading FS =   33
        Number of Trial Surfaces With Valid FS = 4934
        Percentage of Trial Surfaces With Non-Valid FS Solutions
        of the Total Attempted =   1.3 %
        Statistical Data On All Valid FS Values:
           FS Max = 247.326   FS Min =   1.138   FS Ave =   4.123
           Standard Deviation =   13.817   Coefficient of Variation =  335.17 %
        Failure Surface Specified By  8 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1         91.145      659.006
            2         97.041      657.896
            3        116.099      651.829
            4        135.857      648.728
            5        216.061      658.198
            6        229.895      672.641
            7        243.851      686.967
            8        255.587      698.722
               Factor of Safety
             ***    1.138   ***
            Individual data on the    24  slices
                      Water  Water     Tie     Tie     Earthquake
                      Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      5.9    1004.3     0.0     0.0       0.      0.   150.6     0.0      0.0
```

2	19.1	19816.2	0.0	0.0	0.	0.	2972.4	0.0	0.0
3	3.6	6619.4	0.0	0.0	0.	0.	992.9	0.0	0.0
4	0.1	102.9	0.0	0.1	0.	0.	15.4	0.0	0.0
5	2.6	5307.6	0.0	197.2	0.	0.	796.1	0.0	0.0
6	0.8	1662.2	0.0	132.8	0.	0.	249.3	0.0	0.0
7	10.4	25012.6	0.0	4909.1	0.	0.	3751.9	0.0	0.0
8	1.2	3259.8	0.0	896.2	0.	0.	489.0	0.0	0.0
9	1.1	2935.5	0.0	894.9	0.	0.	440.3	0.0	0.0
10	6.4	18515.0	0.0	6496.0	0.	0.	2777.2	0.0	0.0
11	13.1	41402.7	0.0	20203.4	0.	0.	6210.4	0.0	0.0
12	12.2	40690.6	0.0	21271.1	0.	0.	6103.6	0.0	0.0
13	5.4	17888.1	0.0	9211.1	0.	0.	2683.2	0.0	0.0
14	3.3	11124.3	0.0	5579.8	0.	0.	1668.6	0.0	0.0
15	5.0	17760.9	0.0	8069.0	0.	0.	2664.1	0.0	0.0
16	10.6	42466.1	0.0	18084.3	0.	0.	6369.9	0.0	0.0
17	10.9	50510.0	0.0	17762.4	0.	0.	7576.5	0.0	0.0
18	13.3	64588.3	0.0	21454.6	0.	0.	9688.2	0.0	0.0
19	7.1	31078.5	0.0	14379.5	0.	0.	4661.8	0.0	0.0
20	3.4	12630.6	0.0	5349.5	0.	0.	1894.6	0.0	0.0
21	3.3	10732.4	0.0	4193.5	0.	0.	1609.9	0.0	0.0
22	13.8	30988.9	0.0	7834.8	0.	0.	4648.3	0.0	0.0
23	0.1	206.8	0.0	0.0	0.	0.	31.0	0.0	0.0
24	11.7	8149.2	0.0	0.0	0.	0.	1222.4	0.0	0.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
3	116.099	651.829
4	135.857	648.728
5	216.061	658.198
6	229.895	672.641
7	243.851	686.967
8	255.587	698.722

Factor of Safety
*** 1.138 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
3	116.099	651.829
4	135.857	648.728
5	216.061	658.198
6	229.895	672.641
7	243.851	686.967
8	255.587	698.722

Factor of Safety
*** 1.138 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
3	116.099	651.829
4	135.857	648.728
5	216.061	658.198
6	229.895	672.641
7	243.851	686.967
8	255.587	698.722

Factor of Safety
*** 1.138 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.145	659.006
2	97.041	657.896
3	116.099	651.829
4	135.857	648.728
5	216.061	658.198

```
    6        229.895      672.641
    7        243.851      686.967
    8        255.587      698.722
       Factor of Safety
      ***    1.138   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         91.145      659.006
    2         97.041      657.896
    3        116.099      651.829
    4        135.857      648.728
    5        216.061      658.198
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    7        243.851      686.967
    8        255.587      698.722
       Factor of Safety
      ***    1.138   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         91.145      659.006
    2         97.041      657.896
    3        116.099      651.829
    4        135.857      648.728
    5        216.061      658.198
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    8        255.587      698.722
       Factor of Safety
      ***    1.138   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         91.145      659.006
    2         97.041      657.896
    3        116.099      651.829
    4        135.857      648.728
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    8        255.587      698.722
       Factor of Safety
      ***    1.138   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         91.145      659.006
    2         97.041      657.896
    3        116.099      651.829
    4        135.857      648.728
    5        216.061      658.198
    6        229.895      672.641
    7        243.851      686.967
    8        255.587      698.722
       Factor of Safety
      ***    1.138   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         91.145      659.006
    2         97.041      657.896
    3        116.099      651.829
    4        135.857      648.728
    5        216.061      658.198
    6        229.895      672.641
    7        243.851      686.967
    8        255.587      698.722
       Factor of Safety
      ***    1.138   ***
```

**** END OF GSTABL7 OUTPUT ****

Appendix E
Los Angeles County – Geotechnical Review Sheet dated December 27, 2022

PCA GMTR / A866
EPIC LA RPPL2021007149

Los Angeles County Public Works
Geotechnical and Materials Engineering Division
GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET
900 S. Fremont Avenue, Alhambra, CA 91803

Telephone: (626) 458-4925

Tentative Tract Map	83534	**Tentative Map Dated**	**12/13/2022 (rev.)**	**Parent Tract**	---
Grading By Subdivider? [Y]	1,923,600 yd^3	**Location**	Walnut		
Geologist	LGC Geotechnical, Inc.	**Subdivider**	Project Dimensions, Inc.		
Soils Engineer	LGC Geotechnical, Inc.	**Engineer/Arch.**	Fuscoe Engineering, Inc.		

Review of:

Geologic Report(s) Dated: ---
Soils Engineering Report(s) Dated: ---
Geotechnical Report(s) Dated: 07/26/2021, 07/13/2020
References: Tract 27141 reports and maps

TENTATIVE MAP FEASIBILITY IS NOT RECOMMENDED FOR APPROVAL. PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

G1. As previously requested: The CGS Landslide Inventory database shows a landslide mapped in the vicinity of the easterly cul-de-sac of "J" Street and Lots 209 and 210. As previously requested, provide a geologic cross-section(s) at a 1:1 (H:V) scale that transects the most above mentioned lots and most critical slope(s). Include the existing and proposed grades, previous subsurface explorations, subsurface geology, and apparent/true bedrock bedding dip. Additional subsurface data may be required to characterize the area. Provide additional slope stability analyses and mitigation recommendations as necessary.

G2. In addition to comment G1, please provide additional subsurface data for Lots 209 and 210. Is the landslide that CGS mapped still present or was it removed during rough grading of the golf course or nearby tract 27141? GMED has files for tract 27141 which can be reviewed at the request of the geotechnical consultant.

S1. Additional slope stability may be required once on-site geology has been determined. See comment G1.

S2. Please submit documents in response to this review using the EPIC-LA system at the following URL: https://epicla.lacounty.gov/SelfService/#/home.

NOTE: Provide a copy of this review sheet with your resubmittal.

Prepared by

PROFESSIONAL ENGINEER GEORGE MOLINA C 91931 CIVIL STATE OF CALIFORNIA

George Molina
Soils Section

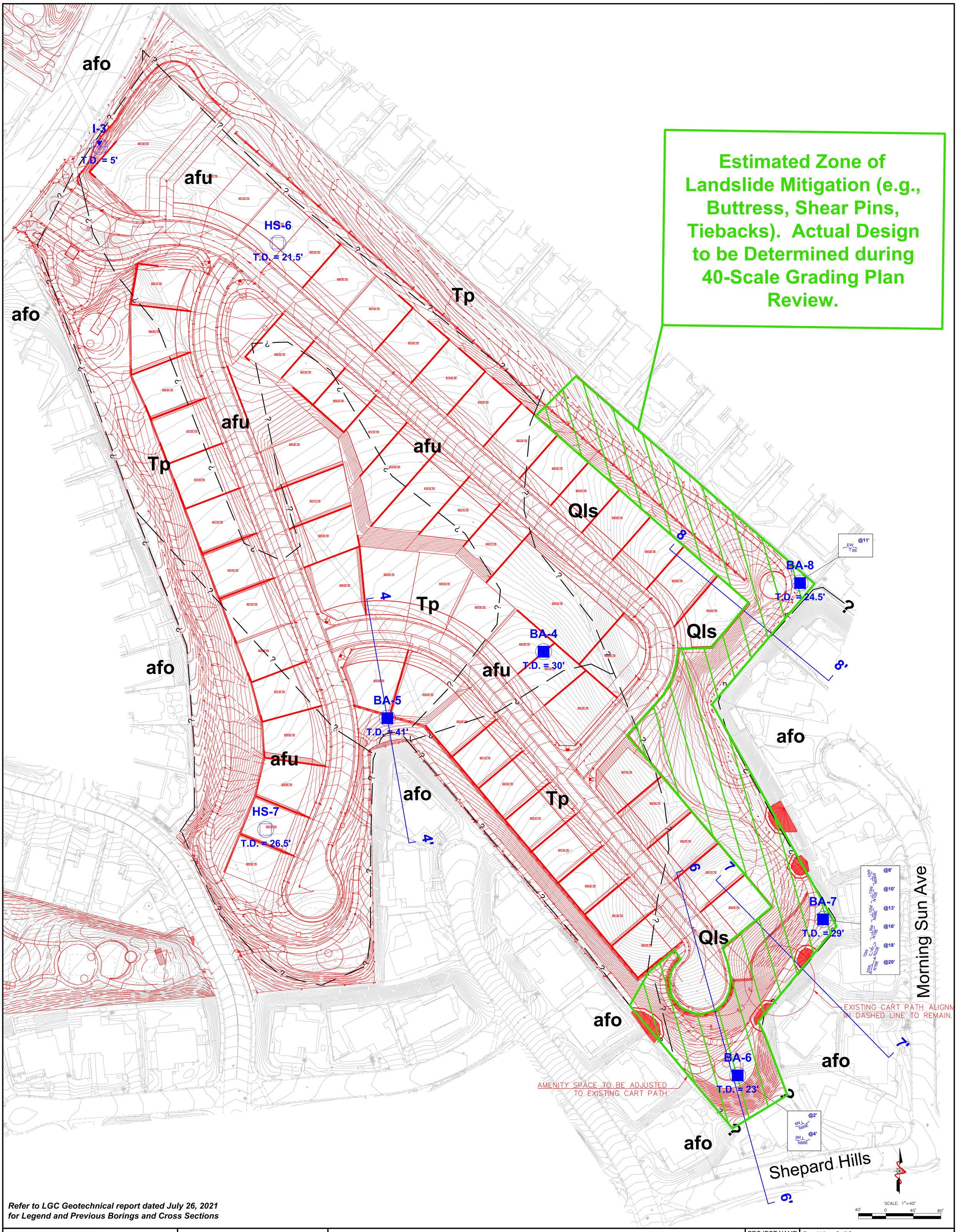
PROFESSIONAL GEOLOGIST Karin L. Burger No. 2507 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

Matthew Cruz
Geology Section

Date 12/27/2022

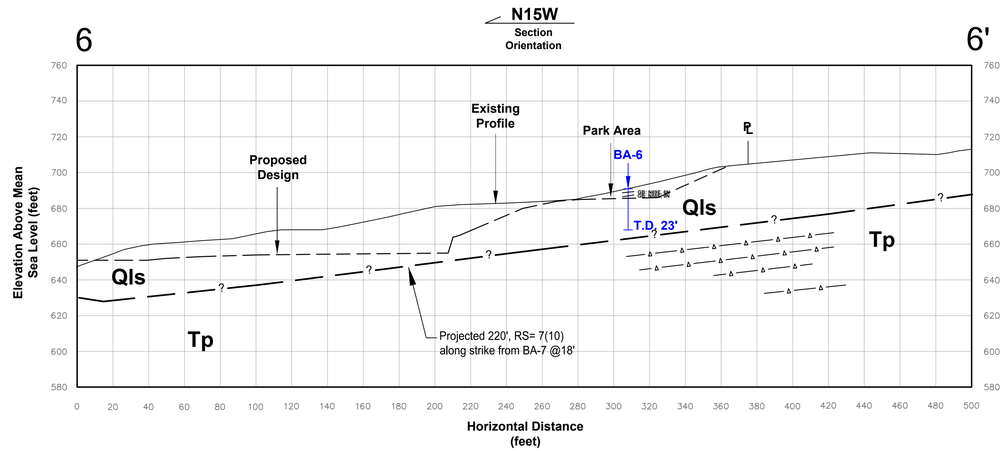
Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey

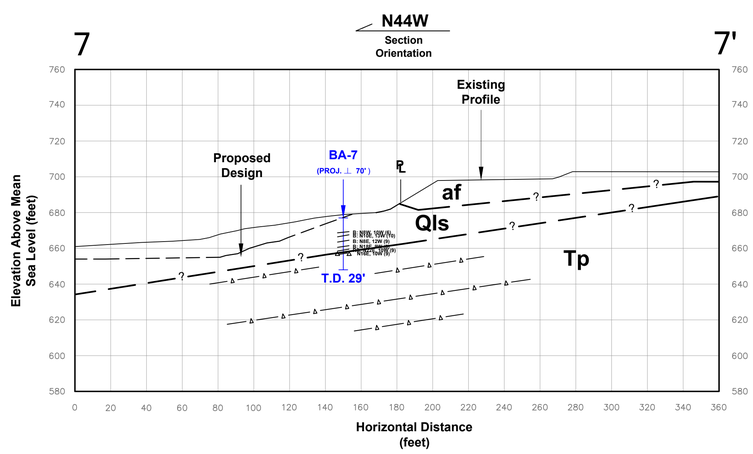
NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

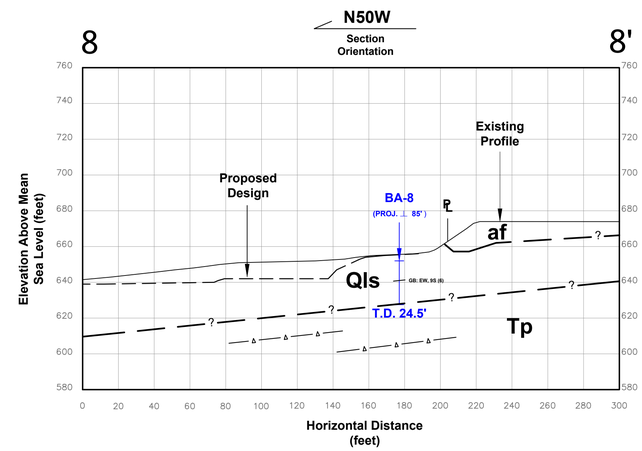


Refer to LGC Geotechnical report dated July 26, 2021 for Legend and Previous Borings and Cross Sections

LGC Geotechnical, Inc.	LGC Geotechnical, Inc. 131 Calle Iglesia, Ste. 200 San Clemente, CA 92672 TEL (949) 369-6141 FAX (949) 369-6142	**Geotechnical Map**	PROJECT NAME: Royal Vista Golf Course PROJECT NO.: 20080-01 ENG. / GEOL.: RLD / KBC SCALE: 1"=40' DATE: May 2023	SHEET 1 of 2







SCALE: 1"=40'

40' 0 40' 80'

LGC Geotechnical, Inc.

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

Geotechnical Cross Sections
6-6' through 8-8'

PROJECT NAME	Royal Vista Golf Course
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1"=40'
DATE	May 2023

SHEET 2 of 2

July 7, 2023 Project No. 20080-01

Mr. Jon Conk
Project Dimensions, Inc.
4 Park Plaza, Suite 700
Irvine, California 92614

Subject: ***Response to Geotechnical Review Comments dated May 31, 2023 regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California***

Introduction

In accordance with your request, LGC Geotechnical, Inc. has prepared this response to geotechnical review comments dated May 31, 2023 regarding the proposed residential development to be located on portions of the existing Royal Vista Golf Course in the City of Rowland Heights, California. The provided review comments (Los Angeles County Public Works, 2023) are primarily based on our Summary of Geotechnical Evaluation and Feasibility Study (LGC Geotechnical, 2020), Updated Summary of Geotechnical Evaluation and Feasibility Study (LGC Geotechnical, 2021) and our recent response to County comments (LGC Geotechnical, 2023).

This response-report should be considered as part of the project design documents in conjunction with our previous geotechnical reports (refer to references). In the case of conflict, the recommendations contained herein should supersede those provided in our previous reports. The remaining recommendations provided in our previous geotechnical reports (refer to references) remain valid and applicable.

Geotechnical Review Dated May 31, 2023

For your convenience, the geotechnical review comments have been repeated below along with our responses. A copy of the review sheet is provided in Appendix B.

Comment No. G1

"Please add a legend to the geotechnical map that provides explanations for units and map symbols."

Response to Comment No. G1

The legend has been included on our Updated Geotechnical Map (Sheets 1 & 2) included herein.

Comment No. G2

"Please put all subsurface measurements on the map with their associated borings and indicate thickness of fill on the geotechnical map. The geotechnical map should encompass the entire tentative map."

Response to Comment No. G2

The requested information is presented on the Updated Geotechnical Map (refer to Sheets 1 & 2), attached. The Updated Geotechnical Map encompasses the entire tentative map area.

Comment No. G3

"There are various 2:1 cut slopes within the Puente Formation proposed across the tract. Please demonstrate, through data and analysis, the stability of these cut slopes given the pervasive low, northwestward dip angles within the formation. Provide mitigation recommendations, as necessary."

Response to Comment No. G3

Based on our evaluation, adverse slope stability conditions were identified in the landslide – affected southeastern portion of the site, and at the location of the large retaining wall within the northern portion of the site. Cross-Sections 1-1' through 4-4' have been updated with Conceptual Remedial Profiles and included on Sheet 4 herein; cross-sections locations are shown on Sheet 1, the 100-Scale Updated Geotechnical Map. Cross-Sections 5-5' through 9-9' have been updated relative to the interpreted limits of landslide at the southeastern portion of the site; they correspond to the 40-Scale Updated Geotechnical Map, Sheet 2, and depict preliminary remedial measures for both temporary and final slope stability of the landslide-affected portion of the site.

For the area of the proposed retaining wall in the northern portion of the site, we have previously indicated (LGC Geotechnical, 2021) that "top-down construction" type retaining walls (e.g., nail walls, tieback walls, or pile and shotcrete walls) may be options to address slope stability concerns at this location. Replacement of the slope with an earthen buttress may also be an option in this location. While adversely oriented clay beds were encountered, landslide material was not. As such, and as there is ample room between the proposed wall and property line, it appears clear that mitigation is feasible at this location. Please note, additional design level slope stability analysis will need to be performed once 40-scale rough grading plans have been prepared and more details are available regarding finalized slope and retaining wall configurations, etc. This additional evaluation may include additional cross-sections and slope stability analysis. Additional subsurface evaluation may be warranted.

Please note the major focus of this response report is mitigation of the landslide area in the southeastern portion of the site. Additional data relative to geologic interpretation and remedial measures are presented on the attached Updated Geotechnical Map (refer to Sheet 2), and Cross-sections (refer to Sheets 4 & 5), based on research and a detailed desktop geologic analysis. Additional slope stability analysis has been performed and our recommendations for mitigation of the landslide to allow for the proposed development are provided herein and graphically depicted on our Updated Geotechnical Map and Cross-Sections.

Comment No. G4

"The extent of the landslide on the subject property has not been sufficiently defined. The cross-sections show the slide plane dipping northwest indefinitely, but where does it terminate? Please provide additional subsurface data to determine the depth and extent of the landslide and the geometry of the slide plane."

Response to Comment No. G4

In order to determine the limits of the landslide, we compared existing topography to historic (1928) topographic contours, and reviewed reports for the Morning Sun Landslide (Harrington, 2006; Leighton & Associates, 2003 & 2010) and in-house geotechnical reports for the adjacent South Pointe residential development (LGC Geotechnical, 2016).

The original topography of the region indicates what appears to be a very large dip-slope underlying the majority of the proposed residential tract and older residential tracts, gently dropping northwest in a broad gentle hillside from the top of hillside area within the South Pointe development. Refer to the Topographic Comparison Exhibit, Sheet 3. The angle of the broad native slope is similar to the pervasive northwest dip observed in borings within the site and the area located just east of Morning Sun Avenue, although local variations exist. The driving force for the historic Morning Sun Landslide was derived from the strong hill located up-dip of the Morning Sun Landslide area (southeast of subject site), in an area that has since been re-graded twice since the Morning Sun failure occurred in 1995.

Original rough grading of the Morning Sun Landslide included emergency rough grading for mitigation of the failed utilities and street and stockpiling of soils on the vacant land east of Morning Sun, as summarized in Leighton, 2003. The referenced summary by Leighton is the only available report that mentions the possibility of a "deeper ancient landslide;" however, no location is identified. The Morning Sun Landslide was further reviewed by Harrington Geotechnical Engineering, as reported in the 2006 report of landslide evaluation. Boring log data by Harrington indicates the Morning Sun Landslide to be a relatively shallow feature; the rupture surface was located within about 20 feet of the surface. Refer to boring BA-11, included on the Updated Geotechnical Map, boring log provided in Appendix C. Rough grading activities for mitigation of the landslide during 2007 were reported to extend to bedrock; and no deeper ancient landslide was identified below the active landslide (Leighton, 2010). Additionally, rough grading for the South Pointe development encountered bedrock in the area of the previous slide, as reported by LGC Geotechnical, 2016.

Historic topographic contours from 1928 (Historic Aerials, 2023) were compared to the existing topography of the subject tract, and estimated limits of artificial fill on site has been added to the Updated Geotechnical Map. Review of original topography for geomorphic expression and comparison of recent data to boring logs have resulted in revised boring log interpretation for Boring BA-6 (refer to Appendix C). Boring BA-6 was only partially observed due to unsafe conditions for downhole logging. Observation and review of retained drive samples has enabled the material that was interpreted to be "landslide material" to be re-interpreted as "older artificial fill." Our updated geotechnical map and cross-sections have been revised accordingly.

From our on-site observations, the material below landslide at 18 feet in depth in BA-7 was interpreted to be bedrock, grading to fresh/unoxidized formation with depth, hard and partially

weakly cemented. The material became harder with depth and was directly observed to be competent material.

The estimated extent of the landslide is depicted on our Updated Geotechnical Map (Sheets 1 & 2). Revised boring logs are presented in Appendix C, attached.

Comment No. G5

"Based on the subsurface data requested in G3, extend cross-sections 6, 7, and 8 to include new data and show the northwesterly limits of the landslide. Show all geologic contacts and the locations of all proposed buttresses, shear pins, tiebacks, and/or any other proposed mitigation measures."

Response to Comment No. G5

The above-noted cross-sections have been extended as requested and updated to include slope stability mitigation measures based on the results of our slope stability analysis.

Comment No. G6

"Previous investigations for the historic landslide that occurred east of the tract on Morning Sun Drive (see references) encountered ancient landslide planes beneath the active slide-plane. Based on the interpretation that this is a block-glide slide that is failing along west/northwest dipping bedding planes, is the slide-plane identified in boring BA-7 a downslope extension of the ancient slide-planes identified offsite? If not, do other slide-planes exist beneath the one encountered in BA-7? Please provide a discussion."

Response to Comment No. G6

Refer to discussion presented in our response to Comment No. G4. Based on our subsurface geotechnical evaluation and review of reports for the offsite Morning Slide Landslide, intact bedrock material was encountered below the identified basal landslide rupture surface. The rupture surface for the Morning Sun Landslide is likely the same one observed in our recent boring BA-7. The relatively thin landslide appears to mantle the upper portion of the overall gentle northwest-facing dip slope. There are no indications that a deeper landslide is present below the broad dip-slope that underlies the community located northwest of the Morning Sun Landslide.

Due to additional clay beds that were encountered below the rupture surface depth, we have performed our slope stability analysis conservatively assuming infinite clay beds below the landslide rupture surface, and have designed the proposed slope stability mitigation systems accordingly.

Comment No. G7

"The geotechnical map shows areas of proposed remediation along the eastern and southern boundaries of the tract, but what is proposed to mitigate the deposits within the tract, which may require significant grading and/or other mitigation measures? How much material will have to be removed?"

Response to Comment No. G7

Removals of the unsuitable fill and landslide materials to competent bedrock should be performed by means of conventional grading and earthwork for the areas of the site away from the project boundaries (refer to our Response to Comment No. G9 for additional discussion). Removals of ancient landslide adjacent to the eastern and southern boundaries will be facilitated with proposed shear pin, tieback, and buttress mitigations discussed herein. Removals of undocumented fill adjacent to property boundaries may be accomplished by means of excavating and recompacting the materials in temporary excavations, ABC slot cuts, or with the support of temporary shoring. Preliminary recommendations for temporary excavations, ABC slot cuts, and temporary shoring are provided in our response to Comment No. G8.

Comment No. G8

"How will offsite properties be stabilized during grading operations? Provide stability analyses to demonstrate that proposed mitigation measures adjacent to existing homes will be grossly stable during rough grading operations."

Response to Comment No. G8

Please refer to the temporary slope stability analysis for Cross Sections 5-5' through 9-9' presented herein for recommendations to stabilize offsite properties in the area with the existing ancient landslide. Temporary excavations in other areas of the site where adverse geologic conditions are not anticipated should be performed in accordance with Cal/OSHA. Preliminary recommendations for temporary excavations, ABC slot cuts, and temporary shoring are provided below. Preliminary estimated locations of temporary shoring are presented on the Updated Geotechnical Map (Sheet 2).

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. Based on our field investigation, the majority of site soils are anticipated to be OSHA Type "B" soils. Soils below groundwater should be considered OSHA type "C" soils. Some sandy soils are present and should be considered susceptible to caving. Raveling of the sandy soils should be anticipated for temporary slopes. Flatter slope inclinations should be considered if raveling cannot be tolerated. The exposed slope surface may be kept surficially moist (but not saturated) during construction to reduce (not eliminate) potential sloughing. Soil 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.

The potential for impacting the existing improvements may be reduced by the installation of temporary shoring or performing narrow "A-B-C" slot cuts while performing earthwork removal and recompaction. Slot cuts should be backfilled immediately with properly compacted fill to finish grade prior to excavation of the adjacent two slots. Please note sands susceptible to caving are present at the site. Recommendations for slot cut dimensions should be evaluated during grading based on the conditions encountered. Protection of the existing offsite improvements during grading is the responsibility of the contractor.
Surcharge loads (vehicular traffic, soil stockpiles, construction equipment, etc.) should be set back from the perimeter of excavations a minimum distance equivalent to a 1:1 projection from the bottom of the excavation or 5 feet, whichever is greater, unless the cut is properly shored and designed for the applicable surcharge load. 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. The potential for impacting the existing improvements may be reduced by the installation of temporary shoring during construction and backfilling of the structure basement walls. Temporary shoring parameters are provided below.

Temporary Shoring

Typical cantilever temporary shoring, where deflection of the shoring will not impact the performance of adjacent structures, with a level backfill may be designed using an active equivalent fluid pressures of 40 pounds per square foot (psf) per foot of depth (or pcf) above the groundwater, and an active equivalent earth pressure of 85 pcf below groundwater. Braced temporary shoring may be used in areas where the shoring will be located close to existing structures/improvements in order to limit shoring defections or required due to the proposed depth of excavation. The shoring designer should contact the geotechnical consultant for geotechnical recommendations and input for braced temporary shoring. Any slopes above temporary shoring will increase the above-noted lateral earth pressures and can be provided on a case-by-case basis.

Any surcharge (e.g., building, equipment or traffic loads, etc.) located within a 1:1 (horizontal to vertical) projection from the base of the shoring should be added to the applicable lateral earth pressure. Surcharge loading effects from adjacent structures should be evaluated by the permanent shoring or temporary shoring designer. Any building, equipment or traffic loads located within a 1:1 (horizontal to vertical) projection from the base of the shoring should be added to the applicable lateral earth pressure. Uniform surcharges may be estimated using the applicable coefficient of lateral earth pressure using a rectangular distribution. A factor of 0.4 may be used for active conditions. A minimum additional uniform lateral earth pressure of 120

psf for the upper 10 feet should be added to the appropriate lateral earth pressures to account for typical vehicle traffic loading. If vehicle traffic is kept at least 10 feet from the shoring, the traffic surcharge may be neglected. The shoring designer should contact the geotechnical engineer for any required geotechnical assistance in estimating any applicable lateral surcharge loads.

For piles spaced a minimum of 2.5 pile diameters on-center, an allowable passive pressure of 600 pcf may be used for passive resistance in areas where the piles are above groundwater and 300 pcf in areas where the piles are below groundwater. The provided passive pressures are based on an arching factor of 2 (e.g., 300 pcf x 2 = 600pcf, and 150 pcf x 2 = 300 pcf) and should be limited to a maximum of 12 times the value provided above (e.g., 500 pcf to a maximum of 7,200 psf, and 300 pcf to a maximum of 3,600 psf). The passive pressure is only applicable for level (5 horizontal feet to 1-foot vertical or flatter) soil conditions. To develop the full lateral value, provisions should be made to assure firm contact between the soldier piles and the undisturbed soils. The concrete placed in the soldier pile excavation below the excavated level should be of adequate strength to transfer the imposed loads to the surrounding soils. The provided allowable passive pressure is based on a factor of safety of 1.5. The structural designer should incorporate appropriate factors of safety and/or load factors in their design.

Continuous lagging should be provided between the soldier piles. Lagging should be placed in a timely manner during excavation in order to minimize potential spalling and sloughing. Careful installation of the lagging will be necessary to achieve bearing against the retained earth. The backfill of the lagging should consist of one sack sand-cement slurry or compacted moistened granular soil. It should be noted that backfill of the lagging with compacted granular soil may result in continuation of caving as the excavation depth progresses. Means and methods are per the contractor in order to ultimately ensure full bearing of retained earth to the lagging. The soldier piles should be designed for the full anticipated lateral pressure, however, the pressure on the lagging will be less due to soil arching between the piles. We recommend that the lagging be designed for the recommended earth pressure, but may be limited to a maximum value of 400 psf if surcharge loads are not present. Lagging placed behind the solider piles will negate the soil arching effect. Therefore, increased lateral earth pressures on the lagging should be anticipated.

It is difficult to accurately predict the amount of deflection of the shored mass. It should be realized, however, that some deflection will occur. The shoring should be designed to limit deflection to within tolerable limits. If greater deflection occurs during construction, additional bracing may be necessary. In areas where less deflection is desired, such as adjacent to existing settlement sensitive improvements, the shoring should be designed for higher lateral earth pressures. The contractor should evaluate the potential drilling conditions when planning the installation methods.

<u>Comment No. G9</u>

"If the slide deposits within the site are to be left in place, please provide data and analysis that demonstrates the slide deposits will not be subject to differential settlement or other instability."

Response to Comment No. G9

Due to the relatively shallow nature of the landslide deposits, we recommend complete removal of the landslide material from the area of the proposed residential structures. Implementation of the recommended slope stability measures will facilitate safe removal of the remainder of the landslide from within the proposed development area. Some landslide material may be left in-place within excavation backcuts along the site perimeter.

Please note that we intend to perform additional subsurface evaluation at the 40-scale grading plan review stage of evaluation, to determine the competency of the landslide material for consideration of leaving portions of the landslide material in-place below the development area. Slope stability issues, related to the landslide, will be addressed as discussed herein. Currently, we are assuming complete removal of the landslide debris below the proposed building structures.

Comment No. S1

"Actual design of the landslide mitigation should be determined at the tentative map stage."

Response to Comment No. S1

Please see attached additional and updated slope stability analysis for Cross-Sections 5-5' through 9-9' along the southeastern edge of the subject site. Updated slope stability analysis recommendations are provided below along with preliminary mitigation recommendations. The proposed landslide mitigation is presented on our Updated Geotechnical Map (Sheet 2) and Geotechnical Cross Sections (Sheets 4 & 5).

Feasibility Level Slope Stability Analysis

Material shear strength recommendations are provided in our response to comments report (LGC Geotechnical, 2023).

Preliminary global slope stability analysis was performed on Cross-Sections 5-5' through 9-9' strategically positioned in the southeast region of the site based on the proposed design profile and anticipated geologic conditions. Slope stability analysis was performed using the computer program GEOSTASE version 2.7 (Gregory Geotechnical Software, 2019). Potential block failure modes were analyzed using Janbu's Simplified Method. Slope stability analysis was performed for static and pseudo-static (seismic) loading conditions. A minimum factor of safety of 1.5 and 1.1 is typically required for static and seismic loading conditions.

Based on the tentative tract map plans and preliminary mitigation measures proposed along southeastern edges of the site adjacent to the landslide (e.g., buttress, shear pins, tiebacks, etc.), slope stability analysis indicates global factors of safety greater than 1.5 and 1.1 for static and seismic loading conditions, respectively. Slope stability analyses for Cross Sections 5-5' through 9-9' are provided in Appendix D. Mitigation recommendations are presented on the Updated Geotechnical Map and Cross Sections (Sheets 2, 4 & 5).

Temporary Stability

Temporary stability of proposed remedial grading backcut slopes adjacent to the landslide have been analyzed as presented herein and will require construction of shear pins and/or tiebacks specifically for temporary stability, in addition to those required for permanent stability.

Grading sequence recommendations are intended to limit risk at each step of site development utilizing the construction of mechanical stabilization and excavation sequencing to maintain temporary stability of each section. Preliminary stages of construction for the landslide mitigation are presented in the slope stability analyses. In general, the preliminary estimated construction sequence would consist of a combination of the following steps (see slope stability analysis of Cross-Sections 5-5' through 9-9' for additional details):

1. Prepare a working area/pad for construction of the proposed concrete shear pins adjacent to the property line.
2. Drill and install shear pins (where recommended).
3. Begin earthwork backcut for buttress/landslide removal.
4. Construct a temporary bench along the buttress backcut to allow construction of the first row of tiebacks (where recommended).
5. Drill and install first row of tiebacks along the buttress backcut (where recommended).
6. Excavate the backcut further down to the second temporary bench to allow construction of the second row of tiebacks (where recommended).
7. Drill and install second row of tiebacks along the buttress backcut (where recommended).
8. Excavate the remaining portion of the buttress/landslide removal to extend below the rupture surface into competent bedrock.
9. Backfill landslide removal excavations to design grades and install subsurface drainage systems (subdrains).

Mechanical Slope Stabilization

In order to stabilize the existing landslide to the required minimum factor of safety, a slope stabilization system consisting of concrete shear pins and tieback anchors are proposed as presented on the Updated Geotechnical Map and cross-sections. Geotechnical recommendations for design and construction of concrete shear pins and tiebacks are provided below.

Preliminary Geotechnical Parameters for Design of Shear Pins

The following geotechnical parameters may be used for the design of shear pins.

TABLE 1

Preliminary Shear Pin Design Parameters

Cross Section	Preliminary Minimum Length* (ft)	Approximate Depth to Rupture Surface (ft)	Minimum Capacity* (kip/ft)
Section 5-5'	40	20	12
Section 6-6'	50	25	12
Section 7-7'	40	20	12
Section 8-8'	50	25	12
Section 9-9'	50	25	12

*Minimum total length for geotechnical requirements

Construction of Shear Pins

Boreholes for shear pins or other drilled improvements should be plumb and free of loose or softened material. Extreme care in drilling, placement of reinforcement steel, and the pouring of concrete will be essential to avoid excessive disturbance of borehole walls. Shear pin steel cages should be installed, and the concrete pumped immediately after drilling is completed. If applicable, concrete placement by pumping or tremie tube to the bottom of drilled hole excavations is recommended. No shear pin borehole should be left open overnight. We recommend that shear pin borings not be drilled immediately adjacent to another shear pin until the concrete in the other shear pin has attained its initial set. A representative from LGC Geotechnical should be onsite during the drilling of shear pin boreholes to verify the assumptions made during the design stages.

Caving of drilled holes and encountering groundwater during drilling should be anticipated, refer to the boring logs provided in Appendix C. The contractor should anticipate that any borehole left open for any extended period of time will likely experience additional caving and additional groundwater levels may develop. In addition, isolated sandy soils are present at the site and these materials are generally susceptible to caving, refer to revised set of boring logs, attached. If caving occurs during shear pin construction, temporary casing may be required. The contractor may also elect to use the "wet" method (drilling slurry) of construction to maintain stability of the drilled boreholes.

Preliminary Design of Tieback Anchors

The tieback array as modeled is recommended to be spaced horizontally along the landslide buttress/removal backcut as shown on the Updated Geotechnical Map and Cross Sections (Sheets

2, 4 & 5). Preliminary tieback anchor design parameters are also shown in Table 2 below, corresponding to the slope stability analysis on the various cross sections. Preliminary positions of the tieback anchors are presented on the Updated Geotechnical Map (Sheet 2). Tieback anchors are shown in profile on the Geotechnical Cross Sections (Sheets 4 & 5). 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.

TABLE 2

Preliminary Tieback Design Parameters

Cross Section/Row Number	Tieback Design Load* (kips)	Minimum Bonded Length* (ft)	Unbonded Length* (ft)	Center to Center Spacing (ft)
Section 5-5' (Row 1)	90	10	20	5
Section 6-6' (Row 1)	316	35	28.5	5
Section 7-7' (Row 1)	167	18.5	21.5	5
Section 7-7' (Row 2)	334	37	12	5
Section 8-8' (Row 1)	203	22.5	35	5
Section 9-9' (Row 1)	226	25	23	20

*Minimum for geotechnical requirements

Summary of preliminary Tieback Anchor Design Parameters:

- Design Load: Per Table 2; 90 to 334 kips
- Center to Center Horizontal Spacing: Per Table 3; 5 to 20 feet
- Unbonded Length: Per Table 2; 12 to 35 feet
- Allowable Bond Stress: 30 psi (with post-grouting)
- Approximate Angle from Horizontal: 35 degrees
- Bonded Length: Per Table 2; 10 to 37 feet
- Tieback Anchor Diameter: 8 inches

In general, the obtained capacity of post-grouted tie-back anchors is primarily a function of construction methods and experience of the specialty contractor along with local site conditions. The capacity of tie-back 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.

Construction & Testing of Tieback Anchors

Caving of the holes excavated into the existing fill soils and the bedrock material is generally not anticipated. However, due to the potentially fractured and sheared nature of the landslide material and the presence of groundwater, caving of excavations within the landslide area should be anticipated.

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.

Comment No. S2

"Independent analysis could not verify that the minimum factors of safety were met for static and pseudostatic stability. Revise recommendations or provide mitigation as necessary."

Response to Comment No. S2

Please refer to our response to Comment No. S1.

Comment No. S3

"The clay layer at the bottom of BA-7 has a different description than that of the torsional shear test. Clarify this discrepancy."

Response to Comment No. S3

Acknowledged, please refer to the revised Boring BA-7 boring log attached in Appendix C.

Comment No. S4

"Provide the clay fraction percent of the slide plane material."

Response to Comment No. S4

It is our understanding clay faction can be used alongside the Atterberg limits index test to estimate fully softened and residual shear strengths using empirical correlations (i.e., Stark, 2012). In our experience, the hydrometer test can at times produce unreliable results. Additionally, we were not physically able to obtain enough rupture surface material to run a hydrometer test after completing the ring shear and Atterberg limits tests. Therefore, we are conservatively assuming a clay fraction of greater than 50 percent for the basal landslide rupture surface material.

Comment No. S5

"It appears that the proposed fill may exceed 40 feet in height therefore provide recommendations for settlement monuments and post grading assessments that will be required prior to development."

Response to Comment No. S5

Proposed fill depths due to remedial grading may exceed 40 feet. Proposed fill depths greater than 40 feet require an increased relative compaction criteria (minimum of 93 percent relative compaction) and a period of settlement monitoring to verify that projected long-term settlement is within tolerable limits. Settlement monitoring of deep fills overlying competent removal bottoms typically consists of series of surface monuments that are survey monitored by a licensed surveyor on a routine basis. The period of settlement is a function of the fill depth and increased relative compaction requirement. Typically, settlement monitoring is performed for a minimum of 3 to 6 months. Structural improvements (e.g., shallow footings and slab-on-grade foundations, etc.) should be constructed after the settlement waiting period. Design level recommendations for deep fill compaction and settlement monitoring should be provided in a 40-scale grading plan review evaluation report.

Comment No. S6

"Slope stability analyses will be required when the geology of the site is conclusively determined."

Response to Comment No. S6

Acknowledged, please refer to our updated maps, cross sections, and analysis presented herein.

Comment No. S7

"Show/Note the following on the geotechnical map

a. Existing and proposed grades.
b. Proposed slope stabilization support.
c. Approximate limits and depth of removal and recompaction of unsuitable soils.
d. Recommendations and grading requirements for construction of buttress/stabilization fills.

e. Detail of keying and benching for placement of fill over slopes steeper than 5: 1 gradient.

f. Location of "Restricted Use Area(s)" / "Building Setback(s)", if applicable.

g. Location and limits of "Restricted Use Area(s)" for all areas with geogrid(s) and 10 feet horizontally from the limit of the embedment area of the proposed geogrid material.

h. All recommended mitigation measures.

Response to Comment No. S7

a. Existing and proposed grades have been included on the Updated Geotechnical Map.
b. Proposed mitigation systems for potential slope stability issues have been depicted on our Updated Geotechnical Map.
c. The approximate limits and depths of remedial grading within the landslide mitigation area have been depicted on the Updated Geotechnical Map.
d. Recommendations for buttress and stabilization fill construction are provided herein.

Buttress/Stability Fill Slopes

With the exception of the ancient landslide area in the southern portion of the site development area, design permanent cut slopes are anticipated to be grossly stable as designed, as long as they are constructed in accordance with these recommendations and our General Earthwork and Grading Specifications (Appendix E) and are properly landscaped and maintained. Slope faces that are to remain as part of the proposed development requiring cut of bedrock material may be designed to be stabilized with stability fills to reduce the potential for surficial failures and to facilitate planting.

Where there is a potential for exposure of adverse bedding and/or material prone to poor surficial stability, we recommend that the outer portion of the proposed cut slopes be replaced with manufactured buttress/stability fill slopes. Additionally, in some areas where cut slopes have been proposed in areas of existing compacted fill, manufactured stability fill slopes are recommended to ensure an appropriate minimum fill thickness behind the finished slope face.

The approximate locations and bottom elevations of the recommended landslide mitigation buttress fill key are provided on the Updated Geotechnical Map; Sheet 2. Stability fill key locations will be delineated at the 40-sacle grading plan review stage of the project. Cross-Sections 1-1' through 4-4' have been updated within Approximate Conceptual Remedial profiles. The locations and dimensions of the recommended keyways, once finalized for the site, should be confirmed by the geotechnical consultant during grading. Some variation to the location and dimensions provided herein should be anticipated based on the conditions encountered.

Stabilization fills should be constructed on proposed cut slopes over 10 feet in height, or where hard rock material will be exposed in the finish slope face, in accordance with the detail provided in Appendix E. Keyway widths should be a minimum of one-half of the total height of the slope or no less than 15 feet wide, whichever is greater. Keyways should be a minimum of 5 feet deep, determined from the lowest toe-of-slope elevation,

and tilt back to the heel a minimum of 1-foot or 2 percent (whichever is greater). Stabilization fill backcuts should be excavated so that at least a minimum 15-foot-wide fill width is maintained for the entire height of the stability fill slope. In general, backcuts should be excavated at 2:1 (horizontal to vertical) inclinations. If grading limits do not allow sufficient room for maintaining 15-foot widths at 2:1 backcut inclinations, then portions of the backcut may be cut steeper to accommodate the stability fill slopes at the appropriate widths at the discretion of the geotechnical consultant. Properly outletted back drains should be constructed along stabilization fill backcuts.

In general, to reduce the potential for backcut failures, we recommend the keyway backcuts be planned to minimize the time the backcut is left exposed. The backcuts should not be initiated prior to forecasted rain or where they will be left open for extended periods, such as weekends.

Backcuts and key excavations should be geologically mapped by the geotechnical consultant during excavation to confirm the anticipated conditions. If adverse joints, fractures, and/or bedding are exposed, additional analysis and/or remediation measure may be required. The grading contractor must trim the backcuts with a slope board to remove loose material to allow for confirmational mapping.

Slope buttress keyways that are depicted on the Updated Geotechnical Map are not differentiated from the stability fill keyways other than that they are wider and/or deeper than the minimum recommendations for stability fills. Earthwork in the areas of Geotechnical Cross-Sections 5-5' through 9-9' should be constructed as buttress fill slopes in general accordance with the General Earthwork and Grading Specification (Appendix E). In general, the recommendations provided above for stability fills are applicable to buttress slopes, with the exception of keyway dimensions.

e. Details for keying and benching are provided in the recommendations provided herein and in our General Grading and Earthwork Recommendations provided in Appendix E.
f. No restricted use areas/building setbacks area currently required/proposed.
g. The use of geogrid reinforcement is not currently proposed. As such, no geotechnical restricted use areas or building setbacks are currently required.
h. The recommended remedial measures and/or conceptual remedial measures are depicted on our Updated Geotechnical Map and Cross Sections.

<u>Comment No. S5 (S8)</u>

"Please submit documents in response to this review using the EPIC-LA system at the following URL: https://epicla.lacounty.gov/SelfService/#/home. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000458. Please contact GMED staff at (626) 458-4925 if documents cannot be uploaded to the plan case."

Response to Comment No. S5 (S8)

Acknowledged.

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

Sincerely,

LGC Geotechnical, Inc.

Ryan Douglas, GE 3147
Project Engineer

Kevin B. Colson, CEG 2210
Vice President

KTM/KBC/RLD/amm

Attachments: Appendix A – References
Appendix B – Los Angeles County Public Works – Geotechnical Review Sheet dated May 31, 2023
Appendix C – Boring Logs (Including Revised Boring Logs)
Appendix D – Slope Stability Analysis
Appendix E – General Grading and Earthwork Recommendations
Sheet 1 – Geotechnical Map of Entire Site (100-Scale)
Sheet 2 – Geotechnical Map of Southeast Corner of Site (40-Scale)
Sheet 3 – 1928 Vs. 2020 Topographic Comparison Exhibit
Sheet 4 – Geotechnical Cross Sections (40-Scale)
Sheet 5 – Geotechnical Cross Sections (40-Scale)

Distribution: (1) Addressee (electronic copy)

Appendix A
References

APPENDIX A

References

County of Los Angeles, 2013, Department of Public Works, Manual for Preparation of Geotechnical Reports, July 1, 2013.

Gregory Geotechnical Software, 2019, GEOSTASE, Slope Stability Analysis Software, Version 2.7, January 2019.

Harrington Geotechnical Engineering, Inc., 2006, Updated Supplemental Geotechnical Investigation and Preliminary Grading Study Review South Pointe West Residential Development, Diamond Bar, California, Project No. 04-01-2336, dated July 5, 2006

LGC Geotechnical, 2016, As Graded Geotechnical Report, South Pointe Residential development, Tract 63623, City of Diamond Bar, California, Project No. 15117-01, dated June 29, 2016

_____, 2020, Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated July 13, 2020.

_____, 2021, Updated Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated July 26, 2021.

_____, 2023, Geotechnical Addendum Report and Response to Geotechnical Review Comments Regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, Los Angeles County, California, Project No. 20080-01, dated May 1, 2023.

Leighton, 2003, Geotechnical Due Diligence Review for the Proposed Development of the Sasak-Patel Property, Tract 51253, Morning Sun Avenue, North of Shepard Hills Road, City of Diamond Bar, California, Project No. 021060-001, dated November 24, 2003

_____, 2010, Supplemental Geotechnical Investigation and Grading Plan Review, Proposed South Pointe West Residential Development, Tract 63623, Between Morning Sun Drive and Larkstone Drive, City of Diamond Bar, California, Project No. 021060-006, dated September 10, 2010

Los Angeles County Public Works, 2021, Geotechnical and Materials Engineering Division, Geologic and Soils Engineering Review Sheet, PCA GMTR / A866, EPIC LA RPPL2021007149, dated November 9, 2021.

_____, 2023, Geotechnical and Materials Engineering Division, Geologic and Soils Engineering Review Sheet, PCA GMGP & GMGR, EPIC LA ESTU2021000458 and RPPL2021007149, Tract Map 83534, dated May 31, 2023.

Post-Tensioning Institute (PTI), 2014, Recommendations for Prestressed Rock and Soil Anchors, PTI DC-35: Prestressed Rock and Soil Anchor Committee, 2014.

Stark, T. D., et al, 2012, Empirical Correlations – Drained Shear Strength for Slope Stability Analyses, Journal of Geotechnical and Geo-Environmental Engineering, dated August 30, 2012.

Appendix B
Los Angeles County – Geotechnical Review Sheet dated May 31, 2023

Dist. Office 2.0
PCA GMGP & GMGR
ESTU2021000458
EPIC LA RPPL2021007149
Telephone: (626) 458-4925

Los Angeles County Public Works
Geotechnical and Materials Engineering Division

GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET

900 S. Fremont Avenue, Alhambra, CA 91803

Tract Map	83534	**Lot(s)**	---	**Parent Tract**	---
Site Address	---	**Location**	Walnut	**APN**	8222-009-900, -901, -902
Geologist	LGC Geotechnical, Inc	**Subdivider**	Project Dimensions, Inc.		
Soils Engineer	LGC Geotechnical, Inc	**Engineer/Arch.**	Fuscoe Engineering, Inc.		

Review of:

Grading P.C. No.: RPPL2021007149 For: Proposed grading to create 360 single-family residential lots, one multi-family lot with 72 condominium townhouse units within 14 buildings, and two public park lots (1,923,600 cyd)
Submittal Received by GMED: **05/03/2023**

Geologic Report(s) Dated: ---
Soils Engineering Report(s) Dated: ---
Geotechnical Report(s) Dated: **05/01/2023,** 07/26/2021
References: Tract 27141 Documents – F. Beach Leighton: 06/22/1966, 01/09/1967, 07/10/1967, 08/14/1967, 12/01/1967, 01/19/1968; Converse Foundation: 05/07/1962; Triad Foundation: 01/12/1966, 04/21/1967,12/11/1967, 07/29/1968
Morning Sun Landslide Documents - Triad Geotechnical Consultants: 05/23/1995, 06/07/1995, 10/04/1995, 10/27/1995, 11/07/1995, 11/20/1995, 01/15/1996, 03/04/1996; Soils and Geology: 12/10/1996; Woodward-Clyde: 02/29/1996, 02/27/2001; Leighton: 01/18/2008; GMED: 07/23/2002

Action: Plan is not recommended for approval from a geotechnical standpoint.

G1. Please add a legend to the geotechnical map that provides explanations for units and map symbols.

G2. Please put all subsurface measurements on the map with their associated borings and indicate thickness of fill on the geotechnical map. The geotechnical map should encompass the entire tentative map.

G3. There are various 2:1 cut slopes within the Puente Formation proposed across the tract. Please demonstrate, through data and analysis, the stability of these cut slopes given the pervasive low, northwestward dip angles within the formation. Provide mitigation recommendations as necessary.

G4. The extent of the landslide on the subject property has not been sufficiently defined. The cross-sections show the slide plane dipping northwest indefinitely, but where does it terminate? Please provide additional subsurface data to determine the depth and extent of the landslide and the geometry of the slide plane.

G5. Based on the subsurface data requested in G3, extend cross-sections 6, 7, and 8 to include new data and show the northwesterly limits of the landslide. Show all geologic contacts and the locations of all proposed buttresses, shear pins, tiebacks, and/or any other proposed mitigation measures.

G6. Previous investigations for the historic landslide that occurred east of the tract on Morning Sun Drive (see references) encountered ancient landslide planes beneath the active slide-plane. Based on the interpretation that this is a block-glide slide that is failing along west/northwest dipping bedding planes, is the slide-plane identified in boring BA-7 a downslope extension of the ancient slide-planes identified offsite? If not, do other slide-planes exist beneath the one encountered in BA-7? Please provide a discussion.

G7. The geotechnical map shows areas of proposed remediation along the eastern and southern boundaries of the tract, but what is proposed to mitigate the deposits within the tract, which may require significant grading and/or other mitigation measures? How much material will have to be removed?

G8. How will offsite properties be stabilized during grading operations? Provide stability analyses to demonstrate that proposed mitigation measures adjacent to existing homes will be grossly stable during rough grading operations.

G9. If the slide deposits within the site are to be left in place, please provide data and analysis that demonstrates the slide deposits will not be subject to differential settlement or other instability.

S1. Actual design of the landslide mitigation should be determined at the tentative map stage.

S2. Independent analysis could not verify that the minimum factors of safety were met for static and pseudostatic stability. Revise recommendations or provide mitigation as necessary.

S3. The clay layer at the bottom of BA-7 has a different description than that of the torsional shear test. Clarify this discrepancy.

Los Angeles County Public Works
Geotechnical and Materials Engineering Division
GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET (continued)

Grading P.C. No.: RPPL2021007149

Remarks (continued):

S4. Provide the clay fraction percent of the slide plane material.

S5. It appears that the proposed fill may exceed 40 feet in height therefore provide recommendations for settlement monuments and post grading assessments that will be required prior to development.

S6. Slope stability analyses will be required when the geology of the site is conclusively determined.

S7. Show/Note the following on the geotechnical map:
   a. Existing and proposed grades.
   b. Proposed slope stabilization support.
   c. Approximate limits and depth of removal and recompaction of unsuitable soils.
   d. Recommendations and grading requirements for construction of buttress/stabilization fills.
   e. Detail of keying and benching for placement of fill over slopes steeper than 5:1 gradient.
   f. Location of "Restricted Use Area(s)" / "Building Setback(s)", if applicable.
   g. Location and limits of "Restricted Use Area(s)" for all areas with geogrid(s) and 10 feet horizontally from the limit of the embedment area of the proposed geogrid material.
   h. All recommended mitigation measures.

S5. Please submit documents in response to this review using the EPIC-LA system at the following URL: https://epicla.lacounty.gov/SelfService/#/home. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000458. Please contact GMED staff at (626) 458-4925 if documents cannot be uploaded to the plan case.

Prepared by

PROFESSIONAL ENGINEER GEORGE MOLINA C 91931 CIVIL STATE OF CALIFORNIA

George Molina
Soils Section

CERTIFIED ENGINEERING GEOLOGIST MATTHEW A. CRUZ No. 2780 STATE OF CALIFORNIA

Matthew Cruz
Geology Section

Date 05/31/2023

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey

NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

Appendix C
Boring Logs (Including Revised Boring Logs)

Geotechnical Boring Log BA-1

Date : 1/11/2021 Revised 7/6/2023 Page 1 of 2	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 30" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 592 ' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by ARN/KTM

Sampled by ARN

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							SM-SC	**@0' to 19' - Artificial Fill - Older (afo)** @0' - Silty to Clayey SAND: brown and light brown mottled, slightly moist to moist, loose to slightly dense; abundant siltstone and sandstone clasts mixed in a silty to clayey sand matrix; clasts approximately 1-2"	
				B-1						
588									@3' - Scattered maroon clay clasts; increased density below 3 feet	
	5									
583										
	10			R-1	10 35	112.8	11.0	ML	@10' - SILT with Sand: light olive brown, moist, very stiff; siltstone clasts in matrix of silty sand	DS
578									@14' - Clay layer: brown, ~8" thick	
	15									
				GB-1			16.6		@17' - Clay layers, several inches thick, moist, sandier material below, grab sample taken	
573									**@19' to T.D. - Tertiary Puente Formation (Tp)**	
	20			R-2	6 20	97.1	6.4	SM	Silty SANDSTONE and Sandy SILTSTONE: gray and orange brown, slightly moist, medium dense; distinct low angle bedding; interbeds range from laminations to beds several inches thick; abundant healed fractures; minor soft sediment deformation; occasional silty claystone interbeds	
			@22' - GB N54E, 20NW @22.5' - CB N55E, 13NW @24' - B N49E, 16NW						@20' - Silty SAND: red brown, slightly moist, medium dense @22' - Attitude on siltstone to sandstone contact @22.5' - Clay bed attitude, gray, ~$\frac{1}{4}$" thick, hard @24' - General bedding attitude @26' - Fluid escape structure, soft sediment deformation	
568										
	25									
			@28' - CB N60E, 33NW	GB-2					@28' - Silty clay bed attitude, paper thin, few old rootlets and iron oxide staining, grab sample taken	
563									@29.5' - Concretionary bed, ~6" thick, continuous around boring	

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-1

Date : 1/11/2021 Revised 7/6/2023 Page 2 of 2	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 30" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 592 ' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by ARN/KTM

Sampled by ARN/KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		@31' - CB N40E, 14NW	R-3	8 30	92.1	28.6	ML	@30' - Sandy SILTSTONE: gray with red orange, very moist, hard	
				GB-3			38.1		@31' - Clay bed attitude, olive green and white, very moist, grab sample taken	AL
558										
	35								@35' - Interbeds up to ~1' thick, mostly sandstone	
553										
									@39' - End of visual log	
	40			R-4	12 35	95.6	24.5		@40' - Sandy SILTSTONE: olive gray with red orange, very moist, hard	
548										
	45			R-2	8 28	90.2	25.4		@45' - Sandy SILTSTONE: gray and orange brown, very moist, hard	
									Total Depth = 46' **No Ground Water Encountered** **Backfilled with Cuttings on 1/11/2021**	
543										
	50									
538										
	55									
533										
									@39' - End of visual log	

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

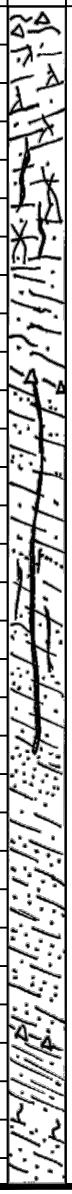
DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log BA-2

Date : 1/12/2021 Revised 7/6/2023 Page 1 of 2	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 30" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 571 ' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by ARN/KTM

Sampled by ARN/KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							CL	**@0' to T.D. - <u>Tertiary Puente Formation (Tp)</u>** @0' - Sandy clay, dark brown, moist, scattered rootlets; topsoil @1' - Transition to bedrock, heavily weathered siltstone and sandstone, abundant fractures @1.5' - Sandstone and siltstone/claystone, well bedded, abundant iron oxide staining, healed fractures to ~7-feet	
567			@3' - GB N85W, 16NE						@3' - General bedding attitude	
	5									
			@7' - GB N51E, 19NW						@7' - General bedding attitude on siltstone to sandstone contact, abundant soft sediment deformation	
562			@9.5' - CB N61E, 25 NW	GB-1			33.2		@9.5' - Attitude on sandy clay bed: olive gray, very moist, grab sample taken, ~6" thick, some infilled burrows	AL SA
	10			R-1	16 30	99.2	12.0	CH	@10' - CLAYSTONE to SILTSTONE with Sand: olive gray, slightly moist, hard	
557									@14' - Sheared silty sandstone beds, ~4" vertical offset, healed fractures, soft sediment deformation. Top of vertical fracture to 20' (non planar)	
	15									
552										
	20			R-2	15 35	107.8	10.6	SM	@20' - Silty SANDSTONE: light orange brown, moist, very dense; massive	
547										
	25			B-1						
			@27' - CB N85W, 17NE						@27' - Several claystone and siltstone interbeds; clay bed attitude on parting, smooth, polished. Decreased fractures below	
542									@29' - Fluid escape sedimentary structures	

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-2

Date : 1/12/2021 Revised 7/6/2023 Page 2 of 2	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 30" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 571 ' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by ARN/KTM

Sampled by ARN/KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		@31' - B N85W, 20NE	R-3	22 40/4"	97.7	12.7	ML	@30' - SILTSTONE: pale olive, moist, hard @31' - Bedding attitude, thinly interbedded zone	DS
537										
	35		@36' - CB N85W, 21NE	GB-2			30.9		@36' - Attitude on bedding plane shear; clay with silt and trace sand: brown, very moist, stiff, waxy/polished surface; grab sample taken @37' - Concretion bed, ~8" thick, increased moisture to wet	
532										
	40			R-4	15 30	102.1	20.0	SC	@40' - Clayey SANDSTONE: gray with red orange, wet, very dense	
527										
	45			R-2	35 30	91.2	31.1	SC	@45' - Clayey SANDSTONE: gray with red orange, wet, very dense	
522									**Total Depth = 46'** **No Ground Water Encountered** **Backfilled with Cuttings on 1/12/2021**	
	50									
517										
	55									
512										

LGC Geotechnical, Inc.

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

SAMPLE TYPES:
- B BULK SAMPLE
- R RING SAMPLE
- G GRAB SAMPLE

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

M ference
File: ..\..\..\..\Resources\Staff\Andrew Nieblas\Scans\LGC Geotechn
Sheet: 9

Geotechnical Boring Log BA-3

Date : 1/13/2021 Revised 7/6/2023 Page 1 of 2	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 30" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 618 ' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by ARN/KTM

Sampled by ARN

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**@0' to T.D. - <u>Tertiary Puente Formation (Tp)</u>** @0' - Sandy clay, dark brown, very moist, soft; topsoil @2' - Transition to bedrock, alternating sandstone and siltstone beds, abundant iron oxide and manganeese oxide staining, pervasive soft sediment deformation, healed bedrock fractures	
614			@3' - GB N85E, 14NW						@3' - General bedding attitude on siltstone bed	
	5									
			@7' - CB N75E, 14NW	GB-1			23.8		@7' - Clay bed attitude on bedding plane shear, ~$\frac{1}{4}$" sheared claystone, olive gray, very moist, hard with waxy sheared surfaces, rootlets; grab sample taken	
609										
	10			R-1 B-1	10 25	100.4	19.3	ML	@10' - Siltstone: light yellowish brown, very moist, hard; soft sediment deformation	DS
			@12' - GB N74E, 14 NW						@12' - General bedding attitude on claystone interbed	
604										
	15									
									@16' - Depositional fluid escape sedimentary structure, ~$\frac{1}{2}$" flame structure, clayey below	
			@18' - GB N80E, 16NW						@18' - General bedding sttitude on claystone bed, ~$\frac{1}{2}$" thick, green	
599										
	20			R-2	7 45	90.8	25.1		@20' - Sandy SILTSTONE: gray and red orange, very moist, hard	
			@22' - CB N75E, 15N						@22' - Clay bed attitude on very thin claystone bed, green, slightly waxy, just above concretionary bed	
594										
	25		@25' - CB N74E, 17NW						@25' - Clay bed attitude on bedding plane shear, slightly waxy, very thin, poorly developed	
				GB-2			27.9		@28' - Thin clay, ~$\frac{1}{4}$" thick, olive gray, very moist; grab sample taken	
589										

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-4

Date : 1/14/2021 Revised 7/6/2023 Page 1 of 1	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 30" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 641 ' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by ARN/KTM

Sampled by ARN/KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							CL	**@0' to T.D. - Undocumented Artificial Fill (afu)** @0' - Sandy clay, dark brown, very moist, scattered small rootlets to 3-feet	
637									@2.5' - Firmer material, medium brown with dark brown mottle; scattered gray clay blebs, and iron oxide-stained sand blebs	
	5								@4' - Sandy Clay to Clayey sand, scattered sand blebs ~1-2" in maximum dimension	
				GB-1			14.1		@8' - Sandy clay, dark gray brown, moist; grab sample taken	
632									@9' - Gradual color transition to gray brown and orange brown	
	10			R-1	7 8	107.4	16.8	SC	@10' - Clayey SAND: gray and red orange, very moist, medium dense	
				B-1						
627									@14' - Scattered globular concretions, ~1-inch in maximum dimension	
	15									
				GB-2					@16' - Clayey Sand and sandy clay; grab sample taken	
									@18' - Slightly sandier, occasional rootlet	
622									@19.5' - End of visual log; groundwater encountered	
	20			R-2	3 4	101.5	25.4	CL	@20' - Sandy CLAY: brown and light gray, wet, medium stiff	
617										
	25								**Total Depth = 30'** **Ground Water Encountered @ 19 feet** **Backfilled with Cuttings on 1/14/2021**	
612										
	30									

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

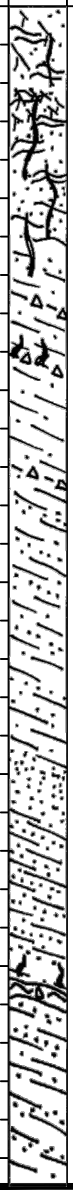
DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log BA-5

Date : 1/14/2021 to 1/15/2021 Revised 7/6/2023 Page 1 of 2	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 30" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 638 ' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by ARN/KTM

Sampled by ARN

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							CL	**@0' to T.D.' - <u>Tertiary Puente Formation (Tp)</u>** Sandy clay, dark brown, moist, scattered rootlets; topsoil/colluvium @2.5' - Sandy clay, abrupt transition to very stiff, abundant caliche, saprolite	
634			@6' - GB N/S, 8W						@4' - Bedrock	
	5								@5' - Clayey sandstone: gray and orange brown, dense, slightly moist, abundant vertical tension fractures, healed @6' - Generalized bedding attitude on sandy claystone bed, ~2.5"-thick, fractures above and below bed	
			@7.5' - CB N14E, 15NW	GB-1			28.1		@7.5' - Clay bed attitude on sandy claystone interbed; grab sample taken	
629			@9' - GB N2W, 11SW	GB-2			37.5		@9' - Generalized bedding attitude on clay with sand, rusty brown, very moist, ½" thick to 5" thick undulatory clay bed; grab sample taken; soft sediment deformation	
	10			B-1						
			@12' - CB N16E, 15NW						@12' - Attitude taken on clay, ~1" thick, fractures in overlying sandstone are clay filled	
624										
	15		@16' - GB N/S, 12W						@16' - General bedding attitude on iron oxide stained silty sand interbed	
619										
	20			R-1	5 25	106.2	8.5	SP	@20' - SANDSTONE: gray and red orange, moist, dense @22' - thinly interbedded siltstone and sandstone	
614										
	25			GB-3			47.6		@25' - Silt bed with clay clasts on undulatory clayey surface, soft sediment deformation; soft, silty sandstone below; grab sample taken	AL SA
609			@29' - B N10E, 13 W						@29' - Bedding attitude on siltstone interbeds	

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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 BA-5

Date : 1/14/2021 to 1/15/2021 Revised 7/6/2023 Page 2 of 2	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 30" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 638 ' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by ARN/KTM

Sampled by ARN

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30			R-2	15 35	99.7	23.7	SM	@30' - Silty SANDSTONE: gray and red orange, very moist, very dense	
604			@33' - GB N26E, 21NW	GB-4			51.6		@32' - Generalized bedding attitude on clay: gray brown, wet; grab sample taken; $\frac{1}{4}$" inch clay, claystone and siltstone rip-up clasts above black clayey sand	
	35								@33' - Active seepage form sandstone bed	
599									@36' - End of visual log; ground water encountered	
	40			R-3	20 25	99.9	23.0	CL	@40' - Clayey SILTSTONE: dark gray, very moist, hard	
594									**Total Depth = 41'** **Ground Water Encountered @ 33'** **Backfilled with Cuttings on 1/15/2021**	
	45									
589										
	50									
584										
	55									
579										

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-6

Date : 3/23/2023 Revised 7/6/2023 Page 1 of 1	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 12" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 690' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by HPB

HPB

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0			B-1					**@0' to T.D.' - <u>Older Artificial Fill (afo)</u>:** Sandy clay, dark brown, wet, soft, scattered rootlets; topsoil/colluvium.	
									@0.5' - Sandy CLAY w/ Silt: orange to yellowish brown, wet, slightly stiff, gravels and cobbles, light gray sand pods, rootlets. Seepage.	
685	5								@2' - SAND: light gray, wet, friable, semi-continuous, cobbles, gravels, rootlets and minor belling below. @4' - SAND: light gray, wet, friable, concretion below.	
									@4.5' - Sandy CLAY w/ Silt: olive brown, wet, slightly stiff, gravels and cobbles, sand pods. @8' - End of visual log. Highly saturated, friable material peeling off side walls below. Seepage.	
680	10			R-1	5 12	95.4	25.5	CL-SM	@10' - CLAY: dark gray, very moist, soft to slightly stiff, plastic, organic-rich, some silt, orange mottling.	DS
675	15								@13' - SILT w/ some Clay: olive brown to grayish brown, very moist, soft to slightly stiff.	
									@17' - Sandy SILT w/ some Clay: olive brown to grayish brown, very moist, slightly stiff.	
670	20			R-2	4 8	98.5	22.5	ML-SM	@20' - Sandy SILT to Silty SAND: dark gray and orange mottled, very moist, slightly stiff, decayed rootlet.	
665	25								**Total Depth = 23'** **Continuous seepage from 2' to T.D.** **Backfilled with cuttings and tamped on 3/23/2023**	
660										

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log BA-7

Date : 3/24/2023 Revised 7/6/2023 Page 1 of 1	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 12" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 677' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by HPB/KTM

Sampled by HPB

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0			B-1					**@0' to 18' - <u>Quaternary Landslide (Qls)</u>:** Sandy CLAY, dark brown, moist, scattered rootlets; topsoil/colluvium. @ 2' - Sandy CLAY, moderate brown to orange, wet, friable, rootlets, no structure, no layers. @ 4' - Sandy clay: dark brown, wet, loose to medium dense, abundant roots. @ 5' - Thinly interbedded, grayish brown and orange oxide, siltstone and fine sandstone, 0.25" to 5" thick interbeds, planar.	
672	5									
			B@8' N08W, 10W						@ 8' - Bedding attitude: SANDSTONE pinching upward in frame structure. @ 9' - Clayey SILTSTONE and SANDSTONE interbeds: layers of orange siltstone partially cemented, slightly fractured, roots along bed. @ 10' - Bedding attitude: dark brown 1" thick SANDSTONE interbed, no sign of offset or shearing. @ 13' - Bedding attitude: SANDSTONE beds are weeping.	
667	10		B@10' N10E, 13W	R-1	8 30	100.4	20.8	SC		
			B@13' N08E, 12W							
662	15									
			B@16' N18E, 9W						@ 16' - Bedding attitude SANDSTONE and SILTSTONE: light gray, orange and brown, thin to very thin interbeds, Clayey SILTSTONE, very moist to wet, dense, iron oxide, manganese oxide.	
			RS@18' N22E, 10W	GB-1				CH	@ 18' - Rupture surface attitude: 2" thick zone of Fat CLAY, soft, wet, Silt interbedded, very thin bluish gray polished clay at base, sheared, seepage, maybe flexural slip, slightly undulatory.	TS
657	20		CB@20' N16E, 10W	R-2	22 50/5	113.9	14.8	SM	**@ 18' to T.D. - <u>Tertiary Puente Formation (Tp)</u>:** Sandy CLAY, dark brown, moist, stiff to medium dense. @ 20' - Clay Bed attitude: thin, light gray Clayey interbed. Below crossbedding, SANDSTONE interbeds with Silty CLAY, grades to darker color. @ 20' - Sandy SILTSTONE: orange and brown, slightly moist, hard. End of visual log. @ 24' - SILTSTONE: gray to brownish gray, slightly moist, hard. @ 25' - Color changes to dark grayish brown to brownish gray, unoxidized. @ 26' - Standing water during logging. @ 29' - Concretion, refusal.	
652	25									
647									**Total Depth = 29'** **Continuous seepage from 2' to T.D.** **Backfilled with cuttings and tamped on 3/24/2023**	

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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
TS	TORSIONAL SHEAR

Geotechnical Boring Log BA-8

Date : 3/27/2023 Revised 7/6/2023 Page 1 of 1	**Drilling Company :** Peter Drilling
Project Name : Royal Vista Golf Course	**Type of Rig :** Limited Access Track Rig
Project Number : 20080-01	**Drop :** 12" **Hole Diameter :** 24"
Elevation of Top of Hole : ~ 652' MSL	**Drive Weight :** 140lbs
Hole Location : See Geotechnical Map	

Logged by HPB/KTM

Sampled by HPB

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0			B-1					**@0' to 20' - <u>Quaternary Landslide (Qls)</u>:** Sandy clay, dark brown, moist, scattered rootlets; fill and topsoil/colluvium. @ 1.5' to 3' - Silty CLAY, mottled dark brown to light brown, wet, soft, rootlets, sand. @ 3' - Cluster of electrical wires, not in service.	
647	5								@ 5' - Gradational change to Clayey SANDSTONE: brown with dark brown vertical fractures, iron oxide pods, wet, medium dense.	
									@ 8' to 10' - Decrease Clay, friable Sandstone	
642	10		GB@11' EW, 9S	R-1	6 9	108.5	19.7	CL	@ 10' - Silty Sand and SANDSTONE, yellowish brown to light olive brown, wet, slightly stiff, manganese oxide, iron oxide. @ 11' - General bedding attitude: roots, white clay, not continuous, material is Clayey SILT, wet, slightly stiff.	DS
637	15								@ 15' - Standing water just below highly fractured concretion. 1' to 2' thick. End of visual log. @ 17' - Silty SAND: light olive brown, orange mottled, wet, stiff. Groundwater encountered.	
632	20			R-2	20 25	99.8	22.9	SM	**@ 20' - <u>Possible Tertiary Puente Formation (Tp)</u>:** Sandy CLAY, dark brown, very moist, very stiff. @ 20' - Silty SAND: yellowish brown to light olive brown, wet, very stiff, orange mottling, fine SANDSTONE and Clayey SILTSTONE interbeds. Shoe had very thin bluish CLAY with charcoal roots along bedding. @ 24.5' - Refusal.	
627	25								**Total Depth = 24.5'** **Groundwater encountered @ 17'** **Backfilled with cuttings on 3/27/2023**	
622										

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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

Geotechnical Boring Log Borehole HS-1

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~521' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
520	0							**@0' to 20' Artificial Fill - Undocumented (afu):** @0' - Silty SAND: dark gray brown, moist; grass	
			R-1	6 9 11	108.1	8.7	SM	@2.5' - Silty SAND: dark gray brown, moist, medium dense; scattered roots/rootlets	-#200
515	5		SPT-1	5 4 5		12.7	ML	@5' - Sandy SILT: medium to dark brown, moist, stiff	
			R-2	3 7 10	111.5	18.8		@7.5' - Sandy SILT: brown, very moist, stiff	
510	10		SPT-2	4 5 7		18.4	CL-ML	@10' - Clayey SILT: light brown, very moist, stiff	AL
505	15		R-3	7 10 12	105.0	22.8	CL	@15' - CLAY: brown, stiff, wet	
500	20		SPT-3	8 10 14		32.0	ML	**@20' to T.D. Tertiary Puente Formation (Tp):** @20' Sandy SILT: light gray and light red-orange, wet, very stiff	
495	25		R-4	21 50/3"	96.2	25.2	SM	@25' Silty SAND: gray with red-orange staining, wet, very dense	
	30							Total Depth = 26.5' Groundwater Encountered at Approximately 9' Backfilled with Cuttings on 6/9/2020	

LGC Geotechnical, Inc.

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

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-2

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~523' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 15' Artificial Fill - Undocumented (afu):** @0' - CLAY: dark brown, moist; grass	
520			SPT-1	6 8 10		17.1	CL	@2.5' - CLAY: dark brown, moist, very stiff; scattered rootlets	AL
	5		R-1	11 19 25	113.0	16.4		@5' - CLAY: gray brown, moist, very stiff	
515			SPT-2	5 8 9		18.1		@7.5' - Sandy CLAY: olive brown, very moist, very stiff	
	10		R-2	15 20 26	98.9	26.9	MH	@10' - SILT: blue gray and rusty brown, very moist, very stiff	
510									
	15		SPT-3	10 25 50		27.9	SM	**@15' to T.D. Tertiary Puente Formation (Tp):** @15' - SANDSTONE: bluegray and red orange, wet, very dense	
505								Total Depth = 16.5' Groundwater Not Encountered Backfilled with Cuttings on 6/9/2020	
	20								
500									
	25								
495									
	30								

LGC Geotechnical, Inc.

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

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-3

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~548' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 20' Artificial Fill - Undocumented (afu):** @0' - Sandy CLAY: olive gray, moist; grass	
545			R-1	9 13 15	111.8	17.4	CL	@2.5' - Sandy CLAY: olive gray, moist, very stiff; mottled coloration; scattered rootlets	
	5		SPT-1	3 3 5		19.2		@5' - Sandy CLAY: tan and gray, very moist, medium stiff	
540			R-2	5 6 8	105.9	20.8	SM	@7.5' - Silty SAND: olive gray, wet, medium dense	
	10		SPT-2	4 2 3		22.5		@10' - Silty SAND: olive gray, wet, loose	
535									
	15		R-3	4 4 15	98.3	25.7	ML	@15' - Sandy SILT: olive gray with red orange, wet, stiff	
530									
	20		SPT-3	50/3"		18.0	SM	**@20' to T.D. Tertiary Puente Formation (Tp):** @20' - Silty SAND: light gray and light red-orange, wet, very dense	
525								Total Depth = 21.5' Groundwater Encountered at Approximately 4' Backfilled with Cuttings on 6/9/2020	
	25								
520									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

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

TEST TYPES:

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-4

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~550' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 7.5' Artificial Fill - Undocumented (afu):** @0' - Sandy CLAY: dark brown, very moist; grass	
			R-1	3 2 6	104.2	21.0	SC	@2.5' - Clayey SAND: brown, wet, loose; scattered rootlets	-#200, AL, MD
545	5		SPT-1	5 6 10		18.6	ML	@5' - Sandy SILT: dark olive gray, wet, very stiff	
								@7.5' to T.D. Tertiary Puente Formation (Tp):	
			R-2	15 14 8	106.6	19.3	ML	@7.5' - Sandy SILT: light gray brown with red orange, wet, stiff	
540	10		SPT-2	6 9 10		28.4		@10' - Sandy SILT: gray and red orange, wet, very stiff	
535	15		R-3	13 14 44	90.4	30.7	MH	@15' - Sandy SILT: light gray with red-orange, wet, hard; well bedded; healed jointing	
								Total Depth = 16.5' Groundwater Encountered at Approximately 2.5' Backfilled with Cuttings on 6/9/2020	
530	20								
525	25								
	30								

LGC Geotechnical, Inc.

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

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

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-5

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~564' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 2.5' Artificial Fill - Undocumented (afu):**	
								@0' - Sandy SILT: dark reddish brown, moist; grass	
								@2.5' to T.D. Tertiary Puente Formation (Tp):	
			SPT-1	11 35 40		9.8	SM	@2.5' - Silty SAND: light brown, moist, very dense	
560									
	5		R-1	43 50/4"	106.7	8.6		@5' - Silty SAND: light brown, moist, very dense	
			SPT-2	27 50/6"		14.5		@7.5' - Silty SAND: rusty brown, very moist, very dense	
555									
	10		R-2	50/4"				@10' - Silty SAND: rusty brown, moist, very dense	
								Total Depth = 10'	
								Groundwater Not Encountered	
								Backfilled with Cuttings on 6/9/2020	
550									
	15								
545									
	20								
540									
	25								
535									
	30								

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

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

TEST TYPES:

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-6

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~601' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
600	0	B-1						**@0' to 15' Artificial Fill - Undocumented (afu):** @0' - Sandy SILT: dark brown, moist; grass	-#200, CR, EI, MD
			R-1	2 2 3	93.8	26.2	ML	@2.5' - Sandy SILT: gray brown, very moist, soft; scattered rootlets	
595	5		SPT-1	P 1 3		24.0		@5' - Sandy SILT: dark brown, wet, soft	
			R-2	3 4 7	104.1	21.3		@7.5' - Sandy SILT: gray brown, wet, medium stiff; scattered organics/old leaves	
590	10		SPT-2	4 6 9		18.8	CL	@10' - Sandy CLAY: gray brown, very moist to wet, stiff	
585	15		R-3	7 16 29	107.7	18.6	SM	@15' - Silty SAND: blue gray and red-orange, wet, dense	
580	20		SPT-3	38 40 50/5"		21.7		@20' - Silty SAND: tan and red-orange, wet, very dense	
575	25							Total Depth = 21.5' Groundwater Encountered at Approximately 5' Backfilled with Cuttings on 6/9/2020	
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

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

TEST TYPES:

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

Last Edited: 7/7/2020

Geotechnical Boring Log Borehole HS-7

Date: 6/9/2020	**Drilling Company:** 2R Drilling
Project Name: Royal Vista Golf Course	**Type of Rig:** Track Rig
Project Number: 20080-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~638' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By ARN
Sampled By ARN
Checked By KBC

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 25' Artificial Fill - Undocumented (afu):** @0' - Sandy SILT: dark gray, moist; grass	
635			SPT-1	3 4 6		15.9	ML	@2.5' - Sandy SILT: dark gray, very moist, stiff	
	5		R-1	12 20 24	117.3	16.4	CL	@5' - CLAY with Sand: dark gray, moist, very stiff	
630			SPT-2	9 12 14		16.6		@7.5' - Sandy CLAY: dark gray, moist, very stiff; abundant rootlets	
	10		R-2	31 31 15	119.3	12.4	SC	@10' - Clayey SAND: brown, very moist, dense; minor orange and yellow mottle	
625									
	15		SPT-3	7 10 12		17.2		@15' - Clayey SAND: blue gray and red-orange, very moist, medium dense	
620									
	20		R-3	16 22 23	104.7	22.0	CL	@20' - Sandy CLAY: blue gray and red orange, very moist, very stiff	
615								@22' - harder drilling	
	25		SPT-4	15 35 50/3"		25.1	SM	**@25' to T.D. Tertiary Puente Formation (Tp):** @25' - Silty SAND: blue gray and red-orange, wet, very dense	
610								Total Depth = 26.5' Groundwater Encountered at Approximately 23' Backfilled with Cuttings on 6/9/2020	
	30								

LGC Geotechnical, Inc.

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

SAMPLE TYPES:

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

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EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/7/2020

LOG OF BORING B-11

Project:	JCC HOMES- SOUTH POINTE DEVELOPMENT	Surface Elev.:	701.0
Job No.:	04-01-2336	Top of Casing Elev.:	N/A
Location:	DIAMOND BAR, CA	Drilling Method:	24" Bucket Auger
Coordinates:		Sampling Method:	Core Barrel

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					**UNCOMPACTED FILL** Gray sandy silt (ML), moist, soft & loose.			
696.0	5					**LANDSLIDE DEBRIS - PUENTE FORMATION** Broken and jumbled sandstone and siltstone. @ 6' - B: N15W, 20NE @ 7.5' - B: N12W, 23NE	3	94	24
691.0	10					@ 10' to 17' - Highly fractured bedrock with open fractures to 1/4".	4	108	17
686.0	15					@ 17 to 18.5' - Soft sheared clayey zone above indistinct rupture surface.	5	98	21
681.0	20					**BEDROCK - PUENTE FORMATION** Tan, massive, fine grained sandstone with few siltstone beds. @ 19' - Fault N15E, 65SE, Truncates beds and truncated by rupture surface above.	4/5"	88	25
676.0	25					@ 25' - B: N60W, 10NE			
671.0	30					@ 31' - B: N35W, 7NE	20/5"		
666.0	35								
661.0	40						35/12"	102	21

Completion Depth:	40.0
Date Boring Started:	8/9/04
Date Boring Completed:	8/9/04
Logged By:	TGH
Drilling Contractor:	AL ROY

Remarks:
Groundwater was not encountered within depth drilled at time of drilling. Caving did not occur. Backfilled with cuttings. Drive Weights 0-22' 2400# 22-42' 1550# 42-65' 850#.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE B-11

Appendix D
Slope Stability Analysis

Summary of Slope Stability Analysis

Cross-Section	Factor of Safety	Description
5-5'	1.30	Stage 1 (Existing Condition)
	1.71	Stage 2 (Existing Condition - Shear Pin)
	1.44	Stage 3 (Temporary Staging Pad)
	1.91	Stage 4 (Temporary Staging Pad - Tieback)
	1.71	Stage 5 (Temporary Backcut - Along Bedding)
	1.52	Stage 5 (Temporary Backcut - Rupture)
	2.81	Stage 6 (Final Condition - Along Bedding (Static))
	2.77	Stage 6 (Final Condition - Rupture (Static))
	1.30	Stage 6 (Final Condition - Rupture (Seismic))
6-6'	1.04	Stage 1 (Existing Condition)
	2.25	Stage 2 (Initial Cut - Shear Pin)
	1.39	Stage 3 (Temporary Staging Pad)
	2.45	Stage 4 (Temporary Staging Pad - Tieback)
	1.36	Stage 5 (Temporary Backcut - Along Bedding)
	1.82	Stage 5 (Temporary Backcut - Rupture)
	1.43	Stage 6 (Final Condition - Seismic (Along Bedding))
	2.65	Stage 6 (Final Condition - Static (Along Bedding))
	4.08	Stage 6 (Final Condition - Static (Rupture))
	1.37	Stage 6 (Final Condition - Seismic (Rupture))
7-7'	1.44	Stage 1 (Existing Condition)
	1.64	Stage 2 (Existing Condition - Shear Pin)
	1.32	Stage 3 (Temporary Staging Pad)
	1.84	Stage 4 (Temporary Staging Pad - Tieback)
	1.52	Stage 5 (2nd Temporary Staging Pad)
	2.22	Stage 6 (2nd Temporary Staging Pad - Tieback)
	1.66	Stage 7 (Temporary Cut - Along Bedding)
	2.13	Stage 7 (Temporary Cut - Rupture)
	3.17	Stage 8 (Final Condition - Along Bedding)
	3.57	Stage 8 (Final Condition - Rupture (Static))
	1.32	Stage 8 (Final Condition - Rupture (Seismic))
8-8'	1.97	Stage 1 (Existing Condition)
	2.25	Stage 2 (Existing Condition - Shear Pin)
	1.57	Stage 3 (Temporary Staging Pad)
	2.39	Stage 4 (Temporary Staging Pad - Tieback)
	1.64	Stage 5 (Temporary Backcut - Along Bedding)
	1.37	Stage 5 (Temporary Backcut - Rupture)
	3.67	Stage 6 (Final Condition - Along Bedding)
	2.85	Stage 6 (Final Condition - Rupture (Static))
	1.40	Stage 6 (Final Condition - Rupture (Seismic))
	4.37	Stage 1 (Existing Condition)
	6.90	Stage 2 (Existing Condition - Shear Pin)
	1.66	Stage 3 (Temporary Staging Pad)
	3.67	Stage 4 (Temporary Staging Pad - Tieback)

Cross-Section	Factor of Safety	Description
9-9'	2.02	Stage 5 (Temporary Backcut - Along Bedding)
	1.46	Stage 5 (Temporary Backcut - Rupture)
	36.08	Stage 6 (Final Condition - Along Bedding)
	70.39	Stgae 6 (Final Condition - Rupture (Static))
	1.87	Stage 6 (Final Condition - Rupture (Seismic))

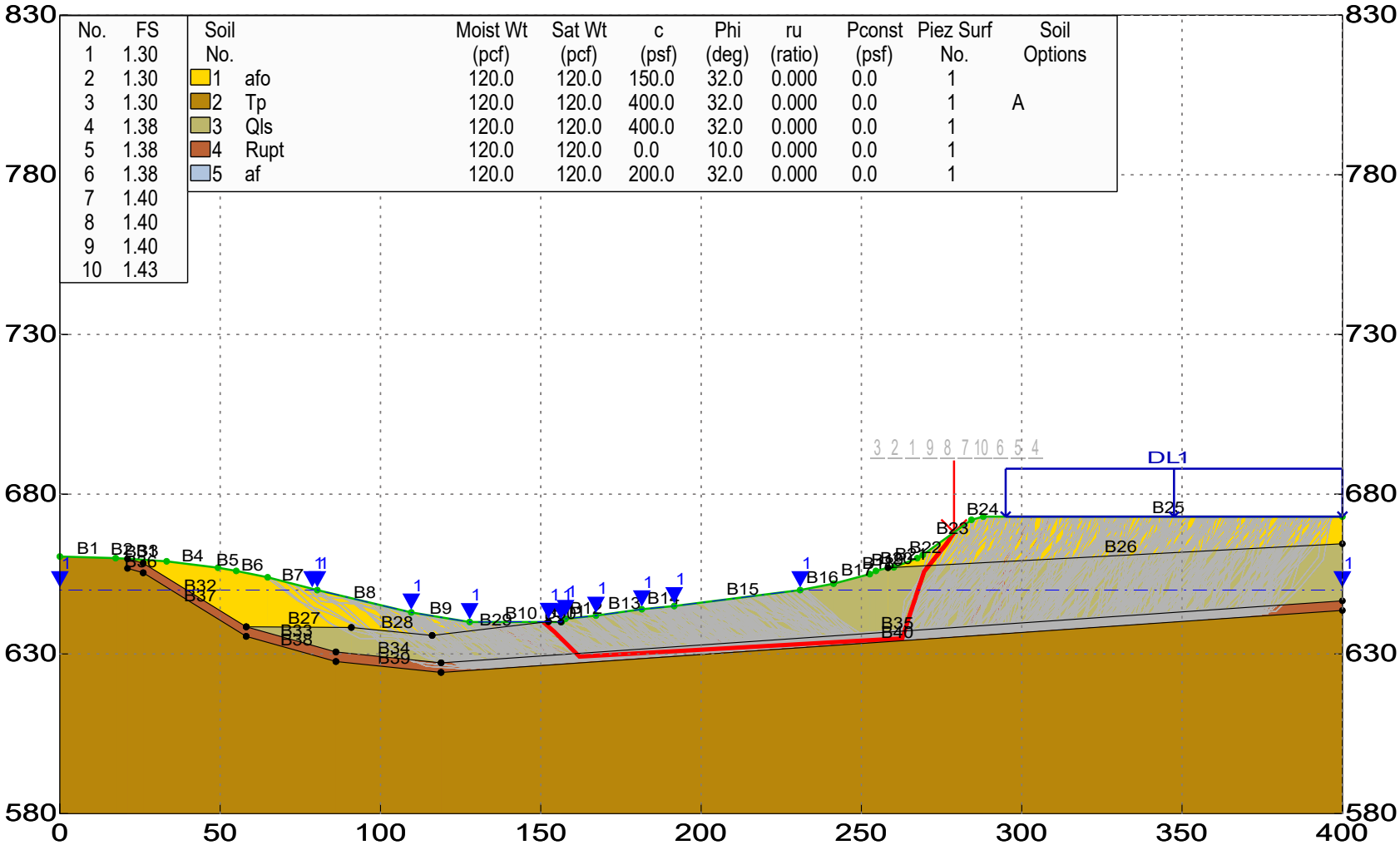
Royal Vista - Cross Section 5
Stage 1 (Existing Condition)

LGC Geotechnical / BPP

\Sec 5 - Stage 1 (Existing Condition).gsd

No.	FS
1	1.30
2	1.30
3	1.30
4	1.38
5	1.38
6	1.38
7	1.40
8	1.40
9	1.40
10	1.43

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 1.30

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5 - Stage 1 (Existing Condition).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5 - Stage 1 (Existing Condition).OUT
Unit System: English

PROJECT: Royal Vista

DESCRIPTION: Stage 1 (Existing Condition)

BOUNDARY DATA

25 Surface Boundaries
40 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	660.500	17.400	660.000	2
2	17.400	660.000	21.100	659.800	2
3	21.100	659.800	33.300	659.000	1
4	33.300	659.000	49.300	657.000	1
5	49.300	657.000	55.000	656.000	1
6	55.000	656.000	64.800	654.000	1
7	64.800	654.000	80.300	650.000	1
8	80.300	650.000	109.600	643.000	1
9	109.600	643.000	127.800	640.000	1
10	127.800	640.000	156.500	640.000	1
11	156.500	640.000	157.700	641.000	3
12	157.700	641.000	167.200	642.000	3
13	167.200	642.000	181.500	644.000	3
14	181.500	644.000	191.600	645.000	3
15	191.600	645.000	230.900	650.000	3
16	230.900	650.000	241.300	652.000	3
17	241.300	652.000	252.600	655.000	3
18	252.600	655.000	254.500	656.000	3
19	254.500	656.000	258.300	657.000	3
20	258.300	657.000	260.100	657.100	1
21	260.100	657.100	267.400	660.000	1
22	267.400	660.000	269.100	661.000	1
23	269.100	661.000	284.300	672.000	1
24	284.300	672.000	288.000	673.000	1
25	288.000	673.000	400.000	673.000	1
26	258.300	657.000	400.000	664.500	3

27	58.100	638.500	90.900	638.300	3
28	90.900	638.300	116.100	635.800	3
29	116.100	635.800	152.400	640.100	3
30	152.400	640.100	156.300	640.000	3
31	21.100	659.800	26.000	658.400	4
32	26.000	658.400	58.100	638.500	4
33	58.100	638.500	86.100	630.600	4
34	86.100	630.600	118.900	627.200	4
35	118.900	627.200	400.000	646.600	4
36	21.100	656.800	26.000	655.400	2
37	26.000	655.400	58.100	635.500	2
38	58.100	635.500	86.100	627.600	2
39	86.100	627.600	118.900	624.200	2
40	118.900	624.200	400.000	643.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 580.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	32.00
2	7.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 13 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)

1	0.00	650.00
2	78.70	650.00
3	80.30	650.00
4	109.60	643.00
5	127.80	640.00
6	152.40	640.10
7	156.30	640.00
8	157.70	641.00
9	167.20	642.00
10	181.50	644.00
11	191.60	645.00
12	230.90	650.00
13	400.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	25	295.000	673.000	250.000	400.000	673.000	250.000	0.00

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	254.00	655.74	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

PIER/PILE LOAD DATA HAS BEEN SUPPRESSED

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)

1	125.00	626.50	250.00	635.30	3.00
2	260.00	636.00	380.00	643.90	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 = 59

Number of Trial Surfaces With Valid FS = 941

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 5.9 %

Statistical Data On All Valid FS Values:
FS Max = 6.488 FS Min = 1.297 FS Ave = 2.069
Standard Deviation = 0.584 Coefficient of Variation = 28.22 %

Critical Surface is Sequence Number 182 of Those Analyzed.

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

Factor Of Safety For The Critical or Specified Surface = 1.297

Table 1 - Geometry Data on the 41 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.09	0.04	150.82	639.96	640.00	-41.57	0.00	0.12
2	1.53	0.76	151.63	639.24	640.00	-41.57	0.00	2.05
3	1.86	2.27	153.33	637.73	640.00	-41.57	0.00	2.49
4	2.04	4.10	155.28	635.90	640.00	-44.76	0.00	2.87
5	0.20	5.21	156.40	634.79	640.00	-44.76	0.00	0.28
6	1.20	6.41	157.10	634.09	640.50	-44.76	39.81	1.69
7	3.41	9.37	159.41	631.81	641.18	-44.76	6.01	4.81
8	0.96	11.77	161.59	629.64	641.41	-44.76	6.01	1.35
9	2.56	12.36	163.35	629.24	641.60	3.25	6.01	2.57
10	2.56	12.48	165.92	629.38	641.87	3.25	6.01	2.57
11	4.77	12.74	169.58	629.59	642.33	3.25	7.96	4.77
12	4.77	13.14	174.35	629.86	643.00	3.25	7.96	4.77
13	4.77	13.54	179.12	630.13	643.67	3.25	7.96	4.77
14	5.05	13.84	184.02	630.41	644.25	3.25	5.65	5.06
15	5.05	14.05	189.07	630.70	644.75	3.25	5.65	5.06
16	4.91	14.33	194.06	630.98	645.31	3.25	7.25	4.92
17	4.91	14.68	198.97	631.26	645.94	3.25	7.25	4.92
18	4.91	15.03	203.88	631.54	646.56	3.25	7.25	4.92
19	4.91	15.37	208.79	631.81	647.19	3.25	7.25	4.92
20	4.91	15.72	213.71	632.09	647.81	3.25	7.25	4.92
21	4.91	16.06	218.62	632.37	648.44	3.25	7.25	4.92
22	4.91	16.41	223.53	632.65	649.06	3.25	7.25	4.92
23	4.91	16.76	228.44	632.93	649.69	3.25	7.25	4.92
24	5.20	17.28	233.50	633.22	650.50	3.25	10.89	5.21
25	5.20	17.99	238.70	633.51	651.50	3.25	10.89	5.21
26	5.65	18.93	244.12	633.82	652.75	3.25	14.87	5.66
27	5.65	20.11	249.77	634.14	654.25	3.25	14.87	5.66
28	1.90	21.14	253.55	634.36	655.50	3.25	27.76	1.90
29	3.80	21.98	256.40	634.52	656.50	3.25	14.74	3.81
30	1.80	22.37	259.20	634.68	657.05	3.25	3.18	1.80
31	2.62	22.82	261.41	634.80	657.62	3.25	21.67	2.62

32	0.74	22.26	263.09	636.03	658.29	72.09	21.67	2.42
33	2.64	17.70	264.78	641.26	658.96	72.09	21.67	8.58
34	1.30	12.43	266.75	647.31	659.74	71.76	21.67	4.15
35	0.24	10.43	267.52	649.64	660.07	71.76	30.47	0.75
36	1.46	8.35	268.37	652.22	660.57	71.76	30.47	4.68
37	0.44	6.04	269.32	655.12	661.16	71.76	35.89	1.42
38	1.51	5.13	270.30	656.73	661.87	51.33	35.89	2.41
39	2.68	4.03	272.39	659.35	663.38	51.33	35.89	4.29
40	2.68	2.62	275.08	662.70	665.32	51.33	35.89	4.29
41	2.46	0.96	277.65	666.23	667.18	56.37	35.89	4.44

Table 2 - Force Data On The 41 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	0.5	0.5	1.0	0.0	0.0	0.0
2	140.1	9.3	109.8	0.0	0.0	0.0
3	506.1	8.7	363.4	0.0	0.0	0.0
4	1004.2	3.0	739.6	0.0	0.0	0.0
5	125.1	0.0	61.5	0.0	0.0	0.0
6	922.7	0.0	452.4	0.0	0.0	0.0
7	3838.6	0.0	2780.4	0.0	0.0	0.0
8	1354.5	0.0	981.1	0.0	0.0	0.0
9	3803.5	0.0	1959.3	0.0	0.0	0.0
10	3841.7	0.0	1979.0	0.0	0.0	0.0
11	7289.8	0.0	3724.0	0.0	0.0	0.0
12	7516.4	0.0	3839.7	0.0	0.0	0.0
13	7742.9	0.0	3955.4	0.0	0.0	0.0
14	8387.8	0.0	4326.3	0.0	0.0	0.0
15	8517.0	0.0	4392.9	0.0	0.0	0.0
16	8450.0	0.0	4331.0	0.0	0.0	0.0
17	8654.0	0.0	4435.6	0.0	0.0	0.0
18	8858.1	0.0	4540.1	0.0	0.0	0.0
19	9062.1	0.0	4644.7	0.0	0.0	0.0
20	9266.1	0.0	4749.3	0.0	0.0	0.0
21	9470.1	0.0	4853.8	0.0	0.0	0.0
22	9674.2	0.0	4958.4	0.0	0.0	0.0
23	9878.2	0.0	5063.0	0.0	0.0	0.0
24	10784.2	0.0	5454.3	0.0	0.0	0.0
25	11224.0	0.0	5358.3	0.0	0.0	0.0
26	12833.9	0.0	5713.3	0.0	0.0	0.0
27	13633.4	0.0	5600.0	0.0	0.0	0.0
28	4820.8	0.0	1857.7	0.0	0.0	0.0
29	10023.9	0.0	3677.1	0.0	0.0	0.0
30	4832.6	0.0	1723.9	0.0	0.0	0.0
31	7166.5	0.0	2486.1	0.0	0.0	0.0
32	1986.5	0.0	2108.0	0.0	0.0	0.0
33	5607.2	0.0	4680.7	0.0	0.0	0.0
34	1937.3	0.0	695.6	0.0	0.0	0.0
35	294.5	0.0	16.8	0.0	0.0	0.0
36	1467.0	0.0	0.0	0.0	0.0	0.0
37	321.6	0.0	0.0	0.0	0.0	0.0
38	929.2	0.0	0.0	0.0	0.0	0.0
39	1298.1	0.0	0.0	0.0	0.0	0.0
40	844.1	0.0	0.0	0.0	0.0	0.0
41	282.7	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 218591.46(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 118913.49(lbs)

TOTAL AREA OF SLIDING MASS = 1821.60(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 41 SLICES

Slice	Soil	Cohesion	Phi(Deg)	Options

No.	Type	(psf)	
1	1	150.00	32.00
2	3	400.00	32.00
3	3	400.00	32.00
4	3	400.00	32.00
5	1	150.00	32.00
6	3	400.00	32.00
7	3	400.00	32.00
8	4	0.00	10.00
9	4	0.00	10.00
10	4	0.00	10.00
11	4	0.00	10.00
12	4	0.00	10.00
13	4	0.00	10.00
14	4	0.00	10.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	4	0.00	10.00
28	4	0.00	10.00
29	4	0.00	10.00
30	4	0.00	10.00
31	4	0.00	10.00
32	4	0.00	10.00
33	3	400.00	32.00
34	3	400.00	32.00
35	3	400.00	32.00
36	3	400.00	32.00
37	3	400.00	32.00
38	3	400.00	32.00
39	1	150.00	32.00
40	1	150.00	32.00
41	1	150.00	32.00

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 41 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-41.57	150.82	0.12	4.35	2.72	2.15
1	-41.57	150.82	0.12	4.35	2.72	2.15
2	-41.57	151.63	2.05	81.19	50.73	40.08
2	-41.57	151.63	2.05	81.19	50.73	40.08
3	-41.57	153.33	2.49	241.65	151.00	119.29
3	-41.57	153.33	2.49	241.65	151.00	119.29
4	-44.76	155.28	2.87	486.21	303.82	240.03
4	-44.76	155.28	2.87	486.21	303.82	240.03
5	-44.76	156.40	0.28	837.81	523.52	413.60
5	-44.76	156.40	0.28	837.81	523.52	413.60
6	-44.76	157.10	1.69	1031.11	644.31	509.02
6	-44.76	157.10	1.69	1031.11	644.31	509.02
7	-44.76	159.41	4.81	1124.00	702.35	554.88
7	-44.76	159.41	4.81	1124.00	702.35	554.88
8	-44.76	161.59	1.35	802.48	141.50	111.79

8	-44.76	161.59	1.35	802.48	141.50	111.79
9	3.25	163.35	2.57	714.45	125.98	99.53
9	3.25	163.35	2.57	714.45	125.98	99.53
10	3.25	165.92	2.57	721.64	127.24	100.53
10	3.25	165.92	2.57	721.64	127.24	100.53
11	3.25	169.58	4.77	743.17	131.04	103.53
11	3.25	169.58	4.77	743.17	131.04	103.53
12	3.25	174.35	4.77	766.26	135.11	106.74
12	3.25	174.35	4.77	766.26	135.11	106.74
13	3.25	179.12	4.77	789.36	139.19	109.96
13	3.25	179.12	4.77	789.36	139.19	109.96
14	3.25	184.02	5.06	799.01	140.89	111.31
14	3.25	184.02	5.06	799.01	140.89	111.31
15	3.25	189.07	5.06	811.32	143.06	113.02
15	3.25	189.07	5.06	811.32	143.06	113.02
16	3.25	194.06	4.92	832.98	146.88	116.04
16	3.25	194.06	4.92	832.98	146.88	116.04
17	3.25	198.97	4.92	853.09	150.42	118.84
17	3.25	198.97	4.92	853.09	150.42	118.84
18	3.25	203.88	4.92	873.21	153.97	121.64
18	3.25	203.88	4.92	873.21	153.97	121.64
19	3.25	208.79	4.92	893.32	157.52	124.44
19	3.25	208.79	4.92	893.32	157.52	124.44
20	3.25	213.71	4.92	913.43	161.06	127.25
20	3.25	213.71	4.92	913.43	161.06	127.25
21	3.25	218.62	4.92	933.54	164.61	130.05
21	3.25	218.62	4.92	933.54	164.61	130.05
22	3.25	223.53	4.92	953.66	168.16	132.85
22	3.25	223.53	4.92	953.66	168.16	132.85
23	3.25	228.44	4.92	973.77	171.70	135.65
23	3.25	228.44	4.92	973.77	171.70	135.65
24	3.25	233.50	5.21	1018.21	179.54	141.84
24	3.25	233.50	5.21	1018.21	179.54	141.84
25	3.25	238.70	5.21	1120.36	197.55	156.07
25	3.25	238.70	5.21	1120.36	197.55	156.07
26	3.25	244.12	5.66	1251.53	220.68	174.34
26	3.25	244.12	5.66	1251.53	220.68	174.34
27	3.25	249.77	5.66	1411.72	248.92	196.66
27	3.25	249.77	5.66	1411.72	248.92	196.66
28	3.25	253.55	1.90	1548.24	273.00	215.68
28	3.25	253.55	1.90	1548.24	273.00	215.68
29	3.25	256.40	3.81	1658.01	292.35	230.97
29	3.25	256.40	3.81	1658.01	292.35	230.97
30	3.25	259.20	1.80	1714.39	302.29	238.82
30	3.25	259.20	1.80	1714.39	302.29	238.82
31	3.25	261.41	2.62	1775.04	312.99	247.27
31	3.25	261.41	2.62	1775.04	312.99	247.27
32	72.09	263.09	2.42	1238.94	218.46	172.59
32	72.09	263.09	2.42	1238.94	218.46	172.59
33	72.09	264.78	8.58	606.44	378.95	299.38
33	72.09	264.78	8.58	606.44	378.95	299.38
34	71.76	266.75	4.15	514.54	321.52	254.01
34	71.76	266.75	4.15	514.54	321.52	254.01
35	71.76	267.52	0.75	477.67	298.48	235.81
35	71.76	267.52	0.75	477.67	298.48	235.81
36	71.76	268.37	4.68	389.33	243.28	192.20
36	71.76	268.37	4.68	389.33	243.28	192.20
37	71.76	269.32	1.42	281.86	176.13	139.15
37	71.76	269.32	1.42	281.86	176.13	139.15
38	51.33	270.30	2.41	373.96	233.68	184.61
38	51.33	270.30	2.41	373.96	233.68	184.61
39	51.33	272.39	4.29	199.38	274.59	216.93
39	51.33	272.39	4.29	199.38	274.59	216.93
40	51.33	275.08	4.29	190.99	119.35	94.29
40	51.33	275.08	4.29	190.99	119.35	94.29
41	56.37	277.65	4.44	64.65	40.40	31.91
41	56.37	277.65	4.44	64.65	40.40	31.91

Table 4 - Base Force Data on the 41 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-41.57	150.82	0.12	0.54	0.33	0.26
1	-41.57	150.82	0.12	0.54	0.33	0.26
2	-41.57	151.63	2.05	166.39	103.97	82.14
2	-41.57	151.63	2.05	166.39	103.97	82.14
3	-41.57	153.33	2.49	601.01	375.55	296.70
3	-41.57	153.33	2.49	601.01	375.55	296.70
4	-44.76	155.28	2.87	1396.46	872.61	689.39
4	-44.76	155.28	2.87	1396.46	872.61	689.39
5	-44.76	156.40	0.28	235.99	147.46	116.50
5	-44.76	156.40	0.28	235.99	147.46	116.50
6	-44.76	157.10	1.69	1742.58	1088.89	860.26
6	-44.76	157.10	1.69	1742.58	1088.89	860.26
7	-44.76	159.41	4.81	5401.65	3375.33	2666.62
7	-44.76	159.41	4.81	5401.65	3375.33	2666.62
8	-44.76	161.59	1.35	1083.69	191.08	150.96
8	-44.76	161.59	1.35	1083.69	191.08	150.96
9	3.25	163.35	2.57	1835.08	323.57	255.64
9	3.25	163.35	2.57	1835.08	323.57	255.64
10	3.25	165.92	2.57	1853.55	326.83	258.21
10	3.25	165.92	2.57	1853.55	326.83	258.21
11	3.25	169.58	4.77	3548.14	625.63	494.27
11	3.25	169.58	4.77	3548.14	625.63	494.27
12	3.25	174.35	4.77	3658.41	645.08	509.63
12	3.25	174.35	4.77	3658.41	645.08	509.63
13	3.25	179.12	4.77	3768.67	664.52	524.99
13	3.25	179.12	4.77	3768.67	664.52	524.99
14	3.25	184.02	5.06	4041.48	712.62	563.00
14	3.25	184.02	5.06	4041.48	712.62	563.00
15	3.25	189.07	5.06	4103.76	723.60	571.67
15	3.25	189.07	5.06	4103.76	723.60	571.67
16	3.25	194.06	4.92	4098.62	722.70	570.96
16	3.25	194.06	4.92	4098.62	722.70	570.96
17	3.25	198.97	4.92	4197.58	740.15	584.74
17	3.25	198.97	4.92	4197.58	740.15	584.74
18	3.25	203.88	4.92	4296.54	757.60	598.53
18	3.25	203.88	4.92	4296.54	757.60	598.53
19	3.25	208.79	4.92	4395.50	775.04	612.31
19	3.25	208.79	4.92	4395.50	775.04	612.31
20	3.25	213.71	4.92	4494.46	792.49	626.10
20	3.25	213.71	4.92	4494.46	792.49	626.10
21	3.25	218.62	4.92	4593.42	809.94	639.88
21	3.25	218.62	4.92	4593.42	809.94	639.88
22	3.25	223.53	4.92	4692.38	827.39	653.67
22	3.25	223.53	4.92	4692.38	827.39	653.67
23	3.25	228.44	4.92	4791.34	844.84	667.45
23	3.25	228.44	4.92	4791.34	844.84	667.45
24	3.25	233.50	5.21	5303.21	935.10	738.76
24	3.25	233.50	5.21	5303.21	935.10	738.76
25	3.25	238.70	5.21	5835.23	1028.91	812.87
25	3.25	238.70	5.21	5835.23	1028.91	812.87
26	3.25	244.12	5.66	7082.51	1248.84	986.62
26	3.25	244.12	5.66	7082.51	1248.84	986.62
27	3.25	249.77	5.66	7989.06	1408.69	1112.91
27	3.25	249.77	5.66	7989.06	1408.69	1112.91
28	3.25	253.55	1.90	2946.40	519.53	410.45
28	3.25	253.55	1.90	2946.40	519.53	410.45
29	3.25	256.40	3.81	6310.58	1112.73	879.09
29	3.25	256.40	3.81	6310.58	1112.73	879.09
30	3.25	259.20	1.80	3090.86	545.00	430.57
30	3.25	259.20	1.80	3090.86	545.00	430.57
31	3.25	261.41	2.62	4653.28	820.50	648.22
31	3.25	261.41	2.62	4653.28	820.50	648.22
32	72.09	263.09	2.42	2995.22	528.14	417.25
32	72.09	263.09	2.42	2995.22	528.14	417.25
33	72.09	264.78	8.58	5204.74	3252.28	2569.42
33	72.09	264.78	8.58	5204.74	3252.28	2569.42
34	71.76	266.75	4.15	2135.82	1334.61	1054.39
34	71.76	266.75	4.15	2135.82	1334.61	1054.39

35	71.76	267.52	0.75	359.31	224.52	177.38
35	71.76	267.52	0.75	359.31	224.52	177.38
36	71.76	268.37	4.68	1822.00	1138.51	899.46
36	71.76	268.37	4.68	1822.00	1138.51	899.46
37	71.76	269.32	1.42	399.41	249.58	197.18
37	71.76	269.32	1.42	399.41	249.58	197.18
38	51.33	270.30	2.41	902.61	564.01	445.59
38	51.33	270.30	2.41	902.61	564.01	445.59
39	51.33	272.39	4.29	855.97	1178.85	931.33
39	51.33	272.39	4.29	855.97	1178.85	931.33
40	51.33	275.08	4.29	819.97	512.37	404.79
40	51.33	275.08	4.29	819.97	512.37	404.79
41	56.37	277.65	4.44	286.93	179.29	141.65
41	56.37	277.65	4.44	286.93	179.29	141.65

Sum of the Resisting Forces = 25865.09 (lbs)

Average Available Shear Strength = 168.06(psf)

Sum of the Driving Forces = 21436.11 (lbs)

Average Mobilized Shear Stress = 139.28(psf)

Total length of the failure surface = 153.91(ft)

Factor of Safety Balance Check: FS = 1.20661

Janbu's Correction Factor (fo) = 1.0750

Janub's FS Corrected = 1.29714

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

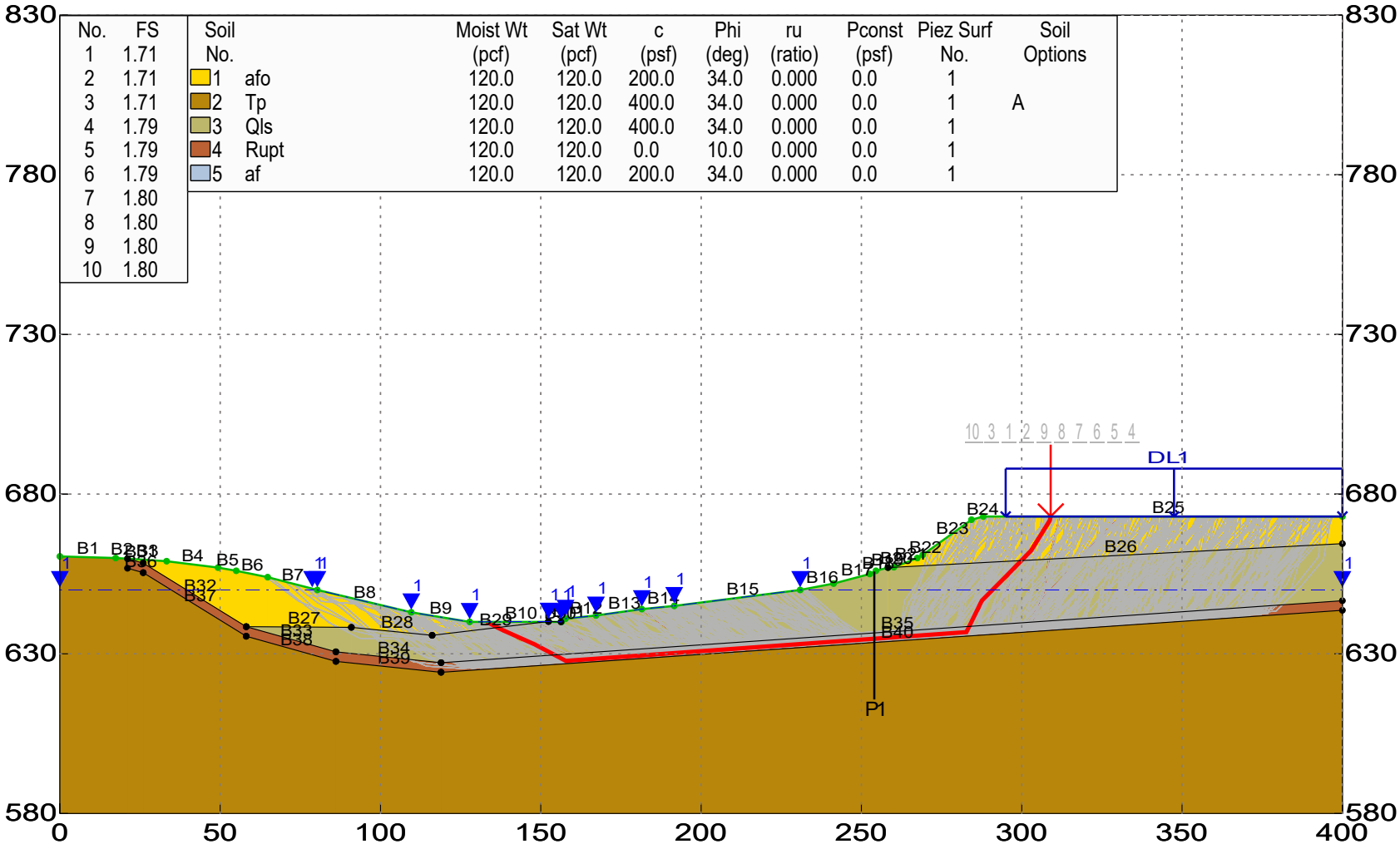
Royal Vista - Cross Section 5
Stage 2 (Existing Condition - Shear Pin)

LGC Geotechnical / BPP

\Sec 5 - Stage 2 (Existing Condition - Shear Pin).gsd

No.	FS
1	1.71
2	1.71
3	1.71
4	1.79
5	1.79
6	1.79
7	1.80
8	1.80
9	1.80
10	1.80

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.71

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5 - Stage 2 (Existing Condition - Shear Pin).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5 - Stage 2 (Existing Condition - Shear Pin).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 5

DESCRIPTION: Stage 2 (Existing Condition - Shear Pin)

BOUNDARY DATA

25 Surface Boundaries
40 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	660.500	17.400	660.000	2
2	17.400	660.000	21.100	659.800	2
3	21.100	659.800	33.300	659.000	1
4	33.300	659.000	49.300	657.000	1
5	49.300	657.000	55.000	656.000	1
6	55.000	656.000	64.800	654.000	1
7	64.800	654.000	80.300	650.000	1
8	80.300	650.000	109.600	643.000	1
9	109.600	643.000	127.800	640.000	1
10	127.800	640.000	156.500	640.000	1
11	156.500	640.000	157.700	641.000	3
12	157.700	641.000	167.200	642.000	3
13	167.200	642.000	181.500	644.000	3
14	181.500	644.000	191.600	645.000	3
15	191.600	645.000	230.900	650.000	3
16	230.900	650.000	241.300	652.000	3
17	241.300	652.000	252.600	655.000	3
18	252.600	655.000	254.500	656.000	3
19	254.500	656.000	258.300	657.000	3
20	258.300	657.000	260.100	657.100	1
21	260.100	657.100	267.400	660.000	1
22	267.400	660.000	269.100	661.000	1
23	269.100	661.000	284.300	672.000	1
24	284.300	672.000	288.000	673.000	1
25	288.000	673.000	400.000	673.000	1
26	258.300	657.000	400.000	664.500	3

27	58.100	638.500	90.900	638.300	3
28	90.900	638.300	116.100	635.800	3
29	116.100	635.800	152.400	640.100	3
30	152.400	640.100	156.300	640.000	3
31	21.100	659.800	26.000	658.400	4
32	26.000	658.400	58.100	638.500	4
33	58.100	638.500	86.100	630.600	4
34	86.100	630.600	118.900	627.200	4
35	118.900	627.200	400.000	646.600	4
36	21.100	656.800	26.000	655.400	2
37	26.000	655.400	58.100	635.500	2
38	58.100	635.500	86.100	627.600	2
39	86.100	627.600	118.900	624.200	2
40	118.900	624.200	400.000	643.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 580.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 13 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)

1	0.00	650.00
2	78.70	650.00
3	80.30	650.00
4	109.60	643.00
5	127.80	640.00
6	152.40	640.10
7	156.30	640.00
8	157.70	641.00
9	167.20	642.00
10	181.50	644.00
11	191.60	645.00
12	230.90	650.00
13	400.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	25	295.000	673.000	250.000	400.000	673.000	250.000	0.00

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	254.00	655.74	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	125.00	626.50	250.00	635.30	3.00
2	260.00	636.00	380.00	643.90	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 = 100

Number of Trial Surfaces With Valid FS = 900

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 10.0 %

Statistical Data On All Valid FS Values:
FS Max = 9.399 FS Min = 1.712 FS Ave = 2.622
Standard Deviation = 0.874 Coefficient of Variation = 33.33 %

Critical Surface is Sequence Number 166 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	254.00	634.70

Factor Of Safety For The Critical or Specified Surface = 1.712

Table 1 - Geometry Data on the 50 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.44	0.89	134.80	639.11	640.00	-27.37	0.00	3.88
2	1.50	2.17	137.27	637.83	640.00	-27.37	0.00	1.69
3	5.02	3.68	140.53	636.32	640.00	-24.05	0.00	5.50
4	5.02	5.92	145.55	634.08	640.00	-24.05	0.00	5.50
5	4.33	8.20	150.23	631.80	640.00	-28.11	0.00	4.91
6	1.87	9.86	153.34	630.14	640.00	-28.11	0.00	2.12
7	2.03	10.90	155.29	629.10	640.00	-28.11	0.00	2.30
8	0.20	11.49	156.40	628.51	640.00	-28.11	0.00	0.23
9	1.20	12.37	157.10	628.13	640.50	-28.11	39.81	1.36
10	0.07	13.21	157.73	627.79	641.00	-28.11	6.01	0.08
11	4.72	13.31	160.13	627.94	641.26	4.12	6.01	4.73
12	4.72	13.47	164.84	628.28	641.75	4.12	6.01	4.73
13	4.77	13.71	169.58	628.62	642.33	4.12	7.96	4.78
14	4.77	14.03	174.35	628.97	643.00	4.12	7.96	4.78
15	4.77	14.36	179.12	629.31	643.67	4.12	7.96	4.78
16	5.05	14.59	184.02	629.66	644.25	4.12	5.65	5.06
17	5.05	14.72	189.07	630.03	644.75	4.12	5.65	5.06
18	4.91	14.93	194.06	630.39	645.31	4.12	7.25	4.93
19	4.91	15.20	198.97	630.74	645.94	4.12	7.25	4.93
20	4.91	15.47	203.88	631.09	646.56	4.12	7.25	4.93
21	4.91	15.74	208.79	631.45	647.19	4.12	7.25	4.93
22	4.91	16.01	213.71	631.80	647.81	4.12	7.25	4.93
23	4.91	16.28	218.62	632.15	648.44	4.12	7.25	4.93
24	4.91	16.56	223.53	632.51	649.06	4.12	7.25	4.93
25	4.91	16.83	228.44	632.86	649.69	4.12	7.25	4.93
26	5.20	17.28	233.50	633.22	650.50	4.12	10.89	5.21
27	5.20	17.90	238.70	633.60	651.50	4.12	10.89	5.21
28	5.65	18.76	244.12	633.99	652.75	4.12	14.87	5.66

29	5.65	19.85	249.77	634.40	654.25	4.12	14.87	5.66
30	1.90	20.83	253.55	634.67	655.50	4.12	27.76	1.90
31	3.80	21.63	256.40	634.87	656.50	4.12	14.74	3.81
32	1.80	21.98	259.20	635.07	657.05	4.12	3.18	1.80
33	3.65	22.55	261.93	635.27	657.83	4.12	21.67	3.66
34	3.65	23.74	265.57	635.53	659.27	4.12	21.67	3.66
35	1.70	24.77	268.25	635.73	660.50	4.12	30.47	1.70
36	4.54	26.69	271.37	635.95	662.64	4.12	35.89	4.55
37	4.54	29.65	275.91	636.28	665.93	4.12	35.89	4.55
38	4.54	32.61	280.46	636.60	669.22	4.12	35.89	4.55
39	0.88	33.51	283.17	637.67	671.18	64.05	35.89	2.00
40	0.70	32.46	283.95	639.28	671.75	64.05	35.89	1.59
41	3.24	29.11	285.92	643.33	672.44	64.05	15.12	7.41
42	0.46	26.05	287.77	646.89	672.94	45.24	15.12	0.65
43	2.86	24.44	289.43	648.56	673.00	45.24	0.00	4.06
44	4.14	20.91	292.93	652.09	673.00	45.24	0.00	5.89
45	0.29	18.68	295.14	654.32	673.00	45.24	0.00	0.41
46	4.61	16.17	297.59	656.83	673.00	45.77	0.00	6.61
47	3.07	12.22	301.43	660.78	673.00	45.77	0.00	4.39
48	2.88	8.31	304.40	664.69	673.00	58.46	0.00	5.50
49	2.88	3.62	307.28	669.38	673.00	58.46	0.00	5.50
50	0.30	0.64	308.86	672.36	673.00	76.83	0.00	1.31

Table 2 - Force Data On The 50 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	367.9	6.1	222.3	0.0	0.0	0.0
2	391.9	3.6	233.5	0.0	0.0	0.0
3	2218.6	16.2	1281.1	0.0	0.0	0.0
4	3569.5	22.6	2057.4	0.0	0.0	0.0
5	4265.7	24.6	2542.6	0.0	0.0	0.0
6	2216.1	8.1	1315.6	0.0	0.0	0.0
7	2650.9	2.4	1565.5	0.0	0.0	0.0
8	275.9	0.0	108.4	0.0	0.0	0.0
9	1781.0	0.0	699.3	0.0	0.0	0.0
10	108.2	0.0	63.1	0.0	0.0	0.0
11	7532.8	0.0	3884.1	0.0	0.0	0.0
12	7621.6	0.0	3929.9	0.0	0.0	0.0
13	7841.2	0.0	4009.5	0.0	0.0	0.0
14	8026.3	0.0	4104.2	0.0	0.0	0.0
15	8211.4	0.0	4198.8	0.0	0.0	0.0
16	8839.0	0.0	4563.4	0.0	0.0	0.0
17	8921.7	0.0	4606.1	0.0	0.0	0.0
18	8799.1	0.0	4514.3	0.0	0.0	0.0
19	8959.1	0.0	4596.4	0.0	0.0	0.0
20	9119.2	0.0	4678.5	0.0	0.0	0.0
21	9279.2	0.0	4760.6	0.0	0.0	0.0
22	9439.2	0.0	4842.7	0.0	0.0	0.0
23	9599.3	0.0	4924.8	0.0	0.0	0.0
24	9759.3	0.0	5006.9	0.0	0.0	0.0
25	9919.3	0.0	5089.0	0.0	0.0	0.0
26	10779.8	0.0	5457.3	0.0	0.0	0.0
27	11170.3	0.0	5335.6	0.0	0.0	0.0
28	12719.8	0.0	5659.3	0.0	0.0	0.0
29	13461.1	0.0	5515.6	0.0	0.0	0.0
30	4749.8	0.0	1822.5	0.0	0.0	0.0
31	9862.1	0.0	3596.3	0.0	0.0	0.0
32	4746.8	0.0	1680.8	0.0	0.0	0.0
33	9879.0	0.0	3363.5	0.0	0.0	0.0
34	10399.0	0.0	3303.5	0.0	0.0	0.0
35	5054.0	0.0	1518.2	0.0	0.0	0.0
36	14550.2	0.0	3992.7	0.0	0.0	0.0
37	16163.8	0.0	3899.8	0.0	0.0	0.0
38	17777.4	0.0	3806.9	0.0	0.0	0.0
39	3522.6	0.0	1540.3	0.0	0.0	0.0
40	2715.3	0.0	1065.0	0.0	0.0	0.0

41	11322.0	0.0	3083.2	0.0	0.0	0.0
42	1434.2	0.0	126.5	0.0	0.0	0.0
43	8375.1	0.0	364.3	0.0	0.0	0.0
44	10399.2	0.0	0.0	0.0	0.0	0.0
45	643.2	0.0	0.0	0.0	0.0	71.8
46	8939.2	0.0	0.0	0.0	0.0	1152.1
47	4496.2	0.0	0.0	0.0	0.0	766.3
48	2868.1	0.0	0.0	0.0	0.0	719.4
49	1249.7	0.0	0.0	0.0	0.0	719.4
50	22.8	0.0	0.0	0.0	0.0	74.6

TOTAL WEIGHT OF SLIDING MASS = 347014.10(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 218896.47(lbs)

TOTAL AREA OF SLIDING MASS = 2891.78(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 50 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	200.00	34.00	
2	3	400.00	34.00	
3	3	400.00	34.00	
4	3	400.00	34.00	
5	3	400.00	34.00	
6	3	400.00	34.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	4	0.00	10.00	
40	3	400.00	34.00	
41	3	400.00	34.00	
42	3	400.00	34.00	
43	3	400.00	34.00	
44	3	400.00	34.00	
45	3	400.00	34.00	
46	3	400.00	34.00	
47	1	200.00	34.00	
48	1	200.00	34.00	
49	1	200.00	34.00	
50	1	200.00	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 50 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-27.37	134.80	3.88	147.84	299.72	177.81
1	-27.37	134.80	3.88	147.84	299.72	177.81
2	-27.37	137.27	1.69	324.34	618.77	367.09
2	-27.37	137.27	1.69	324.34	618.77	367.09
3	-24.05	140.53	5.50	397.54	668.14	396.39
3	-24.05	140.53	5.50	397.54	668.14	396.39
4	-24.05	145.55	5.50	556.39	775.29	459.96
4	-24.05	145.55	5.50	556.39	775.29	459.96
5	-28.11	150.23	4.91	780.10	926.18	549.47
5	-28.11	150.23	4.91	780.10	926.18	549.47
6	-28.11	153.34	2.12	903.16	1009.19	598.72
6	-28.11	153.34	2.12	903.16	1009.19	598.72
7	-28.11	155.29	2.30	666.91	117.59	69.76
7	-28.11	155.29	2.30	666.91	117.59	69.76
8	-28.11	156.40	0.23	957.55	168.84	100.17
8	-28.11	156.40	0.23	957.55	168.84	100.17
9	-28.11	157.10	1.36	1030.59	181.72	107.81
9	-28.11	157.10	1.36	1030.59	181.72	107.81
10	-28.11	157.73	0.08	817.88	144.22	85.56
10	-28.11	157.73	0.08	817.88	144.22	85.56
11	4.12	160.13	4.73	769.74	135.73	80.52
11	4.12	160.13	4.73	769.74	135.73	80.52
12	4.12	164.84	4.73	778.82	137.33	81.47
12	4.12	164.84	4.73	778.82	137.33	81.47
13	4.12	169.58	4.78	799.70	141.01	83.66
13	4.12	169.58	4.78	799.70	141.01	83.66
14	4.12	174.35	4.78	818.58	144.34	85.63
14	4.12	174.35	4.78	818.58	144.34	85.63
15	4.12	179.12	4.78	837.46	147.67	87.61
15	4.12	179.12	4.78	837.46	147.67	87.61
16	4.12	184.02	5.06	842.32	148.52	88.11
16	4.12	184.02	5.06	842.32	148.52	88.11
17	4.12	189.07	5.06	850.21	149.92	88.94
17	4.12	189.07	5.06	850.21	149.92	88.94
18	4.12	194.06	4.93	867.74	153.01	90.77
18	4.12	194.06	4.93	867.74	153.01	90.77
19	4.12	198.97	4.93	883.53	155.79	92.42
19	4.12	198.97	4.93	883.53	155.79	92.42
20	4.12	203.88	4.93	899.31	158.57	94.08
20	4.12	203.88	4.93	899.31	158.57	94.08
21	4.12	208.79	4.93	915.09	161.36	95.73
21	4.12	208.79	4.93	915.09	161.36	95.73
22	4.12	213.71	4.93	930.87	164.14	97.38
22	4.12	213.71	4.93	930.87	164.14	97.38
23	4.12	218.62	4.93	946.66	166.92	99.03
23	4.12	218.62	4.93	946.66	166.92	99.03
24	4.12	223.53	4.93	962.44	169.70	100.68
24	4.12	223.53	4.93	962.44	169.70	100.68
25	4.12	228.44	4.93	978.22	172.49	102.33
25	4.12	228.44	4.93	978.22	172.49	102.33
26	4.12	233.50	5.21	1018.22	179.54	106.51
26	4.12	233.50	5.21	1018.22	179.54	106.51
27	4.12	238.70	5.21	1115.89	196.76	116.73
27	4.12	238.70	5.21	1115.89	196.76	116.73
28	4.12	244.12	5.66	1242.41	219.07	129.97
28	4.12	244.12	5.66	1242.41	219.07	129.97
29	4.12	249.77	5.66	1397.76	246.46	146.22

29	4.12	249.77	5.66	1397.76	246.46	146.22
30	4.12	253.55	1.90	1531.06	269.97	160.16
30	4.12	253.55	1.90	1531.06	269.97	160.16
31	4.12	256.40	3.81	1638.40	288.89	171.39
31	4.12	256.40	3.81	1638.40	288.89	171.39
32	4.12	259.20	1.80	1692.37	298.41	177.04
32	4.12	259.20	1.80	1692.37	298.41	177.04
33	4.12	261.93	3.66	1773.43	312.70	185.52
33	4.12	261.93	3.66	1773.43	312.70	185.52
34	4.12	265.57	3.66	1931.06	340.50	202.01
34	4.12	265.57	3.66	1931.06	340.50	202.01
35	4.12	268.25	1.70	2065.91	364.28	216.11
35	4.12	268.25	1.70	2065.91	364.28	216.11
36	4.12	271.37	4.55	2308.29	407.01	241.47
36	4.12	271.37	4.55	2308.29	407.01	241.47
37	4.12	275.91	4.55	2680.99	472.73	280.46
37	4.12	275.91	4.55	2680.99	472.73	280.46
38	4.12	280.46	4.55	3053.68	538.45	319.44
38	4.12	280.46	4.55	3053.68	538.45	319.44
39	64.05	283.17	2.00	2653.73	467.92	277.60
39	64.05	283.17	2.00	2653.73	467.92	277.60
40	64.05	283.95	1.59	1458.42	1383.72	820.91
40	64.05	283.95	1.59	1458.42	1383.72	820.91
41	64.05	285.92	7.41	1377.76	1329.31	788.64
41	64.05	285.92	7.41	1377.76	1329.31	788.64
42	45.24	287.77	0.65	1883.75	1670.60	991.11
42	45.24	287.77	0.65	1883.75	1670.60	991.11
43	45.24	289.43	4.06	1821.34	1628.51	966.14
43	45.24	289.43	4.06	1821.34	1628.51	966.14
44	45.24	292.93	5.89	1586.88	1470.37	872.32
44	45.24	292.93	5.89	1586.88	1470.37	872.32
45	45.24	295.14	0.41	1574.17	1461.79	867.23
45	45.24	295.14	0.41	1574.17	1461.79	867.23
46	45.77	297.59	6.61	1351.63	1311.68	778.18
46	45.77	297.59	6.61	1351.63	1311.68	778.18
47	45.77	301.43	4.39	1110.47	949.02	563.02
47	45.77	301.43	4.39	1110.47	949.02	563.02
48	58.46	304.40	5.50	620.16	618.30	366.82
48	58.46	304.40	5.50	620.16	618.30	366.82
49	58.46	307.28	5.50	286.07	392.96	233.13
49	58.46	307.28	5.50	286.07	392.96	233.13
50	76.83	308.86	1.31	116.91	78.86	46.78
50	76.83	308.86	1.31	116.91	78.86	46.78

Table 4 - Base Force Data on the 50 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-27.37	134.80	3.88	572.91	1161.48	689.06
1	-27.37	134.80	3.88	572.91	1161.48	689.06
2	-27.37	137.27	1.69	549.41	1048.16	621.84
2	-27.37	137.27	1.69	549.41	1048.16	621.84
3	-24.05	140.53	5.50	2186.45	3674.78	2180.13
3	-24.05	140.53	5.50	2186.45	3674.78	2180.13
4	-24.05	145.55	5.50	3060.17	4264.11	2529.76
4	-24.05	145.55	5.50	3060.17	4264.11	2529.76
5	-28.11	150.23	4.91	3833.50	4551.38	2700.18
5	-28.11	150.23	4.91	3833.50	4551.38	2700.18
6	-28.11	153.34	2.12	1918.03	2143.20	1271.49
6	-28.11	153.34	2.12	1918.03	2143.20	1271.49
7	-28.11	155.29	2.30	1532.33	270.19	160.30
7	-28.11	155.29	2.30	1532.33	270.19	160.30
8	-28.11	156.40	0.23	217.11	38.28	22.71
8	-28.11	156.40	0.23	217.11	38.28	22.71
9	-28.11	157.10	1.36	1402.02	247.21	146.66
9	-28.11	157.10	1.36	1402.02	247.21	146.66
10	-28.11	157.73	0.08	63.28	11.16	6.62
10	-28.11	157.73	0.08	63.28	11.16	6.62

11	4.12	160.13	4.73	3639.38	641.72	380.71
11	4.12	160.13	4.73	3639.38	641.72	380.71
12	4.12	164.84	4.73	3682.31	649.29	385.20
12	4.12	164.84	4.73	3682.31	649.29	385.20
13	4.12	169.58	4.78	3821.76	673.88	399.79
13	4.12	169.58	4.78	3821.76	673.88	399.79
14	4.12	174.35	4.78	3911.99	689.79	409.23
14	4.12	174.35	4.78	3911.99	689.79	409.23
15	4.12	179.12	4.78	4002.21	705.70	418.67
15	4.12	179.12	4.78	4002.21	705.70	418.67
16	4.12	184.02	5.06	4264.74	751.99	446.13
16	4.12	184.02	5.06	4264.74	751.99	446.13
17	4.12	189.07	5.06	4304.67	759.03	450.31
17	4.12	189.07	5.06	4304.67	759.03	450.31
18	4.12	194.06	4.93	4273.81	753.59	447.08
18	4.12	194.06	4.93	4273.81	753.59	447.08
19	4.12	198.97	4.93	4351.55	767.29	455.21
19	4.12	198.97	4.93	4351.55	767.29	455.21
20	4.12	203.88	4.93	4429.28	781.00	463.34
20	4.12	203.88	4.93	4429.28	781.00	463.34
21	4.12	208.79	4.93	4507.01	794.71	471.47
21	4.12	208.79	4.93	4507.01	794.71	471.47
22	4.12	213.71	4.93	4584.74	808.41	479.60
22	4.12	213.71	4.93	4584.74	808.41	479.60
23	4.12	218.62	4.93	4662.47	822.12	487.74
23	4.12	218.62	4.93	4662.47	822.12	487.74
24	4.12	223.53	4.93	4740.20	835.83	495.87
24	4.12	223.53	4.93	4740.20	835.83	495.87
25	4.12	228.44	4.93	4817.93	849.53	504.00
25	4.12	228.44	4.93	4817.93	849.53	504.00
26	4.12	233.50	5.21	5308.44	936.02	555.31
26	4.12	233.50	5.21	5308.44	936.02	555.31
27	4.12	238.70	5.21	5817.66	1025.81	608.58
27	4.12	238.70	5.21	5817.66	1025.81	608.58
28	4.12	244.12	5.66	7037.76	1240.95	736.21
28	4.12	244.12	5.66	7037.76	1240.95	736.21
29	4.12	249.77	5.66	7917.78	1396.12	828.27
29	4.12	249.77	5.66	7917.78	1396.12	828.27
30	4.12	253.55	1.90	2916.54	514.26	305.10
30	4.12	253.55	1.90	2916.54	514.26	305.10
31	4.12	256.40	3.81	6242.02	1100.64	652.97
31	4.12	256.40	3.81	6242.02	1100.64	652.97
32	4.12	259.20	1.80	3054.14	538.53	319.49
32	4.12	259.20	1.80	3054.14	538.53	319.49
33	4.12	261.93	3.66	6489.77	1144.32	678.89
33	4.12	261.93	3.66	6489.77	1144.32	678.89
34	4.12	265.57	3.66	7066.59	1246.03	739.23
34	4.12	265.57	3.66	7066.59	1246.03	739.23
35	4.12	268.25	1.70	3521.12	620.87	368.34
35	4.12	268.25	1.70	3521.12	620.87	368.34
36	4.12	271.37	4.55	10512.17	1853.58	1099.67
36	4.12	271.37	4.55	10512.17	1853.58	1099.67
37	4.12	275.91	4.55	12209.47	2152.86	1277.22
37	4.12	275.91	4.55	12209.47	2152.86	1277.22
38	4.12	280.46	4.55	13906.76	2452.14	1454.77
38	4.12	280.46	4.55	13906.76	2452.14	1454.77
39	64.05	283.17	2.00	5311.48	936.56	555.63
39	64.05	283.17	2.00	5311.48	936.56	555.63
40	64.05	283.95	1.59	2322.65	2203.68	1307.37
40	64.05	283.95	1.59	2322.65	2203.68	1307.37
41	64.05	285.92	7.41	10203.59	9844.77	5840.58
41	64.05	285.92	7.41	10203.59	9844.77	5840.58
42	45.24	287.77	0.65	1227.41	1088.53	645.79
42	45.24	287.77	0.65	1227.41	1088.53	645.79
43	45.24	289.43	4.06	7386.30	6604.29	3918.11
43	45.24	289.43	4.06	7386.30	6604.29	3918.11
44	45.24	292.93	5.89	9339.47	8653.72	5133.96
44	45.24	292.93	5.89	9339.47	8653.72	5133.96
45	45.24	295.14	0.41	641.61	595.81	353.47
45	45.24	295.14	0.41	641.61	595.81	353.47
46	45.77	297.59	6.61	8928.98	8665.11	5140.73
46	45.77	297.59	6.61	8928.98	8665.11	5140.73

47	45.77	301.43	4.39	4879.31	4169.91	2473.87
47	45.77	301.43	4.39	4879.31	4169.91	2473.87
48	58.46	304.40	5.50	3410.89	3400.68	2017.51
48	58.46	304.40	5.50	3410.89	3400.68	2017.51
49	58.46	307.28	5.50	1573.38	2161.26	1282.20
49	58.46	307.28	5.50	1573.38	2161.26	1282.20
50	76.83	308.86	1.31	153.16	103.31	61.29
50	76.83	308.86	1.31	153.16	103.31	61.29

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 50 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
30	12000.0	0.0	12000.0	90.00	-0.388606E+03

Sum of the Resisting Forces = 72552.08 (lbs)

Average Available Shear Strength = 366.13(psf)

Sum of the Driving Forces = 45152.94 (lbs)

Average Mobilized Shear Stress = 227.86(psf)

Total length of the failure surface = 198.16(ft)

Factor of Safety Balance Check: FS = 1.60681

Janbu's Correction Factor (fo) = 1.0657

Janub's FS Corrected = 1.71238

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

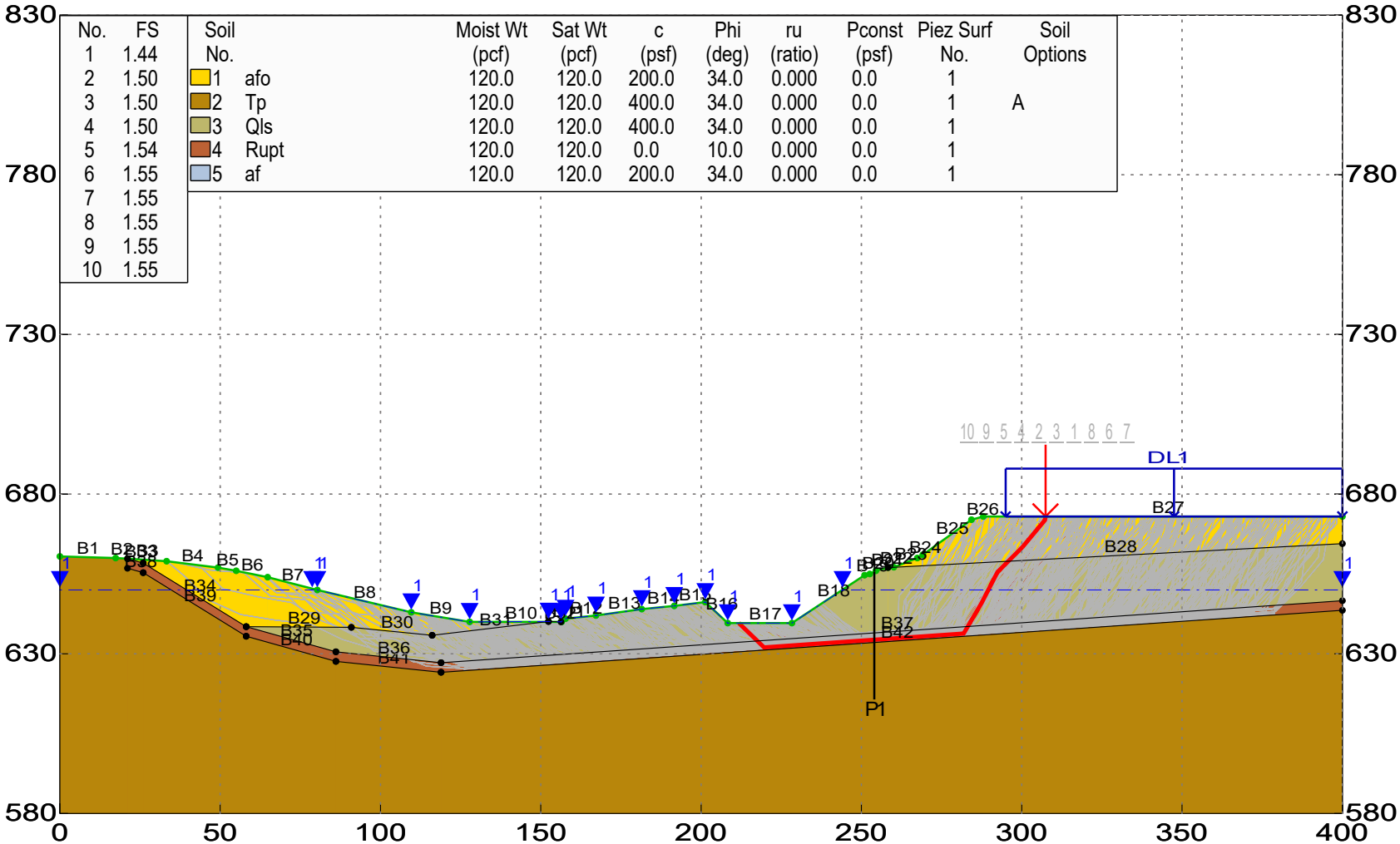
Royal Vista - Cross Section 5
Stage 3 (Temporary Staging Pad)

LGC Geotechnical / BPP

\Sec 5 - Stage 3 (Temporary Staging Pad).gsd

No.	FS
1	1.44
2	1.50
3	1.50
4	1.50
5	1.54
6	1.55
7	1.55
8	1.55
9	1.55
10	1.55

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.44

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5 - Stage 3 (Temporary Staging Pad).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5 - Stage 3 (Temporary Staging Pad).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 5

DESCRIPTION: Stage 3 (Temporary Staging Pad)

BOUNDARY DATA

27 Surface Boundaries
42 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	660.500	17.400	660.000	2
2	17.400	660.000	21.100	659.800	2
3	21.100	659.800	33.300	659.000	1
4	33.300	659.000	49.300	657.000	1
5	49.300	657.000	55.000	656.000	1
6	55.000	656.000	64.800	654.000	1
7	64.800	654.000	80.300	650.000	1
8	80.300	650.000	109.600	643.000	1
9	109.600	643.000	127.800	640.000	1
10	127.800	640.000	156.500	640.000	1
11	156.500	640.000	157.700	641.000	3
12	157.700	641.000	167.200	642.000	3
13	167.200	642.000	181.500	644.000	3
14	181.500	644.000	191.600	645.000	3
15	191.600	645.000	201.300	646.200	3
16	201.300	646.200	208.300	639.600	3
17	208.300	639.600	228.300	639.600	3
18	228.300	639.600	251.000	654.600	3
19	251.000	654.600	252.600	655.000	3
20	252.600	655.000	254.500	656.000	3
21	254.500	656.000	258.300	657.000	3
22	258.300	657.000	260.100	657.100	1
23	260.100	657.100	267.400	660.000	1
24	267.400	660.000	269.100	661.000	1
25	269.100	661.000	284.300	672.000	1
26	284.300	672.000	288.000	673.000	1

27	288.000	673.000	400.000	673.000	1
28	258.300	657.000	400.000	664.500	3
29	58.100	638.500	90.900	638.300	3
30	90.900	638.300	116.100	635.800	3
31	116.100	635.800	152.400	640.100	3
32	152.400	640.100	156.300	640.000	3
33	21.100	659.800	26.000	658.400	4
34	26.000	658.400	58.100	638.500	4
35	58.100	638.500	86.100	630.600	4
36	86.100	630.600	118.900	627.200	4
37	118.900	627.200	400.000	646.600	4
38	21.100	656.800	26.000	655.400	2
39	26.000	655.400	58.100	635.500	2
40	58.100	635.500	86.100	627.600	2
41	86.100	627.600	118.900	624.200	2
42	118.900	624.200	400.000	643.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 580.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 16 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	650.00
2	78.70	650.00
3	80.30	650.00
4	109.60	643.00
5	127.80	640.00
6	152.40	640.10
7	156.30	640.00
8	157.70	641.00
9	167.20	642.00
10	181.50	644.00
11	191.60	645.00
12	201.30	646.20
13	208.30	639.60
14	228.30	639.60
15	244.10	650.00
16	400.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	27	295.000	673.000	250.000	400.000	673.000	250.000	0.00

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	254.00	655.74	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 11.00(ft)

Zone	X - 1	Y - 1	X - 2	Y - 2	Height

No.	(ft)	(ft)	(ft)	(ft)	(ft)
1	125.00	626.50	250.00	635.30	3.00
2	260.00	636.00	380.00	643.90	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 = 88

Number of Trial Surfaces With Valid FS = 912

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 8.8 %

Statistical Data On All Valid FS Values:
FS Max = 7.465 FS Min = 1.441 FS Ave = 2.417
Standard Deviation = 0.770 Coefficient of Variation = 31.87 %

Critical Surface is Sequence Number 6 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	254.00	634.38

Factor Of Safety For The Critical or Specified Surface = 1.441

Table 1 - Geometry Data on the 32 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.90	1.40	213.20	638.20	639.60	-43.98	0.00	4.03
2	2.90	4.19	216.10	635.41	639.60	-43.98	0.00	4.03
3	2.08	6.60	218.59	633.00	639.60	-43.98	0.00	2.89
4	4.34	7.45	221.80	632.15	639.60	3.97	0.00	4.35
5	4.34	7.15	226.13	632.45	639.60	3.97	0.00	4.35
6	5.27	8.56	230.93	632.78	641.34	3.97	33.46	5.28
7	5.27	11.67	236.20	633.15	644.82	3.97	33.46	5.28
8	5.27	14.79	241.47	633.51	648.30	3.97	33.46	5.28
9	3.45	17.36	245.82	633.82	651.18	3.97	33.46	3.46
10	3.45	19.40	249.28	634.06	653.46	3.97	33.46	3.46
11	1.60	20.57	251.80	634.23	654.80	3.97	14.04	1.60
12	1.90	21.15	253.55	634.35	655.50	3.97	27.76	1.90
13	3.80	21.95	256.40	634.55	656.50	3.97	14.74	3.81
14	1.80	22.31	259.20	634.74	657.05	3.97	3.18	1.80
15	3.65	22.89	261.93	634.93	657.83	3.97	21.67	3.66
16	3.65	24.09	265.57	635.19	659.27	3.97	21.67	3.66
17	1.70	25.13	268.25	635.37	660.50	3.97	30.47	1.70
18	4.26	26.96	271.23	635.58	662.54	3.97	35.89	4.27
19	4.26	29.75	275.49	635.87	665.62	3.97	35.89	4.27
20	4.26	32.54	279.75	636.17	668.71	3.97	35.89	4.27
21	1.29	33.29	282.52	637.43	670.71	59.76	35.89	2.57
22	1.13	32.09	283.74	639.51	671.59	59.76	35.89	2.24
23	3.12	29.27	285.86	643.15	672.42	59.76	15.12	6.19

24	0.58	26.53	287.71	646.39	672.92	62.89	15.12	1.28
25	1.56	24.52	288.78	648.48	673.00	62.89	0.00	3.42
26	2.87	20.19	290.99	652.81	673.00	62.89	0.00	6.31
27	2.57	16.10	293.71	656.90	673.00	45.10	0.00	3.64
28	0.79	14.41	295.39	658.59	673.00	45.10	0.00	1.12
29	4.40	11.81	297.99	661.19	673.00	45.10	0.00	6.24
30	3.52	7.48	301.95	665.52	673.00	50.23	0.00	5.50
31	3.52	3.25	305.47	669.75	673.00	50.23	0.00	5.50
32	0.18	0.57	307.32	672.43	673.00	80.81	0.00	1.16

Table 2 - Force Data On The 32 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	486.1	0.0	351.2	0.0	0.0	0.0
2	1458.2	0.0	1053.7	0.0	0.0	0.0
3	1647.1	0.0	1190.2	0.0	0.0	0.0
4	3876.5	0.0	2020.6	0.0	0.0	0.0
5	3720.0	0.0	1939.0	0.0	0.0	0.0
6	5407.3	0.0	1965.0	0.0	0.0	0.0
7	7375.9	0.0	2677.8	0.0	0.0	0.0
8	9344.5	0.0	3390.6	0.0	0.0	0.0
9	7188.4	0.0	3492.2	0.0	0.0	0.0
10	8033.1	0.0	3440.6	0.0	0.0	0.0
11	3949.1	0.0	1578.1	0.0	0.0	0.0
12	4821.5	0.0	1859.6	0.0	0.0	0.0
13	10008.9	0.0	3672.1	0.0	0.0	0.0
14	4817.9	0.0	1717.6	0.0	0.0	0.0
15	10026.3	0.0	3439.7	0.0	0.0	0.0
16	10550.5	0.0	3381.9	0.0	0.0	0.0
17	5126.0	0.0	1555.4	0.0	0.0	0.0
18	13780.1	0.0	3841.8	0.0	0.0	0.0
19	15204.4	0.0	3763.1	0.0	0.0	0.0
20	16628.8	0.0	3684.4	0.0	0.0	0.0
21	5167.5	0.0	2015.2	0.0	0.0	0.0
22	4346.6	0.0	1467.9	0.0	0.0	0.0
23	10951.3	0.0	2646.8	0.0	0.0	0.0
24	1854.6	0.0	288.0	0.0	0.0	0.0
25	4580.5	0.0	324.1	0.0	0.0	0.0
26	6962.4	0.0	0.0	0.0	0.0	0.0
27	4964.9	0.0	0.0	0.0	0.0	0.0
28	1366.0	0.0	0.0	0.0	0.0	197.5
29	6240.2	0.0	0.0	0.0	0.0	1101.2
30	3158.8	0.0	0.0	0.0	0.0	879.5
31	1373.9	0.0	0.0	0.0	0.0	879.5
32	12.6	0.0	0.0	0.0	0.0	46.1

TOTAL WEIGHT OF SLIDING MASS = 194429.49(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 141890.18(lbs)

TOTAL AREA OF SLIDING MASS = 1620.25(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 32 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	
3	4	0.00	10.00	
4	4	0.00	10.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	

10	4	0.00	10.00
11	4	0.00	10.00
12	4	0.00	10.00
13	4	0.00	10.00
14	4	0.00	10.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	3	400.00	34.00
23	3	400.00	34.00
24	3	400.00	34.00
25	3	400.00	34.00
26	3	400.00	34.00
27	3	400.00	34.00
28	3	400.00	34.00
29	1	200.00	34.00
30	1	200.00	34.00
31	1	200.00	34.00
32	1	200.00	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 32 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-43.98	213.20	4.03	723.75	888.18	621.12
1	-43.98	213.20	4.03	723.75	888.18	621.12
2	-43.98	216.10	4.03	1038.60	1100.54	769.64
2	-43.98	216.10	4.03	1038.60	1100.54	769.64
3	-43.98	218.59	2.89	435.55	76.80	53.71
3	-43.98	218.59	2.89	435.55	76.80	53.71
4	3.97	221.80	4.35	425.20	74.97	52.43
4	3.97	221.80	4.35	425.20	74.97	52.43
5	3.97	226.13	4.35	408.03	71.95	50.31
5	3.97	226.13	4.35	408.03	71.95	50.31
6	3.97	230.93	5.28	648.55	114.36	79.97
6	3.97	230.93	5.28	648.55	114.36	79.97
7	3.97	236.20	5.28	885.14	156.07	109.15
7	3.97	236.20	5.28	885.14	156.07	109.15
8	3.97	241.47	5.28	1121.72	197.79	138.32
8	3.97	241.47	5.28	1121.72	197.79	138.32
9	3.97	245.82	3.46	1064.01	187.61	131.20
9	3.97	245.82	3.46	1064.01	187.61	131.20
10	3.97	249.28	3.46	1321.43	233.00	162.94
10	3.97	249.28	3.46	1321.43	233.00	162.94
11	3.97	251.80	1.60	1470.76	259.33	181.36
11	3.97	251.80	1.60	1470.76	259.33	181.36
12	3.97	253.55	1.90	1547.06	272.79	190.77
12	3.97	253.55	1.90	1547.06	272.79	190.77
13	3.97	256.40	3.81	1654.69	291.77	204.04
13	3.97	256.40	3.81	1654.69	291.77	204.04
14	3.97	259.20	1.80	1709.00	301.34	210.74
14	3.97	259.20	1.80	1709.00	301.34	210.74
15	3.97	261.93	3.66	1790.37	315.69	220.77
15	3.97	261.93	3.66	1790.37	315.69	220.77
16	3.97	265.57	3.66	1948.33	343.54	240.25
16	3.97	265.57	3.66	1948.33	343.54	240.25
17	3.97	268.25	1.70	2083.41	367.36	256.90
17	3.97	268.25	1.70	2083.41	367.36	256.90

18	3.97	271.23	4.27	2314.32	408.08	285.38
18	3.97	271.23	4.27	2314.32	408.08	285.38
19	3.97	275.49	4.27	2663.97	469.73	328.49
19	3.97	275.49	4.27	2663.97	469.73	328.49
20	3.97	279.75	4.27	3013.61	531.38	371.61
20	3.97	279.75	4.27	3013.61	531.38	371.61
21	59.76	282.52	2.57	2616.13	461.29	322.59
21	59.76	282.52	2.57	2616.13	461.29	322.59
22	59.76	283.74	2.24	1434.74	1367.75	956.50
22	59.76	283.74	2.24	1434.74	1367.75	956.50
23	59.76	285.86	6.19	1375.76	1327.96	928.67
23	59.76	285.86	6.19	1375.76	1327.96	928.67
24	62.89	287.71	1.28	1192.68	1204.47	842.31
24	62.89	287.71	1.28	1192.68	1204.47	842.31
25	62.89	288.78	3.42	1136.91	1166.86	816.01
25	62.89	288.78	3.42	1136.91	1166.86	816.01
26	62.89	290.99	6.31	923.55	1022.94	715.37
26	62.89	290.99	6.31	923.55	1022.94	715.37
27	45.10	293.71	3.64	1081.28	1129.33	789.77
27	45.10	293.71	3.64	1081.28	1129.33	789.77
28	45.10	295.39	1.12	1112.91	1150.67	804.69
28	45.10	295.39	1.12	1112.91	1150.67	804.69
29	45.10	297.99	6.24	1005.39	878.14	614.11
29	45.10	297.99	6.24	1005.39	878.14	614.11
30	50.23	301.95	5.50	601.56	605.76	423.62
30	50.23	301.95	5.50	601.56	605.76	423.62
31	50.23	305.47	5.50	286.13	392.99	274.83
31	50.23	305.47	5.50	286.13	392.99	274.83
32	80.81	307.32	1.16	77.14	52.03	36.39
32	80.81	307.32	1.16	77.14	52.03	36.39

Table 4 - Base Force Data on the 32 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-43.98	213.20	4.03	2914.15	3576.20	2500.91
1	-43.98	213.20	4.03	2914.15	3576.20	2500.91
2	-43.98	216.10	4.03	4181.87	4431.28	3098.89
2	-43.98	216.10	4.03	4181.87	4431.28	3098.89
3	-43.98	218.59	2.89	1259.52	222.09	155.31
3	-43.98	218.59	2.89	1259.52	222.09	155.31
4	3.97	221.80	4.35	1848.21	325.89	227.90
4	3.97	221.80	4.35	1848.21	325.89	227.90
5	3.97	226.13	4.35	1773.59	312.73	218.70
5	3.97	226.13	4.35	1773.59	312.73	218.70
6	3.97	230.93	5.28	3423.90	603.73	422.20
6	3.97	230.93	5.28	3423.90	603.73	422.20
7	3.97	236.20	5.28	4672.92	823.96	576.21
7	3.97	236.20	5.28	4672.92	823.96	576.21
8	3.97	241.47	5.28	5921.94	1044.20	730.23
8	3.97	241.47	5.28	5921.94	1044.20	730.23
9	3.97	245.82	3.46	3679.66	648.82	453.74
9	3.97	245.82	3.46	3679.66	648.82	453.74
10	3.97	249.28	3.46	4569.89	805.80	563.51
10	3.97	249.28	3.46	4569.89	805.80	563.51
11	3.97	251.80	1.60	2358.86	415.93	290.87
11	3.97	251.80	1.60	2358.86	415.93	290.87
12	3.97	253.55	1.90	2946.48	519.54	363.33
12	3.97	253.55	1.90	2946.48	519.54	363.33
13	3.97	256.40	3.81	6302.93	1111.38	777.21
13	3.97	256.40	3.81	6302.93	1111.38	777.21
14	3.97	259.20	1.80	3083.60	543.72	380.24
14	3.97	259.20	1.80	3083.60	543.72	380.24
15	3.97	261.93	3.66	6550.55	1155.04	807.74
15	3.97	261.93	3.66	6550.55	1155.04	807.74
16	3.97	265.57	3.66	7128.51	1256.95	879.01
16	3.97	265.57	3.66	7128.51	1256.95	879.01
17	3.97	268.25	1.70	3550.30	626.01	437.79

17	3.97	268.25	1.70	3550.30	626.01	437.79
18	3.97	271.23	4.27	9880.71	1742.24	1218.38
18	3.97	271.23	4.27	9880.71	1742.24	1218.38
19	3.97	275.49	4.27	11373.49	2005.45	1402.46
19	3.97	275.49	4.27	11373.49	2005.45	1402.46
20	3.97	279.75	4.27	12866.26	2268.67	1586.53
20	3.97	279.75	4.27	12866.26	2268.67	1586.53
21	59.76	282.52	2.57	6719.92	1184.90	828.63
21	59.76	282.52	2.57	6719.92	1184.90	828.63
22	59.76	283.74	2.24	3215.93	3065.76	2143.95
22	59.76	283.74	2.24	3215.93	3065.76	2143.95
23	59.76	285.86	6.19	8515.78	8219.92	5748.37
23	59.76	285.86	6.19	8515.78	8219.92	5748.37
24	62.89	287.71	1.28	1524.72	1539.80	1076.82
24	62.89	287.71	1.28	1524.72	1539.80	1076.82
25	62.89	288.78	3.42	3883.96	3986.26	2787.68
25	62.89	288.78	3.42	3883.96	3986.26	2787.68
26	62.89	290.99	6.31	5823.33	6450.03	4510.65
26	62.89	290.99	6.31	5823.33	6450.03	4510.65
27	45.10	293.71	3.64	3936.96	4111.92	2875.56
27	45.10	293.71	3.64	3936.96	4111.92	2875.56
28	45.10	295.39	1.12	1245.27	1287.52	900.39
28	45.10	295.39	1.12	1245.27	1287.52	900.39
29	45.10	297.99	6.24	6273.68	5479.66	3832.05
29	45.10	297.99	6.24	6273.68	5479.66	3832.05
30	50.23	301.95	5.50	3308.60	3331.68	2329.92
30	50.23	301.95	5.50	3308.60	3331.68	2329.92
31	50.23	305.47	5.50	1573.69	2161.47	1511.56
31	50.23	305.47	5.50	1573.69	2161.47	1511.56
32	80.81	307.32	1.16	89.13	60.12	42.04
32	80.81	307.32	1.16	89.13	60.12	42.04

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 32 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
12	12000.0	0.0	12000.0	90.00	-0.374577E+03

Sum of the Resisting Forces = 45033.73 (lbs)

Average Available Shear Strength = 380.03(psf)

Sum of the Driving Forces = 33773.40 (lbs)

Average Mobilized Shear Stress = 285.01(psf)

Total length of the failure surface = 118.50(ft)

Factor of Safety Balance Check: FS = 1.33341

Janbu's Correction Factor (fo) = 1.0806

Janub's FS Corrected = 1.44085

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

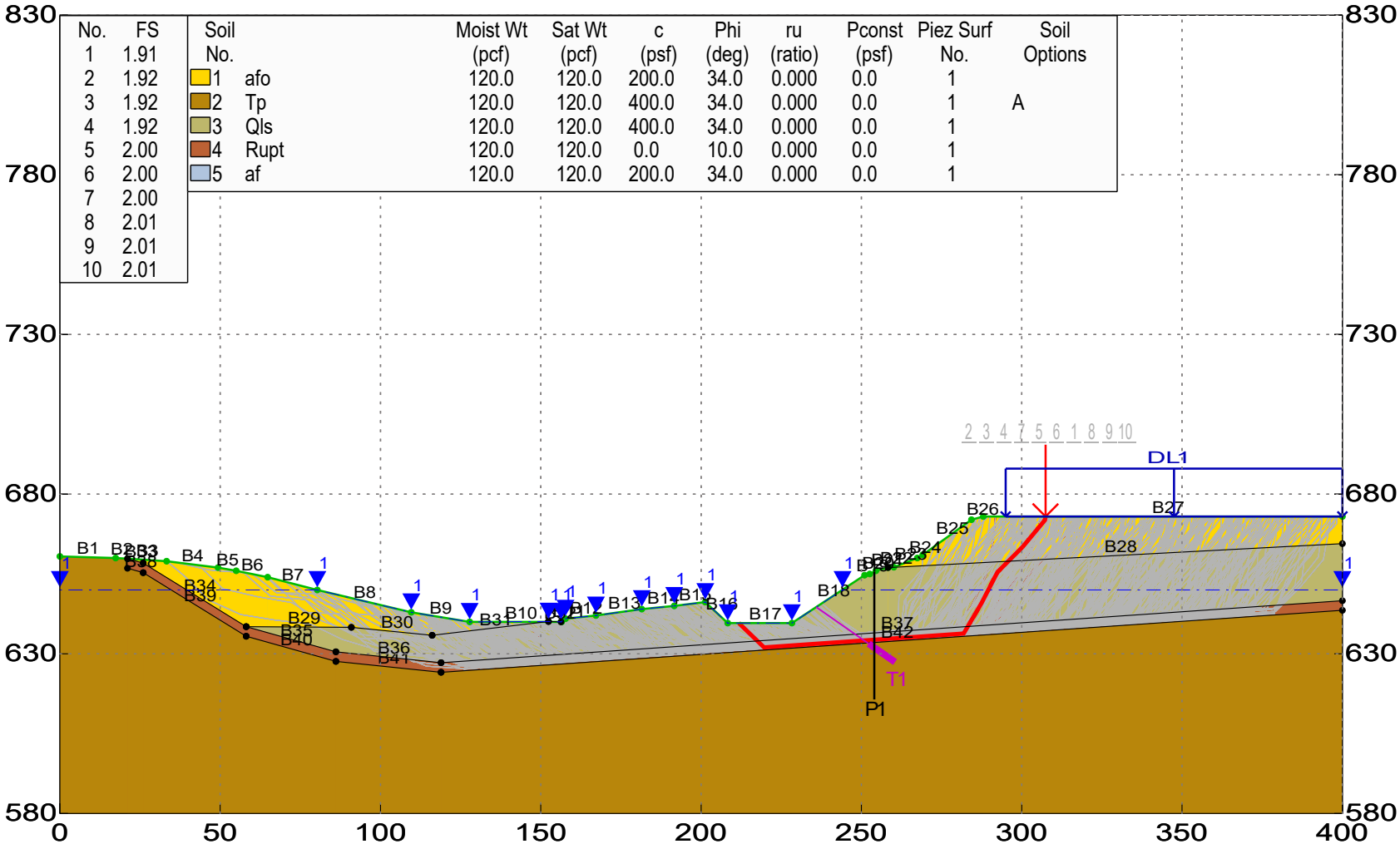
Royal Vista - Cross Section 5
Stage 4 (Temporary Staging Pad - Tieback)

LGC Geotechnical / BPP

\Sec 5 - Stage 4 (Temporary Staging Pad - Tieback).gsd

No.	FS
1	1.91
2	1.92
3	1.92
4	1.92
5	2.00
6	2.00
7	2.00
8	2.01
9	2.01
10	2.01

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.91

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5 - Stage 4 (Temporary Staging Pad - Tieback).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5 - Stage 4 (Temporary Staging Pad - Tieback).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 5

DESCRIPTION: Stage 4 (Temporary Staging Pad - Tieback)

BOUNDARY DATA

27 Surface Boundaries
42 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	660.500	17.400	660.000	2
2	17.400	660.000	21.100	659.800	2
3	21.100	659.800	33.300	659.000	1
4	33.300	659.000	49.300	657.000	1
5	49.300	657.000	55.000	656.000	1
6	55.000	656.000	64.800	654.000	1
7	64.800	654.000	80.300	650.000	1
8	80.300	650.000	109.600	643.000	1
9	109.600	643.000	127.800	640.000	1
10	127.800	640.000	156.500	640.000	1
11	156.500	640.000	157.700	641.000	3
12	157.700	641.000	167.200	642.000	3
13	167.200	642.000	181.500	644.000	3
14	181.500	644.000	191.600	645.000	3
15	191.600	645.000	201.300	646.200	3
16	201.300	646.200	208.300	639.600	3
17	208.300	639.600	228.300	639.600	3
18	228.300	639.600	251.000	654.600	3
19	251.000	654.600	252.600	655.000	3
20	252.600	655.000	254.500	656.000	3
21	254.500	656.000	258.300	657.000	3
22	258.300	657.000	260.100	657.100	1
23	260.100	657.100	267.400	660.000	1
24	267.400	660.000	269.100	661.000	1
25	269.100	661.000	284.300	672.000	1
26	284.300	672.000	288.000	673.000	1

27	288.000	673.000	400.000	673.000	1
28	258.300	657.000	400.000	664.500	3
29	58.100	638.500	90.900	638.300	3
30	90.900	638.300	116.100	635.800	3
31	116.100	635.800	152.400	640.100	3
32	152.400	640.100	156.300	640.000	3
33	21.100	659.800	26.000	658.400	4
34	26.000	658.400	58.100	638.500	4
35	58.100	638.500	86.100	630.600	4
36	86.100	630.600	118.900	627.200	4
37	118.900	627.200	400.000	646.600	4
38	21.100	656.800	26.000	655.400	2
39	26.000	655.400	58.100	635.500	2
40	58.100	635.500	86.100	627.600	2
41	86.100	627.600	118.900	624.200	2
42	118.900	624.200	400.000	643.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 580.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 15 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	650.00
2	80.30	650.00
3	109.60	643.00
4	127.80	640.00
5	152.40	640.10
6	156.30	640.00
7	157.70	641.00
8	167.20	642.00
9	181.50	644.00
10	191.60	645.00
11	201.30	646.20
12	208.30	639.60
13	228.30	639.60
14	244.10	650.00
15	400.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	27	295.000	673.000	250.000	400.000	673.000	250.000	0.00

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	235.90	644.62	90400.0	5.0	35.00	20.0	10.0

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.

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	254.00	655.74	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	125.00	626.50	250.00	635.30	3.00
2	260.00	636.00	380.00	643.90	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 = 167

Number of Trial Surfaces With Valid FS = 833

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 16.7 %

Statistical Data On All Valid FS Values:
FS Max = 9.800 FS Min = 1.911 FS Ave = 3.171
Standard Deviation = 1.013 Coefficient of Variation = 31.95 %

Critical Surface is Sequence Number 6 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	250.83	634.16

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	254.00	634.38

Factor Of Safety For The Critical or Specified Surface = 1.911

Table 1 - Geometry Data on the 32 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.90	1.40	213.20	638.20	639.60	-43.98	0.00	4.03
2	2.90	4.19	216.10	635.41	639.60	-43.98	0.00	4.03
3	2.08	6.60	218.59	633.00	639.60	-43.98	0.00	2.89
4	4.34	7.45	221.80	632.15	639.60	3.97	0.00	4.35
5	4.34	7.15	226.13	632.45	639.60	3.97	0.00	4.35
6	5.27	8.56	230.93	632.78	641.34	3.97	33.46	5.28
7	5.27	11.67	236.20	633.15	644.82	3.97	33.46	5.28
8	5.27	14.79	241.47	633.51	648.30	3.97	33.46	5.28
9	3.45	17.36	245.82	633.82	651.18	3.97	33.46	3.46
10	3.45	19.40	249.28	634.06	653.46	3.97	33.46	3.46
11	1.60	20.57	251.80	634.23	654.80	3.97	14.04	1.60
12	1.90	21.15	253.55	634.35	655.50	3.97	27.76	1.90
13	3.80	21.95	256.40	634.55	656.50	3.97	14.74	3.81
14	1.80	22.31	259.20	634.74	657.05	3.97	3.18	1.80
15	3.65	22.89	261.93	634.93	657.83	3.97	21.67	3.66
16	3.65	24.09	265.57	635.19	659.27	3.97	21.67	3.66
17	1.70	25.13	268.25	635.37	660.50	3.97	30.47	1.70
18	4.26	26.96	271.23	635.58	662.54	3.97	35.89	4.27
19	4.26	29.75	275.49	635.87	665.62	3.97	35.89	4.27
20	4.26	32.54	279.75	636.17	668.71	3.97	35.89	4.27
21	1.29	33.29	282.52	637.43	670.71	59.76	35.89	2.57
22	1.13	32.09	283.74	639.51	671.59	59.76	35.89	2.24
23	3.12	29.27	285.86	643.15	672.42	59.76	15.12	6.19
24	0.58	26.53	287.71	646.39	672.92	62.89	15.12	1.28
25	1.56	24.52	288.78	648.48	673.00	62.89	0.00	3.42
26	2.87	20.19	290.99	652.81	673.00	62.89	0.00	6.31
27	2.57	16.10	293.71	656.90	673.00	45.10	0.00	3.64
28	0.79	14.41	295.39	658.59	673.00	45.10	0.00	1.12
29	4.40	11.81	297.99	661.19	673.00	45.10	0.00	6.24
30	3.52	7.48	301.95	665.52	673.00	50.23	0.00	5.50
31	3.52	3.25	305.47	669.75	673.00	50.23	0.00	5.50
32	0.18	0.57	307.32	672.43	673.00	80.81	0.00	1.16

Table 2 - Force Data On The 32 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	486.1	0.0	351.2	0.0	0.0	0.0
2	1458.2	0.0	1053.7	0.0	0.0	0.0
3	1647.1	0.0	1190.2	0.0	0.0	0.0
4	3876.5	0.0	2020.6	0.0	0.0	0.0
5	3720.0	0.0	1939.0	0.0	0.0	0.0
6	5407.3	0.0	1965.0	0.0	0.0	0.0
7	7375.9	0.0	2677.8	0.0	0.0	0.0
8	9344.5	0.0	3390.6	0.0	0.0	0.0
9	7188.4	0.0	3492.2	0.0	0.0	0.0
10	8033.1	0.0	3440.6	0.0	0.0	0.0
11	3949.1	0.0	1578.1	0.0	0.0	0.0
12	4821.5	0.0	1859.6	0.0	0.0	0.0
13	10008.9	0.0	3672.1	0.0	0.0	0.0
14	4817.9	0.0	1717.6	0.0	0.0	0.0
15	10026.3	0.0	3439.7	0.0	0.0	0.0
16	10550.5	0.0	3381.9	0.0	0.0	0.0
17	5126.0	0.0	1555.4	0.0	0.0	0.0
18	13780.1	0.0	3841.8	0.0	0.0	0.0
19	15204.4	0.0	3763.1	0.0	0.0	0.0
20	16628.8	0.0	3684.4	0.0	0.0	0.0
21	5167.5	0.0	2015.2	0.0	0.0	0.0
22	4346.6	0.0	1467.9	0.0	0.0	0.0
23	10951.3	0.0	2646.8	0.0	0.0	0.0
24	1854.6	0.0	288.0	0.0	0.0	0.0
25	4580.5	0.0	324.1	0.0	0.0	0.0

26	6962.4	0.0	0.0	0.0	0.0	0.0
27	4964.9	0.0	0.0	0.0	0.0	0.0
28	1366.0	0.0	0.0	0.0	0.0	197.5
29	6240.2	0.0	0.0	0.0	0.0	1101.2
30	3158.8	0.0	0.0	0.0	0.0	879.5
31	1373.9	0.0	0.0	0.0	0.0	879.5
32	12.6	0.0	0.0	0.0	0.0	46.1

TOTAL WEIGHT OF SLIDING MASS = 194429.49(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 141890.18(lbs)

TOTAL AREA OF SLIDING MASS = 1620.25(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 32 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	
3	4	0.00	10.00	
4	4	0.00	10.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	3	400.00	34.00	
23	3	400.00	34.00	
24	3	400.00	34.00	
25	3	400.00	34.00	
26	3	400.00	34.00	
27	3	400.00	34.00	
28	3	400.00	34.00	
29	1	200.00	34.00	
30	1	200.00	34.00	
31	1	200.00	34.00	
32	1	200.00	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 32 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-43.98	213.20	4.03	472.95	719.01	379.02
1	-43.98	213.20	4.03	472.95	719.01	379.02
2	-43.98	216.10	4.03	727.83	890.92	469.65
2	-43.98	216.10	4.03	727.83	890.92	469.65
3	-43.98	218.59	2.89	420.39	74.13	39.08
3	-43.98	218.59	2.89	420.39	74.13	39.08

4	3.97	221.80	4.35	426.15	75.14	39.61
4	3.97	221.80	4.35	426.15	75.14	39.61
5	3.97	226.13	4.35	408.94	72.11	38.01
5	3.97	226.13	4.35	408.94	72.11	38.01
6	3.97	230.93	5.28	650.01	114.61	60.42
6	3.97	230.93	5.28	650.01	114.61	60.42
7	3.97	236.20	5.28	887.12	156.42	82.46
7	3.97	236.20	5.28	887.12	156.42	82.46
8	3.97	241.47	5.28	1124.24	198.23	104.50
8	3.97	241.47	5.28	1124.24	198.23	104.50
9	3.97	245.82	3.46	1066.40	188.04	99.12
9	3.97	245.82	3.46	1066.40	188.04	99.12
10	3.97	249.28	3.46	4309.62	759.90	400.58
10	3.97	249.28	3.46	4309.62	759.90	400.58
11	3.97	251.80	1.60	1474.06	259.92	137.01
11	3.97	251.80	1.60	1474.06	259.92	137.01
12	3.97	253.55	1.90	1550.54	273.40	144.12
12	3.97	253.55	1.90	1550.54	273.40	144.12
13	3.97	256.40	3.81	1658.41	292.42	154.15
13	3.97	256.40	3.81	1658.41	292.42	154.15
14	3.97	259.20	1.80	1712.84	302.02	159.21
14	3.97	259.20	1.80	1712.84	302.02	159.21
15	3.97	261.93	3.66	1794.39	316.40	166.79
15	3.97	261.93	3.66	1794.39	316.40	166.79
16	3.97	265.57	3.66	1952.71	344.32	181.51
16	3.97	265.57	3.66	1952.71	344.32	181.51
17	3.97	268.25	1.70	2088.09	368.19	194.09
17	3.97	268.25	1.70	2088.09	368.19	194.09
18	3.97	271.23	4.27	2319.52	408.99	215.60
18	3.97	271.23	4.27	2319.52	408.99	215.60
19	3.97	275.49	4.27	2669.95	470.78	248.17
19	3.97	275.49	4.27	2669.95	470.78	248.17
20	3.97	279.75	4.27	3020.38	532.57	280.75
20	3.97	279.75	4.27	3020.38	532.57	280.75
21	59.76	282.52	2.57	2741.06	483.32	254.78
21	59.76	282.52	2.57	2741.06	483.32	254.78
22	59.76	283.74	2.24	1696.96	1544.61	814.24
22	59.76	283.74	2.24	1696.96	1544.61	814.24
23	59.76	285.86	6.19	1630.34	1499.68	790.55
23	59.76	285.86	6.19	1630.34	1499.68	790.55
24	62.89	287.71	1.28	1441.96	1372.61	723.57
24	62.89	287.71	1.28	1441.96	1372.61	723.57
25	62.89	288.78	3.42	1378.41	1329.75	700.98
25	62.89	288.78	3.42	1378.41	1329.75	700.98
26	62.89	290.99	6.31	1135.26	1165.74	614.52
26	62.89	290.99	6.31	1135.26	1165.74	614.52
27	45.10	293.71	3.64	1232.80	1231.54	649.20
27	45.10	293.71	3.64	1232.80	1231.54	649.20
28	45.10	295.39	1.12	1267.30	1254.81	661.47
28	45.10	295.39	1.12	1267.30	1254.81	661.47
29	45.10	297.99	6.24	1123.21	957.62	504.81
29	45.10	297.99	6.24	1123.21	957.62	504.81
30	50.23	301.95	5.50	693.85	668.01	352.14
30	50.23	301.95	5.50	693.85	668.01	352.14
31	50.23	305.47	5.50	346.00	433.38	228.45
31	50.23	305.47	5.50	346.00	433.38	228.45
32	80.81	307.32	1.16	94.85	63.98	33.73
32	80.81	307.32	1.16	94.85	63.98	33.73

Table 4 - Base Force Data on the 32 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-43.98	213.20	4.03	1904.30	2895.04	1526.12
1	-43.98	213.20	4.03	1904.30	2895.04	1526.12
2	-43.98	216.10	4.03	2930.55	3587.26	1891.02
2	-43.98	216.10	4.03	2930.55	3587.26	1891.02
3	-43.98	218.59	2.89	1215.67	214.36	113.00

3	-43.98	218.59	2.89	1215.67	214.36	113.00
4	3.97	221.80	4.35	1852.36	326.62	172.18
4	3.97	221.80	4.35	1852.36	326.62	172.18
5	3.97	226.13	4.35	1777.57	313.43	165.23
5	3.97	226.13	4.35	1777.57	313.43	165.23
6	3.97	230.93	5.28	3431.59	605.08	318.97
6	3.97	230.93	5.28	3431.59	605.08	318.97
7	3.97	236.20	5.28	4683.41	825.81	435.33
7	3.97	236.20	5.28	4683.41	825.81	435.33
8	3.97	241.47	5.28	5935.24	1046.54	551.68
8	3.97	241.47	5.28	5935.24	1046.54	551.68
9	3.97	245.82	3.46	3687.92	650.28	342.79
9	3.97	245.82	3.46	3687.92	650.28	342.79
10	3.97	249.28	3.46	14903.92	2627.96	1385.33
10	3.97	249.28	3.46	14903.92	2627.96	1385.33
11	3.97	251.80	1.60	2364.16	416.87	219.75
11	3.97	251.80	1.60	2364.16	416.87	219.75
12	3.97	253.55	1.90	2953.10	520.71	274.49
12	3.97	253.55	1.90	2953.10	520.71	274.49
13	3.97	256.40	3.81	6317.08	1113.87	587.18
13	3.97	256.40	3.81	6317.08	1113.87	587.18
14	3.97	259.20	1.80	3090.52	544.94	287.27
14	3.97	259.20	1.80	3090.52	544.94	287.27
15	3.97	261.93	3.66	6565.26	1157.63	610.25
15	3.97	261.93	3.66	6565.26	1157.63	610.25
16	3.97	265.57	3.66	7144.52	1259.77	664.09
16	3.97	265.57	3.66	7144.52	1259.77	664.09
17	3.97	268.25	1.70	3558.28	627.42	330.74
17	3.97	268.25	1.70	3558.28	627.42	330.74
18	3.97	271.23	4.27	9902.90	1746.15	920.48
18	3.97	271.23	4.27	9902.90	1746.15	920.48
19	3.97	275.49	4.27	11399.03	2009.96	1059.55
19	3.97	275.49	4.27	11399.03	2009.96	1059.55
20	3.97	279.75	4.27	12895.16	2273.76	1198.61
20	3.97	279.75	4.27	12895.16	2273.76	1198.61
21	59.76	282.52	2.57	7040.83	1241.49	654.45
21	59.76	282.52	2.57	7040.83	1241.49	654.45
22	59.76	283.74	2.24	3803.67	3462.19	1825.09
22	59.76	283.74	2.24	3803.67	3462.19	1825.09
23	59.76	285.86	6.19	10091.63	9282.84	4893.44
23	59.76	285.86	6.19	10091.63	9282.84	4893.44
24	62.89	287.71	1.28	1843.40	1754.75	925.02
24	62.89	287.71	1.28	1843.40	1754.75	925.02
25	62.89	288.78	3.42	4708.96	4542.73	2394.70
25	62.89	288.78	3.42	4708.96	4542.73	2394.70
26	62.89	290.99	6.31	7158.24	7350.44	3874.78
26	62.89	290.99	6.31	7158.24	7350.44	3874.78
27	45.10	293.71	3.64	4488.67	4484.06	2363.77
27	45.10	293.71	3.64	4488.67	4484.06	2363.77
28	45.10	295.39	1.12	1418.02	1404.04	740.14
28	45.10	295.39	1.12	1418.02	1404.04	740.14
29	45.10	297.99	6.24	7008.90	5975.57	3150.02
29	45.10	297.99	6.24	7008.90	5975.57	3150.02
30	50.23	301.95	5.50	3816.16	3674.03	1936.76
30	50.23	301.95	5.50	3816.16	3674.03	1936.76
31	50.23	305.47	5.50	1902.98	2383.58	1256.50
31	50.23	305.47	5.50	1902.98	2383.58	1256.50
32	80.81	307.32	1.16	109.59	73.92	38.97
32	80.81	307.32	1.16	109.59	73.92	38.97

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 32 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
10	14810.3	10370.3	18080.0	35.00	-0.177760E+05

***Pier/Pile Slice Force Data on the 32 Slices (Only Applicable Slices Listed)

***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
12	12000.0	0.0	12000.0	90.00	-0.374577E+03

Sum of the Resisting Forces = 48366.54 (lbs)

Average Available Shear Strength = 408.16(psf)

Sum of the Driving Forces = 27342.51 (lbs)

Average Mobilized Shear Stress = 230.74(psf)

Total length of the failure surface = 118.50(ft)

Factor of Safety Balance Check: FS = 1.76891

Janbu's Correction Factor (fo) = 1.0806

Janub's FS Corrected = 1.91144

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

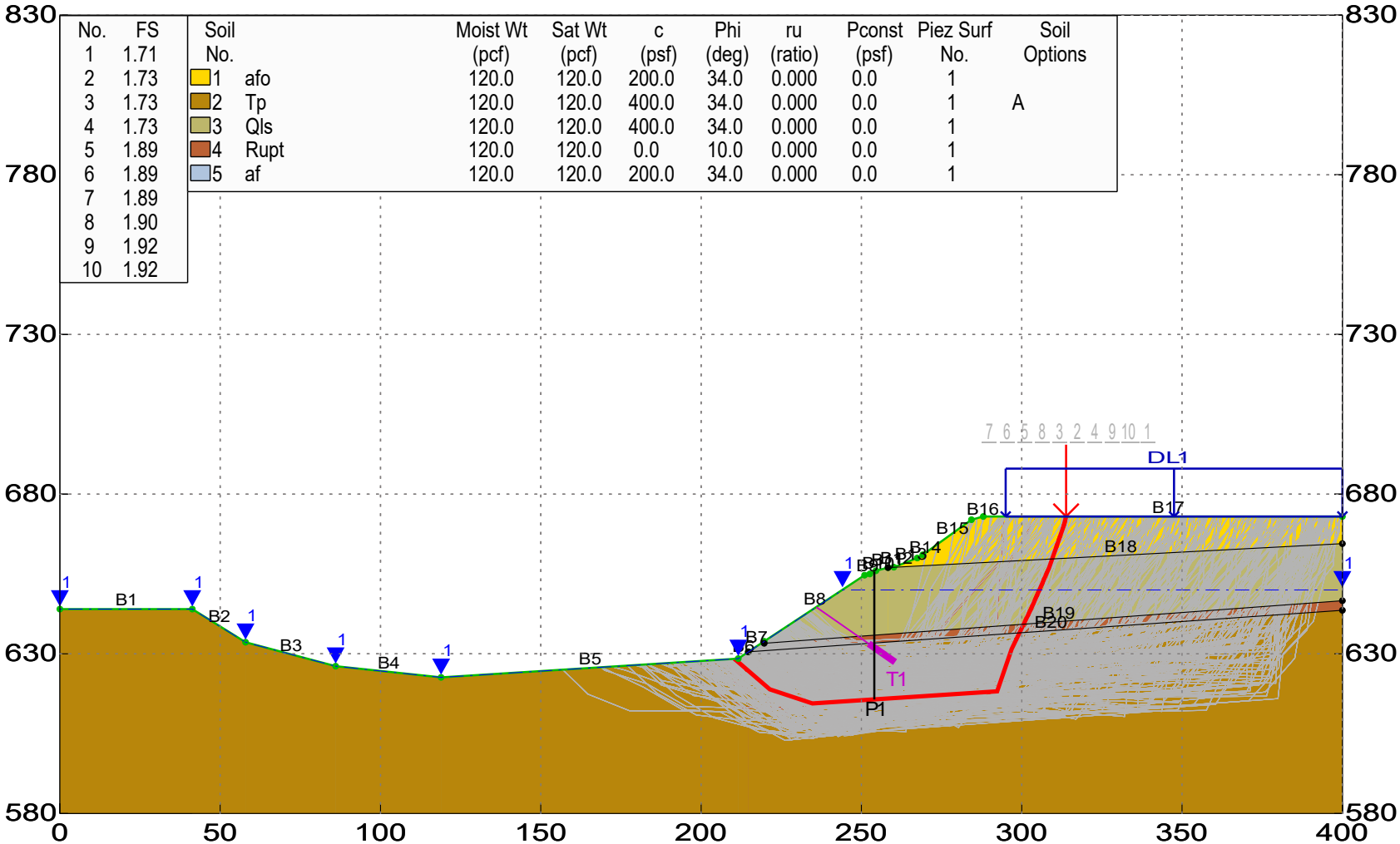
Royal Vista - Cross Section 5
Stage 5 (Temporary Backcut - Along Bedding)

LGC Geotechnical / BPP

\Sec 5- Stage 5 (Temporary Backcut - Along Bedding).gsd

No.	FS
1	1.71
2	1.73
3	1.73
4	1.73
5	1.89
6	1.89
7	1.89
8	1.90
9	1.92
10	1.92

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.71

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

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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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 5 (Temporary Backcut - Along Bedding).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 5 (Temporary Backcut - Along Bedding).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 5

DESCRIPTION: Stage 5 (Temporary Backcut - Along Bedding)

BOUNDARY DATA

17 Surface Boundaries
20 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	644.000	41.300	644.000	2
2	41.300	644.000	57.900	633.600	2
3	57.900	633.600	86.000	626.100	2
4	86.000	626.100	118.900	622.600	2
5	118.900	622.600	211.600	628.500	2
6	211.600	628.500	214.700	630.600	2
7	214.700	630.600	219.700	633.900	4
8	219.700	633.900	251.000	654.600	3
9	251.000	654.600	252.600	655.000	3
10	252.600	655.000	254.500	656.000	3
11	254.500	656.000	258.300	657.000	3
12	258.300	657.000	260.100	657.100	1
13	260.100	657.100	267.400	660.000	1
14	267.400	660.000	269.100	661.000	1
15	269.100	661.000	284.300	672.000	1
16	284.300	672.000	288.000	673.000	1
17	288.000	673.000	400.000	673.000	1
18	258.300	657.000	400.000	664.500	3
19	219.700	633.300	400.000	646.600	4
20	214.700	630.600	400.000	643.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 580.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	644.00
2	41.30	644.00
3	57.90	633.60
4	86.00	626.10
5	118.90	622.60
6	211.60	628.50
7	244.10	650.00
8	400.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress	Deflection

(psf) (deg from Vert)

1 17 295.000 673.000 250.000 400.000 673.000
250.000 0.00

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	235.90	644.61	90400.0	5.0	35.00	20.0	10.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	254.00	655.74	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 14.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	225.00	617.70	250.00	619.50	30.00
2	260.00	620.20	380.00	628.40	30.00

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 = 76

Number of Trial Surfaces With Valid FS = 924

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 7.6 %

Statistical Data On All Valid FS Values:
FS Max = 10.509 FS Min = 1.705 FS Ave = 3.764
Standard Deviation = 1.596 Coefficient of Variation = 42.41 %

Critical Surface is Sequence Number 7 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	251.27	633.85

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.

Factor Of Safety For The Critical or Specified Surface = 1.705

Table 1 - Geometry Data on the 35 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.55	0.22	210.58	628.22	628.44	-36.15	3.64	0.68
2	0.75	0.78	211.23	627.69	628.48	-40.91	3.64	0.99
3	3.10	3.52	213.15	626.03	629.55	-40.91	34.11	4.10
4	0.08	5.98	214.74	624.65	630.63	-40.91	33.42	0.11
5	4.92	9.80	217.24	622.48	632.28	-40.91	33.42	6.51
6	1.73	14.87	220.57	619.60	634.47	-40.91	33.48	2.29
7	4.43	18.39	223.65	618.12	636.51	-18.25	33.48	4.67
8	4.43	22.78	228.08	616.66	639.44	-18.25	33.48	4.67
9	4.43	27.18	232.51	615.20	642.37	-18.25	33.48	4.67
10	4.69	30.77	237.07	614.62	645.39	3.73	33.48	4.70
11	4.69	33.56	241.76	614.92	648.49	3.73	33.48	4.70
12	3.45	35.99	245.82	615.19	651.18	3.73	33.48	3.46
13	3.45	38.04	249.28	615.41	653.46	3.73	33.48	3.46
14	1.60	39.22	251.80	615.58	654.80	3.73	14.04	1.60
15	1.90	39.81	253.55	615.69	655.50	3.73	27.76	1.90
16	3.80	40.62	256.40	615.88	656.50	3.73	14.74	3.81
17	1.80	40.99	259.20	616.06	657.05	3.73	3.18	1.80
18	3.65	41.58	261.93	616.24	657.83	3.73	21.67	3.66
19	3.65	42.80	265.57	616.48	659.27	3.73	21.67	3.66
20	1.70	43.85	268.25	616.65	660.50	3.73	30.47	1.70
21	5.07	45.96	271.63	616.87	662.83	3.73	35.89	5.08
22	5.07	49.29	276.70	617.21	666.50	3.73	35.89	5.08
23	5.07	52.63	281.77	617.54	670.17	3.73	35.89	5.08
24	3.70	54.68	286.15	617.82	672.50	3.73	15.12	3.71
25	4.34	54.92	290.17	618.08	673.00	3.73	0.00	4.35

26	2.66	50.88	293.67	622.12	673.00	71.14	0.00	8.24
27	1.86	44.25	295.93	628.75	673.00	71.14	0.00	5.76
28	2.43	39.00	298.08	634.00	673.00	64.36	0.00	5.61
29	1.31	35.10	299.95	637.90	673.00	64.36	0.00	3.03
30	2.32	31.32	301.76	641.68	673.00	64.36	0.00	5.35
31	2.58	25.95	304.21	647.05	673.00	66.39	0.00	6.44
32	3.03	19.54	307.01	653.46	673.00	66.39	0.00	7.56
33	0.97	14.68	309.01	658.32	673.00	70.79	0.00	2.95
34	3.64	8.07	311.32	664.93	673.00	70.79	0.00	11.05
35	0.69	1.43	313.48	671.57	673.00	76.33	0.00	2.94

Table 2 - Force Data On The 35 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	14.2	0.0	9.1	0.0	0.0	0.0
2	70.1	0.0	48.1	0.0	0.0	0.0
3	1310.3	0.0	622.8	0.0	0.0	0.0
4	59.7	0.0	28.4	0.0	0.0	0.0
5	5779.4	0.0	2753.3	0.0	0.0	0.0
6	3091.0	0.0	1475.3	0.0	0.0	0.0
7	9780.7	0.0	3716.9	0.0	0.0	0.0
8	12116.8	0.0	4606.9	0.0	0.0	0.0
9	14452.9	0.0	5496.8	0.0	0.0	0.0
10	17303.3	0.0	6264.2	0.0	0.0	0.0
11	18874.1	0.0	6833.8	0.0	0.0	0.0
12	14898.9	0.0	7509.9	0.0	0.0	0.0
13	15750.3	0.0	7461.3	0.0	0.0	0.0
14	7530.3	0.0	3443.8	0.0	0.0	0.0
15	9075.8	0.0	4076.0	0.0	0.0	0.0
16	18522.7	0.0	8107.7	0.0	0.0	0.0
17	8853.2	0.0	3819.9	0.0	0.0	0.0
18	18213.9	0.0	7705.4	0.0	0.0	0.0
19	18744.7	0.0	7651.0	0.0	0.0	0.0
20	8944.7	0.0	3544.9	0.0	0.0	0.0
21	27943.1	0.0	10495.3	0.0	0.0	0.0
22	29971.3	0.0	10390.5	0.0	0.0	0.0
23	31999.6	0.0	10285.7	0.0	0.0	0.0
24	24277.1	0.0	7445.1	0.0	0.0	0.0
25	28576.6	0.0	8654.6	0.0	0.0	0.0
26	16261.4	0.0	14332.0	0.0	0.0	0.0
27	9889.0	0.0	7639.2	0.0	0.0	465.6
28	11365.5	0.0	5602.8	0.0	0.0	607.2
29	5525.1	0.0	2288.9	0.0	0.0	327.9
30	8707.8	0.0	2779.5	0.0	0.0	579.3
31	8038.5	0.0	1187.1	0.0	0.0	645.3
32	7096.3	0.0	0.0	0.0	0.0	756.7
33	1710.9	0.0	0.0	0.0	0.0	242.7
34	3522.3	0.0	0.0	0.0	0.0	908.9
35	119.1	0.0	0.0	0.0	0.0	173.7

TOTAL WEIGHT OF SLIDING MASS = 418390.43(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 275890.60(lbs)

TOTAL AREA OF SLIDING MASS = 3486.59(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 35 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	400.00	34.00	A
2	2	400.00	34.00	A
3	2	400.00	34.00	A
4	2	400.00	34.00	A
5	2	400.00	34.00	A

6	2	400.00	34.00	A
7	2	400.00	34.00	A
8	2	400.00	34.00	A
9	2	400.00	34.00	A
10	2	300.00	12.00	A
11	2	300.00	12.00	A
12	2	300.00	12.00	A
13	2	300.00	12.00	A
14	2	300.00	12.00	A
15	2	300.00	12.00	A
16	2	300.00	12.00	A
17	2	300.00	12.00	A
18	2	300.00	12.00	A
19	2	300.00	12.00	A
20	2	300.00	12.00	A
21	2	300.00	12.00	A
22	2	300.00	12.00	A
23	2	300.00	12.00	A
24	2	300.00	12.00	A
25	2	300.00	12.00	A
26	2	400.00	34.00	A
27	2	400.00	34.00	A
28	2	400.00	34.00	A
29	4	0.00	10.00	
30	3	400.00	34.00	
31	3	400.00	34.00	
32	3	400.00	34.00	
33	3	400.00	34.00	
34	1	200.00	34.00	
35	1	200.00	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 35 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-36.15	210.58	0.68	247.06	566.64	294.96
1	-36.15	210.58	0.68	247.06	566.64	294.96
2	-40.91	211.23	0.99	361.24	643.66	335.05
2	-40.91	211.23	0.99	361.24	643.66	335.05
3	-40.91	213.15	4.10	698.66	871.25	453.52
3	-40.91	213.15	4.10	698.66	871.25	453.52
4	-40.91	214.74	0.11	981.61	1062.10	552.87
4	-40.91	214.74	0.11	981.61	1062.10	552.87
5	-40.91	217.24	6.51	1418.43	1356.74	706.24
5	-40.91	217.24	6.51	1418.43	1356.74	706.24
6	-40.91	220.57	2.29	1999.51	1748.68	910.26
6	-40.91	220.57	2.29	1999.51	1748.68	910.26
7	-18.25	223.65	4.67	1699.43	1546.28	804.90
7	-18.25	223.65	4.67	1699.43	1546.28	804.90
8	-18.25	228.08	4.67	2084.38	1805.93	940.06
8	-18.25	228.08	4.67	2084.38	1805.93	940.06
9	-18.25	232.51	4.67	2469.34	2065.59	1075.22
9	-18.25	232.51	4.67	2469.34	2065.59	1075.22
10	3.73	237.07	4.70	2329.05	795.06	413.86
10	3.73	237.07	4.70	2329.05	795.06	413.86
11	3.73	241.76	4.70	2541.30	840.17	437.34
11	3.73	241.76	4.70	2541.30	840.17	437.34
12	3.73	245.82	3.46	2118.62	750.33	390.58
12	3.73	245.82	3.46	2118.62	750.33	390.58
13	3.73	249.28	3.46	2377.41	805.33	419.21
13	3.73	249.28	3.46	2377.41	805.33	419.21
14	3.73	251.80	1.60	8958.50	2204.19	1147.37

14	3.73	251.80	1.60	8958.50	2204.19	1147.37
15	3.73	253.55	1.90	2604.45	853.59	444.33
15	3.73	253.55	1.90	2604.45	853.59	444.33
16	3.73	256.40	3.81	2712.89	876.64	456.33
16	3.73	256.40	3.81	2712.89	876.64	456.33
17	3.73	259.20	1.80	2767.93	888.34	462.42
17	3.73	259.20	1.80	2767.93	888.34	462.42
18	3.73	261.93	3.66	2850.04	905.79	471.50
18	3.73	261.93	3.66	2850.04	905.79	471.50
19	3.73	265.57	3.66	3009.06	939.60	489.10
19	3.73	265.57	3.66	3009.06	939.60	489.10
20	3.73	268.25	1.70	3144.94	968.48	504.13
20	3.73	268.25	1.70	3144.94	968.48	504.13
21	3.73	271.63	5.08	3410.13	1024.85	533.47
21	3.73	271.63	5.08	3410.13	1024.85	533.47
22	3.73	276.70	5.08	3827.80	1113.62	579.69
22	3.73	276.70	5.08	3827.80	1113.62	579.69
23	3.73	281.77	5.08	4245.47	1202.40	625.90
23	3.73	281.77	5.08	4245.47	1202.40	625.90
24	3.73	286.15	3.71	4506.93	1257.98	654.83
24	3.73	286.15	3.71	4506.93	1257.98	654.83
25	3.73	290.17	4.35	4551.48	1267.45	659.76
25	3.73	290.17	4.35	4551.48	1267.45	659.76
26	71.14	293.67	8.24	1747.31	1578.58	821.71
26	71.14	293.67	8.24	1747.31	1578.58	821.71
27	71.14	295.93	5.76	1685.23	1536.70	799.92
27	71.14	295.93	5.76	1685.23	1536.70	799.92
28	64.36	298.08	5.61	1925.64	1698.86	884.33
28	64.36	298.08	5.61	1925.64	1698.86	884.33
29	64.36	299.95	3.03	3068.17	541.00	281.61
29	64.36	299.95	3.03	3068.17	541.00	281.61
30	64.36	301.76	5.35	1679.46	1532.81	797.89
30	64.36	301.76	5.35	1679.46	1532.81	797.89
31	66.39	304.21	6.44	1420.08	1357.85	706.82
31	66.39	304.21	6.44	1420.08	1357.85	706.82
32	66.39	307.01	7.56	1107.71	1147.16	597.14
32	66.39	307.01	7.56	1107.71	1147.16	597.14
33	70.79	309.01	2.95	649.35	838.00	436.21
33	70.79	309.01	2.95	649.35	838.00	436.21
34	70.79	311.32	11.05	426.16	487.45	253.74
34	70.79	311.32	11.05	426.16	487.45	253.74
35	76.33	313.48	2.94	163.89	110.54	57.54
35	76.33	313.48	2.94	163.89	110.54	57.54

Table 4 - Base Force Data on the 35 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-36.15	210.58	0.68	166.91	382.82	199.27
1	-36.15	210.58	0.68	166.91	382.82	199.27
2	-40.91	211.23	0.99	357.64	637.24	331.71
2	-40.91	211.23	0.99	357.64	637.24	331.71
3	-40.91	213.15	4.10	2865.89	3573.86	1860.34
3	-40.91	213.15	4.10	2865.89	3573.86	1860.34
4	-40.91	214.74	0.11	108.13	117.00	60.90
4	-40.91	214.74	0.11	108.13	117.00	60.90
5	-40.91	217.24	6.51	9228.24	8826.91	4594.77
5	-40.91	217.24	6.51	9228.24	8826.91	4594.77
6	-40.91	220.57	2.29	4582.63	4007.78	2086.21
6	-40.91	220.57	2.29	4582.63	4007.78	2086.21
7	-18.25	223.65	4.67	7930.68	7215.98	3756.21
7	-18.25	223.65	4.67	7930.68	7215.98	3756.21
8	-18.25	228.08	4.67	9727.13	8427.70	4386.96
8	-18.25	228.08	4.67	9727.13	8427.70	4386.96
9	-18.25	232.51	4.67	11523.58	9639.42	5017.71
9	-18.25	232.51	4.67	11523.58	9639.42	5017.71
10	3.73	237.07	4.70	10937.77	3733.76	1943.58
10	3.73	237.07	4.70	10937.77	3733.76	1943.58

11	3.73	241.76	4.70	11934.54	3945.63	2053.86
11	3.73	241.76	4.70	11934.54	3945.63	2053.86
12	3.73	245.82	3.46	7324.80	2594.14	1350.36
12	3.73	245.82	3.46	7324.80	2594.14	1350.36
13	3.73	249.28	3.46	8219.53	2784.32	1449.35
13	3.73	249.28	3.46	8219.53	2784.32	1449.35
14	3.73	251.80	1.60	14364.09	3534.20	1839.70
14	3.73	251.80	1.60	14364.09	3534.20	1839.70
15	3.73	253.55	1.90	4958.99	1625.28	846.02
15	3.73	253.55	1.90	4958.99	1625.28	846.02
16	3.73	256.40	3.81	10330.91	3338.33	1737.74
16	3.73	256.40	3.81	10330.91	3338.33	1737.74
17	3.73	259.20	1.80	4992.87	1602.42	834.12
17	3.73	259.20	1.80	4992.87	1602.42	834.12
18	3.73	261.93	3.66	10424.77	3313.18	1724.65
18	3.73	261.93	3.66	10424.77	3313.18	1724.65
19	3.73	265.57	3.66	11006.45	3436.82	1789.01
19	3.73	265.57	3.66	11006.45	3436.82	1789.01
20	3.73	268.25	1.70	5357.77	1649.91	858.85
20	3.73	268.25	1.70	5357.77	1649.91	858.85
21	3.73	271.63	5.08	17314.77	5203.60	2708.69
21	3.73	271.63	5.08	17314.77	5203.60	2708.69
22	3.73	276.70	5.08	19435.46	5654.37	2943.33
22	3.73	276.70	5.08	19435.46	5654.37	2943.33
23	3.73	281.77	5.08	21556.14	6105.13	3177.97
23	3.73	281.77	5.08	21556.14	6105.13	3177.97
24	3.73	286.15	3.71	16711.14	4664.42	2428.02
24	3.73	286.15	3.71	16711.14	4664.42	2428.02
25	3.73	290.17	4.35	19779.13	5507.88	2867.08
25	3.73	290.17	4.35	19779.13	5507.88	2867.08
26	71.14	293.67	8.24	14396.78	13006.51	6770.42
26	71.14	293.67	8.24	14396.78	13006.51	6770.42
27	71.14	295.93	5.76	9707.94	8852.34	4608.01
27	71.14	295.93	5.76	9707.94	8852.34	4608.01
28	64.36	298.08	5.61	10809.17	9536.20	4963.98
28	64.36	298.08	5.61	10809.17	9536.20	4963.98
29	64.36	299.95	3.03	9301.94	1640.18	853.78
29	64.36	299.95	3.03	9301.94	1640.18	853.78
30	64.36	301.76	5.35	8993.41	8208.11	4272.66
30	64.36	301.76	5.35	8993.41	8208.11	4272.66
31	66.39	304.21	6.44	9150.89	8749.94	4554.70
31	66.39	304.21	6.44	9150.89	8749.94	4554.70
32	66.39	307.01	7.56	8369.93	8668.01	4512.05
32	66.39	307.01	7.56	8369.93	8668.01	4512.05
33	70.79	309.01	2.95	1916.14	2472.78	1287.18
33	70.79	309.01	2.95	1916.14	2472.78	1287.18
34	70.79	311.32	11.05	4708.67	5385.87	2803.57
34	70.79	311.32	11.05	4708.67	5385.87	2803.57
35	76.33	313.48	2.94	481.76	324.95	169.15
35	76.33	313.48	2.94	481.76	324.95	169.15

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 35 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 35 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
11	12000.0	0.0	12000.0	90.00	0.335021E+03

Sum of the Resisting Forces = 120952.53 (lbs)

Average Available Shear Strength = 832.17(psf)

Sum of the Driving Forces = 68572.59 (lbs)

Average Mobilized Shear Stress = 471.79(psf)

Total length of the failure surface = 145.35(ft)

Factor of Safety Balance Check: FS = 1.76386

Janbu's Correction Factor (fo) = 0.9669

Janub's FS Corrected = 1.70547

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

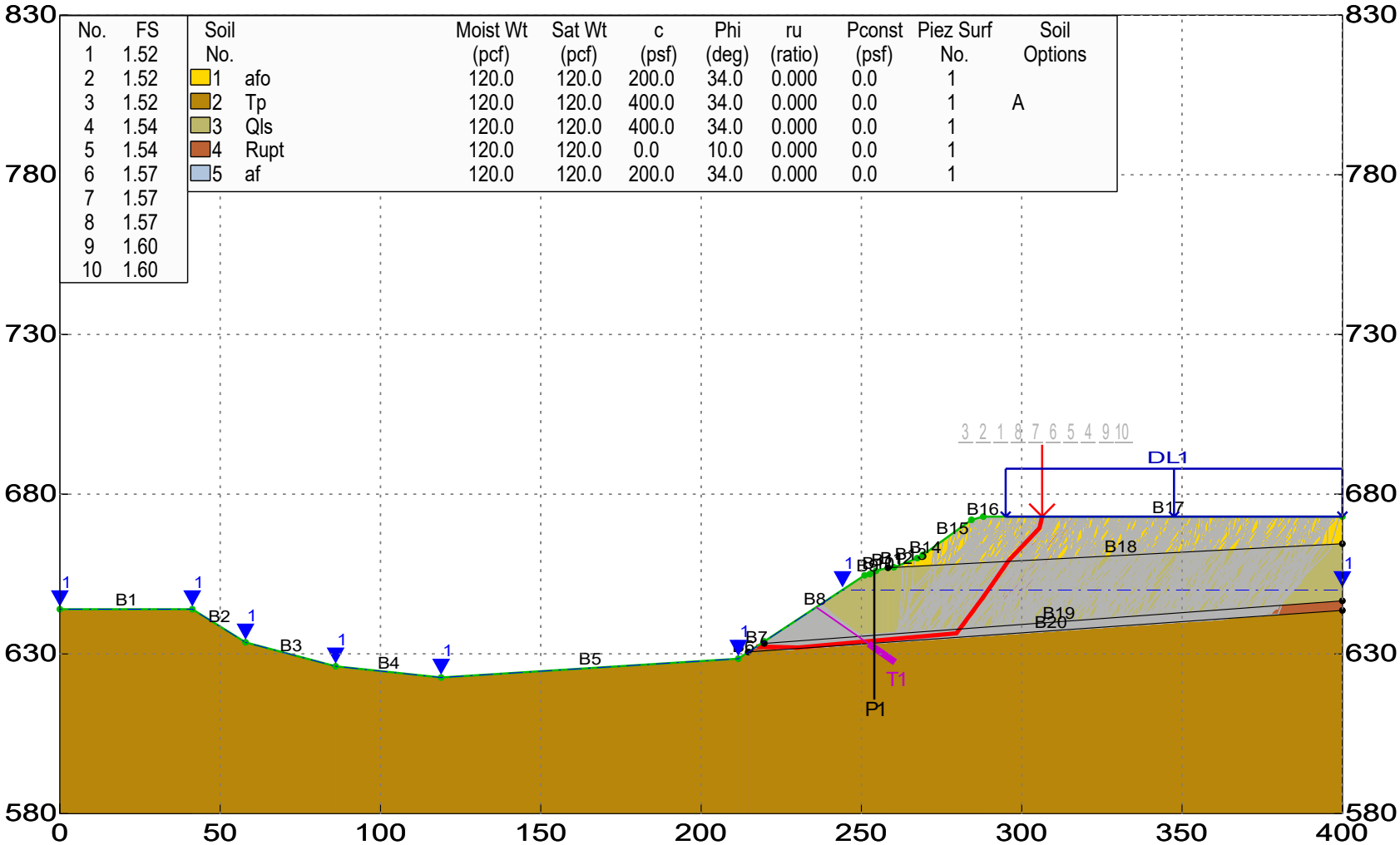
Royal Vista - Cross Section 5
Stage 5 (Temporary Backcut - Rupture)

LGC Geotechnical / BPP

\Sec 5- Stage 5 (Temporary Backcut - Rupture).gsd

No.	FS
1	1.52
2	1.52
3	1.52
4	1.54
5	1.54
6	1.57
7	1.57
8	1.57
9	1.60
10	1.60

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.52

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 5 (Temporary Backcut - Rupture).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 5 (Temporary Backcut - Rupture).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 5

DESCRIPTION: Stage 5 (Temporary Backcut - Rupture)

BOUNDARY DATA

17 Surface Boundaries
20 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	644.000	41.300	644.000	2
2	41.300	644.000	57.900	633.600	2
3	57.900	633.600	86.000	626.100	2
4	86.000	626.100	118.900	622.600	2
5	118.900	622.600	211.600	628.500	2
6	211.600	628.500	214.700	630.600	2
7	214.700	630.600	219.700	633.900	4
8	219.700	633.900	251.000	654.600	3
9	251.000	654.600	252.600	655.000	3
10	252.600	655.000	254.500	656.000	3
11	254.500	656.000	258.300	657.000	3
12	258.300	657.000	260.100	657.100	1
13	260.100	657.100	267.400	660.000	1
14	267.400	660.000	269.100	661.000	1
15	269.100	661.000	284.300	672.000	1
16	284.300	672.000	288.000	673.000	1
17	288.000	673.000	400.000	673.000	1
18	258.300	657.000	400.000	664.500	3
19	219.700	633.300	400.000	646.600	4
20	214.700	630.600	400.000	643.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 580.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	644.00
2	41.30	644.00
3	57.90	633.60
4	86.00	626.10
5	118.90	622.60
6	211.60	628.50
7	244.10	650.00
8	400.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress	Deflection

(psf) (deg from Vert)

1 17 295.000 673.000 250.000 400.000 673.000
250.000 0.00

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	235.90	644.61	90400.0	5.0	35.00	20.0	10.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	254.00	655.74	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 14.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	225.00	632.70	250.00	634.50	3.00
2	260.00	635.20	380.00	643.40	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 = 206

Number of Trial Surfaces With Valid FS = 794

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 20.6 %

Statistical Data On All Valid FS Values:
FS Max = 8.786 FS Min = 1.515 FS Ave = 2.593
Standard Deviation = 0.834 Coefficient of Variation = 32.15 %

Critical Surface is Sequence Number 93 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	251.23	633.88

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	254.00	634.13

Factor Of Safety For The Critical or Specified Surface = 1.515

Table 1 - Geometry Data on the 30 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.07	0.02	217.32	632.31	632.33	-1.44	33.42	0.07
2	2.35	0.85	218.53	632.28	633.13	-1.44	33.42	2.35
3	5.26	3.46	222.33	632.18	635.64	-1.44	33.48	5.26
4	5.26	7.07	227.59	632.05	639.12	-1.44	33.48	5.26
5	4.63	10.20	232.54	632.19	642.39	5.16	33.48	4.64
6	4.63	12.84	237.16	632.61	645.45	5.16	33.48	4.64
7	4.63	15.48	241.79	633.03	648.51	5.16	33.48	4.64
8	3.45	17.79	245.82	633.39	651.18	5.16	33.48	3.46
9	3.45	19.76	249.28	633.70	653.46	5.16	33.48	3.46
10	1.60	20.87	251.80	633.93	654.80	5.16	14.04	1.61
11	1.90	21.41	253.55	634.09	655.50	5.16	27.76	1.91
12	3.80	22.15	256.40	634.35	656.50	5.16	14.74	3.82
13	1.80	22.45	259.20	634.60	657.05	5.16	3.18	1.81
14	3.65	22.98	261.93	634.85	657.83	5.16	21.67	3.66
15	3.65	24.10	265.57	635.18	659.27	5.16	21.67	3.66
16	1.70	25.08	268.25	635.42	660.50	5.16	30.47	1.71
17	5.26	27.17	271.73	635.73	662.90	5.16	35.89	5.28
18	5.26	30.50	276.99	636.21	666.71	5.16	35.89	5.28
19	1.00	31.86	280.12	637.12	668.98	53.55	35.89	1.68
20	3.68	30.38	282.46	640.29	670.67	53.55	35.89	6.20
21	3.64	27.25	286.12	645.24	672.49	53.55	15.12	6.12
22	0.06	25.24	287.97	647.75	672.99	55.29	15.12	0.11
23	1.53	24.10	288.76	648.90	673.00	55.29	0.00	2.68
24	2.74	21.03	290.90	651.97	673.00	55.29	0.00	4.80

25	2.74	17.08	293.63	655.92	673.00	55.29	0.00	4.80
26	0.75	14.56	295.38	658.44	673.00	55.29	0.00	1.32
27	0.16	13.90	295.83	659.10	673.00	55.29	0.00	0.28
28	4.81	11.24	298.31	661.76	673.00	46.65	0.00	7.00
29	4.81	6.15	303.12	666.85	673.00	46.65	0.00	7.00
30	0.82	1.80	305.93	671.20	673.00	77.12	0.00	3.70

Table 2 - Force Data On The 30 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	0.2	0.0	0.0	0.0	0.0	0.0
2	238.9	0.0	82.0	0.0	0.0	0.0
3	2183.4	0.0	780.6	0.0	0.0	0.0
4	4463.7	0.0	1605.9	0.0	0.0	0.0
5	5659.7	0.0	2047.6	0.0	0.0	0.0
6	7126.0	0.0	2580.3	0.0	0.0	0.0
7	8592.3	0.0	3113.0	0.0	0.0	0.0
8	7363.1	0.0	3589.8	0.0	0.0	0.0
9	8178.8	0.0	3522.5	0.0	0.0	0.0
10	4006.7	0.0	1610.8	0.0	0.0	0.0
11	4881.6	0.0	1894.0	0.0	0.0	0.0
12	10101.8	0.0	3726.8	0.0	0.0	0.0
13	4849.3	0.0	1736.8	0.0	0.0	0.0
14	10064.9	0.0	3465.6	0.0	0.0	0.0
15	10555.7	0.0	3390.2	0.0	0.0	0.0
16	5117.0	0.0	1553.3	0.0	0.0	0.0
17	17154.0	0.0	4703.2	0.0	0.0	0.0
18	19257.6	0.0	4546.7	0.0	0.0	0.0
19	3812.9	0.0	1349.5	0.0	0.0	0.0
20	13420.5	0.0	3755.9	0.0	0.0	0.0
21	11898.4	0.0	1818.7	0.0	0.0	0.0
22	185.9	0.0	15.1	0.0	0.0	0.0
23	4420.5	0.0	184.8	0.0	0.0	0.0
24	6902.6	0.0	0.0	0.0	0.0	0.0
25	5605.9	0.0	0.0	0.0	0.0	0.0
26	1310.4	0.0	0.0	0.0	0.0	187.5
27	267.5	0.0	0.0	0.0	0.0	40.1
28	6482.3	0.0	0.0	0.0	0.0	1201.3
29	3547.1	0.0	0.0	0.0	0.0	1201.3
30	178.4	0.0	0.0	0.0	0.0	206.1

TOTAL WEIGHT OF SLIDING MASS = 187826.91(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 139819.18(lbs)

TOTAL AREA OF SLIDING MASS = 1565.22(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 30 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	4	0.00	10.00	
2	4	0.00	10.00	
3	4	0.00	10.00	
4	4	0.00	10.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	

15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	3	400.00	34.00
21	3	400.00	34.00
22	3	400.00	34.00
23	3	400.00	34.00
24	3	400.00	34.00
25	3	400.00	34.00
26	3	400.00	34.00
27	1	200.00	34.00
28	1	200.00	34.00
29	1	200.00	34.00
30	1	200.00	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 30 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-1.44	217.32	0.07	2.72	0.48	0.32
1	-1.44	217.32	0.07	2.72	0.48	0.32
2	-1.44	218.53	2.35	67.10	11.83	7.88
2	-1.44	218.53	2.35	67.10	11.83	7.88
3	-1.44	222.33	5.26	267.49	47.17	31.40
3	-1.44	222.33	5.26	267.49	47.17	31.40
4	-1.44	227.59	5.26	544.95	96.09	63.96
4	-1.44	227.59	5.26	544.95	96.09	63.96
5	5.16	232.54	4.64	773.93	136.46	90.84
5	5.16	232.54	4.64	773.93	136.46	90.84
6	5.16	237.16	4.64	973.96	171.74	114.32
6	5.16	237.16	4.64	973.96	171.74	114.32
7	5.16	241.79	4.64	1173.99	207.01	137.80
7	5.16	241.79	4.64	1173.99	207.01	137.80
8	5.16	245.82	3.46	1085.63	191.43	127.42
8	5.16	245.82	3.46	1085.63	191.43	127.42
9	5.16	249.28	3.46	1338.63	236.04	157.12
9	5.16	249.28	3.46	1338.63	236.04	157.12
10	5.16	251.80	1.61	7893.68	1391.87	926.51
10	5.16	251.80	1.61	7893.68	1391.87	926.51
11	5.16	253.55	1.91	1558.81	274.86	182.96
11	5.16	253.55	1.91	1558.81	274.86	182.96
12	5.16	256.40	3.82	1662.81	293.20	195.17
12	5.16	256.40	3.82	1662.81	293.20	195.17
13	5.16	259.20	1.81	1713.68	302.17	201.14
13	5.16	259.20	1.81	1713.68	302.17	201.14
14	5.16	261.93	3.66	1791.63	315.91	210.29
14	5.16	261.93	3.66	1791.63	315.91	210.29
15	5.16	265.57	3.66	1944.91	342.94	228.28
15	5.16	265.57	3.66	1944.91	342.94	228.28
16	5.16	268.25	1.71	2076.52	366.15	243.73
16	5.16	268.25	1.71	2076.52	366.15	243.73
17	5.16	271.73	5.28	2343.82	413.28	275.10
17	5.16	271.73	5.28	2343.82	413.28	275.10
18	5.16	276.99	5.28	2768.52	488.17	324.95
18	5.16	276.99	5.28	2768.52	488.17	324.95
19	53.55	280.12	1.68	2581.14	455.12	302.96
19	53.55	280.12	1.68	2581.14	455.12	302.96
20	53.55	282.46	6.20	1610.07	1486.00	989.17
20	53.55	282.46	6.20	1610.07	1486.00	989.17
21	53.55	286.12	6.12	1569.67	1458.76	971.04

21	53.55	286.12	6.12	1569.67	1458.76	971.04
22	55.29	287.97	0.11	1464.85	1388.05	923.97
22	55.29	287.97	0.11	1464.85	1388.05	923.97
23	55.29	288.76	2.68	1426.37	1362.10	906.69
23	55.29	288.76	2.68	1426.37	1362.10	906.69
24	55.29	290.90	4.80	1248.74	1242.29	826.94
24	55.29	290.90	4.80	1248.74	1242.29	826.94
25	55.29	293.63	4.80	968.60	1053.33	701.16
25	55.29	293.63	4.80	968.60	1053.33	701.16
26	55.29	295.38	1.32	937.90	1032.62	687.37
26	55.29	295.38	1.32	937.90	1032.62	687.37
27	55.29	295.83	0.28	1012.54	882.97	587.76
27	55.29	295.83	0.28	1012.54	882.97	587.76
28	46.65	298.31	7.00	960.74	848.03	564.50
28	46.65	298.31	7.00	960.74	848.03	564.50
29	46.65	303.12	7.00	555.60	574.76	382.59
29	46.65	303.12	7.00	555.60	574.76	382.59
30	77.12	305.93	3.70	150.61	101.59	67.62
30	77.12	305.93	3.70	150.61	101.59	67.62

Table 4 - Base Force Data on the 30 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-1.44	217.32	0.07	0.18	0.03	0.02
1	-1.44	217.32	0.07	0.18	0.03	0.02
2	-1.44	218.53	2.35	157.45	27.76	18.48
2	-1.44	218.53	2.35	157.45	27.76	18.48
3	-1.44	222.33	5.26	1407.87	248.25	165.25
3	-1.44	222.33	5.26	1407.87	248.25	165.25
4	-1.44	227.59	5.26	2868.20	505.74	336.65
4	-1.44	227.59	5.26	2868.20	505.74	336.65
5	5.16	232.54	4.64	3594.47	633.80	421.90
5	5.16	232.54	4.64	3594.47	633.80	421.90
6	5.16	237.16	4.64	4523.50	797.61	530.94
6	5.16	237.16	4.64	4523.50	797.61	530.94
7	5.16	241.79	4.64	5452.52	961.43	639.98
7	5.16	241.79	4.64	5452.52	961.43	639.98
8	5.16	245.82	3.46	3760.67	663.11	441.40
8	5.16	245.82	3.46	3760.67	663.11	441.40
9	5.16	249.28	3.46	4637.05	817.64	544.27
9	5.16	249.28	3.46	4637.05	817.64	544.27
10	5.16	251.80	1.61	12681.24	2236.04	1488.44
10	5.16	251.80	1.61	12681.24	2236.04	1488.44
11	5.16	253.55	1.91	2973.78	524.36	349.04
11	5.16	253.55	1.91	2973.78	524.36	349.04
12	5.16	256.40	3.82	6344.38	1118.69	744.66
12	5.16	256.40	3.82	6344.38	1118.69	744.66
13	5.16	259.20	1.81	3097.16	546.11	363.53
13	5.16	259.20	1.81	3097.16	546.11	363.53
14	5.16	261.93	3.66	6566.03	1157.77	770.68
14	5.16	261.93	3.66	6566.03	1157.77	770.68
15	5.16	265.57	3.66	7127.80	1256.82	836.62
15	5.16	265.57	3.66	7127.80	1256.82	836.62
16	5.16	268.25	1.71	3544.43	624.98	416.02
16	5.16	268.25	1.71	3544.43	624.98	416.02
17	5.16	271.73	5.28	12380.51	2183.02	1453.15
17	5.16	271.73	5.28	12380.51	2183.02	1453.15
18	5.16	276.99	5.28	14623.86	2578.58	1716.46
18	5.16	276.99	5.28	14623.86	2578.58	1716.46
19	53.55	280.12	1.68	4333.51	764.11	508.64
19	53.55	280.12	1.68	4333.51	764.11	508.64
20	53.55	282.46	6.20	9976.33	9207.61	6129.14
20	53.55	282.46	6.20	9976.33	9207.61	6129.14
21	53.55	286.12	6.12	9614.05	8934.70	5947.47
21	53.55	286.12	6.12	9614.05	8934.70	5947.47
22	55.29	287.97	0.11	157.88	149.61	99.59
22	55.29	287.97	0.11	157.88	149.61	99.59

23	55.29	288.76	2.68	3828.48	3655.97	2433.63
23	55.29	288.76	2.68	3828.48	3655.97	2433.63
24	55.29	290.90	4.80	5999.79	5968.78	3973.17
24	55.29	290.90	4.80	5999.79	5968.78	3973.17
25	55.29	293.63	4.80	4653.81	5060.90	3368.84
25	55.29	293.63	4.80	4653.81	5060.90	3368.84
26	55.29	295.38	1.32	1235.39	1360.16	905.40
26	55.29	295.38	1.32	1235.39	1360.16	905.40
27	55.29	295.83	0.28	285.16	248.67	165.53
27	55.29	295.83	0.28	285.16	248.67	165.53
28	46.65	298.31	7.00	6725.17	5936.19	3951.48
28	46.65	298.31	7.00	6725.17	5936.19	3951.48
29	46.65	303.12	7.00	3889.19	4023.29	2678.14
29	46.65	303.12	7.00	3889.19	4023.29	2678.14
30	77.12	305.93	3.70	557.15	375.81	250.16
30	77.12	305.93	3.70	557.15	375.81	250.16

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 30 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
10	14810.3	10370.3	18080.0	35.00	0.668273E+04

***Pier/Pile Slice Force Data on the 30 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
11	12000.0	0.0	12000.0	90.00	-0.487477E+03

Sum of the Resisting Forces = 44332.32 (lbs)

Average Available Shear Strength = 409.58(psf)

Sum of the Driving Forces = 31480.25 (lbs)

Average Mobilized Shear Stress = 290.84(psf)

Total length of the failure surface = 108.24(ft)

Factor of Safety Balance Check: FS = 1.40826

Janbu's Correction Factor (fo) = 1.0759

Janub's FS Corrected = 1.51511

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

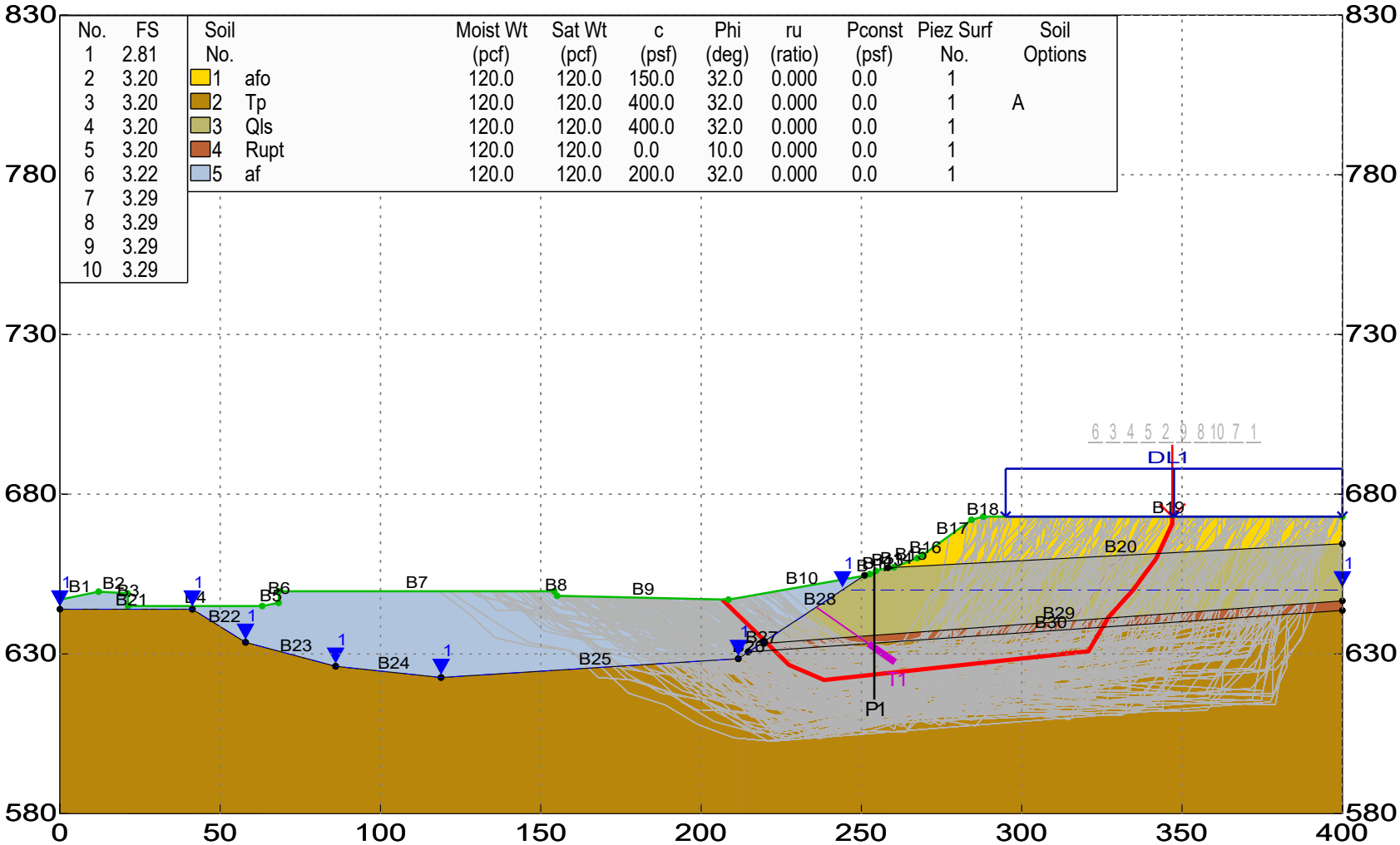
Royal Vista - Cross Section 5
Stage 6 (Final Condition - Along Bedding (Static))

LGC Geotechnical / BPP

\Sec 5- Stage 6 (Final Condition - Along Bedding (Static)).gsd

No.	FS
1	2.81
2	3.20
3	3.20
4	3.20
5	3.20
6	3.22
7	3.29
8	3.29
9	3.29
10	3.29

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 2.81

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 6 (Final Condition - Along Bedding (Static)).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 6 (Final Condition - Along Bedding (Static)).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 5

DESCRIPTION: Stage 6 (Final Condition - Along Bedding (Static))

BOUNDARY DATA

19 Surface Boundaries
30 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.000	12.100	649.500	5
2	12.100	649.500	21.100	649.000	5
3	21.100	649.000	21.300	645.000	5
4	21.300	645.000	63.100	645.000	5
5	63.100	645.000	68.200	646.000	5
6	68.200	646.000	68.300	649.600	5
7	68.300	649.600	154.200	649.600	5
8	154.200	649.600	155.100	648.200	5
9	155.100	648.200	208.500	647.000	5
10	208.500	647.000	251.000	654.500	5
11	251.000	654.500	252.600	655.000	3
12	252.600	655.000	254.500	656.000	3
13	254.500	656.000	258.300	657.000	3
14	258.300	657.000	260.100	657.100	1
15	260.100	657.100	267.400	660.000	1
16	267.400	660.000	269.100	661.000	1
17	269.100	661.000	284.300	672.000	1
18	284.300	672.000	288.000	673.000	1
19	288.000	673.000	400.000	673.000	1
20	258.300	657.000	400.000	664.500	3
21	0.000	644.000	41.300	644.000	2
22	41.300	644.000	57.900	633.600	2
23	57.900	633.600	86.000	626.100	2
24	86.000	626.100	118.900	622.600	2
25	118.900	622.600	211.600	628.500	2
26	211.600	628.500	214.700	630.600	2

27	214.700	630.600	219.700	633.900	4
28	219.700	633.900	251.000	654.600	3
29	219.700	633.300	400.000	646.600	4
30	214.700	630.600	400.000	643.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 580.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	32.00
2	7.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	644.00
2	41.30	644.00
3	57.90	633.60
4	86.00	626.10
5	118.90	622.60
6	211.60	628.50
7	244.10	650.00
8	400.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	19	295.000	673.000	250.000	400.000	673.000	250.000	0.00

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	235.90	644.61	90400.0	5.0	35.00	20.0	10.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	254.00	655.74	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 12.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	220.00	617.10	250.00	619.50	30.00
2	260.00	620.20	380.00	628.40	30.00

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 = 161

Number of Trial Surfaces With Valid FS = 839

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 16.1 %

Statistical Data On All Valid FS Values:
FS Max = 15.611 FS Min = 2.808 FS Ave = 5.912
Standard Deviation = 1.764 Coefficient of Variation = 29.84 %

Critical Surface is Sequence Number 112 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	251.86	633.44

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	254.00	623.54

Factor Of Safety For The Critical or Specified Surface = 2.808

Table 1 - Geometry Data on the 44 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	1.89	0.92	207.55	646.10	647.02	-44.75	-1.29	2.67
2	1.75	2.86	209.38	644.30	647.15	-44.75	10.01	2.47
3	4.31	6.35	212.41	641.34	647.69	-44.09	10.01	6.00
4	4.31	11.29	216.72	637.16	648.45	-44.09	10.01	6.00
5	1.04	14.36	219.39	634.56	648.92	-45.00	10.01	1.47
6	0.02	14.99	219.92	634.03	649.02	-45.00	10.01	0.04
7	0.65	15.39	220.26	633.69	649.08	-45.00	10.01	0.92
8	2.20	17.06	221.68	632.27	649.33	-45.00	10.01	3.11
9	4.58	21.04	225.07	628.88	649.92	-45.00	10.01	6.47
10	5.51	25.41	230.11	625.40	650.81	-23.35	10.01	6.00
11	5.51	28.76	235.62	623.02	651.79	-23.35	10.01	6.00
12	2.86	30.53	239.81	621.99	652.52	6.23	10.01	2.88
13	2.86	30.73	242.67	622.30	653.03	6.23	10.01	2.88
14	3.45	30.94	245.82	622.65	653.59	6.23	10.01	3.47

15	3.45	31.17	249.28	623.02	654.20	6.23	10.01	3.47
16	1.60	31.45	251.80	623.30	654.75	6.23	17.35	1.61
17	1.90	32.01	253.55	623.49	655.50	6.23	27.76	1.91
18	3.80	32.70	256.40	623.80	656.50	6.23	14.74	3.82
19	1.80	32.94	259.20	624.11	657.05	6.23	3.18	1.81
20	3.65	33.42	261.93	624.40	657.83	6.23	21.67	3.67
21	3.65	34.47	265.57	624.80	659.27	6.23	21.67	3.67
22	1.70	35.41	268.25	625.09	660.50	6.23	30.47	1.71
23	5.07	37.37	271.63	625.46	662.83	6.23	35.89	5.10
24	5.07	40.48	276.70	626.02	666.50	6.23	35.89	5.10
25	5.07	43.60	281.77	626.57	670.17	6.23	35.89	5.10
26	3.70	45.45	286.15	627.05	672.50	6.23	15.12	3.72
27	3.50	45.56	289.75	627.44	673.00	6.23	0.00	3.52
28	3.50	45.18	293.25	627.82	673.00	6.23	0.00	3.52
29	5.16	44.71	297.58	628.29	673.00	6.23	0.00	5.19
30	5.16	44.14	302.74	628.86	673.00	6.23	0.00	5.19
31	5.16	43.58	307.89	629.42	673.00	6.23	0.00	5.19
32	5.16	43.02	313.05	629.98	673.00	6.23	0.00	5.19
33	5.16	42.45	318.21	630.55	673.00	6.23	0.00	5.19
34	4.40	38.41	322.98	634.59	673.00	59.70	0.00	8.72
35	1.66	33.23	326.01	639.77	673.00	59.70	0.00	3.28
36	0.02	31.80	326.85	641.20	673.00	48.12	0.00	0.02
37	3.94	29.60	328.83	643.40	673.00	48.12	0.00	5.91
38	3.94	25.20	332.77	647.80	673.00	48.12	0.00	5.91
39	0.11	22.94	334.80	650.06	673.00	48.12	0.00	0.16
40	3.52	20.45	336.61	652.55	673.00	54.11	0.00	6.00
41	3.52	15.59	340.13	657.41	673.00	54.11	0.00	6.00
42	0.76	12.35	342.26	660.65	673.00	65.02	0.00	1.79
43	4.31	6.91	344.80	666.09	673.00	65.02	0.00	10.21
44	0.01	1.14	346.96	671.86	673.00	89.67	0.00	2.28

Table 2 - Force Data On The 44 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	208.7	0.0	0.0	0.0	0.0	0.0
2	601.6	0.0	0.0	0.0	0.0	0.0
3	3284.3	0.0	0.0	0.0	0.0	0.0
4	5836.5	0.0	0.0	0.0	0.0	0.0
5	1789.0	0.0	0.0	0.0	0.0	0.0
6	44.9	0.0	0.0	0.0	0.0	0.0
7	1198.0	0.0	21.5	0.0	0.0	0.0
8	4500.5	0.0	391.9	0.0	0.0	0.0
9	11554.7	0.0	2396.1	0.0	0.0	0.0
10	16797.1	0.0	3996.0	0.0	0.0	0.0
11	19011.9	0.0	5564.4	0.0	0.0	0.0
12	10489.0	0.0	3145.8	0.0	0.0	0.0
13	10555.2	0.0	3343.5	0.0	0.0	0.0
14	12808.8	0.0	5923.4	0.0	0.0	0.0
15	12905.0	0.0	5841.8	0.0	0.0	0.0
16	6038.5	0.0	2681.6	0.0	0.0	0.0
17	7298.2	0.0	3161.6	0.0	0.0	0.0
18	14910.5	0.0	6249.1	0.0	0.0	0.0
19	7115.7	0.0	2925.6	0.0	0.0	0.0
20	14638.3	0.0	5864.3	0.0	0.0	0.0
21	15098.9	0.0	5773.0	0.0	0.0	0.0
22	7222.7	0.0	2657.7	0.0	0.0	0.0
23	22720.8	0.0	7803.5	0.0	0.0	0.0
24	24614.0	0.0	7627.7	0.0	0.0	0.0
25	26507.3	0.0	7451.8	0.0	0.0	0.0
26	20180.9	0.0	5330.7	0.0	0.0	0.0
27	19135.1	0.0	4956.3	0.0	0.0	0.0
28	18974.7	0.0	4872.4	0.0	0.0	0.0
29	27664.2	0.0	7025.9	0.0	0.0	1289.2
30	27316.0	0.0	6843.8	0.0	0.0	1289.2
31	26967.9	0.0	6661.6	0.0	0.0	1289.2
32	26619.7	0.0	6479.5	0.0	0.0	1289.2

33	26271.5	0.0	6297.4	0.0	0.0	1289.2
34	20270.8	0.0	8381.5	0.0	0.0	1099.4
35	6608.9	0.0	2096.9	0.0	0.0	414.3
36	60.6	0.0	13.1	0.0	0.0	4.0
37	14006.8	0.0	2431.6	0.0	0.0	985.9
38	11925.5	0.0	810.5	0.0	0.0	985.9
39	297.6	0.0	0.0	0.0	0.0	27.0
40	8631.7	0.0	0.0	0.0	0.0	879.4
41	6579.9	0.0	0.0	0.0	0.0	879.4
42	1119.8	0.0	0.0	0.0	0.0	189.0
43	3575.2	0.0	0.0	0.0	0.0	1078.1
44	1.8	0.0	0.0	0.0	0.0	3.3

TOTAL WEIGHT OF SLIDING MASS = 523958.57(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 387518.07(lbs)

TOTAL AREA OF SLIDING MASS = 4366.32(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 44 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	5	200.00	32.00	
5	5	200.00	32.00	
6	3	400.00	32.00	
7	3	400.00	32.00	
8	4	0.00	10.00	
9	2	400.00	32.00	A
10	2	400.00	32.00	A
11	2	400.00	32.00	A
12	2	250.00	10.00	A
13	2	250.00	10.00	A
14	2	250.00	10.00	A
15	2	250.00	10.00	A
16	2	250.00	10.00	A
17	2	250.00	10.00	A
18	2	250.00	10.00	A
19	2	250.00	10.00	A
20	2	250.00	10.00	A
21	2	250.00	10.00	A
22	2	250.00	10.00	A
23	2	250.00	10.00	A
24	2	250.00	10.00	A
25	2	250.00	10.00	A
26	2	250.00	10.00	A
27	2	250.00	10.00	A
28	2	250.00	10.00	A
29	2	250.00	10.00	A
30	2	250.00	10.00	A
31	2	250.00	10.00	A
32	2	250.00	10.00	A
33	2	250.00	10.00	A
34	2	400.00	32.00	A
35	4	0.00	10.00	
36	4	0.00	10.00	
37	3	400.00	32.00	
38	3	400.00	32.00	
39	3	400.00	32.00	
40	3	400.00	32.00	
41	3	400.00	32.00	
42	3	400.00	32.00	
43	1	150.00	32.00	
44	1	150.00	32.00	

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 44 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-44.75	207.55	2.67	220.17	337.58	102.15
1	-44.75	207.55	2.67	220.17	337.58	102.15
2	-44.75	209.38	2.47	512.75	520.40	157.47
2	-44.75	209.38	2.47	512.75	520.40	157.47
3	-44.09	212.41	6.00	1030.94	844.21	255.46
3	-44.09	212.41	6.00	1030.94	844.21	255.46
4	-44.09	216.72	6.00	1770.29	1306.20	395.26
4	-44.09	216.72	6.00	1770.29	1306.20	395.26
5	-45.00	219.39	1.47	2252.04	1607.23	486.35
5	-45.00	219.39	1.47	2252.04	1607.23	486.35
6	-45.00	219.92	0.04	2429.20	1917.93	580.37
6	-45.00	219.92	0.04	2429.20	1917.93	580.37
7	-45.00	220.26	0.92	2459.61	1936.94	586.12
7	-45.00	220.26	0.92	2459.61	1936.94	586.12
8	-45.00	221.68	3.11	2039.39	359.60	108.82
8	-45.00	221.68	3.11	2039.39	359.60	108.82
9	-45.00	225.07	6.47	2877.67	2198.17	665.17
9	-45.00	225.07	6.47	2877.67	2198.17	665.17
10	-23.35	230.11	6.00	2677.67	2073.19	627.35
10	-23.35	230.11	6.00	2677.67	2073.19	627.35
11	-23.35	235.62	6.00	2832.03	2169.65	656.54
11	-23.35	235.62	6.00	2832.03	2169.65	656.54
12	6.23	239.81	2.88	2546.54	699.02	211.53
12	6.23	239.81	2.88	2546.54	699.02	211.53
13	6.23	242.67	2.88	2501.32	691.05	209.11
13	6.23	242.67	2.88	2501.32	691.05	209.11
14	6.23	245.82	3.47	1984.39	599.90	181.53
14	6.23	245.82	3.47	1984.39	599.90	181.53
15	6.23	249.28	3.47	2035.44	608.90	184.26
15	6.23	249.28	3.47	2035.44	608.90	184.26
16	6.23	251.80	1.61	8526.46	1753.45	530.60
16	6.23	251.80	1.61	8526.46	1753.45	530.60
17	6.23	253.55	1.91	2164.29	631.62	191.13
17	6.23	253.55	1.91	2164.29	631.62	191.13
18	6.23	256.40	3.82	2265.74	649.51	196.54
18	6.23	256.40	3.82	2265.74	649.51	196.54
19	6.23	259.20	1.81	2313.84	657.99	199.11
19	6.23	259.20	1.81	2313.84	657.99	199.11
20	6.23	261.93	3.67	2389.23	671.29	203.13
20	6.23	261.93	3.67	2389.23	671.29	203.13
21	6.23	265.57	3.67	2539.34	697.75	211.14
21	6.23	265.57	3.67	2539.34	697.75	211.14
22	6.23	268.25	1.71	2668.71	720.57	218.04
22	6.23	268.25	1.71	2668.71	720.57	218.04
23	6.23	271.63	5.10	2925.83	765.90	231.76
23	6.23	271.63	5.10	2925.83	765.90	231.76
24	6.23	276.70	5.10	3331.42	837.42	253.40
24	6.23	276.70	5.10	3331.42	837.42	253.40
25	6.23	281.77	5.10	3737.01	908.94	275.05
25	6.23	281.77	5.10	3737.01	908.94	275.05
26	6.23	286.15	3.72	3987.87	953.17	288.43
26	6.23	286.15	3.72	3987.87	953.17	288.43
27	6.23	289.75	3.52	4025.02	959.72	290.41
27	6.23	289.75	3.52	4025.02	959.72	290.41
28	6.23	293.25	3.52	4003.16	955.86	289.25
28	6.23	293.25	3.52	4003.16	955.86	289.25
29	6.23	297.58	5.19	4224.55	994.90	301.06
29	6.23	297.58	5.19	4224.55	994.90	301.06
30	6.23	302.74	5.19	4192.35	989.22	299.34
30	6.23	302.74	5.19	4192.35	989.22	299.34
31	6.23	307.89	5.19	4160.14	983.55	297.62

31	6.23	307.89	5.19	4160.14	983.55	297.62
32	6.23	313.05	5.19	4127.94	977.87	295.90
32	6.23	313.05	5.19	4127.94	977.87	295.90
33	6.23	318.21	5.19	4095.73	972.19	294.19
33	6.23	318.21	5.19	4095.73	972.19	294.19
34	59.70	322.98	8.72	2717.50	2098.08	634.88
34	59.70	322.98	8.72	2717.50	2098.08	634.88
35	59.70	326.01	3.28	3274.53	577.39	174.72
35	59.70	326.01	3.28	3274.53	577.39	174.72
36	48.12	326.85	0.02	3303.59	582.51	176.27
36	48.12	326.85	0.02	3303.59	582.51	176.27
37	48.12	328.83	5.91	2638.83	2048.92	620.01
37	48.12	328.83	5.91	2638.83	2048.92	620.01
38	48.12	332.77	5.91	2432.73	1920.14	581.04
38	48.12	332.77	5.91	2432.73	1920.14	581.04
39	48.12	334.80	0.16	2323.79	1852.07	560.44
39	48.12	334.80	0.16	2323.79	1852.07	560.44
40	54.11	336.61	6.00	1964.50	1627.56	492.50
40	54.11	336.61	6.00	1964.50	1627.56	492.50
41	54.11	340.13	6.00	1510.18	1343.67	406.60
41	54.11	340.13	6.00	1510.18	1343.67	406.60
42	65.02	342.26	1.79	1005.94	1028.58	311.25
42	65.02	342.26	1.79	1005.94	1028.58	311.25
43	65.02	344.80	10.21	675.41	572.04	173.10
43	65.02	344.80	10.21	675.41	572.04	173.10
44	89.67	346.96	2.28	10.69	6.68	2.02
44	89.67	346.96	2.28	10.69	6.68	2.02

Table 4 - Base Force Data on the 44 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-44.75	207.55	2.67	587.37	900.59	272.52
1	-44.75	207.55	2.67	587.37	900.59	272.52
2	-44.75	209.38	2.47	1265.84	1284.73	388.76
2	-44.75	209.38	2.47	1265.84	1284.73	388.76
3	-44.09	212.41	6.00	6185.66	5065.23	1532.75
3	-44.09	212.41	6.00	6185.66	5065.23	1532.75
4	-44.09	216.72	6.00	10621.77	7837.22	2371.55
4	-44.09	216.72	6.00	10621.77	7837.22	2371.55
5	-45.00	219.39	1.47	3305.52	2359.08	713.86
5	-45.00	219.39	1.47	3305.52	2359.08	713.86
6	-45.00	219.92	0.04	85.80	67.74	20.50
6	-45.00	219.92	0.04	85.80	67.74	20.50
7	-45.00	220.26	0.92	2256.98	1777.36	537.83
7	-45.00	220.26	0.92	2256.98	1777.36	537.83
8	-45.00	221.68	3.11	6340.05	1117.92	338.28
8	-45.00	221.68	3.11	6340.05	1117.92	338.28
9	-45.00	225.07	6.47	18619.90	14223.19	4303.96
9	-45.00	225.07	6.47	18619.90	14223.19	4303.96
10	-23.35	230.11	6.00	16066.02	12439.16	3764.11
10	-23.35	230.11	6.00	16066.02	12439.16	3764.11
11	-23.35	235.62	6.00	16992.18	13017.89	3939.23
11	-23.35	235.62	6.00	16992.18	13017.89	3939.23
12	6.23	239.81	2.88	7333.20	2012.96	609.12
12	6.23	239.81	2.88	7333.20	2012.96	609.12
13	6.23	242.67	2.88	7202.99	1990.00	602.18
13	6.23	242.67	2.88	7202.99	1990.00	602.18
14	6.23	245.82	3.47	6886.77	2081.94	630.00
14	6.23	245.82	3.47	6886.77	2081.94	630.00
15	6.23	249.28	3.47	7063.95	2113.18	639.45
15	6.23	249.28	3.47	7063.95	2113.18	639.45
16	6.23	251.80	1.61	13723.30	2822.16	853.99
16	6.23	251.80	1.61	13723.30	2822.16	853.99
17	6.23	253.55	1.91	4136.56	1207.21	365.30
17	6.23	253.55	1.91	4136.56	1207.21	365.30
18	6.23	256.40	3.82	8660.90	2482.79	751.30
18	6.23	256.40	3.82	8660.90	2482.79	751.30

19	6.23	259.20	1.81	4189.62	1191.41	360.52
19	6.23	259.20	1.81	4189.62	1191.41	360.52
20	6.23	261.93	3.67	8772.46	2464.74	745.83
20	6.23	261.93	3.67	8772.46	2464.74	745.83
21	6.23	265.57	3.67	9323.61	2561.92	775.24
21	6.23	265.57	3.67	9323.61	2561.92	775.24
22	6.23	268.25	1.71	4563.74	1232.23	372.88
22	6.23	268.25	1.71	4563.74	1232.23	372.88
23	6.23	271.63	5.10	14912.16	3903.60	1181.24
23	6.23	271.63	5.10	14912.16	3903.60	1181.24
24	6.23	276.70	5.10	16979.36	4268.10	1291.53
24	6.23	276.70	5.10	16979.36	4268.10	1291.53
25	6.23	281.77	5.10	19046.55	4632.61	1401.83
25	6.23	281.77	5.10	19046.55	4632.61	1401.83
26	6.23	286.15	3.72	14842.71	3547.66	1073.53
26	6.23	286.15	3.72	14842.71	3547.66	1073.53
27	6.23	289.75	3.52	14171.16	3378.95	1022.48
27	6.23	289.75	3.52	14171.16	3378.95	1022.48
28	6.23	293.25	3.52	14094.20	3365.38	1018.37
28	6.23	293.25	3.52	14094.20	3365.38	1018.37
29	6.23	297.58	5.19	21914.21	5160.90	1561.70
29	6.23	297.58	5.19	21914.21	5160.90	1561.70
30	6.23	302.74	5.19	21747.15	5131.45	1552.78
30	6.23	302.74	5.19	21747.15	5131.45	1552.78
31	6.23	307.89	5.19	21580.09	5101.99	1543.87
31	6.23	307.89	5.19	21580.09	5101.99	1543.87
32	6.23	313.05	5.19	21413.04	5072.53	1534.96
32	6.23	313.05	5.19	21413.04	5072.53	1534.96
33	6.23	318.21	5.19	21245.98	5043.07	1526.04
33	6.23	318.21	5.19	21245.98	5043.07	1526.04
34	59.70	322.98	8.72	23684.48	18285.92	5533.35
34	59.70	322.98	8.72	23684.48	18285.92	5533.35
35	59.70	326.01	3.28	10755.06	1896.41	573.86
35	59.70	326.01	3.28	10755.06	1896.41	573.86
36	48.12	326.85	0.02	78.51	13.84	4.19
36	48.12	326.85	0.02	78.51	13.84	4.19
37	48.12	328.83	5.91	15587.93	12103.28	3662.47
37	48.12	328.83	5.91	15587.93	12103.28	3662.47
38	48.12	332.77	5.91	14370.46	11342.52	3432.26
38	48.12	332.77	5.91	14370.46	11342.52	3432.26
39	48.12	334.80	0.16	376.35	299.95	90.77
39	48.12	334.80	0.16	376.35	299.95	90.77
40	54.11	336.61	6.00	11787.00	9765.33	2955.00
40	54.11	336.61	6.00	11787.00	9765.33	2955.00
41	54.11	340.13	6.00	9061.08	8061.99	2439.57
41	54.11	340.13	6.00	9061.08	8061.99	2439.57
42	65.02	342.26	1.79	1800.09	1840.60	556.97
42	65.02	342.26	1.79	1800.09	1840.60	556.97
43	65.02	344.80	10.21	6896.32	5840.88	1767.46
43	65.02	344.80	10.21	6896.32	5840.88	1767.46
44	89.67	346.96	2.28	24.38	15.23	4.61
44	89.67	346.96	2.28	24.38	15.23	4.61

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 44 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 44 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
17	12000.0	0.0	12000.0	90.00	-0.589190E+03

Sum of the Resisting Forces = 158103.09 (lbs)

Average Available Shear Strength = 906.99(psf)

Sum of the Driving Forces = 51990.71 (lbs)

Average Mobilized Shear Stress = 298.26(psf)

Total length of the failure surface = 174.32(ft)

Factor of Safety Balance Check: FS = 3.04099

Janbu's Correction Factor (fo) = 0.9234

Janub's FS Corrected = 2.80820

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

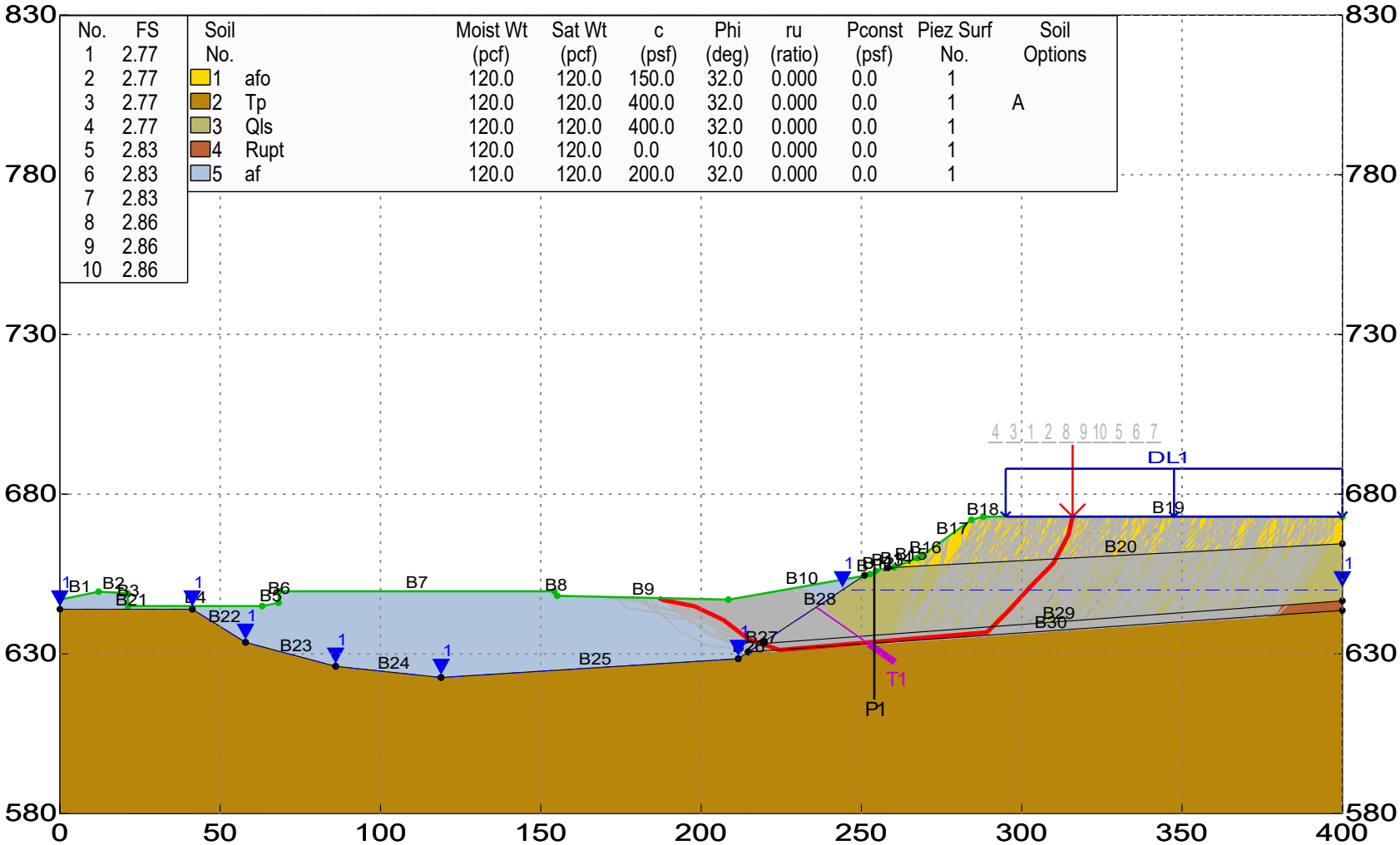
Royal Vista - Cross Section 5
Stage 6 (Final Condition - Rupture (Static))

LGC Geotechnical / BPP

\Sec 5- Stage 6 (Final Condition - Rupture (Static)).gsd

No.	FS
1	2.77
2	2.77
3	2.77
4	2.77
5	2.83
6	2.83
7	2.83
8	2.86
9	2.86
10	2.86

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 2.77

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 6 (Final Condition - Rupture (Static)).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 6 (Final Condition - Rupture (Static)).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 5

DESCRIPTION: Stage 6 (Final Condition - Rupture (Static))

BOUNDARY DATA

19 Surface Boundaries
30 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.000	12.100	649.500	5
2	12.100	649.500	21.100	649.000	5
3	21.100	649.000	21.300	645.000	5
4	21.300	645.000	63.100	645.000	5
5	63.100	645.000	68.200	646.000	5
6	68.200	646.000	68.300	649.600	5
7	68.300	649.600	154.200	649.600	5
8	154.200	649.600	155.100	648.200	5
9	155.100	648.200	208.500	647.000	5
10	208.500	647.000	251.000	654.500	5
11	251.000	654.500	252.600	655.000	3
12	252.600	655.000	254.500	656.000	3
13	254.500	656.000	258.300	657.000	3
14	258.300	657.000	260.100	657.100	1
15	260.100	657.100	267.400	660.000	1
16	267.400	660.000	269.100	661.000	1
17	269.100	661.000	284.300	672.000	1
18	284.300	672.000	288.000	673.000	1
19	288.000	673.000	400.000	673.000	1
20	258.300	657.000	400.000	664.500	3
21	0.000	644.000	41.300	644.000	2
22	41.300	644.000	57.900	633.600	2
23	57.900	633.600	86.000	626.100	2
24	86.000	626.100	118.900	622.600	2
25	118.900	622.600	211.600	628.500	2
26	211.600	628.500	214.700	630.600	2

27	214.700	630.600	219.700	633.900	4
28	219.700	633.900	251.000	654.600	3
29	219.700	633.300	400.000	646.600	4
30	214.700	630.600	400.000	643.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 580.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	32.00
2	7.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	644.00
2	41.30	644.00
3	57.90	633.60
4	86.00	626.10
5	118.90	622.60
6	211.60	628.50
7	244.10	650.00
8	400.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	19	295.000	673.000	250.000	400.000	673.000	250.000	0.00

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	235.90	644.61	90400.0	5.0	35.00	20.0	10.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	254.00	655.74	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 10.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	220.00	632.10	250.00	634.50	3.00
2	260.00	635.20	380.00	643.40	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 = 317

Number of Trial Surfaces With Valid FS = 683

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 31.7 %

Statistical Data On All Valid FS Values:
FS Max = 7.487 FS Min = 2.767 FS Ave = 3.682
Standard Deviation = 0.716 Coefficient of Variation = 19.44 %

Critical Surface is Sequence Number 95 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	251.67	633.57

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	254.00	633.77

Factor Of Safety For The Critical or Specified Surface = 2.767

Table 1 - Geometry Data on the 43 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	1.29	0.29	187.51	647.19	647.47	-24.97	-1.29	1.42
2	4.90	1.01	190.61	646.40	647.40	-11.32	-1.29	5.00
3	4.90	1.88	195.51	645.41	647.29	-11.32	-1.29	5.00
4	4.52	3.33	200.22	643.85	647.19	-25.41	-1.29	5.00
5	4.52	5.38	204.74	641.71	647.08	-25.41	-1.29	5.00
6	1.50	6.96	207.75	640.06	647.02	-37.56	-1.29	1.90
7	3.21	9.04	210.11	638.24	647.28	-37.56	10.01	4.05
8	3.21	12.08	213.32	635.77	647.85	-37.56	10.01	4.05
9	3.76	14.58	216.81	633.88	648.47	-19.14	10.01	3.98
10	0.04	15.58	218.71	633.22	648.80	-19.14	10.01	0.05
11	0.97	15.84	219.22	633.05	648.89	-19.14	10.01	1.03
12	4.62	17.31	222.01	632.08	649.38	-19.14	10.01	4.89
13	0.05	18.53	224.35	631.27	649.80	-19.14	10.01	0.05
14	1.37	18.61	225.06	631.32	649.92	4.84	10.01	1.38

15	4.59	18.88	228.04	631.57	650.45	4.84	10.01	4.61
16	4.59	19.30	232.63	631.96	651.26	4.84	10.01	4.61
17	4.59	19.72	237.22	632.35	652.07	4.84	10.01	4.61
18	4.59	20.14	241.81	632.73	652.88	4.84	10.01	4.61
19	3.45	20.51	245.82	633.08	653.59	4.84	10.01	3.46
20	3.45	20.83	249.28	633.37	654.20	4.84	10.01	3.46
21	1.60	21.17	251.80	633.58	654.75	4.84	17.35	1.61
22	1.90	21.77	253.55	633.73	655.50	4.84	27.76	1.91
23	3.80	22.53	256.40	633.97	656.50	4.84	14.74	3.81
24	1.80	22.84	259.20	634.21	657.05	4.84	3.18	1.81
25	3.65	23.39	261.93	634.44	657.83	4.84	21.67	3.66
26	3.65	24.53	265.57	634.75	659.27	4.84	21.67	3.66
27	1.70	25.53	268.25	634.97	660.50	4.84	30.47	1.71
28	5.07	27.57	271.63	635.26	662.83	4.84	35.89	5.08
29	5.07	30.81	276.70	635.69	666.50	4.84	35.89	5.08
30	5.07	34.05	281.77	636.12	670.17	4.84	35.89	5.08
31	3.70	36.01	286.15	636.49	672.50	4.84	15.12	3.71
32	1.14	36.31	288.57	636.69	673.00	4.84	0.00	1.15
33	1.80	35.35	290.04	637.65	673.00	45.22	0.00	2.55
34	4.06	32.40	292.97	640.60	673.00	45.22	0.00	5.76
35	1.19	29.76	295.59	643.24	673.00	45.22	0.00	1.69
36	2.79	27.62	297.58	645.38	673.00	47.78	0.00	4.16
37	2.79	24.54	300.38	648.46	673.00	47.78	0.00	4.16
38	1.13	22.38	302.34	650.62	673.00	47.78	0.00	1.68
39	3.50	19.97	304.66	653.03	673.00	45.59	0.00	5.00
40	3.50	16.40	308.16	656.60	673.00	45.59	0.00	5.00
41	0.72	13.92	310.26	659.08	673.00	62.48	0.00	1.56
42	3.90	9.49	312.57	663.51	673.00	62.48	0.00	8.44
43	1.33	2.87	315.19	670.13	673.00	76.92	0.00	5.89

Table 2 - Force Data On The 43 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	44.1	0.0	0.0	0.0	0.0	0.0
2	592.0	0.0	0.0	0.0	0.0	0.0
3	1104.4	0.0	0.0	0.0	0.0	0.0
4	1807.2	0.0	0.0	0.0	0.0	0.0
5	2914.8	0.0	0.0	0.0	0.0	0.0
6	1256.0	0.0	0.0	0.0	0.0	0.0
7	3484.5	0.0	0.0	0.0	0.0	0.0
8	4654.9	0.0	0.0	0.0	0.0	0.0
9	6585.0	0.0	0.0	0.0	0.0	0.0
10	79.9	0.0	0.0	0.0	0.0	0.0
11	1844.0	0.0	21.8	0.0	0.0	0.0
12	9601.2	0.0	703.1	0.0	0.0	0.0
13	106.1	0.0	12.4	0.0	0.0	0.0
14	3061.7	0.0	363.5	0.0	0.0	0.0
15	10397.2	0.0	1560.3	0.0	0.0	0.0
16	10629.2	0.0	2089.6	0.0	0.0	0.0
17	10861.3	0.0	2618.8	0.0	0.0	0.0
18	11093.3	0.0	3148.1	0.0	0.0	0.0
19	8491.8	0.0	3656.6	0.0	0.0	0.0
20	8622.9	0.0	3593.5	0.0	0.0	0.0
21	4064.4	0.0	1645.1	0.0	0.0	0.0
22	4963.7	0.0	1936.0	0.0	0.0	0.0
23	10273.4	0.0	3814.5	0.0	0.0	0.0
24	4933.9	0.0	1780.1	0.0	0.0	0.0
25	10243.3	0.0	3557.0	0.0	0.0	0.0
26	10743.1	0.0	3486.4	0.0	0.0	0.0
27	5207.3	0.0	1599.7	0.0	0.0	0.0
28	16764.3	0.0	4676.7	0.0	0.0	0.0
29	18732.8	0.0	4540.6	0.0	0.0	0.0
30	20701.3	0.0	4404.5	0.0	0.0	0.0
31	15988.6	0.0	3130.4	0.0	0.0	0.0
32	4979.9	0.0	952.4	0.0	0.0	0.0
33	7628.9	0.0	1967.6	0.0	0.0	0.0

34	15779.7	0.0	3379.6	0.0	0.0	0.0
35	4238.8	0.0	710.5	0.0	0.0	296.8
36	9259.8	0.0	1198.5	0.0	0.0	698.5
37	8227.3	0.0	399.5	0.0	0.0	698.5
38	3038.4	0.0	0.0	0.0	0.0	282.9
39	8384.1	0.0	0.0	0.0	0.0	874.8
40	6884.4	0.0	0.0	0.0	0.0	874.8
41	1200.3	0.0	0.0	0.0	0.0	179.6
42	4442.0	0.0	0.0	0.0	0.0	975.6
43	459.5	0.0	0.0	0.0	0.0	333.5

TOTAL WEIGHT OF SLIDING MASS = 294370.81(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 235966.88(lbs)

TOTAL AREA OF SLIDING MASS = 2453.09(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 43 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	5	200.00	32.00	
5	5	200.00	32.00	
6	5	200.00	32.00	
7	5	200.00	32.00	
8	5	200.00	32.00	
9	5	200.00	32.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	2	400.00	32.00	A
14	2	250.00	10.00	A
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	3	400.00	32.00	
35	3	400.00	32.00	
36	3	400.00	32.00	
37	3	400.00	32.00	
38	3	400.00	32.00	
39	3	400.00	32.00	
40	3	400.00	32.00	
41	3	400.00	32.00	
42	1	150.00	32.00	
43	1	150.00	32.00	

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 43 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-24.97	187.51	1.42	79.47	249.66	90.89
1	-24.97	187.51	1.42	79.47	249.66	90.89
2	-11.32	190.61	5.00	143.28	289.53	105.40
2	-11.32	190.61	5.00	143.28	289.53	105.40
3	-11.32	195.51	5.00	253.14	358.18	130.39
3	-11.32	195.51	5.00	253.14	358.18	130.39
4	-25.41	200.22	5.00	494.16	508.78	185.22
4	-25.41	200.22	5.00	494.16	508.78	185.22
5	-25.41	204.74	5.00	771.42	682.04	248.29
5	-25.41	204.74	5.00	771.42	682.04	248.29
6	-37.56	207.75	1.90	1100.99	887.98	323.26
6	-37.56	207.75	1.90	1100.99	887.98	323.26
7	-37.56	210.11	4.05	1407.90	1079.75	393.07
7	-37.56	210.11	4.05	1407.90	1079.75	393.07
8	-37.56	213.32	4.05	1856.05	1359.79	495.02
8	-37.56	213.32	4.05	1856.05	1359.79	495.02
9	-19.14	216.81	3.98	1940.48	1412.55	514.22
9	-19.14	216.81	3.98	1940.48	1412.55	514.22
10	-19.14	218.71	0.05	1914.88	337.65	122.92
10	-19.14	218.71	0.05	1914.88	337.65	122.92
11	-19.14	219.22	1.03	1925.72	339.56	123.61
11	-19.14	219.22	1.03	1925.72	339.56	123.61
12	-19.14	222.01	4.89	1980.31	349.18	127.12
12	-19.14	222.01	4.89	1980.31	349.18	127.12
13	-19.14	224.35	0.05	2218.94	1786.55	650.37
13	-19.14	224.35	0.05	2218.94	1786.55	650.37
14	4.84	225.06	1.38	1948.92	593.65	216.11
14	4.84	225.06	1.38	1948.92	593.65	216.11
15	4.84	228.04	4.61	1915.56	337.76	122.96
15	4.84	228.04	4.61	1915.56	337.76	122.96
16	4.84	232.63	4.61	1851.57	326.48	118.85
16	4.84	232.63	4.61	1851.57	326.48	118.85
17	4.84	237.22	4.61	1787.59	315.20	114.74
17	4.84	237.22	4.61	1787.59	315.20	114.74
18	4.84	241.81	4.61	1723.60	303.92	110.64
18	4.84	241.81	4.61	1723.60	303.92	110.64
19	4.84	245.82	3.46	1397.17	246.36	89.68
19	4.84	245.82	3.46	1397.17	246.36	89.68
20	4.84	249.28	3.46	1453.08	256.22	93.27
20	4.84	249.28	3.46	1453.08	256.22	93.27
21	4.84	251.80	1.61	7950.96	1401.97	510.37
21	4.84	251.80	1.61	7950.96	1401.97	510.37
22	4.84	253.55	1.91	1587.97	280.00	101.93
22	4.84	253.55	1.91	1587.97	280.00	101.93
23	4.84	256.40	3.81	1693.46	298.60	108.70
23	4.84	256.40	3.81	1693.46	298.60	108.70
24	4.84	259.20	1.81	1745.50	307.78	112.04
24	4.84	259.20	1.81	1745.50	307.78	112.04
25	4.84	261.93	3.66	1824.75	321.75	117.13
25	4.84	261.93	3.66	1824.75	321.75	117.13
26	4.84	265.57	3.66	1980.05	349.14	127.10
26	4.84	265.57	3.66	1980.05	349.14	127.10
27	4.84	268.25	1.71	2113.23	372.62	135.65
27	4.84	268.25	1.71	2113.23	372.62	135.65
28	4.84	271.63	5.08	2375.20	418.81	152.46
28	4.84	271.63	5.08	2375.20	418.81	152.46
29	4.84	276.70	5.08	2788.09	491.62	178.97
29	4.84	276.70	5.08	2788.09	491.62	178.97
30	4.84	281.77	5.08	3200.98	564.42	205.47
30	4.84	281.77	5.08	3200.98	564.42	205.47
31	4.84	286.15	3.71	3458.11	609.76	221.98
31	4.84	286.15	3.71	3458.11	609.76	221.98
32	4.84	288.57	1.15	3506.02	618.21	225.05
32	4.84	288.57	1.15	3506.02	618.21	225.05

33	45.22	290.04	2.55	3246.96	572.53	208.42
33	45.22	290.04	2.55	3246.96	572.53	208.42
34	45.22	292.97	5.76	2525.85	1978.33	720.19
34	45.22	292.97	5.76	2525.85	1978.33	720.19
35	45.22	295.59	1.69	2604.38	2027.40	738.05
35	45.22	295.59	1.69	2604.38	2027.40	738.05
36	47.78	297.58	4.16	2448.45	1929.96	702.58
36	47.78	297.58	4.16	2448.45	1929.96	702.58
37	47.78	300.38	4.16	2308.56	1842.55	670.76
37	47.78	300.38	4.16	2308.56	1842.55	670.76
38	47.78	302.34	1.68	2179.60	1761.96	641.42
38	47.78	302.34	1.68	2179.60	1761.96	641.42
39	45.59	304.66	5.00	1992.72	1645.19	598.91
39	45.59	304.66	5.00	1992.72	1645.19	598.91
40	45.59	308.16	5.00	1649.34	1430.62	520.80
40	45.59	308.16	5.00	1649.34	1430.62	520.80
41	62.48	310.26	1.56	1105.79	1090.98	397.16
41	62.48	310.26	1.56	1105.79	1090.98	397.16
42	62.48	312.57	8.44	870.26	693.80	252.57
42	62.48	312.57	8.44	870.26	693.80	252.57
43	76.92	315.19	5.89	167.76	254.83	92.77
43	76.92	315.19	5.89	167.76	254.83	92.77

Table 4 - Base Force Data on the 43 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-24.97	187.51	1.42	112.89	354.64	129.10
1	-24.97	187.51	1.42	112.89	354.64	129.10
2	-11.32	190.61	5.00	716.42	1447.67	527.01
2	-11.32	190.61	5.00	716.42	1447.67	527.01
3	-11.32	195.51	5.00	1265.71	1790.91	651.96
3	-11.32	195.51	5.00	1265.71	1790.91	651.96
4	-25.41	200.22	5.00	2470.79	2543.92	926.08
4	-25.41	200.22	5.00	2470.79	2543.92	926.08
5	-25.41	204.74	5.00	3857.10	3410.18	1241.44
5	-25.41	204.74	5.00	3857.10	3410.18	1241.44
6	-37.56	207.75	1.90	2088.27	1684.24	613.13
6	-37.56	207.75	1.90	2088.27	1684.24	613.13
7	-37.56	210.11	4.05	5704.29	4374.77	1592.58
7	-37.56	210.11	4.05	5704.29	4374.77	1592.58
8	-37.56	213.32	4.05	7520.07	5509.39	2005.63
8	-37.56	213.32	4.05	7520.07	5509.39	2005.63
9	-19.14	216.81	3.98	7730.54	5627.34	2048.57
9	-19.14	216.81	3.98	7730.54	5627.34	2048.57
10	-19.14	218.71	0.05	86.60	15.27	5.56
10	-19.14	218.71	0.05	86.60	15.27	5.56
11	-19.14	219.22	1.03	1977.28	348.65	126.92
11	-19.14	219.22	1.03	1977.28	348.65	126.92
12	-19.14	222.01	4.89	9691.00	1708.78	622.06
12	-19.14	222.01	4.89	9691.00	1708.78	622.06
13	-19.14	224.35	0.05	112.05	90.21	32.84
13	-19.14	224.35	0.05	112.05	90.21	32.84
14	4.84	225.06	1.38	2682.26	817.02	297.43
14	4.84	225.06	1.38	2682.26	817.02	297.43
15	4.84	228.04	4.61	8822.88	1555.71	566.34
15	4.84	228.04	4.61	8822.88	1555.71	566.34
16	4.84	232.63	4.61	8528.16	1503.74	547.42
16	4.84	232.63	4.61	8528.16	1503.74	547.42
17	4.84	237.22	4.61	8233.45	1451.78	528.50
17	4.84	237.22	4.61	8233.45	1451.78	528.50
18	4.84	241.81	4.61	7938.73	1399.81	509.59
18	4.84	241.81	4.61	7938.73	1399.81	509.59
19	4.84	245.82	3.46	4837.48	852.98	310.52
19	4.84	245.82	3.46	4837.48	852.98	310.52
20	4.84	249.28	3.46	5031.05	887.11	322.94
20	4.84	249.28	3.46	5031.05	887.11	322.94
21	4.84	251.80	1.61	12767.06	2251.18	819.52

21	4.84	251.80	1.61	12767.06	2251.18	819.52
22	4.84	253.55	1.91	3027.94	533.91	194.36
22	4.84	253.55	1.91	3027.94	533.91	194.36
23	4.84	256.40	3.81	6458.17	1138.75	414.55
23	4.84	256.40	3.81	6458.17	1138.75	414.55
24	4.84	259.20	1.81	3153.14	555.98	202.40
24	4.84	259.20	1.81	3153.14	555.98	202.40
25	4.84	261.93	3.66	6684.17	1178.60	429.06
25	4.84	261.93	3.66	6684.17	1178.60	429.06
26	4.84	265.57	3.66	7253.03	1278.90	465.57
26	4.84	265.57	3.66	7253.03	1278.90	465.57
27	4.84	268.25	1.71	3605.34	635.72	231.43
27	4.84	268.25	1.71	3605.34	635.72	231.43
28	4.84	271.63	5.08	12077.43	2129.58	775.25
28	4.84	271.63	5.08	12077.43	2129.58	775.25
29	4.84	276.70	5.08	14176.89	2499.77	910.01
29	4.84	276.70	5.08	14176.89	2499.77	910.01
30	4.84	281.77	5.08	16276.36	2869.96	1044.78
30	4.84	281.77	5.08	16276.36	2869.96	1044.78
31	4.84	286.15	3.71	12840.80	2264.18	824.25
31	4.84	286.15	3.71	12840.80	2264.18	824.25
32	4.84	288.57	1.15	4021.96	709.18	258.17
32	4.84	288.57	1.15	4021.96	709.18	258.17
33	45.22	290.04	2.55	8289.68	1461.69	532.11
33	45.22	290.04	2.55	8289.68	1461.69	532.11
34	45.22	292.97	5.76	14553.28	11398.60	4149.53
34	45.22	292.97	5.76	14553.28	11398.60	4149.53
35	45.22	295.59	1.69	4388.91	3416.57	1243.77
35	45.22	295.59	1.69	4388.91	3416.57	1243.77
36	47.78	297.58	4.16	10180.65	8024.77	2921.33
36	47.78	297.58	4.16	10180.65	8024.77	2921.33
37	47.78	300.38	4.16	9598.98	7661.30	2789.01
37	47.78	300.38	4.16	9598.98	7661.30	2789.01
38	47.78	302.34	1.68	3670.46	2967.16	1080.16
38	47.78	302.34	1.68	3670.46	2967.16	1080.16
39	45.59	304.66	5.00	9963.61	8225.96	2994.57
39	45.59	304.66	5.00	9963.61	8225.96	2994.57
40	45.59	308.16	5.00	8246.71	7153.12	2604.01
40	45.59	308.16	5.00	8246.71	7153.12	2604.01
41	62.48	310.26	1.56	1719.56	1696.52	617.60
41	62.48	310.26	1.56	1719.56	1696.52	617.60
42	62.48	312.57	8.44	7349.30	5859.09	2132.94
42	62.48	312.57	8.44	7349.30	5859.09	2132.94
43	76.92	315.19	5.89	988.79	1501.99	546.78
43	76.92	315.19	5.89	988.79	1501.99	546.78

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 43 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
21	14810.3	10370.3	18080.0	35.00	0.149042E+04

***Pier/Pile Slice Force Data on the 43 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
22	12000.0	0.0	12000.0	90.00	-0.457234E+03

Sum of the Resisting Forces = 90417.78 (lbs)

Average Available Shear Strength = 593.61(psf)

Sum of the Driving Forces = 35185.04 (lbs)

Average Mobilized Shear Stress = 231.00(psf)

Total length of the failure surface = 152.32(ft)

Factor of Safety Balance Check: FS = 2.56978

Janbu's Correction Factor (fo) = 1.0766

Janub's FS Corrected = 2.76675

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

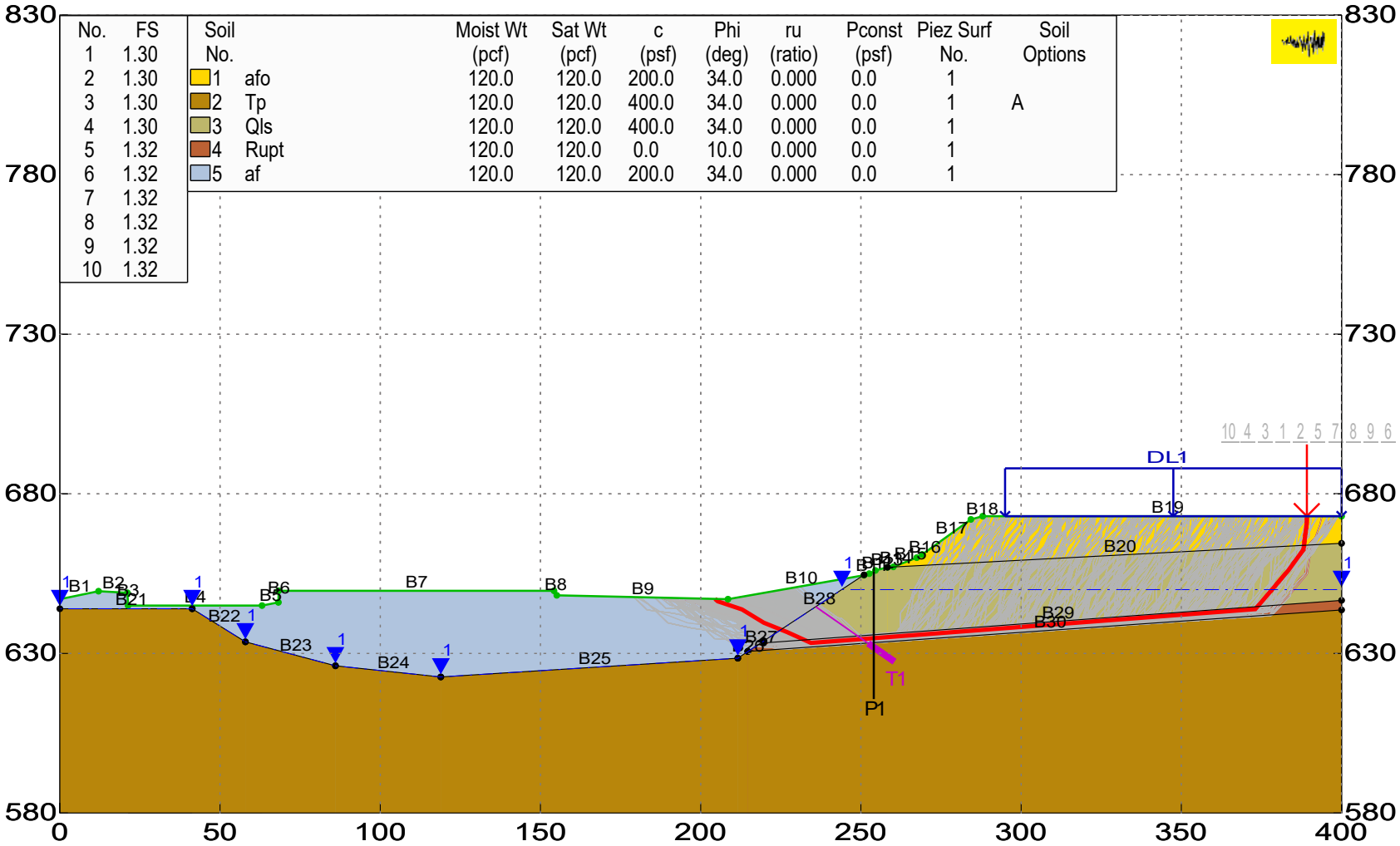
Royal Vista - Cross Section 5
Stage 6 (Final Condition - Rupture (Seismic))

LGC Geotechnical / BPP

\Sec 5- Stage 6 (Final Condition - Rupture (Seismic)).gsd

No.	FS
1	1.30
2	1.30
3	1.30
4	1.30
5	1.32
6	1.32
7	1.32
8	1.32
9	1.32
10	1.32

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.30

Simplified Janbu (Corrected) Method

kh = 0.15000

GEOSTASE
Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** GEOSTASE(R) ***

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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.
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Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 6 (Final Condition - Rupture (Seismic)).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\5-5'\Sec 5- Stage 6 (Final Condition - Rupture (Seismic)).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 5

DESCRIPTION: Stage 6 (Final Condition - Rupture (Seismic))

BOUNDARY DATA

19 Surface Boundaries
30 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.000	12.100	649.500	5
2	12.100	649.500	21.100	649.000	5
3	21.100	649.000	21.300	645.000	5
4	21.300	645.000	63.100	645.000	5
5	63.100	645.000	68.200	646.000	5
6	68.200	646.000	68.300	649.600	5
7	68.300	649.600	154.200	649.600	5
8	154.200	649.600	155.100	648.200	5
9	155.100	648.200	208.500	647.000	5
10	208.500	647.000	251.000	654.500	5
11	251.000	654.500	252.600	655.000	3
12	252.600	655.000	254.500	656.000	3
13	254.500	656.000	258.300	657.000	3
14	258.300	657.000	260.100	657.100	1
15	260.100	657.100	267.400	660.000	1
16	267.400	660.000	269.100	661.000	1
17	269.100	661.000	284.300	672.000	1
18	284.300	672.000	288.000	673.000	1
19	288.000	673.000	400.000	673.000	1
20	258.300	657.000	400.000	664.500	3
21	0.000	644.000	41.300	644.000	2
22	41.300	644.000	57.900	633.600	2
23	57.900	633.600	86.000	626.100	2
24	86.000	626.100	118.900	622.600	2
25	118.900	622.600	211.600	628.500	2
26	211.600	628.500	214.700	630.600	2

27	214.700	630.600	219.700	633.900	4
28	219.700	633.900	251.000	654.600	3
29	219.700	633.300	400.000	646.600	4
30	214.700	630.600	400.000	643.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 580.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	644.00
2	41.30	644.00
3	57.90	633.60
4	86.00	626.10
5	118.90	622.60
6	211.60	628.50
7	244.10	650.00
8	400.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	19	295.000	673.000	250.000	400.000	673.000	250.000	0.00

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

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.15000(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 Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	235.90	644.61	90400.0	5.0	35.00	20.0	10.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	254.00	655.74	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 8.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	225.00	632.70	250.00	634.50	3.00
2	260.00	635.20	380.00	643.40	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 = 177

Number of Trial Surfaces With Valid FS = 823

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 17.7 %

Statistical Data On All Valid FS Values:
FS Max = 6.440 FS Min = 1.303 FS Ave = 1.829
Standard Deviation = 0.658 Coefficient of Variation = 35.97 %

Critical Surface is Sequence Number 81 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	250.32	634.51

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	254.00	634.79

Factor Of Safety For The Critical or Specified Surface = 1.303

Table 1 - Geometry Data on the 54 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.86	0.37	204.87	646.71	647.08	-41.65	-1.29	1.15
2	3.20	1.24	206.90	645.79	647.04	-18.49	-1.29	3.38
3	4.39	2.86	210.69	644.52	647.39	-18.49	10.01	4.62

4	3.41	5.33	214.59	642.74	648.07	-31.56	10.01	4.00
5	3.41	8.03	218.00	640.65	648.68	-31.56	10.01	4.00
6	2.68	10.15	221.04	639.06	649.21	-21.98	10.01	2.89
7	2.68	11.70	223.72	637.98	649.69	-21.98	10.01	2.89
8	0.04	12.49	225.08	637.43	649.93	-21.98	10.01	0.04
9	2.03	13.09	226.11	637.02	650.11	-21.98	10.01	2.19
10	2.61	14.50	228.43	636.01	650.52	-24.44	10.01	2.87
11	2.61	16.15	231.04	634.83	650.98	-24.44	10.01	2.87
12	2.05	17.62	233.38	633.77	651.39	-24.44	10.01	2.26
13	4.85	18.51	236.83	633.48	652.00	4.36	10.01	4.86
14	4.85	19.00	241.68	633.85	652.85	4.36	10.01	4.86
15	3.45	19.42	245.82	634.17	653.59	4.36	10.01	3.46
16	3.45	19.76	249.28	634.43	654.20	4.36	10.01	3.46
17	1.60	20.12	251.80	634.63	654.75	4.36	17.35	1.60
18	1.90	20.74	253.55	634.76	655.50	4.36	27.76	1.91
19	3.80	21.52	256.40	634.98	656.50	4.36	14.74	3.81
20	1.80	21.86	259.20	635.19	657.05	4.36	3.18	1.81
21	3.65	22.43	261.93	635.40	657.83	4.36	21.67	3.66
22	3.65	23.60	265.57	635.68	659.27	4.36	21.67	3.66
23	1.70	24.62	268.25	635.88	660.50	4.36	30.47	1.70
24	5.07	26.70	271.63	636.14	662.83	4.36	35.89	5.08
25	5.07	29.98	276.70	636.52	666.50	4.36	35.89	5.08
26	5.07	33.26	281.77	636.91	670.17	4.36	35.89	5.08
27	3.70	35.26	286.15	637.24	672.50	4.36	15.12	3.71
28	3.50	35.48	289.75	637.52	673.00	4.36	0.00	3.51
29	3.50	35.21	293.25	637.79	673.00	4.36	0.00	3.51
30	4.88	34.89	297.44	638.11	673.00	4.36	0.00	4.89
31	4.88	34.52	302.32	638.48	673.00	4.36	0.00	4.89
32	4.88	34.15	307.20	638.85	673.00	4.36	0.00	4.89
33	4.88	33.78	312.07	639.22	673.00	4.36	0.00	4.89
34	4.88	33.41	316.95	639.59	673.00	4.36	0.00	4.89
35	4.88	33.03	321.83	639.97	673.00	4.36	0.00	4.89
36	4.88	32.66	326.71	640.34	673.00	4.36	0.00	4.89
37	4.88	32.29	331.59	640.71	673.00	4.36	0.00	4.89
38	4.88	31.92	336.46	641.08	673.00	4.36	0.00	4.89
39	4.88	31.55	341.34	641.45	673.00	4.36	0.00	4.89
40	4.88	31.17	346.22	641.83	673.00	4.36	0.00	4.89
41	4.88	30.80	351.10	642.20	673.00	4.36	0.00	4.89
42	4.88	30.43	355.98	642.57	673.00	4.36	0.00	4.89
43	4.88	30.06	360.85	642.94	673.00	4.36	0.00	4.89
44	4.88	29.69	365.73	643.31	673.00	4.36	0.00	4.89
45	4.88	29.31	370.61	643.69	673.00	4.36	0.00	4.89
46	0.68	28.73	373.39	644.27	673.00	49.49	0.00	1.04
47	4.52	25.69	375.99	647.31	673.00	49.49	0.00	6.96
48	0.04	23.02	378.27	649.98	673.00	49.69	0.00	0.06
49	2.57	21.49	379.57	651.51	673.00	49.69	0.00	3.97
50	2.57	18.46	382.14	654.54	673.00	49.69	0.00	3.97
51	4.67	13.70	385.76	659.30	673.00	54.28	0.00	8.00
52	0.17	9.79	388.18	663.21	673.00	82.77	0.00	1.34
53	0.84	5.82	388.68	667.18	673.00	82.77	0.00	6.66
54	0.07	1.26	389.13	671.74	673.00	88.50	0.00	2.52

Table 2 - Force Data On The 54 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	38.4	0.0	0.0	5.8	0.0	0.0
2	478.1	0.0	0.0	71.7	0.0	0.0
3	1507.1	0.0	0.0	226.1	0.0	0.0
4	2180.7	0.0	0.0	327.1	0.0	0.0
5	3283.0	0.0	0.0	492.4	0.0	0.0
6	3260.7	0.0	0.0	489.1	0.0	0.0
7	3759.5	0.0	0.0	563.9	0.0	0.0
8	57.0	0.0	0.0	8.5	0.0	0.0
9	3183.3	0.0	102.4	477.5	0.0	0.0
10	4549.2	0.0	450.8	682.4	0.0	0.0
11	5066.6	0.0	814.4	760.0	0.0	0.0

12	4345.8	0.0	895.4	651.9	0.0	0.0
13	10771.3	0.0	2470.2	1615.7	0.0	0.0
14	11053.9	0.0	3069.0	1658.1	0.0	0.0
15	8038.5	0.0	3417.7	1205.8	0.0	0.0
16	8181.6	0.0	3360.9	1227.2	0.0	0.0
17	3863.9	0.0	1539.4	579.6	0.0	0.0
18	4728.9	0.0	1812.2	709.3	0.0	0.0
19	9814.7	0.0	3572.7	1472.2	0.0	0.0
20	4721.8	0.0	1668.3	708.3	0.0	0.0
21	9823.1	0.0	3335.5	1473.5	0.0	0.0
22	10336.3	0.0	3271.9	1550.4	0.0	0.0
23	5022.5	0.0	1502.2	753.4	0.0	0.0
24	16230.7	0.0	4395.3	2434.6	0.0	0.0
25	18225.2	0.0	4272.8	2733.8	0.0	0.0
26	20219.6	0.0	4150.3	3032.9	0.0	0.0
27	15653.2	0.0	2953.4	2348.0	0.0	0.0
28	14901.8	0.0	2733.7	2235.3	0.0	0.0
29	14789.7	0.0	2675.2	2218.5	0.0	0.0
30	20426.0	0.0	3631.0	3063.9	0.0	1219.5
31	20208.3	0.0	3517.5	3031.2	0.0	1219.5
32	19990.6	0.0	3403.9	2998.6	0.0	1219.5
33	19772.8	0.0	3290.4	2965.9	0.0	1219.5
34	19555.1	0.0	3176.8	2933.3	0.0	1219.5
35	19337.4	0.0	3063.3	2900.6	0.0	1219.5
36	19119.6	0.0	2949.7	2867.9	0.0	1219.5
37	18901.9	0.0	2836.2	2835.3	0.0	1219.5
38	18684.2	0.0	2722.6	2802.6	0.0	1219.5
39	18466.4	0.0	2609.1	2770.0	0.0	1219.5
40	18248.7	0.0	2495.5	2737.3	0.0	1219.5
41	18031.0	0.0	2382.0	2704.6	0.0	1219.5
42	17813.2	0.0	2268.4	2672.0	0.0	1219.5
43	17595.5	0.0	2154.9	2639.3	0.0	1219.5
44	17377.8	0.0	2041.3	2606.7	0.0	1219.5
45	17160.0	0.0	1927.8	2574.0	0.0	1219.5
46	2329.2	0.0	372.1	349.4	0.0	168.9
47	13939.2	0.0	1169.3	2090.9	0.0	1130.3
48	109.1	0.0	0.1	16.4	0.0	9.9
49	6620.7	0.0	0.0	993.1	0.0	641.9
50	5688.0	0.0	0.0	853.2	0.0	641.9
51	7678.2	0.0	0.0	1151.7	0.0	1167.7
52	198.0	0.0	0.0	29.7	0.0	42.1
53	584.8	0.0	0.0	87.7	0.0	209.4
54	9.9	0.0	0.0	1.5	0.0	16.5

TOTAL WEIGHT OF SLIDING MASS = 555931.80(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 458471.26(lbs)

TOTAL AREA OF SLIDING MASS = 4632.76(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 54 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	34.00	
2	5	200.00	34.00	
3	5	200.00	34.00	
4	5	200.00	34.00	
5	5	200.00	34.00	
6	5	200.00	34.00	
7	5	200.00	34.00	
8	3	400.00	34.00	
9	3	400.00	34.00	
10	3	400.00	34.00	
11	3	400.00	34.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	

18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	4	0.00	10.00
28	4	0.00	10.00
29	4	0.00	10.00
30	4	0.00	10.00
31	4	0.00	10.00
32	4	0.00	10.00
33	4	0.00	10.00
34	4	0.00	10.00
35	4	0.00	10.00
36	4	0.00	10.00
37	4	0.00	10.00
38	4	0.00	10.00
39	4	0.00	10.00
40	4	0.00	10.00
41	4	0.00	10.00
42	4	0.00	10.00
43	4	0.00	10.00
44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	3	400.00	34.00
48	3	400.00	34.00
49	3	400.00	34.00
50	3	400.00	34.00
51	3	400.00	34.00
52	3	400.00	34.00
53	1	200.00	34.00
54	1	200.00	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 54 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-41.65	204.87	1.15	368.87	448.81	338.49
1	-41.65	204.87	1.15	368.87	448.81	338.49
2	-18.49	206.90	3.38	249.30	368.16	277.66
2	-18.49	206.90	3.38	249.30	368.16	277.66
3	-18.49	210.69	4.62	487.23	528.64	398.70
3	-18.49	210.69	4.62	487.23	528.64	398.70
4	-31.56	214.59	4.00	1114.37	951.65	717.73
4	-31.56	214.59	4.00	1114.37	951.65	717.73
5	-31.56	218.00	4.00	1601.66	1280.33	965.62
5	-31.56	218.00	4.00	1601.66	1280.33	965.62
6	-21.98	221.04	2.89	1647.78	1311.44	989.08
6	-21.98	221.04	2.89	1647.78	1311.44	989.08
7	-21.98	223.72	2.89	1886.98	1472.78	1110.76
7	-21.98	223.72	2.89	1886.98	1472.78	1110.76
8	-21.98	225.08	0.04	2092.41	1811.35	1366.11
8	-21.98	225.08	0.04	2092.41	1811.35	1366.11
9	-21.98	226.11	2.19	2124.51	1833.00	1382.44
9	-21.98	226.11	2.19	2124.51	1833.00	1382.44
10	-24.44	228.43	2.87	2304.27	1954.25	1473.89
10	-24.44	228.43	2.87	2304.27	1954.25	1473.89

11	-24.44	231.04	2.87	2399.18	2018.27	1522.17
11	-24.44	231.04	2.87	2399.18	2018.27	1522.17
12	-24.44	233.38	2.26	1837.71	324.04	244.39
12	-24.44	233.38	2.26	1837.71	324.04	244.39
13	4.36	236.83	4.86	1695.23	298.91	225.44
13	4.36	236.83	4.86	1695.23	298.91	225.44
14	4.36	241.68	4.86	1631.07	287.60	216.91
14	4.36	241.68	4.86	1631.07	287.60	216.91
15	4.36	245.82	3.46	1327.72	234.11	176.57
15	4.36	245.82	3.46	1327.72	234.11	176.57
16	4.36	249.28	3.46	4358.41	768.51	579.60
16	4.36	249.28	3.46	4358.41	768.51	579.60
17	4.36	251.80	1.60	1439.84	253.88	191.48
17	4.36	251.80	1.60	1439.84	253.88	191.48
18	4.36	253.55	1.91	1521.26	268.24	202.30
18	4.36	253.55	1.91	1521.26	268.24	202.30
19	4.36	256.40	3.81	1627.59	286.99	216.44
19	4.36	256.40	3.81	1627.59	286.99	216.44
20	4.36	259.20	1.81	1680.71	296.35	223.51
20	4.36	259.20	1.81	1680.71	296.35	223.51
21	4.36	261.93	3.66	1760.86	310.49	234.17
21	4.36	261.93	3.66	1760.86	310.49	234.17
22	4.36	265.57	3.66	1917.13	338.04	254.95
22	4.36	265.57	3.66	1917.13	338.04	254.95
23	4.36	268.25	1.70	2050.92	361.63	272.74
23	4.36	268.25	1.70	2050.92	361.63	272.74
24	4.36	271.63	5.08	2313.20	407.88	307.62
24	4.36	271.63	5.08	2313.20	407.88	307.62
25	4.36	276.70	5.08	2726.43	480.74	362.57
25	4.36	276.70	5.08	2726.43	480.74	362.57
26	4.36	281.77	5.08	3139.67	553.61	417.53
26	4.36	281.77	5.08	3139.67	553.61	417.53
27	4.36	286.15	3.71	3397.60	599.09	451.83
27	4.36	286.15	3.71	3397.60	599.09	451.83
28	4.36	289.75	3.51	3441.31	606.80	457.64
28	4.36	289.75	3.51	3441.31	606.80	457.64
29	4.36	293.25	3.51	3426.10	604.11	455.62
29	4.36	293.25	3.51	3426.10	604.11	455.62
30	4.36	297.44	4.89	3655.20	644.51	486.09
30	4.36	297.44	4.89	3655.20	644.51	486.09
31	4.36	302.32	4.89	3634.01	640.77	483.27
31	4.36	302.32	4.89	3634.01	640.77	483.27
32	4.36	307.20	4.89	3612.82	637.04	480.45
32	4.36	307.20	4.89	3612.82	637.04	480.45
33	4.36	312.07	4.89	3591.62	633.30	477.63
33	4.36	312.07	4.89	3591.62	633.30	477.63
34	4.36	316.95	4.89	3570.43	629.56	474.81
34	4.36	316.95	4.89	3570.43	629.56	474.81
35	4.36	321.83	4.89	3549.24	625.83	471.99
35	4.36	321.83	4.89	3549.24	625.83	471.99
36	4.36	326.71	4.89	3528.04	622.09	469.18
36	4.36	326.71	4.89	3528.04	622.09	469.18
37	4.36	331.59	4.89	3506.85	618.35	466.36
37	4.36	331.59	4.89	3506.85	618.35	466.36
38	4.36	336.46	4.89	3485.66	614.62	463.54
38	4.36	336.46	4.89	3485.66	614.62	463.54
39	4.36	341.34	4.89	3464.46	610.88	460.72
39	4.36	341.34	4.89	3464.46	610.88	460.72
40	4.36	346.22	4.89	3443.27	607.14	457.90
40	4.36	346.22	4.89	3443.27	607.14	457.90
41	4.36	351.10	4.89	3422.08	603.40	455.08
41	4.36	351.10	4.89	3422.08	603.40	455.08
42	4.36	355.98	4.89	3400.88	599.67	452.27
42	4.36	355.98	4.89	3400.88	599.67	452.27
43	4.36	360.85	4.89	3379.69	595.93	449.45
43	4.36	360.85	4.89	3379.69	595.93	449.45
44	4.36	365.73	4.89	3358.49	592.19	446.63
44	4.36	365.73	4.89	3358.49	592.19	446.63
45	4.36	370.61	4.89	3337.30	588.46	443.81
45	4.36	370.61	4.89	3337.30	588.46	443.81
46	49.49	373.39	1.04	2860.86	504.45	380.45
46	49.49	373.39	1.04	2860.86	504.45	380.45

47	49.49	375.99	6.96	1697.09	1544.70	1165.00
47	49.49	375.99	6.96	1697.09	1544.70	1165.00
48	49.69	378.27	0.06	1597.23	1477.34	1114.20
48	49.69	378.27	0.06	1597.23	1477.34	1114.20
49	49.69	379.57	3.97	1486.04	1402.35	1057.64
49	49.69	379.57	3.97	1486.04	1402.35	1057.64
50	49.69	382.14	3.97	1265.31	1253.46	945.35
50	49.69	382.14	3.97	1265.31	1253.46	945.35
51	54.28	385.76	8.00	818.73	952.24	718.17
51	54.28	385.76	8.00	818.73	952.24	718.17
52	82.77	388.18	1.34	267.76	180.61	136.21
52	82.77	388.18	1.34	267.76	180.61	136.21
53	82.77	388.68	6.66	178.24	120.23	90.67
53	82.77	388.68	6.66	178.24	120.23	90.67
54	88.50	389.13	2.52	18.28	12.33	9.30
54	88.50	389.13	2.52	18.28	12.33	9.30

Table 4 - Base Force Data on the 54 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-41.65	204.87	1.15	424.20	516.13	389.26
1	-41.65	204.87	1.15	424.20	516.13	389.26
2	-18.49	206.90	3.38	841.70	1242.97	937.44
2	-18.49	206.90	3.38	841.70	1242.97	937.44
3	-18.49	210.69	4.62	2252.88	2444.35	1843.52
3	-18.49	210.69	4.62	2252.88	2444.35	1843.52
4	-31.56	214.59	4.00	4457.47	3806.60	2870.91
4	-31.56	214.59	4.00	4457.47	3806.60	2870.91
5	-31.56	218.00	4.00	6406.64	5121.33	3862.48
5	-31.56	218.00	4.00	6406.64	5121.33	3862.48
6	-21.98	221.04	2.89	4756.76	3785.83	2855.25
6	-21.98	221.04	2.89	4756.76	3785.83	2855.25
7	-21.98	223.72	2.89	5447.28	4251.59	3206.52
7	-21.98	223.72	2.89	5447.28	4251.59	3206.52
8	-21.98	225.08	0.04	85.77	74.25	56.00
8	-21.98	225.08	0.04	85.77	74.25	56.00
9	-21.98	226.11	2.19	4643.04	4005.96	3021.27
9	-21.98	226.11	2.19	4643.04	4005.96	3021.27
10	-24.44	228.43	2.87	6616.57	5611.51	4232.16
10	-24.44	228.43	2.87	6616.57	5611.51	4232.16
11	-24.44	231.04	2.87	6889.09	5795.32	4370.80
11	-24.44	231.04	2.87	6889.09	5795.32	4370.80
12	-24.44	233.38	2.26	4147.95	731.40	551.61
12	-24.44	233.38	2.26	4147.95	731.40	551.61
13	4.36	236.83	4.86	8242.33	1453.35	1096.10
13	4.36	236.83	4.86	8242.33	1453.35	1096.10
14	4.36	241.68	4.86	7930.40	1398.34	1054.62
14	4.36	241.68	4.86	7930.40	1398.34	1054.62
15	4.36	245.82	3.46	4593.92	810.03	610.92
15	4.36	245.82	3.46	4593.92	810.03	610.92
16	4.36	249.28	3.46	15080.17	2659.04	2005.43
16	4.36	249.28	3.46	15080.17	2659.04	2005.43
17	4.36	251.80	1.60	2310.43	407.39	307.25
17	4.36	251.80	1.60	2310.43	407.39	307.25
18	4.36	253.55	1.91	2898.79	511.14	385.49
18	4.36	253.55	1.91	2898.79	511.14	385.49
19	4.36	256.40	3.81	6202.78	1093.72	824.87
19	4.36	256.40	3.81	6202.78	1093.72	824.87
20	4.36	259.20	1.81	3034.06	534.99	403.48
20	4.36	259.20	1.81	3034.06	534.99	403.48
21	4.36	261.93	3.66	6445.81	1136.57	857.19
21	4.36	261.93	3.66	6445.81	1136.57	857.19
22	4.36	265.57	3.66	7017.83	1237.43	933.26
22	4.36	265.57	3.66	7017.83	1237.43	933.26
23	4.36	268.25	1.70	3496.68	616.56	465.01
23	4.36	268.25	1.70	3496.68	616.56	465.01
24	4.36	271.63	5.08	11754.21	2072.58	1563.13

24	4.36	271.63	5.08	11754.21	2072.58	1563.13
25	4.36	276.70	5.08	13854.02	2442.84	1842.37
25	4.36	276.70	5.08	13854.02	2442.84	1842.37
26	4.36	281.77	5.08	15953.82	2813.09	2121.61
26	4.36	281.77	5.08	15953.82	2813.09	2121.61
27	4.36	286.15	3.71	12607.61	2223.06	1676.62
27	4.36	286.15	3.71	12607.61	2223.06	1676.62
28	4.36	289.75	3.51	12079.55	2129.95	1606.40
28	4.36	289.75	3.51	12079.55	2129.95	1606.40
29	4.36	293.25	3.51	12026.17	2120.54	1599.30
29	4.36	293.25	3.51	12026.17	2120.54	1599.30
30	4.36	297.44	4.89	17882.14	3153.10	2378.05
30	4.36	297.44	4.89	17882.14	3153.10	2378.05
31	4.36	302.32	4.89	17778.46	3134.82	2364.26
31	4.36	302.32	4.89	17778.46	3134.82	2364.26
32	4.36	307.20	4.89	17674.78	3116.54	2350.47
32	4.36	307.20	4.89	17674.78	3116.54	2350.47
33	4.36	312.07	4.89	17571.09	3098.26	2336.69
33	4.36	312.07	4.89	17571.09	3098.26	2336.69
34	4.36	316.95	4.89	17467.41	3079.98	2322.90
34	4.36	316.95	4.89	17467.41	3079.98	2322.90
35	4.36	321.83	4.89	17363.73	3061.69	2309.11
35	4.36	321.83	4.89	17363.73	3061.69	2309.11
36	4.36	326.71	4.89	17260.04	3043.41	2295.32
36	4.36	326.71	4.89	17260.04	3043.41	2295.32
37	4.36	331.59	4.89	17156.36	3025.13	2281.53
37	4.36	331.59	4.89	17156.36	3025.13	2281.53
38	4.36	336.46	4.89	17052.67	3006.85	2267.74
38	4.36	336.46	4.89	17052.67	3006.85	2267.74
39	4.36	341.34	4.89	16948.99	2988.56	2253.96
39	4.36	341.34	4.89	16948.99	2988.56	2253.96
40	4.36	346.22	4.89	16845.31	2970.28	2240.17
40	4.36	346.22	4.89	16845.31	2970.28	2240.17
41	4.36	351.10	4.89	16741.62	2952.00	2226.38
41	4.36	351.10	4.89	16741.62	2952.00	2226.38
42	4.36	355.98	4.89	16637.94	2933.72	2212.59
42	4.36	355.98	4.89	16637.94	2933.72	2212.59
43	4.36	360.85	4.89	16534.26	2915.44	2198.80
43	4.36	360.85	4.89	16534.26	2915.44	2198.80
44	4.36	365.73	4.89	16430.57	2897.15	2185.01
44	4.36	365.73	4.89	16430.57	2897.15	2185.01
45	4.36	370.61	4.89	16326.89	2878.87	2171.23
45	4.36	370.61	4.89	16326.89	2878.87	2171.23
46	49.49	373.39	1.04	2975.09	524.59	395.64
46	49.49	373.39	1.04	2975.09	524.59	395.64
47	49.49	375.99	6.96	11811.87	10751.23	8108.51
47	49.49	375.99	6.96	11811.87	10751.23	8108.51
48	49.69	378.27	0.06	97.53	90.21	68.04
48	49.69	378.27	0.06	97.53	90.21	68.04
49	49.69	379.57	3.97	5898.80	5566.58	4198.28
49	49.69	379.57	3.97	5898.80	5566.58	4198.28
50	49.69	382.14	3.97	5022.61	4975.58	3752.55
50	49.69	382.14	3.97	5022.61	4975.58	3752.55
51	54.28	385.76	8.00	6549.82	7617.91	5745.38
51	54.28	385.76	8.00	6549.82	7617.91	5745.38
52	82.77	388.18	1.34	358.90	242.08	182.57
52	82.77	388.18	1.34	358.90	242.08	182.57
53	82.77	388.68	6.66	1187.02	800.66	603.85
53	82.77	388.68	6.66	1187.02	800.66	603.85
54	88.50	389.13	2.52	45.99	31.02	23.39
54	88.50	389.13	2.52	45.99	31.02	23.39

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 54 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
16	14810.3	10370.3	18080.0	35.00	-0.120743E+05

***Pier/Pile Slice Force Data on the 54 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
18	12000.0	0.0	12000.0	90.00	-0.411757E+03

Sum of the Resisting Forces = 126262.90 (lbs)

Average Available Shear Strength = 610.81(psf)

Sum of the Driving Forces = 102590.43 (lbs)

Average Mobilized Shear Stress = 496.29(psf)

Total length of the failure surface = 206.71(ft)

Factor of Safety Balance Check: FS = 1.23075

Janbu's Correction Factor (fo) = 1.0587

Janub's FS Corrected = 1.30299

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.22784(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 641.564(ft)

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

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

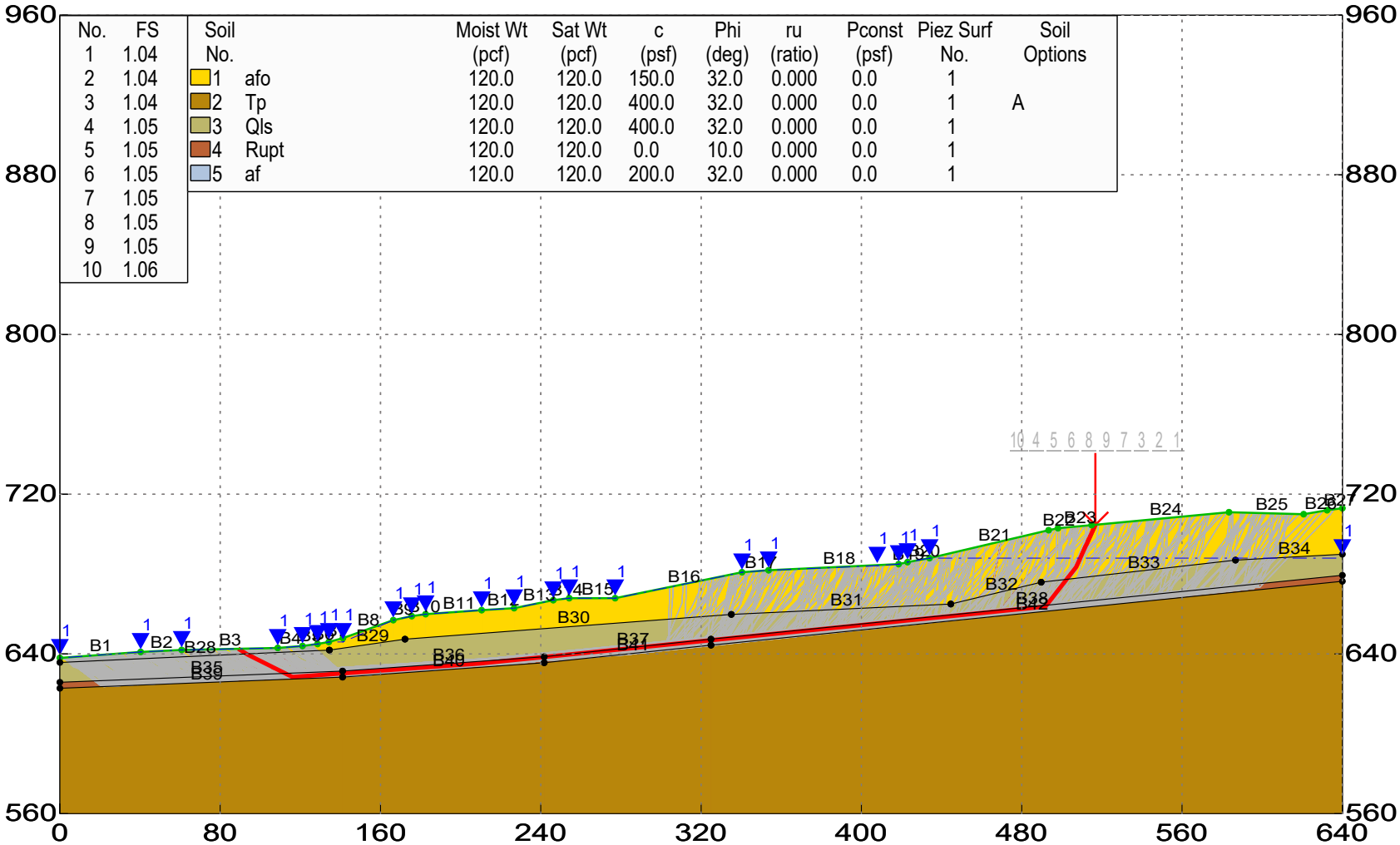
Royal Vista - Cross Section 6
Stage 1 (Existing Condition)

LGC Geotechnical / BPP

\Sec 6 - Stage 1 (Existing Condition).gsd

No.	FS
1	1.04
2	1.04
3	1.04
4	1.05
5	1.05
6	1.05
7	1.05
8	1.05
9	1.05
10	1.06

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 1.04

Simplified Janbu (Corrected) Method

GEOSTASE
Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 1 (Existing Condition).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 1 (Existing Condition).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 6

DESCRIPTION: Stage 1 (Existing Condition)

BOUNDARY DATA

27 Surface Boundaries
42 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	638.000	40.300	641.000	1
2	40.300	641.000	60.800	642.000	1
3	60.800	642.000	108.700	643.000	1
4	108.700	643.000	121.100	644.000	1
5	121.100	644.000	128.600	645.000	1
6	128.600	645.000	134.200	646.000	1
7	134.200	646.000	141.300	647.900	1
8	141.300	647.900	166.400	656.900	1
9	166.400	656.900	175.600	658.900	1
10	175.600	658.900	182.500	659.900	1
11	182.500	659.900	210.500	661.900	1
12	210.500	661.900	226.700	662.900	1
13	226.700	662.900	246.200	666.900	1
14	246.200	666.900	254.200	667.900	1
15	254.200	667.900	277.100	667.900	1
16	277.100	667.900	340.400	680.900	1
17	340.400	680.900	353.700	681.900	1
18	353.700	681.900	418.600	685.000	1
19	418.600	685.000	423.000	686.000	1
20	423.000	686.000	434.000	688.000	1
21	434.000	688.000	493.400	702.000	1
22	493.400	702.000	498.100	703.000	1
23	498.100	703.000	514.900	704.500	1
24	514.900	704.500	583.400	711.000	1
25	583.400	711.000	620.700	710.000	1
26	620.700	710.000	632.400	712.000	1

27	632.400	712.000	640.000	713.000	1
28	0.000	635.700	134.500	641.900	3
29	134.500	641.900	172.200	647.400	3
30	172.200	647.400	335.100	659.800	3
31	335.100	659.800	444.600	665.000	3
32	444.600	665.000	489.700	675.900	3
33	489.700	675.900	586.700	687.000	3
34	586.700	687.000	640.000	689.900	3
35	0.000	625.800	141.100	631.400	4
36	141.100	631.400	241.700	638.600	4
37	241.700	638.600	324.900	647.400	4
38	324.900	647.400	640.000	679.400	4
39	0.000	622.800	141.100	628.400	2
40	141.100	628.400	241.700	635.600	2
41	241.700	635.600	324.900	644.400	2
42	324.900	644.400	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	32.00
2	8.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 23 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	638.00
2	40.30	641.00
3	60.80	642.00
4	108.70	643.00
5	121.10	644.00
6	128.60	645.00
7	134.20	646.00
8	141.30	646.00
9	166.40	656.90
10	175.60	658.90
11	182.50	659.90
12	210.50	661.90
13	226.70	662.90
14	246.20	666.90
15	254.20	667.90
16	277.10	667.90
17	340.40	680.90
18	353.70	681.90
19	407.90	684.20
20	418.60	685.00
21	423.00	686.00
22	434.00	688.00
23	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

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.

3 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 = 25.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	20.00	625.00	140.00	630.50	3.00
2	145.00	630.00	295.00	642.00	3.00
3	300.00	643.00	600.00	674.50	3.00

The Simplified Janbu (Corrected) 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 = 3.926 FS Min = 1.042 FS Ave = 1.648
Standard Deviation = 0.618 Coefficient of Variation = 37.47 %

Critical Surface is Sequence Number 123 of Those Analyzed.

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

Factor Of Safety For The Critical or Specified Surface = 1.042

Table 1 - Geometry Data on the 101 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.21	1.34	91.11	641.29	642.63	-31.62	1.20	4.94
2	0.50	2.84	93.46	639.84	642.68	-31.62	1.20	0.59
3	5.00	4.30	96.21	638.44	642.74	-26.63	1.20	5.59
4	5.00	6.91	101.20	635.93	642.84	-26.63	1.20	5.59
5	5.00	9.52	106.20	633.43	642.95	-26.63	1.20	5.59
6	3.80	11.93	110.60	631.22	643.15	-26.63	4.61	4.25
7	3.55	14.08	114.28	629.37	643.45	-26.63	4.61	3.98
8	2.52	15.12	117.32	628.57	643.69	4.13	4.61	2.53
9	2.52	15.14	119.84	628.76	643.90	4.13	4.61	2.53
10	3.75	15.27	122.98	628.98	644.25	4.13	7.59	3.76
11	3.75	15.50	126.73	629.25	644.75	4.13	7.59	3.76
12	2.80	15.76	130.00	629.49	645.25	4.13	10.12	2.81
13	2.80	16.06	132.80	629.69	645.75	4.13	10.12	2.81
14	0.30	16.24	134.35	629.80	646.04	4.13	14.98	0.30
15	3.30	16.59	136.15	629.93	646.52	4.13	14.98	3.31
16	3.30	17.23	139.45	630.17	647.40	4.13	14.98	3.31
17	0.20	17.57	141.20	630.30	647.87	4.13	14.98	0.20
18	5.02	18.31	143.81	630.49	648.80	4.13	19.73	5.03
19	5.02	19.75	148.83	630.85	650.60	4.13	19.73	5.03
20	5.02	21.19	153.85	631.21	652.40	4.13	19.73	5.03
21	5.02	22.63	158.87	631.57	654.20	4.13	19.73	5.03
22	5.02	24.06	163.89	631.94	656.00	4.13	19.73	5.03
23	2.90	24.99	167.85	632.22	657.22	4.13	12.26	2.91
24	2.90	25.41	170.75	632.43	657.85	4.13	12.26	2.91
25	3.40	25.87	173.90	632.66	658.53	4.13	12.26	3.41
26	3.45	26.24	177.33	632.91	659.15	4.13	8.25	3.46
27	3.45	26.49	180.78	633.16	659.65	4.13	8.25	3.46
28	5.48	26.62	185.24	633.48	660.10	4.13	4.09	5.50
29	5.48	26.61	190.73	633.88	660.49	4.13	4.09	5.50
30	5.48	26.61	196.21	634.27	660.88	4.13	4.09	5.50
31	5.48	26.60	201.69	634.67	661.27	4.13	4.09	5.50
32	5.48	26.60	207.18	635.06	661.66	4.13	4.09	5.50
33	0.58	26.59	210.21	635.29	661.88	5.76	4.09	0.58
34	5.40	26.47	213.20	635.59	662.07	5.76	3.53	5.43
35	5.40	26.26	218.60	636.14	662.40	5.76	3.53	5.43
36	5.40	26.05	224.00	636.68	662.73	5.76	3.53	5.43
37	5.00	26.20	229.20	637.21	663.41	5.76	11.59	5.03
38	5.00	26.73	234.20	637.71	664.44	5.76	11.59	5.03
39	5.00	27.25	239.20	638.22	665.46	5.76	11.59	5.03
40	4.50	27.74	243.95	638.70	666.44	5.76	11.59	4.52
41	4.00	28.02	248.20	639.13	667.15	5.76	7.13	4.02
42	4.00	28.12	252.20	639.53	667.65	5.76	7.13	4.02
43	4.58	27.94	256.49	639.96	667.90	5.76	0.00	4.60
44	4.58	27.47	261.07	640.43	667.90	5.76	0.00	4.60
45	4.58	27.01	265.65	640.89	667.90	5.76	0.00	4.60
46	4.58	26.55	270.23	641.35	667.90	5.76	0.00	4.60
47	4.58	26.09	274.81	641.81	667.90	5.76	0.00	4.60
48	4.78	26.11	279.49	642.28	668.39	5.76	11.61	4.80
49	4.78	26.61	284.27	642.77	669.37	5.76	11.61	4.80
50	4.78	27.10	289.05	643.25	670.35	5.76	11.61	4.80
51	4.78	27.60	293.83	643.73	671.34	5.76	11.61	4.80
52	4.78	28.10	298.61	644.21	672.32	5.76	11.61	4.80
53	4.78	28.60	303.39	644.70	673.30	5.76	11.61	4.80
54	4.78	29.10	308.17	645.18	674.28	5.76	11.61	4.80
55	4.78	29.60	312.95	645.66	675.26	5.76	11.61	4.80
56	4.78	30.10	317.73	646.14	676.24	5.76	11.61	4.80
57	4.78	30.60	322.51	646.63	677.23	5.76	11.61	4.80
58	5.10	31.11	327.45	647.13	678.24	5.76	11.61	5.13
59	5.10	31.65	332.55	647.64	679.29	5.76	11.61	5.13
60	2.65	32.05	336.42	648.03	680.08	5.76	11.61	2.66
61	2.65	32.33	339.07	648.30	680.63	5.76	11.61	2.66
62	4.43	32.41	342.62	648.66	681.07	5.76	4.30	4.46

63	4.43	32.30	347.05	649.10	681.40	5.76	4.30	4.46
64	4.43	32.18	351.48	649.55	681.73	5.76	4.30	4.46
65	4.93	31.99	356.16	650.02	682.02	5.76	2.73	4.95
66	4.93	31.73	361.09	650.52	682.25	5.76	2.73	4.95
67	4.93	31.47	366.02	651.02	682.49	5.76	2.73	4.95
68	4.93	31.21	370.95	651.52	682.72	5.76	2.73	4.95
69	4.93	30.95	375.87	652.01	682.96	5.76	2.73	4.95
70	4.93	30.68	380.80	652.51	683.19	5.76	2.73	4.95
71	4.93	30.42	385.73	653.01	683.43	5.76	2.73	4.95
72	4.93	30.16	390.65	653.51	683.67	5.76	2.73	4.95
73	4.93	29.90	395.58	654.00	683.90	5.76	2.73	4.95
74	4.93	29.64	400.51	654.50	684.14	5.76	2.73	4.95
75	4.93	29.37	405.44	655.00	684.37	5.76	2.73	4.95
76	5.35	29.10	410.57	655.52	684.62	5.76	2.73	5.38
77	5.35	28.82	415.93	656.06	684.87	5.76	2.73	5.38
78	4.40	28.95	420.80	656.55	685.50	5.76	12.80	4.42
79	5.50	29.45	425.75	657.05	686.50	5.76	10.30	5.53
80	5.50	29.90	431.25	657.60	687.50	5.76	10.30	5.53
81	5.30	30.48	436.65	658.15	688.62	5.76	13.26	5.33
82	5.30	31.19	441.95	658.68	689.87	5.76	13.26	5.33
83	5.01	31.88	447.11	659.20	691.09	5.76	13.26	5.04
84	5.01	32.56	452.12	659.71	692.27	5.76	13.26	5.04
85	5.01	33.23	457.13	660.22	693.45	5.76	13.26	5.04
86	5.01	33.91	462.14	660.72	694.63	5.76	13.26	5.04
87	5.01	34.59	467.15	661.23	695.81	5.76	13.26	5.04
88	5.01	35.26	472.16	661.73	696.99	5.76	13.26	5.04
89	5.01	35.94	477.17	662.24	698.18	5.76	13.26	5.04
90	5.01	36.61	482.18	662.75	699.36	5.76	13.26	5.04
91	5.01	37.29	487.19	663.25	700.54	5.76	13.26	5.04
92	2.10	37.77	490.75	663.61	701.38	5.76	13.26	2.11
93	0.53	37.63	492.07	664.06	701.69	52.20	13.26	0.87
94	1.06	36.78	492.87	665.09	701.87	52.20	13.26	1.74
95	4.70	33.69	495.75	668.81	702.50	52.20	12.01	7.67
96	4.28	28.60	500.24	674.59	703.19	52.20	5.10	6.98
97	4.75	23.18	504.75	680.41	703.59	52.20	5.10	7.75
98	2.06	18.16	508.15	685.74	703.90	65.55	5.10	4.98
99	2.86	12.97	510.61	691.14	704.12	65.55	5.10	6.90
100	2.86	6.95	513.47	697.43	704.37	65.55	5.10	6.90
101	1.87	1.97	515.83	702.62	704.59	65.55	5.42	4.51

Table 2 - Force Data On The 101 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	677.0	0.0	413.2	0.0	0.0	0.0
2	169.9	0.0	103.7	0.0	0.0	0.0
3	2579.8	0.0	1500.1	0.0	0.0	0.0
4	4144.8	0.0	2410.1	0.0	0.0	0.0
5	5709.9	0.0	3320.2	0.0	0.0	0.0
6	5446.2	0.0	3147.8	0.0	0.0	0.0
7	6003.8	0.0	3470.0	0.0	0.0	0.0
8	4575.3	0.0	2370.0	0.0	0.0	0.0
9	4581.7	0.0	2373.3	0.0	0.0	0.0
10	6870.5	0.0	3519.4	0.0	0.0	0.0
11	6973.6	0.0	3572.2	0.0	0.0	0.0
12	5295.5	0.0	2675.5	0.0	0.0	0.0
13	5395.5	0.0	2726.1	0.0	0.0	0.0
14	584.5	0.0	304.0	0.0	0.0	0.0
15	6568.8	0.0	3317.0	0.0	0.0	0.0
16	6824.2	0.0	3267.8	0.0	0.0	0.0
17	421.8	0.0	196.5	0.0	0.0	0.0
18	11031.7	0.0	4387.0	0.0	0.0	0.0
19	11897.6	0.0	4867.3	0.0	0.0	0.0
20	12763.5	0.0	5347.5	0.0	0.0	0.0
21	13629.4	0.0	5827.7	0.0	0.0	0.0
22	14495.2	0.0	6307.9	0.0	0.0	0.0
23	8697.1	0.0	4329.7	0.0	0.0	0.0

24	8843.6	0.0	4402.6	0.0	0.0	0.0
25	10554.9	0.0	5254.5	0.0	0.0	0.0
26	10864.2	0.0	5547.6	0.0	0.0	0.0
27	10968.1	0.0	5600.6	0.0	0.0	0.0
28	17515.5	0.0	9085.5	0.0	0.0	0.0
29	17512.7	0.0	9084.0	0.0	0.0	0.0
30	17509.8	0.0	9082.5	0.0	0.0	0.0
31	17506.9	0.0	9081.0	0.0	0.0	0.0
32	17504.0	0.0	9079.5	0.0	0.0	0.0
33	1850.4	0.0	962.2	0.0	0.0	0.0
34	17154.7	0.0	8931.7	0.0	0.0	0.0
35	17017.5	0.0	8860.3	0.0	0.0	0.0
36	16880.3	0.0	8788.9	0.0	0.0	0.0
37	15722.6	0.0	7885.5	0.0	0.0	0.0
38	16035.2	0.0	8042.3	0.0	0.0	0.0
39	16347.7	0.0	8199.0	0.0	0.0	0.0
40	14980.2	0.0	7513.2	0.0	0.0	0.0
41	13451.4	0.0	6922.1	0.0	0.0	0.0
42	13497.5	0.0	6945.9	0.0	0.0	0.0
43	15354.1	0.0	8024.7	0.0	0.0	0.0
44	15100.0	0.0	7891.9	0.0	0.0	0.0
45	14845.9	0.0	7759.1	0.0	0.0	0.0
46	14591.8	0.0	7626.3	0.0	0.0	0.0
47	14337.7	0.0	7493.5	0.0	0.0	0.0
48	14974.4	0.0	7509.5	0.0	0.0	0.0
49	15260.7	0.0	7653.1	0.0	0.0	0.0
50	15547.0	0.0	7796.7	0.0	0.0	0.0
51	15833.4	0.0	7940.3	0.0	0.0	0.0
52	16119.7	0.0	8083.9	0.0	0.0	0.0
53	16406.0	0.0	8227.5	0.0	0.0	0.0
54	16692.3	0.0	8371.1	0.0	0.0	0.0
55	16978.7	0.0	8514.6	0.0	0.0	0.0
56	17265.0	0.0	8658.2	0.0	0.0	0.0
57	17551.3	0.0	8801.8	0.0	0.0	0.0
58	19042.0	0.0	9549.4	0.0	0.0	0.0
59	19367.9	0.0	9712.9	0.0	0.0	0.0
60	10192.4	0.0	5111.4	0.0	0.0	0.0
61	10280.4	0.0	5155.5	0.0	0.0	0.0
62	17241.9	0.0	8960.7	0.0	0.0	0.0
63	17181.2	0.0	8929.1	0.0	0.0	0.0
64	17120.4	0.0	8897.6	0.0	0.0	0.0
65	18916.7	0.0	9864.9	0.0	0.0	0.0
66	18761.8	0.0	9775.9	0.0	0.0	0.0
67	18606.9	0.0	9687.0	0.0	0.0	0.0
68	18451.9	0.0	9598.1	0.0	0.0	0.0
69	18297.0	0.0	9509.1	0.0	0.0	0.0
70	18142.1	0.0	9420.2	0.0	0.0	0.0
71	17987.2	0.0	9331.3	0.0	0.0	0.0
72	17832.2	0.0	9242.4	0.0	0.0	0.0
73	17677.3	0.0	9153.4	0.0	0.0	0.0
74	17522.4	0.0	9064.5	0.0	0.0	0.0
75	17367.5	0.0	8975.6	0.0	0.0	0.0
76	18682.1	0.0	9637.5	0.0	0.0	0.0
77	18499.4	0.0	9590.7	0.0	0.0	0.0
78	15286.1	0.0	7596.8	0.0	0.0	0.0
79	19437.8	0.0	9834.0	0.0	0.0	0.0
80	19731.4	0.0	9982.5	0.0	0.0	0.0
81	19382.5	0.0	9922.5	0.0	0.0	0.0
82	19836.7	0.0	9744.7	0.0	0.0	0.0
83	19173.2	0.0	9049.9	0.0	0.0	0.0
84	19579.2	0.0	8891.0	0.0	0.0	0.0
85	19985.3	0.0	8732.0	0.0	0.0	0.0
86	20391.3	0.0	8573.0	0.0	0.0	0.0
87	20797.3	0.0	8414.0	0.0	0.0	0.0
88	21203.4	0.0	8255.1	0.0	0.0	0.0
89	21609.4	0.0	8096.1	0.0	0.0	0.0
90	22015.5	0.0	7937.1	0.0	0.0	0.0
91	22421.5	0.0	7778.1	0.0	0.0	0.0
92	9530.4	0.0	3216.8	0.0	0.0	0.0
93	2408.4	0.0	1300.2	0.0	0.0	0.0
94	4695.0	0.0	2481.1	0.0	0.0	0.0
95	19003.8	0.0	9185.4	0.0	0.0	0.0

96	14680.3	0.0	5839.4	0.0	0.0	0.0
97	13205.4	0.0	3667.9	0.0	0.0	0.0
98	4488.7	0.0	703.0	0.0	0.0	0.0
99	4449.8	0.0	0.0	0.0	0.0	0.0
100	2381.9	0.0	0.0	0.0	0.0	0.0
101	440.5	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1357218.18(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 712971.30(lbs)

TOTAL AREA OF SLIDING MASS = 11310.15(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 101 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	150.00	32.00	
2	3	400.00	32.00	
3	3	400.00	32.00	
4	3	400.00	32.00	
5	3	400.00	32.00	
6	3	400.00	32.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	4	0.00	10.00	
40	4	0.00	10.00	
41	4	0.00	10.00	
42	4	0.00	10.00	
43	4	0.00	10.00	
44	4	0.00	10.00	
45	4	0.00	10.00	
46	4	0.00	10.00	
47	4	0.00	10.00	
48	4	0.00	10.00	
49	4	0.00	10.00	
50	4	0.00	10.00	
51	4	0.00	10.00	
52	4	0.00	10.00	
53	4	0.00	10.00	
54	4	0.00	10.00	

55	4	0.00	10.00
56	4	0.00	10.00
57	4	0.00	10.00
58	4	0.00	10.00
59	4	0.00	10.00
60	4	0.00	10.00
61	4	0.00	10.00
62	4	0.00	10.00
63	4	0.00	10.00
64	4	0.00	10.00
65	4	0.00	10.00
66	4	0.00	10.00
67	4	0.00	10.00
68	4	0.00	10.00
69	4	0.00	10.00
70	4	0.00	10.00
71	4	0.00	10.00
72	4	0.00	10.00
73	4	0.00	10.00
74	4	0.00	10.00
75	4	0.00	10.00
76	4	0.00	10.00
77	4	0.00	10.00
78	4	0.00	10.00
79	4	0.00	10.00
80	4	0.00	10.00
81	4	0.00	10.00
82	4	0.00	10.00
83	4	0.00	10.00
84	4	0.00	10.00
85	4	0.00	10.00
86	4	0.00	10.00
87	4	0.00	10.00
88	4	0.00	10.00
89	4	0.00	10.00
90	4	0.00	10.00
91	4	0.00	10.00
92	4	0.00	10.00
93	4	0.00	10.00
94	3	400.00	32.00
95	3	400.00	32.00
96	3	400.00	32.00
97	1	150.00	32.00
98	1	150.00	32.00
99	1	150.00	32.00
100	1	150.00	32.00
101	1	150.00	32.00

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 101 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-31.62	91.11	4.94	274.97	321.82	309.24
1	-31.62	91.11	4.94	274.97	321.82	309.24
2	-31.62	93.46	0.59	664.53	815.25	783.37
2	-31.62	93.46	0.59	664.53	815.25	783.37
3	-26.63	96.21	5.59	652.17	807.52	775.95
3	-26.63	96.21	5.59	652.17	807.52	775.95
4	-26.63	101.20	5.59	871.05	944.29	907.38
4	-26.63	101.20	5.59	871.05	944.29	907.38
5	-26.63	106.20	5.59	1089.93	1081.07	1038.80
5	-26.63	106.20	5.59	1089.93	1081.07	1038.80

6	-26.63	110.60	4.25	1298.73	1211.53	1164.17
6	-26.63	110.60	4.25	1298.73	1211.53	1164.17
7	-26.63	114.28	3.98	895.51	157.90	151.73
7	-26.63	114.28	3.98	895.51	157.90	151.73
8	4.13	117.32	2.53	866.08	152.71	146.74
8	4.13	117.32	2.53	866.08	152.71	146.74
9	4.13	119.84	2.53	867.30	152.93	146.95
9	4.13	119.84	2.53	867.30	152.93	146.95
10	4.13	122.98	3.76	884.82	156.02	149.92
10	4.13	122.98	3.76	884.82	156.02	149.92
11	4.13	126.73	3.76	898.10	158.36	152.17
11	4.13	126.73	3.76	898.10	158.36	152.17
12	4.13	130.00	2.81	926.41	163.35	156.97
12	4.13	130.00	2.81	926.41	163.35	156.97
13	4.13	132.80	2.81	943.91	166.44	159.93
13	4.13	132.80	2.81	943.91	166.44	159.93
14	4.13	134.35	0.30	925.95	163.27	156.89
14	4.13	134.35	0.30	925.95	163.27	156.89
15	4.13	136.15	3.31	975.63	172.03	165.30
15	4.13	136.15	3.31	975.63	172.03	165.30
16	4.13	139.45	3.31	1066.71	188.09	180.74
16	4.13	139.45	3.31	1066.71	188.09	180.74
17	4.13	141.20	0.20	1115.01	196.61	188.92
17	4.13	141.20	0.20	1115.01	196.61	188.92
18	4.13	143.81	5.03	1309.26	230.86	221.83
18	4.13	143.81	5.03	1309.26	230.86	221.83
19	4.13	148.83	5.03	1385.37	244.28	234.73
19	4.13	148.83	5.03	1385.37	244.28	234.73
20	4.13	153.85	5.03	1461.48	257.70	247.62
20	4.13	153.85	5.03	1461.48	257.70	247.62
21	4.13	158.87	5.03	1537.58	271.12	260.52
21	4.13	158.87	5.03	1537.58	271.12	260.52
22	4.13	163.89	5.03	1613.69	284.54	273.41
22	4.13	163.89	5.03	1613.69	284.54	273.41
23	4.13	167.85	2.91	1490.94	262.89	252.62
23	4.13	167.85	2.91	1490.94	262.89	252.62
24	4.13	170.75	2.91	1516.05	267.32	256.87
24	4.13	170.75	2.91	1516.05	267.32	256.87
25	4.13	173.90	3.41	1543.33	272.13	261.49
25	4.13	173.90	3.41	1543.33	272.13	261.49
26	4.13	177.33	3.46	1525.83	269.05	258.53
26	4.13	177.33	3.46	1525.83	269.05	258.53
27	4.13	180.78	3.46	1540.42	271.62	261.00
27	4.13	180.78	3.46	1540.42	271.62	261.00
28	4.13	185.24	5.50	1522.17	268.40	257.91
28	4.13	185.24	5.50	1522.17	268.40	257.91
29	4.13	190.73	5.50	1521.92	268.35	257.86
29	4.13	190.73	5.50	1521.92	268.35	257.86
30	4.13	196.21	5.50	1521.66	268.31	257.82
30	4.13	196.21	5.50	1521.66	268.31	257.82
31	4.13	201.69	5.50	1521.41	268.27	257.78
31	4.13	201.69	5.50	1521.41	268.27	257.78
32	4.13	207.18	5.50	1521.16	268.22	257.74
32	4.13	207.18	5.50	1521.16	268.22	257.74
33	5.76	210.21	0.58	1513.00	266.78	256.35
33	5.76	210.21	0.58	1513.00	266.78	256.35
34	5.76	213.20	5.43	1504.41	265.27	254.90
34	5.76	213.20	5.43	1504.41	265.27	254.90
35	5.76	218.60	5.43	1492.37	263.15	252.86
35	5.76	218.60	5.43	1492.37	263.15	252.86
36	5.76	224.00	5.43	1480.34	261.02	250.82
36	5.76	224.00	5.43	1480.34	261.02	250.82
37	5.76	229.20	5.03	1547.90	272.94	262.27
37	5.76	229.20	5.03	1547.90	272.94	262.27
38	5.76	234.20	5.03	1578.67	278.36	267.48
38	5.76	234.20	5.03	1578.67	278.36	267.48
39	5.76	239.20	5.03	1609.44	283.79	272.69
39	5.76	239.20	5.03	1609.44	283.79	272.69
40	5.76	243.95	4.52	1638.67	288.94	277.65
40	5.76	243.95	4.52	1638.67	288.94	277.65
41	5.76	248.20	4.02	1612.42	284.31	273.20
41	5.76	248.20	4.02	1612.42	284.31	273.20

42	5.76	252.20	4.02	1617.96	285.29	274.14
42	5.76	252.20	4.02	1617.96	285.29	274.14
43	5.76	256.49	4.60	1581.07	278.79	267.89
43	5.76	256.49	4.60	1581.07	278.79	267.89
44	5.76	261.07	4.60	1554.91	274.17	263.45
44	5.76	261.07	4.60	1554.91	274.17	263.45
45	5.76	265.65	4.60	1528.74	269.56	259.02
45	5.76	265.65	4.60	1528.74	269.56	259.02
46	5.76	270.23	4.60	1502.58	264.95	254.59
46	5.76	270.23	4.60	1502.58	264.95	254.59
47	5.76	274.81	4.60	1476.41	260.33	250.15
47	5.76	274.81	4.60	1476.41	260.33	250.15
48	5.76	279.49	4.80	1542.23	271.94	261.31
48	5.76	279.49	4.80	1542.23	271.94	261.31
49	5.76	284.27	4.80	1571.72	277.14	266.30
49	5.76	284.27	4.80	1571.72	277.14	266.30
50	5.76	289.05	4.80	1601.21	282.34	271.30
50	5.76	289.05	4.80	1601.21	282.34	271.30
51	5.76	293.83	4.80	1630.70	287.54	276.30
51	5.76	293.83	4.80	1630.70	287.54	276.30
52	5.76	298.61	4.80	1660.19	292.74	281.29
52	5.76	298.61	4.80	1660.19	292.74	281.29
53	5.76	303.39	4.80	1689.68	297.94	286.29
53	5.76	303.39	4.80	1689.68	297.94	286.29
54	5.76	308.17	4.80	1719.17	303.14	291.28
54	5.76	308.17	4.80	1719.17	303.14	291.28
55	5.76	312.95	4.80	1748.65	308.33	296.28
55	5.76	312.95	4.80	1748.65	308.33	296.28
56	5.76	317.73	4.80	1778.14	313.53	301.28
56	5.76	317.73	4.80	1778.14	313.53	301.28
57	5.76	322.51	4.80	1807.63	318.73	306.27
57	5.76	322.51	4.80	1807.63	318.73	306.27
58	5.76	327.45	5.13	1838.11	324.11	311.44
58	5.76	327.45	5.13	1838.11	324.11	311.44
59	5.76	332.55	5.13	1869.57	329.66	316.77
59	5.76	332.55	5.13	1869.57	329.66	316.77
60	5.76	336.42	2.66	1893.48	333.87	320.82
60	5.76	336.42	2.66	1893.48	333.87	320.82
61	5.76	339.07	2.66	1909.82	336.75	323.59
61	5.76	339.07	2.66	1909.82	336.75	323.59
62	5.76	342.62	4.46	1845.38	325.39	312.67
62	5.76	342.62	4.46	1845.38	325.39	312.67
63	5.76	347.05	4.46	1838.88	324.24	311.57
63	5.76	347.05	4.46	1838.88	324.24	311.57
64	5.76	351.48	4.46	1832.38	323.10	310.47
64	5.76	351.48	4.46	1832.38	323.10	310.47
65	5.76	356.16	4.95	1814.97	320.03	307.52
65	5.76	356.16	4.95	1814.97	320.03	307.52
66	5.76	361.09	4.95	1801.72	317.69	305.27
66	5.76	361.09	4.95	1801.72	317.69	305.27
67	5.76	366.02	4.95	1788.47	315.36	303.03
67	5.76	366.02	4.95	1788.47	315.36	303.03
68	5.76	370.95	4.95	1775.22	313.02	300.78
68	5.76	370.95	4.95	1775.22	313.02	300.78
69	5.76	375.87	4.95	1761.97	310.68	298.54
69	5.76	375.87	4.95	1761.97	310.68	298.54
70	5.76	380.80	4.95	1748.72	308.35	296.29
70	5.76	380.80	4.95	1748.72	308.35	296.29
71	5.76	385.73	4.95	1735.47	306.01	294.05
71	5.76	385.73	4.95	1735.47	306.01	294.05
72	5.76	390.65	4.95	1722.22	303.67	291.80
72	5.76	390.65	4.95	1722.22	303.67	291.80
73	5.76	395.58	4.95	1708.97	301.34	289.56
73	5.76	395.58	4.95	1708.97	301.34	289.56
74	5.76	400.51	4.95	1695.72	299.00	287.31
74	5.76	400.51	4.95	1695.72	299.00	287.31
75	5.76	405.44	4.95	1682.47	296.66	285.07
75	5.76	405.44	4.95	1682.47	296.66	285.07
76	5.76	410.57	5.38	1670.02	294.47	282.96
76	5.76	410.57	5.38	1670.02	294.47	282.96
77	5.76	415.93	5.38	1645.01	290.06	278.72
77	5.76	415.93	5.38	1645.01	290.06	278.72

78	5.76	420.80	4.42	1725.65	304.28	292.38
78	5.76	420.80	4.42	1725.65	304.28	292.38
79	5.76	425.75	5.53	1724.56	304.09	292.20
79	5.76	425.75	5.53	1724.56	304.09	292.20
80	5.76	431.25	5.53	1750.61	308.68	296.61
80	5.76	431.25	5.53	1750.61	308.68	296.61
81	5.76	436.65	5.33	1763.04	310.87	298.72
81	5.76	436.65	5.33	1763.04	310.87	298.72
82	5.76	441.95	5.33	1880.05	331.50	318.54
82	5.76	441.95	5.33	1880.05	331.50	318.54
83	5.76	447.11	5.04	1993.87	351.57	337.83
83	5.76	447.11	5.04	1993.87	351.57	337.83
84	5.76	452.12	5.04	2104.49	371.08	356.57
84	5.76	452.12	5.04	2104.49	371.08	356.57
85	5.76	457.13	5.04	2215.12	390.59	375.32
85	5.76	457.13	5.04	2215.12	390.59	375.32
86	5.76	462.14	5.04	2325.75	410.09	394.06
86	5.76	462.14	5.04	2325.75	410.09	394.06
87	5.76	467.15	5.04	2436.37	429.60	412.80
87	5.76	467.15	5.04	2436.37	429.60	412.80
88	5.76	472.16	5.04	2547.00	449.10	431.55
88	5.76	472.16	5.04	2547.00	449.10	431.55
89	5.76	477.17	5.04	2657.63	468.61	450.29
89	5.76	477.17	5.04	2657.63	468.61	450.29
90	5.76	482.18	5.04	2768.25	488.12	469.03
90	5.76	482.18	5.04	2768.25	488.12	469.03
91	5.76	487.19	5.04	2878.88	507.62	487.78
91	5.76	487.19	5.04	2878.88	507.62	487.78
92	5.76	490.75	2.11	2957.41	521.47	501.08
92	5.76	490.75	2.11	2957.41	521.47	501.08
93	52.20	492.07	0.87	2462.50	434.21	417.23
93	52.20	492.07	0.87	2462.50	434.21	417.23
94	52.20	492.87	1.74	1368.93	1255.40	1206.32
94	52.20	492.87	1.74	1368.93	1255.40	1206.32
95	52.20	495.75	7.67	1291.90	1207.27	1160.07
95	52.20	495.75	7.67	1291.90	1207.27	1160.07
96	52.20	500.24	6.98	1153.08	1120.52	1076.72
96	52.20	500.24	6.98	1153.08	1120.52	1076.72
97	52.20	504.75	7.75	1172.47	882.64	848.13
97	52.20	504.75	7.75	1172.47	882.64	848.13
98	65.55	508.15	4.98	720.57	600.26	576.79
98	65.55	508.15	4.98	720.57	600.26	576.79
99	65.55	510.61	6.90	517.68	473.48	454.97
99	65.55	510.61	6.90	517.68	473.48	454.97
100	65.55	513.47	6.90	212.59	282.84	271.78
100	65.55	513.47	6.90	212.59	282.84	271.78
101	65.55	515.83	4.51	99.44	62.13	59.71
101	65.55	515.83	4.51	99.44	62.13	59.71

Table 4 - Base Force Data on the 101 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-31.62	91.11	4.94	1359.55	1591.20	1528.99
1	-31.62	91.11	4.94	1359.55	1591.20	1528.99
2	-31.62	93.46	0.59	389.17	477.44	458.77
2	-31.62	93.46	0.59	389.17	477.44	458.77
3	-26.63	96.21	5.59	3645.51	4513.90	4337.43
3	-26.63	96.21	5.59	3645.51	4513.90	4337.43
4	-26.63	101.20	5.59	4869.03	5278.44	5072.09
4	-26.63	101.20	5.59	4869.03	5278.44	5072.09
5	-26.63	106.20	5.59	6092.55	6042.99	5806.74
5	-26.63	106.20	5.59	6092.55	6042.99	5806.74
6	-26.63	110.60	4.25	5525.04	5154.11	4952.61
6	-26.63	110.60	4.25	5525.04	5154.11	4952.61
7	-26.63	114.28	3.98	3560.79	627.86	603.32
7	-26.63	114.28	3.98	3560.79	627.86	603.32
8	4.13	117.32	2.53	2189.45	386.06	370.97

8	4.13	117.32	2.53	2189.45	386.06	370.97
9	4.13	119.84	2.53	2192.53	386.60	371.49
9	4.13	119.84	2.53	2192.53	386.60	371.49
10	4.13	122.98	3.76	3326.71	586.59	563.66
10	4.13	122.98	3.76	3326.71	586.59	563.66
11	4.13	126.73	3.76	3376.64	595.39	572.12
11	4.13	126.73	3.76	3376.64	595.39	572.12
12	4.13	130.00	2.81	2600.71	458.58	440.65
12	4.13	130.00	2.81	2600.71	458.58	440.65
13	4.13	132.80	2.81	2649.85	467.24	448.97
13	4.13	132.80	2.81	2649.85	467.24	448.97
14	4.13	134.35	0.30	278.51	49.11	47.19
14	4.13	134.35	0.30	278.51	49.11	47.19
15	4.13	136.15	3.31	3227.96	569.18	546.92
15	4.13	136.15	3.31	3227.96	569.18	546.92
16	4.13	139.45	3.31	3529.32	622.31	597.99
16	4.13	139.45	3.31	3529.32	622.31	597.99
17	4.13	141.20	0.20	223.58	39.42	37.88
17	4.13	141.20	0.20	223.58	39.42	37.88
18	4.13	143.81	5.03	6589.61	1161.93	1116.50
18	4.13	143.81	5.03	6589.61	1161.93	1116.50
19	4.13	148.83	5.03	6972.67	1229.47	1181.40
19	4.13	148.83	5.03	6972.67	1229.47	1181.40
20	4.13	153.85	5.03	7355.72	1297.01	1246.31
20	4.13	153.85	5.03	7355.72	1297.01	1246.31
21	4.13	158.87	5.03	7738.78	1364.56	1311.21
21	4.13	158.87	5.03	7738.78	1364.56	1311.21
22	4.13	163.89	5.03	8121.84	1432.10	1376.11
22	4.13	163.89	5.03	8121.84	1432.10	1376.11
23	4.13	167.85	2.91	4334.99	764.38	734.49
23	4.13	167.85	2.91	4334.99	764.38	734.49
24	4.13	170.75	2.91	4408.01	777.25	746.87
24	4.13	170.75	2.91	4408.01	777.25	746.87
25	4.13	173.90	3.41	5261.00	927.66	891.39
25	4.13	173.90	3.41	5261.00	927.66	891.39
26	4.13	177.33	3.46	5277.84	930.63	894.24
26	4.13	177.33	3.46	5277.84	930.63	894.24
27	4.13	180.78	3.46	5328.28	939.52	902.79
27	4.13	180.78	3.46	5328.28	939.52	902.79
28	4.13	185.24	5.50	8369.32	1475.74	1418.04
28	4.13	185.24	5.50	8369.32	1475.74	1418.04
29	4.13	190.73	5.50	8367.94	1475.49	1417.81
29	4.13	190.73	5.50	8367.94	1475.49	1417.81
30	4.13	196.21	5.50	8366.56	1475.25	1417.58
30	4.13	196.21	5.50	8366.56	1475.25	1417.58
31	4.13	201.69	5.50	8365.17	1475.01	1417.34
31	4.13	201.69	5.50	8365.17	1475.01	1417.34
32	4.13	207.18	5.50	8363.79	1474.76	1417.11
32	4.13	207.18	5.50	8363.79	1474.76	1417.11
33	5.76	210.21	0.58	881.93	155.51	149.43
33	5.76	210.21	0.58	881.93	155.51	149.43
34	5.76	213.20	5.43	8165.07	1439.72	1383.44
34	5.76	213.20	5.43	8165.07	1439.72	1383.44
35	5.76	218.60	5.43	8099.76	1428.21	1372.37
35	5.76	218.60	5.43	8099.76	1428.21	1372.37
36	5.76	224.00	5.43	8034.45	1416.69	1361.31
36	5.76	224.00	5.43	8034.45	1416.69	1361.31
37	5.76	229.20	5.03	7778.82	1371.62	1317.99
37	5.76	229.20	5.03	7778.82	1371.62	1317.99
38	5.76	234.20	5.03	7933.46	1398.88	1344.19
38	5.76	234.20	5.03	7933.46	1398.88	1344.19
39	5.76	239.20	5.03	8088.09	1426.15	1370.39
39	5.76	239.20	5.03	8088.09	1426.15	1370.39
40	5.76	243.95	4.52	7411.50	1306.85	1255.76
40	5.76	243.95	4.52	7411.50	1306.85	1255.76
41	5.76	248.20	4.02	6482.45	1143.03	1098.34
41	5.76	248.20	4.02	6482.45	1143.03	1098.34
42	5.76	252.20	4.02	6504.71	1146.96	1102.12
42	5.76	252.20	4.02	6504.71	1146.96	1102.12
43	5.76	256.49	4.60	7278.11	1283.33	1233.16
43	5.76	256.49	4.60	7278.11	1283.33	1233.16
44	5.76	261.07	4.60	7157.67	1262.09	1212.75

44	5.76	261.07	4.60	7157.67	1262.09	1212.75
45	5.76	265.65	4.60	7037.22	1240.85	1192.34
45	5.76	265.65	4.60	7037.22	1240.85	1192.34
46	5.76	270.23	4.60	6916.78	1219.61	1171.93
46	5.76	270.23	4.60	6916.78	1219.61	1171.93
47	5.76	274.81	4.60	6796.34	1198.38	1151.53
47	5.76	274.81	4.60	6796.34	1198.38	1151.53
48	5.76	279.49	4.80	7409.33	1306.47	1255.39
48	5.76	279.49	4.80	7409.33	1306.47	1255.39
49	5.76	284.27	4.80	7551.01	1331.45	1279.39
49	5.76	284.27	4.80	7551.01	1331.45	1279.39
50	5.76	289.05	4.80	7692.68	1356.43	1303.40
50	5.76	289.05	4.80	7692.68	1356.43	1303.40
51	5.76	293.83	4.80	7834.35	1381.41	1327.40
51	5.76	293.83	4.80	7834.35	1381.41	1327.40
52	5.76	298.61	4.80	7976.02	1406.39	1351.41
52	5.76	298.61	4.80	7976.02	1406.39	1351.41
53	5.76	303.39	4.80	8117.70	1431.37	1375.41
53	5.76	303.39	4.80	8117.70	1431.37	1375.41
54	5.76	308.17	4.80	8259.37	1456.35	1399.41
54	5.76	308.17	4.80	8259.37	1456.35	1399.41
55	5.76	312.95	4.80	8401.04	1481.33	1423.42
55	5.76	312.95	4.80	8401.04	1481.33	1423.42
56	5.76	317.73	4.80	8542.72	1506.31	1447.42
56	5.76	317.73	4.80	8542.72	1506.31	1447.42
57	5.76	322.51	4.80	8684.39	1531.29	1471.43
57	5.76	322.51	4.80	8684.39	1531.29	1471.43
58	5.76	327.45	5.13	9421.99	1661.35	1596.40
58	5.76	327.45	5.13	9421.99	1661.35	1596.40
59	5.76	332.55	5.13	9583.26	1689.79	1623.73
59	5.76	332.55	5.13	9583.26	1689.79	1623.73
60	5.76	336.42	2.66	5043.21	889.25	854.49
60	5.76	336.42	2.66	5043.21	889.25	854.49
61	5.76	339.07	2.66	5086.75	896.93	861.87
61	5.76	339.07	2.66	5086.75	896.93	861.87
62	5.76	342.62	4.46	8222.76	1449.89	1393.21
62	5.76	342.62	4.46	8222.76	1449.89	1393.21
63	5.76	347.05	4.46	8193.79	1444.79	1388.30
63	5.76	347.05	4.46	8193.79	1444.79	1388.30
64	5.76	351.48	4.46	8164.82	1439.68	1383.39
64	5.76	351.48	4.46	8164.82	1439.68	1383.39
65	5.76	356.16	4.95	8988.29	1584.88	1522.92
65	5.76	356.16	4.95	8988.29	1584.88	1522.92
66	5.76	361.09	4.95	8922.68	1573.31	1511.80
66	5.76	361.09	4.95	8922.68	1573.31	1511.80
67	5.76	366.02	4.95	8857.06	1561.74	1500.68
67	5.76	366.02	4.95	8857.06	1561.74	1500.68
68	5.76	370.95	4.95	8791.44	1550.17	1489.56
68	5.76	370.95	4.95	8791.44	1550.17	1489.56
69	5.76	375.87	4.95	8725.82	1538.60	1478.45
69	5.76	375.87	4.95	8725.82	1538.60	1478.45
70	5.76	380.80	4.95	8660.20	1527.03	1467.33
70	5.76	380.80	4.95	8660.20	1527.03	1467.33
71	5.76	385.73	4.95	8594.58	1515.46	1456.21
71	5.76	385.73	4.95	8594.58	1515.46	1456.21
72	5.76	390.65	4.95	8528.96	1503.89	1445.09
72	5.76	390.65	4.95	8528.96	1503.89	1445.09
73	5.76	395.58	4.95	8463.34	1492.32	1433.97
73	5.76	395.58	4.95	8463.34	1492.32	1433.97
74	5.76	400.51	4.95	8397.72	1480.74	1422.86
74	5.76	400.51	4.95	8397.72	1480.74	1422.86
75	5.76	405.44	4.95	8332.10	1469.17	1411.74
75	5.76	405.44	4.95	8332.10	1469.17	1411.74
76	5.76	410.57	5.38	8979.99	1583.41	1521.51
76	5.76	410.57	5.38	8979.99	1583.41	1521.51
77	5.76	415.93	5.38	8845.53	1559.71	1498.73
77	5.76	415.93	5.38	8845.53	1559.71	1498.73
78	5.76	420.80	4.42	7631.43	1345.63	1293.02
78	5.76	420.80	4.42	7631.43	1345.63	1293.02
79	5.76	425.75	5.53	9533.30	1680.98	1615.26
79	5.76	425.75	5.53	9533.30	1680.98	1615.26
80	5.76	431.25	5.53	9677.29	1706.37	1639.66

80	5.76	431.25	5.53	9677.29	1706.37	1639.66
81	5.76	436.65	5.33	9391.62	1656.00	1591.26
81	5.76	436.65	5.33	9391.62	1656.00	1591.26
82	5.76	441.95	5.33	10014.90	1765.90	1696.86
82	5.76	441.95	5.33	10014.90	1765.90	1696.86
83	5.76	447.11	5.04	10042.25	1770.72	1701.49
83	5.76	447.11	5.04	10042.25	1770.72	1701.49
84	5.76	452.12	5.04	10599.44	1868.97	1795.90
84	5.76	452.12	5.04	10599.44	1868.97	1795.90
85	5.76	457.13	5.04	11156.62	1967.21	1890.30
85	5.76	457.13	5.04	11156.62	1967.21	1890.30
86	5.76	462.14	5.04	11713.80	2065.46	1984.71
86	5.76	462.14	5.04	11713.80	2065.46	1984.71
87	5.76	467.15	5.04	12270.98	2163.70	2079.12
87	5.76	467.15	5.04	12270.98	2163.70	2079.12
88	5.76	472.16	5.04	12828.16	2261.95	2173.52
88	5.76	472.16	5.04	12828.16	2261.95	2173.52
89	5.76	477.17	5.04	13385.34	2360.20	2267.93
89	5.76	477.17	5.04	13385.34	2360.20	2267.93
90	5.76	482.18	5.04	13942.52	2458.44	2362.33
90	5.76	482.18	5.04	13942.52	2458.44	2362.33
91	5.76	487.19	5.04	14499.70	2556.69	2456.74
91	5.76	487.19	5.04	14499.70	2556.69	2456.74
92	5.76	490.75	2.11	6250.97	1102.21	1059.12
92	5.76	490.75	2.11	6250.97	1102.21	1059.12
93	52.20	492.07	0.87	2143.22	377.91	363.13
93	52.20	492.07	0.87	2143.22	377.91	363.13
94	52.20	492.87	1.74	2375.76	2178.74	2093.56
94	52.20	492.87	1.74	2375.76	2178.74	2093.56
95	52.20	495.75	7.67	9907.45	9258.42	8896.47
95	52.20	495.75	7.67	9907.45	9258.42	8896.47
96	52.20	500.24	6.98	8048.50	7821.26	7515.49
96	52.20	500.24	6.98	8048.50	7821.26	7515.49
97	52.20	504.75	7.75	9081.08	6836.28	6569.02
97	52.20	504.75	7.75	9081.08	6836.28	6569.02
98	65.55	508.15	4.98	3585.05	2986.48	2869.73
98	65.55	508.15	4.98	3585.05	2986.48	2869.73
99	65.55	510.61	6.90	3574.10	3268.96	3141.16
99	65.55	510.61	6.90	3574.10	3268.96	3141.16
100	65.55	513.47	6.90	1467.71	1952.74	1876.40
100	65.55	513.47	6.90	1467.71	1952.74	1876.40
101	65.55	515.83	4.51	448.69	280.37	269.41
101	65.55	515.83	4.51	448.69	280.37	269.41

Sum of the Resisting Forces = 153436.37 (lbs)

Average Available Shear Strength = 336.30(psf)

Sum of the Driving Forces = 153250.65 (lbs)

Average Mobilized Shear Stress = 335.89(psf)

Total length of the failure surface = 456.25(ft)

Factor of Safety Balance Check: FS = 1.00121

Janbu's Correction Factor (fo) = 1.0409

Janub's FS Corrected = 1.04214

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

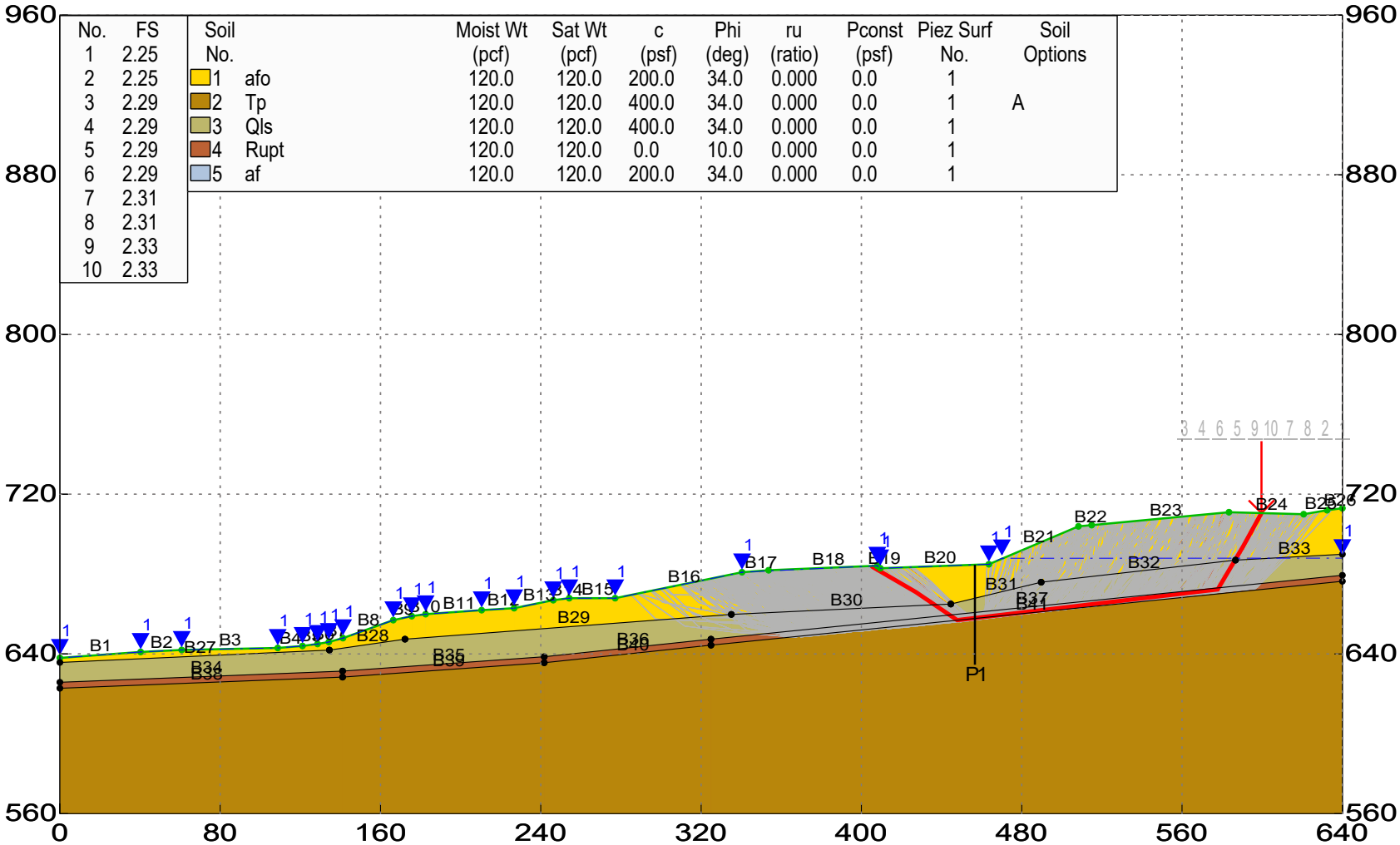
Royal Vista - Cross Section 6
Stage 2 (Initial Cut - Shear Pin)

LGC Geotechnical / BPP

\Sec 6 - Stage 2 (Initial Cut - Shear Pin)).gsd

No.	FS
1	2.25
2	2.25
3	2.29
4	2.29
5	2.29
6	2.29
7	2.31
8	2.31
9	2.33
10	2.33

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 2.25

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 2 (Initial Cut - Shear Pin)).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 2 (Initial Cut - Shear Pin)).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 6

DESCRIPTION: Stage 2 (Initial Cut - Shear Pin)

BOUNDARY DATA

26 Surface Boundaries
41 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	638.000	40.300	641.000	1
2	40.300	641.000	60.800	642.000	1
3	60.800	642.000	108.700	643.000	1
4	108.700	643.000	121.100	644.000	1
5	121.100	644.000	128.600	645.000	1
6	128.600	645.000	134.200	646.000	1
7	134.200	646.000	141.300	647.900	1
8	141.300	647.900	166.400	656.900	1
9	166.400	656.900	175.600	658.900	1
10	175.600	658.900	182.500	659.900	1
11	182.500	659.900	210.500	661.900	1
12	210.500	661.900	226.700	662.900	1
13	226.700	662.900	246.200	666.900	1
14	246.200	666.900	254.200	667.900	1
15	254.200	667.900	277.100	667.900	1
16	277.100	667.900	340.400	680.900	1
17	340.400	680.900	353.700	681.900	1
18	353.700	681.900	407.900	684.200	1
19	407.900	684.200	409.400	682.900	1
20	409.400	682.900	463.600	684.900	1
21	463.600	684.900	508.300	703.900	1
22	508.300	703.900	514.900	704.500	1
23	514.900	704.500	583.400	711.000	1
24	583.400	711.000	620.700	710.000	1
25	620.700	710.000	632.400	712.000	1
26	632.400	712.000	640.000	713.000	1

27	0.000	635.700	134.500	641.900	3
28	134.500	641.900	172.200	647.400	3
29	172.200	647.400	335.100	659.800	3
30	335.100	659.800	444.600	665.000	3
31	444.600	665.000	489.700	675.900	3
32	489.700	675.900	586.700	687.000	3
33	586.700	687.000	640.000	689.900	3
34	0.000	625.800	141.100	631.400	4
35	141.100	631.400	241.700	638.600	4
36	241.700	638.600	324.900	647.400	4
37	324.900	647.400	640.000	679.400	4
38	0.000	622.800	141.100	628.400	2
39	141.100	628.400	241.700	635.600	2
40	241.700	635.600	324.900	644.400	2
41	324.900	644.400	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 22 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point	X-Water	Y-Water

No.	(ft)	(ft)
1	0.00	638.00
2	40.30	641.00
3	60.80	642.00
4	108.70	643.00
5	121.10	644.00
6	128.60	645.00
7	134.20	646.00
8	141.30	647.90
9	166.40	656.90
10	175.60	658.90
11	182.50	659.90
12	210.50	661.90
13	226.70	662.90
14	246.20	666.90
15	254.20	667.90
16	277.10	667.90
17	340.40	680.90
18	407.90	684.20
19	409.40	682.90
20	463.60	684.90
21	470.10	687.90
22	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	456.60	684.64	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 25.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	360.00	649.00	455.00	658.00	3.00
2	460.00	660.00	600.00	674.50	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 = 247

Number of Trial Surfaces With Valid FS = 753

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 24.7 %

Statistical Data On All Valid FS Values:
FS Max = 33.229 FS Min = 2.254 FS Ave = 3.449
Standard Deviation = 2.556 Coefficient of Variation = 74.12 %

Critical Surface is Sequence Number 333 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	456.60	657.99

Factor Of Safety For The Critical or Specified Surface = 2.254

Table 1 - Geometry Data on the 51 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.02	0.01	404.98	684.07	684.08	-39.90	2.43	0.03
2	0.53	0.25	405.26	683.84	684.09	-39.90	2.43	0.69
3	2.38	1.23	406.71	682.92	684.15	-30.29	2.43	2.75
4	1.50	1.76	408.65	681.79	683.55	-30.29	-40.91	1.74
5	4.43	2.92	411.61	680.06	682.98	-30.29	2.11	5.13
6	4.43	5.67	416.04	677.47	683.15	-30.29	2.11	5.13
7	4.43	8.42	420.47	674.89	683.31	-30.29	2.11	5.13
8	4.43	11.17	424.90	672.30	683.47	-30.29	2.11	5.13
9	4.70	14.23	429.46	669.41	683.64	-34.22	2.11	5.68
10	4.70	17.60	434.16	666.21	683.81	-34.22	2.11	5.68
11	3.76	20.63	438.39	663.34	683.97	-34.22	2.11	4.55
12	3.76	23.33	442.15	660.78	684.11	-34.22	2.11	4.55
13	0.57	24.88	444.32	659.31	684.19	-34.22	2.11	0.69
14	3.18	26.23	446.19	658.03	684.26	-34.22	2.11	3.85
15	5.27	27.15	450.42	657.26	684.41	6.74	2.11	5.31
16	5.27	26.72	455.69	657.88	684.61	6.74	2.11	5.31
17	5.27	26.30	460.96	658.51	684.80	6.74	2.11	5.31
18	3.25	26.58	465.23	659.01	685.59	6.74	23.03	3.27
19	3.25	27.58	468.48	659.39	686.97	6.74	23.03	3.27
20	0.56	28.16	470.38	659.62	687.78	6.74	23.03	0.56
21	4.76	28.98	473.04	659.93	688.91	6.74	23.03	4.79
22	4.76	30.44	477.80	660.50	690.94	6.74	23.03	4.79
23	4.76	31.90	482.56	661.06	692.96	6.74	23.03	4.79
24	4.76	33.36	487.32	661.62	694.98	6.74	23.03	4.79
25	4.65	34.80	492.02	662.18	696.98	6.74	23.03	4.68
26	4.65	36.23	496.68	662.73	698.96	6.74	23.03	4.68
27	4.65	37.66	501.32	663.28	700.94	6.74	23.03	4.68
28	4.65	39.08	505.98	663.83	702.91	6.74	23.03	4.68
29	3.30	39.75	509.95	664.30	704.05	6.74	5.19	3.32
30	3.30	39.66	513.25	664.69	704.35	6.74	5.19	3.32
31	4.84	39.56	517.32	665.17	704.73	6.74	5.42	4.87
32	4.84	39.45	522.16	665.74	705.19	6.74	5.42	4.87
33	4.84	39.34	527.00	666.31	705.65	6.74	5.42	4.87
34	4.84	39.22	531.84	666.88	706.11	6.74	5.42	4.87
35	4.84	39.11	536.68	667.46	706.57	6.74	5.42	4.87

36	4.84	39.00	541.52	668.03	707.03	6.74	5.42	4.87
37	4.84	38.88	546.35	668.60	707.48	6.74	5.42	4.87
38	4.84	38.77	551.19	669.17	707.94	6.74	5.42	4.87
39	4.84	38.66	556.03	669.74	708.40	6.74	5.42	4.87
40	4.84	38.55	560.87	670.32	708.86	6.74	5.42	4.87
41	4.84	38.43	565.71	670.89	709.32	6.74	5.42	4.87
42	4.84	38.32	570.55	671.46	709.78	6.74	5.42	4.87
43	4.84	38.21	575.39	672.03	710.24	6.74	5.42	4.87
44	0.48	37.77	578.05	672.73	710.49	59.58	5.42	0.94
45	2.56	35.33	579.57	675.31	710.64	59.58	5.42	5.05
46	2.56	31.21	582.12	679.66	710.88	59.58	5.42	5.05
47	3.01	26.56	584.90	684.40	710.96	59.58	-1.54	5.94
48	0.59	23.44	586.70	687.47	710.91	59.58	-1.54	1.16
49	3.47	19.93	588.73	690.92	710.86	59.58	-1.54	6.85
50	4.57	12.70	592.75	698.05	710.75	61.29	-1.54	9.51
51	4.57	4.23	597.32	706.39	710.63	61.29	-1.54	9.51

Table 2 - Force Data On The 51 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	0.0	0.0	0.0	0.0	0.0	0.0
2	15.8	0.0	10.0	0.0	0.0	0.0
3	350.0	0.0	208.9	0.0	0.0	0.0
4	316.7	0.0	108.9	0.0	0.0	0.0
5	1552.6	0.0	933.7	0.0	0.0	0.0
6	3013.4	0.0	1812.2	0.0	0.0	0.0
7	4474.1	0.0	2690.7	0.0	0.0	0.0
8	5934.9	0.0	3569.2	0.0	0.0	0.0
9	8024.6	0.0	5039.5	0.0	0.0	0.0
10	9924.5	0.0	6232.7	0.0	0.0	0.0
11	9314.9	0.0	5849.9	0.0	0.0	0.0
12	10532.7	0.0	6614.7	0.0	0.0	0.0
13	1697.7	0.0	1066.2	0.0	0.0	0.0
14	10011.8	0.0	6287.5	0.0	0.0	0.0
15	17181.7	0.0	8984.4	0.0	0.0	0.0
16	16910.4	0.0	8842.6	0.0	0.0	0.0
17	16639.1	0.0	8700.7	0.0	0.0	0.0
18	10366.4	0.0	4484.8	0.0	0.0	0.0
19	10755.3	0.0	4672.7	0.0	0.0	0.0
20	1888.0	4.5	992.8	0.0	0.0	0.0
21	16553.5	0.0	8365.5	0.0	0.0	0.0
22	17387.9	0.0	8198.1	0.0	0.0	0.0
23	18222.3	0.0	8030.6	0.0	0.0	0.0
24	19056.7	0.0	7863.1	0.0	0.0	0.0
25	19420.6	0.0	7519.2	0.0	0.0	0.0
26	20216.8	0.0	7359.4	0.0	0.0	0.0
27	21013.0	0.0	7199.6	0.0	0.0	0.0
28	21809.1	0.0	7039.7	0.0	0.0	0.0
29	15742.1	0.0	4899.0	0.0	0.0	0.0
30	15706.5	0.0	4818.5	0.0	0.0	0.0
31	22973.1	0.0	6920.4	0.0	0.0	0.0
32	22907.6	0.0	6747.3	0.0	0.0	0.0
33	22842.1	0.0	6574.2	0.0	0.0	0.0
34	22776.6	0.0	6401.2	0.0	0.0	0.0
35	22711.0	0.0	6228.1	0.0	0.0	0.0
36	22645.5	0.0	6055.0	0.0	0.0	0.0
37	22580.0	0.0	5882.0	0.0	0.0	0.0
38	22514.5	0.0	5708.9	0.0	0.0	0.0
39	22448.9	0.0	5535.8	0.0	0.0	0.0
40	22383.4	0.0	5362.8	0.0	0.0	0.0
41	22317.9	0.0	5189.7	0.0	0.0	0.0
42	22252.4	0.0	5016.6	0.0	0.0	0.0
43	22186.8	0.0	4843.6	0.0	0.0	0.0
44	2166.0	0.0	897.6	0.0	0.0	0.0
45	10837.8	0.0	3987.4	0.0	0.0	0.0
46	9576.2	0.0	2615.7	0.0	0.0	0.0

47	9587.0	0.0	1321.2	0.0	0.0	0.0
48	1655.2	0.0	36.3	0.0	0.0	0.0
49	8298.3	0.0	0.0	0.0	0.0	0.0
50	6963.2	0.0	0.0	0.0	0.0	0.0
51	2321.1	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 668977.42(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 447569.53(lbs)

TOTAL AREA OF SLIDING MASS = 5574.81(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 51 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	200.00	34.00	
2	1	200.00	34.00	
3	1	200.00	34.00	
4	1	200.00	34.00	
5	1	200.00	34.00	
6	1	200.00	34.00	
7	1	200.00	34.00	
8	1	200.00	34.00	
9	1	200.00	34.00	
10	1	200.00	34.00	
11	3	400.00	34.00	
12	3	400.00	34.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	4	0.00	10.00	
40	4	0.00	10.00	
41	4	0.00	10.00	
42	4	0.00	10.00	
43	4	0.00	10.00	
44	4	0.00	10.00	
45	3	400.00	34.00	
46	3	400.00	34.00	
47	3	400.00	34.00	
48	1	200.00	34.00	
49	1	200.00	34.00	
50	1	200.00	34.00	
51	1	200.00	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 51 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-39.90	404.98	0.03	109.61	273.94	120.44
1	-39.90	404.98	0.03	109.61	273.94	120.44
2	-39.90	405.26	0.69	129.24	287.17	126.26
2	-39.90	405.26	0.69	129.24	287.17	126.26
3	-30.29	406.71	2.75	155.70	305.02	134.11
3	-30.29	406.71	2.75	155.70	305.02	134.11
4	-30.29	408.65	1.74	250.54	368.99	162.24
4	-30.29	408.65	1.74	250.54	368.99	162.24
5	-30.29	411.61	5.13	275.29	385.69	169.58
5	-30.29	411.61	5.13	275.29	385.69	169.58
6	-30.29	416.04	5.13	470.29	517.21	227.41
6	-30.29	416.04	5.13	470.29	517.21	227.41
7	-30.29	420.47	5.13	665.29	648.74	285.24
7	-30.29	420.47	5.13	665.29	648.74	285.24
8	-30.29	424.90	5.13	860.28	780.27	343.07
8	-30.29	424.90	5.13	860.28	780.27	343.07
9	-34.22	429.46	5.68	1131.07	962.91	423.37
9	-34.22	429.46	5.68	1131.07	962.91	423.37
10	-34.22	434.16	5.68	1379.38	1130.40	497.01
10	-34.22	434.16	5.68	1379.38	1130.40	497.01
11	-34.22	438.39	4.55	1685.24	1536.71	675.66
11	-34.22	438.39	4.55	1685.24	1536.71	675.66
12	-34.22	442.15	4.55	1884.04	1670.80	734.62
12	-34.22	442.15	4.55	1884.04	1670.80	734.62
13	-34.22	444.32	0.69	1521.83	268.34	117.98
13	-34.22	444.32	0.69	1521.83	268.34	117.98
14	-34.22	446.19	3.85	1604.04	282.84	124.36
14	-34.22	446.19	3.85	1604.04	282.84	124.36
15	6.74	450.42	5.31	1551.04	273.49	120.25
15	6.74	450.42	5.31	1551.04	273.49	120.25
16	6.74	455.69	5.31	1526.55	269.17	118.35
16	6.74	455.69	5.31	1526.55	269.17	118.35
17	6.74	460.96	5.31	1502.06	264.85	116.45
17	6.74	460.96	5.31	1502.06	264.85	116.45
18	6.74	465.23	3.27	1801.47	317.65	139.66
18	6.74	465.23	3.27	1801.47	317.65	139.66
19	6.74	468.48	3.27	1863.13	328.52	144.44
19	6.74	468.48	3.27	1863.13	328.52	144.44
20	6.74	470.38	0.56	1606.28	283.23	124.53
20	6.74	470.38	0.56	1606.28	283.23	124.53
21	6.74	473.04	4.79	1715.25	302.44	132.98
21	6.74	473.04	4.79	1715.25	302.44	132.98
22	6.74	477.80	4.79	1923.42	339.15	149.12
22	6.74	477.80	4.79	1923.42	339.15	149.12
23	6.74	482.56	4.79	2131.58	375.86	165.26
23	6.74	482.56	4.79	2131.58	375.86	165.26
24	6.74	487.32	4.79	2339.75	412.56	181.39
24	6.74	487.32	4.79	2339.75	412.56	181.39
25	6.74	492.02	4.68	2545.50	448.84	197.35
25	6.74	492.02	4.68	2545.50	448.84	197.35
26	6.74	496.68	4.68	2748.85	484.70	213.11
26	6.74	496.68	4.68	2748.85	484.70	213.11
27	6.74	501.32	4.68	2952.19	520.55	228.88
27	6.74	501.32	4.68	2952.19	520.55	228.88
28	6.74	505.98	4.68	3155.53	556.41	244.64
28	6.74	505.98	4.68	3155.53	556.41	244.64
29	6.74	509.95	3.32	3263.84	575.50	253.04
29	6.74	509.95	3.32	3263.84	575.50	253.04
30	6.74	513.25	3.32	3277.12	577.84	254.07
30	6.74	513.25	3.32	3277.12	577.84	254.07
31	6.74	517.32	4.87	3294.64	580.93	255.42

31	6.74	517.32	4.87	3294.64	580.93	255.42
32	6.74	522.16	4.87	3316.40	584.77	257.11
32	6.74	522.16	4.87	3316.40	584.77	257.11
33	6.74	527.00	4.87	3338.16	588.61	258.80
33	6.74	527.00	4.87	3338.16	588.61	258.80
34	6.74	531.84	4.87	3359.92	592.44	260.49
34	6.74	531.84	4.87	3359.92	592.44	260.49
35	6.74	536.68	4.87	3381.68	596.28	262.17
35	6.74	536.68	4.87	3381.68	596.28	262.17
36	6.74	541.52	4.87	3403.45	600.12	263.86
36	6.74	541.52	4.87	3403.45	600.12	263.86
37	6.74	546.35	4.87	3425.21	603.96	265.55
37	6.74	546.35	4.87	3425.21	603.96	265.55
38	6.74	551.19	4.87	3446.97	607.79	267.23
38	6.74	551.19	4.87	3446.97	607.79	267.23
39	6.74	556.03	4.87	3468.73	611.63	268.92
39	6.74	556.03	4.87	3468.73	611.63	268.92
40	6.74	560.87	4.87	3490.49	615.47	270.61
40	6.74	560.87	4.87	3490.49	615.47	270.61
41	6.74	565.71	4.87	3512.25	619.30	272.30
41	6.74	565.71	4.87	3512.25	619.30	272.30
42	6.74	570.55	4.87	3534.01	623.14	273.98
42	6.74	570.55	4.87	3534.01	623.14	273.98
43	6.74	575.39	4.87	3555.77	626.98	275.67
43	6.74	575.39	4.87	3555.77	626.98	275.67
44	59.58	578.05	0.94	3135.15	552.81	243.06
44	59.58	578.05	0.94	3135.15	552.81	243.06
45	59.58	579.57	5.05	2024.91	1765.82	776.39
45	59.58	579.57	5.05	2024.91	1765.82	776.39
46	59.58	582.12	5.05	1881.26	1668.93	733.79
46	59.58	582.12	5.05	1881.26	1668.93	733.79
47	59.58	584.90	5.94	1710.70	1553.88	683.21
47	59.58	584.90	5.94	1710.70	1553.88	683.21
48	59.58	586.70	1.16	1697.13	1344.73	591.25
48	59.58	586.70	1.16	1697.13	1344.73	591.25
49	59.58	588.73	6.85	1444.60	1174.40	516.36
49	59.58	588.73	6.85	1444.60	1174.40	516.36
50	61.29	592.75	9.51	853.21	775.50	340.97
50	61.29	592.75	9.51	853.21	775.50	340.97
51	61.29	597.32	9.51	211.57	342.71	150.68
51	61.29	597.32	9.51	211.57	342.71	150.68

Table 4 - Base Force Data on the 51 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-39.90	404.98	0.03	3.05	7.62	3.35
1	-39.90	404.98	0.03	3.05	7.62	3.35
2	-39.90	405.26	0.69	88.75	197.20	86.70
2	-39.90	405.26	0.69	88.75	197.20	86.70
3	-30.29	406.71	2.75	428.76	839.96	369.31
3	-30.29	406.71	2.75	428.76	839.96	369.31
4	-30.29	408.65	1.74	435.23	641.00	281.83
4	-30.29	408.65	1.74	435.23	641.00	281.83
5	-30.29	411.61	5.13	1411.49	1977.52	869.47
5	-30.29	411.61	5.13	1411.49	1977.52	869.47
6	-30.29	416.04	5.13	2411.29	2651.89	1165.98
6	-30.29	416.04	5.13	2411.29	2651.89	1165.98
7	-30.29	420.47	5.13	3411.10	3326.27	1462.49
7	-30.29	420.47	5.13	3411.10	3326.27	1462.49
8	-30.29	424.90	5.13	4410.90	4000.64	1759.00
8	-30.29	424.90	5.13	4410.90	4000.64	1759.00
9	-34.22	429.46	5.68	6427.81	5472.20	2406.02
9	-34.22	429.46	5.68	6427.81	5472.20	2406.02
10	-34.22	434.16	5.68	7838.96	6424.04	2824.52
10	-34.22	434.16	5.68	7838.96	6424.04	2824.52
11	-34.22	438.39	4.55	7667.38	6991.60	3074.06
11	-34.22	438.39	4.55	7667.38	6991.60	3074.06

12	-34.22	442.15	4.55	8571.85	7601.67	3342.30
12	-34.22	442.15	4.55	8571.85	7601.67	3342.30
13	-34.22	444.32	0.69	1046.37	184.50	81.12
13	-34.22	444.32	0.69	1046.37	184.50	81.12
14	-34.22	446.19	3.85	6170.85	1088.09	478.41
14	-34.22	446.19	3.85	6170.85	1088.09	478.41
15	6.74	450.42	5.31	8235.56	1452.15	638.48
15	6.74	450.42	5.31	8235.56	1452.15	638.48
16	6.74	455.69	5.31	8105.52	1429.22	628.40
16	6.74	455.69	5.31	8105.52	1429.22	628.40
17	6.74	460.96	5.31	7975.49	1406.29	618.32
17	6.74	460.96	5.31	7975.49	1406.29	618.32
18	6.74	465.23	3.27	5895.54	1039.54	457.07
18	6.74	465.23	3.27	5895.54	1039.54	457.07
19	6.74	468.48	3.27	6097.34	1075.12	472.71
19	6.74	468.48	3.27	6097.34	1075.12	472.71
20	6.74	470.38	0.56	903.62	159.33	70.06
20	6.74	470.38	0.56	903.62	159.33	70.06
21	6.74	473.04	4.79	8222.00	1449.76	637.43
21	6.74	473.04	4.79	8222.00	1449.76	637.43
22	6.74	477.80	4.79	9219.85	1625.71	714.79
22	6.74	477.80	4.79	9219.85	1625.71	714.79
23	6.74	482.56	4.79	10217.69	1801.65	792.15
23	6.74	482.56	4.79	10217.69	1801.65	792.15
24	6.74	487.32	4.79	11215.53	1977.60	869.51
24	6.74	487.32	4.79	11215.53	1977.60	869.51
25	6.74	492.02	4.68	11919.00	2101.64	924.05
25	6.74	492.02	4.68	11919.00	2101.64	924.05
26	6.74	496.68	4.68	12871.13	2269.53	997.86
26	6.74	496.68	4.68	12871.13	2269.53	997.86
27	6.74	501.32	4.68	13823.25	2437.41	1071.68
27	6.74	501.32	4.68	13823.25	2437.41	1071.68
28	6.74	505.98	4.68	14775.37	2605.30	1145.50
28	6.74	505.98	4.68	14775.37	2605.30	1145.50
29	6.74	509.95	3.32	10845.66	1912.38	840.84
29	6.74	509.95	3.32	10845.66	1912.38	840.84
30	6.74	513.25	3.32	10889.79	1920.16	844.26
30	6.74	513.25	3.32	10889.79	1920.16	844.26
31	6.74	517.32	4.87	16054.23	2830.79	1244.64
31	6.74	517.32	4.87	16054.23	2830.79	1244.64
32	6.74	522.16	4.87	16160.26	2849.49	1252.86
32	6.74	522.16	4.87	16160.26	2849.49	1252.86
33	6.74	527.00	4.87	16266.30	2868.19	1261.08
33	6.74	527.00	4.87	16266.30	2868.19	1261.08
34	6.74	531.84	4.87	16372.34	2886.89	1269.30
34	6.74	531.84	4.87	16372.34	2886.89	1269.30
35	6.74	536.68	4.87	16478.38	2905.58	1277.52
35	6.74	536.68	4.87	16478.38	2905.58	1277.52
36	6.74	541.52	4.87	16584.42	2924.28	1285.75
36	6.74	541.52	4.87	16584.42	2924.28	1285.75
37	6.74	546.35	4.87	16690.46	2942.98	1293.97
37	6.74	546.35	4.87	16690.46	2942.98	1293.97
38	6.74	551.19	4.87	16796.50	2961.68	1302.19
38	6.74	551.19	4.87	16796.50	2961.68	1302.19
39	6.74	556.03	4.87	16902.54	2980.37	1310.41
39	6.74	556.03	4.87	16902.54	2980.37	1310.41
40	6.74	560.87	4.87	17008.58	2999.07	1318.63
40	6.74	560.87	4.87	17008.58	2999.07	1318.63
41	6.74	565.71	4.87	17114.62	3017.77	1326.85
41	6.74	565.71	4.87	17114.62	3017.77	1326.85
42	6.74	570.55	4.87	17220.65	3036.47	1335.07
42	6.74	570.55	4.87	17220.65	3036.47	1335.07
43	6.74	575.39	4.87	17326.69	3055.16	1343.29
43	6.74	575.39	4.87	17326.69	3055.16	1343.29
44	59.58	578.05	0.94	2959.59	521.85	229.45
44	59.58	578.05	0.94	2959.59	521.85	229.45
45	59.58	579.57	5.05	10225.31	8916.96	3920.60
45	59.58	579.57	5.05	10225.31	8916.96	3920.60
46	59.58	582.12	5.05	9499.93	8427.68	3705.48
46	59.58	582.12	5.05	9499.93	8427.68	3705.48
47	59.58	584.90	5.94	10165.50	9233.64	4059.84
47	59.58	584.90	5.94	10165.50	9233.64	4059.84

48	59.58	586.70	1.16	1972.24	1562.71	687.09
48	59.58	586.70	1.16	1972.24	1562.71	687.09
49	59.58	588.73	6.85	9898.52	8047.05	3538.12
49	59.58	588.73	6.85	9898.52	8047.05	3538.12
50	61.29	592.75	9.51	8116.65	7377.36	3243.67
50	61.29	592.75	9.51	8116.65	7377.36	3243.67
51	61.29	597.32	9.51	2012.70	3260.19	1433.44
51	61.29	597.32	9.51	2012.70	3260.19	1433.44

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 51 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
16	12000.0	0.0	12000.0	90.00	-0.129008E+04

Sum of the Resisting Forces = 122883.47 (lbs)

Average Available Shear Strength = 544.52(psf)

Sum of the Driving Forces = 58184.36 (lbs)

Average Mobilized Shear Stress = 257.83(psf)

Total length of the failure surface = 225.67(ft)

Factor of Safety Balance Check: FS = 2.11197

Janbu's Correction Factor (fo) = 1.0670

Janub's FS Corrected = 2.25350

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

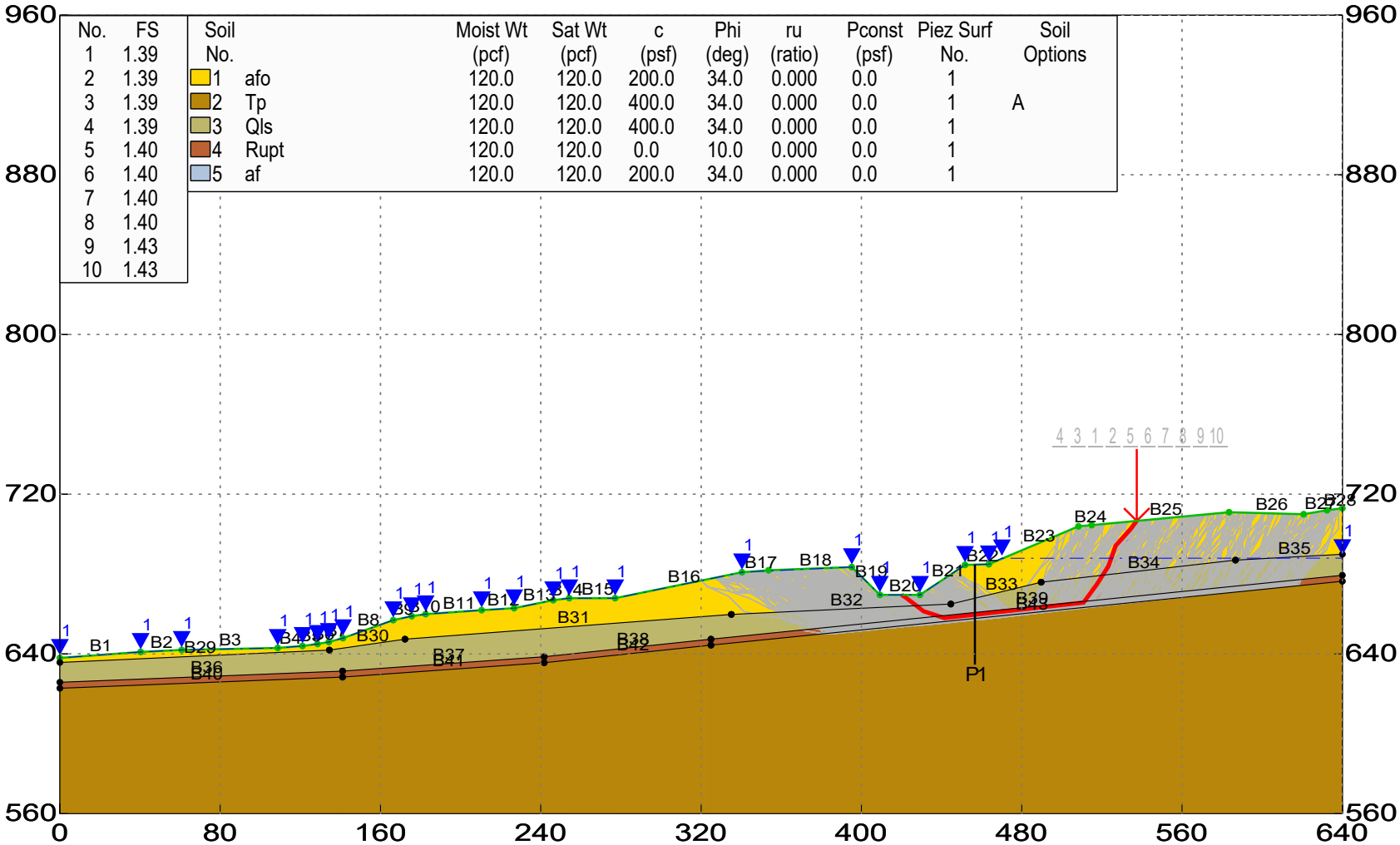
Royal Vista - Cross Section 6
Stage 3 (Temporary Staging Pad)

LGC Geotechnical / BPP

\Sec 6 - Stage 3 (Temporary Staging Pad).gsd

No.	FS
1	1.39
2	1.39
3	1.39
4	1.39
5	1.40
6	1.40
7	1.40
8	1.40
9	1.43
10	1.43

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.39

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 3 (Temporary Staging Pad).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 3 (Temporary Staging Pad).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 6

DESCRIPTION: Stage 3 (Temporary Staging Pad)

BOUNDARY DATA

28 Surface Boundaries
43 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	638.000	40.300	641.000	1
2	40.300	641.000	60.800	642.000	1
3	60.800	642.000	108.700	643.000	1
4	108.700	643.000	121.100	644.000	1
5	121.100	644.000	128.600	645.000	1
6	128.600	645.000	134.200	646.000	1
7	134.200	646.000	141.300	647.900	1
8	141.300	647.900	166.400	656.900	1
9	166.400	656.900	175.600	658.900	1
10	175.600	658.900	182.500	659.900	1
11	182.500	659.900	210.500	661.900	1
12	210.500	661.900	226.700	662.900	1
13	226.700	662.900	246.200	666.900	1
14	246.200	666.900	254.200	667.900	1
15	254.200	667.900	277.100	667.900	1
16	277.100	667.900	340.400	680.900	1
17	340.400	680.900	353.700	681.900	1
18	353.700	681.900	395.200	683.500	1
19	395.200	683.500	409.200	669.600	1
20	409.200	669.600	429.200	669.600	1
21	429.200	669.600	451.700	684.600	1
22	451.700	684.600	463.600	684.900	1
23	463.600	684.900	508.300	703.900	1
24	508.300	703.900	514.900	704.500	1
25	514.900	704.500	583.400	711.000	1
26	583.400	711.000	620.700	710.000	1

27	620.700	710.000	632.400	712.000	1
28	632.400	712.000	640.000	713.000	1
29	0.000	635.700	134.500	641.900	3
30	134.500	641.900	172.200	647.400	3
31	172.200	647.400	335.100	659.800	3
32	335.100	659.800	444.600	665.000	3
33	444.600	665.000	489.700	675.900	3
34	489.700	675.900	586.700	687.000	3
35	586.700	687.000	640.000	689.900	3
36	0.000	625.800	141.100	631.400	4
37	141.100	631.400	241.700	638.600	4
38	241.700	638.600	324.900	647.400	4
39	324.900	647.400	640.000	679.400	4
40	0.000	622.800	141.100	628.400	2
41	141.100	628.400	241.700	635.600	2
42	241.700	635.600	324.900	644.400	2
43	324.900	644.400	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 24 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	638.00
2	40.30	641.00
3	60.80	642.00
4	108.70	643.00
5	121.10	644.00
6	128.60	645.00
7	134.20	646.00
8	141.30	647.90
9	166.40	656.90
10	175.60	658.90
11	182.50	659.90
12	210.50	661.90
13	226.70	662.90
14	246.20	666.90
15	254.20	667.90
16	277.10	667.90
17	340.40	680.90
18	395.20	683.50
19	409.20	669.60
20	429.20	669.60
21	451.70	684.60
22	463.60	684.90
23	470.10	687.90
24	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	456.60	684.72	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	380.00	651.00	475.00	660.00	3.00
2	480.00	662.50	620.00	676.00	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 = 121

Number of Trial Surfaces With Valid FS = 879

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 12.1 %

Statistical Data On All Valid FS Values:
FS Max = 4.749 FS Min = 1.394 FS Ave = 2.471
Standard Deviation = 0.756 Coefficient of Variation = 30.60 %

Critical Surface is Sequence Number 106 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	456.60	659.70

Factor Of Safety For The Critical or Specified Surface = 1.394

Table 1 - Geometry Data on the 35 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.26	0.73	421.13	668.87	669.60	-33.01	0.00	2.70
2	2.56	2.46	423.54	667.14	669.60	-37.66	0.00	3.23
3	2.56	4.43	426.10	665.17	669.60	-37.66	0.00	3.23
4	1.82	6.12	428.29	663.48	669.60	-37.66	0.00	2.30
5	1.77	8.10	430.09	662.09	670.19	-37.66	33.69	2.24
6	3.80	11.25	432.87	660.79	672.05	-18.00	33.69	3.99
7	3.80	15.02	436.67	659.56	674.58	-18.00	33.69	3.99
8	2.87	18.32	440.00	658.48	676.80	-18.00	33.69	3.02
9	3.17	20.62	443.02	658.19	678.81	6.36	33.69	3.19
10	3.55	22.49	446.38	658.56	681.05	6.36	33.69	3.57
11	3.55	24.46	449.93	658.96	683.42	6.36	33.69	3.57
12	5.95	25.19	454.68	659.49	684.68	6.36	1.44	5.99
13	5.95	24.68	460.63	660.15	684.83	6.36	1.44	5.99
14	3.25	24.93	465.23	660.66	685.59	6.36	23.03	3.27
15	3.25	25.95	468.48	661.02	686.97	6.36	23.03	3.27
16	0.56	26.55	470.38	661.24	687.78	6.36	23.03	0.56
17	4.76	27.38	473.04	661.53	688.91	6.36	23.03	4.79
18	4.76	28.87	477.80	662.06	690.94	6.36	23.03	4.79
19	4.76	30.37	482.56	662.59	692.96	6.36	23.03	4.79
20	4.76	31.86	487.32	663.12	694.98	6.36	23.03	4.79
21	4.65	33.34	492.02	663.65	696.98	6.36	23.03	4.68
22	4.65	34.79	496.68	664.16	698.96	6.36	23.03	4.68
23	4.65	36.25	501.32	664.68	700.94	6.36	23.03	4.68
24	4.65	37.71	505.98	665.20	702.91	6.36	23.03	4.68
25	2.56	38.41	509.58	665.60	704.02	6.36	5.19	2.57
26	0.42	38.12	511.07	666.04	704.15	54.09	5.19	0.72
27	3.62	35.51	513.09	668.83	704.34	54.09	5.19	6.18
28	2.41	31.62	516.10	672.99	704.61	54.09	5.42	4.10
29	3.07	27.84	518.84	677.03	704.87	57.17	5.42	5.66
30	2.89	23.50	521.82	681.65	705.16	57.17	5.42	5.34
31	1.40	19.45	523.97	685.91	705.36	70.82	5.42	4.27

32	2.21	14.42	525.78	691.11	705.53	70.82	5.42	6.73
33	3.68	9.48	528.72	696.33	705.81	48.04	5.42	5.50
34	3.68	5.74	532.40	700.42	706.16	48.04	5.42	5.50
35	3.14	1.94	535.81	704.55	706.48	52.98	5.42	5.22

Table 2 - Force Data On The 35 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	199.2	0.0	123.5	0.0	0.0	0.0
2	753.9	0.0	495.2	0.0	0.0	0.0
3	1360.0	0.0	893.4	0.0	0.0	0.0
4	1336.5	0.0	877.9	0.0	0.0	0.0
5	1721.5	0.0	782.9	0.0	0.0	0.0
6	5126.1	0.0	1940.4	0.0	0.0	0.0
7	6840.7	0.0	2589.4	0.0	0.0	0.0
8	6309.3	0.0	2388.2	0.0	0.0	0.0
9	7836.9	0.0	2838.7	0.0	0.0	0.0
10	9580.2	0.0	3470.2	0.0	0.0	0.0
11	10419.9	0.0	3774.4	0.0	0.0	0.0
12	17985.0	0.0	9404.1	0.0	0.0	0.0
13	17618.8	0.0	9212.6	0.0	0.0	0.0
14	9722.5	0.0	4203.6	0.0	0.0	0.0
15	10120.0	0.0	4395.0	0.0	0.0	0.0
16	1779.7	4.5	935.3	0.0	0.0	0.0
17	15640.7	0.0	7881.5	0.0	0.0	0.0
18	16493.6	0.0	7723.9	0.0	0.0	0.0
19	17346.5	0.0	7566.2	0.0	0.0	0.0
20	18199.4	0.0	7408.5	0.0	0.0	0.0
21	18601.1	0.0	7084.6	0.0	0.0	0.0
22	19414.9	0.0	6934.1	0.0	0.0	0.0
23	20228.8	0.0	6783.7	0.0	0.0	0.0
24	21042.6	0.0	6633.3	0.0	0.0	0.0
25	11781.0	0.0	3581.7	0.0	0.0	0.0
26	1930.7	0.0	983.0	0.0	0.0	0.0
27	15433.4	0.0	7359.0	0.0	0.0	0.0
28	9136.3	0.0	3825.6	0.0	0.0	0.0
29	10255.0	0.0	3849.1	0.0	0.0	0.0
30	8164.7	0.0	2091.2	0.0	0.0	0.0
31	3275.5	0.0	537.9	0.0	0.0	0.0
32	3825.0	0.0	0.0	0.0	0.0	0.0
33	4184.2	0.0	0.0	0.0	0.0	0.0
34	2533.4	0.0	0.0	0.0	0.0	0.0
35	729.9	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 326927.19(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 208082.77(lbs)

TOTAL AREA OF SLIDING MASS = 2724.39(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 35 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	200.00	34.00	
2	1	200.00	34.00	
3	1	200.00	34.00	
4	3	400.00	34.00	
5	3	400.00	34.00	
6	3	400.00	34.00	
7	3	400.00	34.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	

12	4	0.00	10.00
13	4	0.00	10.00
14	4	0.00	10.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	3	400.00	34.00
28	3	400.00	34.00
29	3	400.00	34.00
30	1	200.00	34.00
31	1	200.00	34.00
32	1	200.00	34.00
33	1	200.00	34.00
34	1	200.00	34.00
35	1	200.00	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 35 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-33.01	421.13	2.70	216.18	345.81	245.34
1	-33.01	421.13	2.70	216.18	345.81	245.34
2	-37.66	423.54	3.23	437.13	494.85	351.07
2	-37.66	423.54	3.23	437.13	494.85	351.07
3	-37.66	426.10	3.23	627.64	623.35	442.24
3	-37.66	426.10	3.23	627.64	623.35	442.24
4	-37.66	428.29	2.30	990.83	1068.32	757.93
4	-37.66	428.29	2.30	990.83	1068.32	757.93
5	-37.66	430.09	2.24	1441.96	1372.62	973.82
5	-37.66	430.09	2.24	1441.96	1372.62	973.82
6	-18.00	432.87	3.99	1161.97	1183.76	839.83
6	-18.00	432.87	3.99	1161.97	1183.76	839.83
7	-18.00	436.67	3.99	1510.11	1418.58	1006.43
7	-18.00	436.67	3.99	1510.11	1418.58	1006.43
8	-18.00	440.00	3.02	1472.44	259.63	184.20
8	-18.00	440.00	3.02	1472.44	259.63	184.20
9	6.36	443.02	3.19	1560.20	275.11	195.18
9	6.36	443.02	3.19	1560.20	275.11	195.18
10	6.36	446.38	3.57	1701.27	299.98	212.82
10	6.36	446.38	3.57	1701.27	299.98	212.82
11	6.36	449.93	3.57	1850.39	326.27	231.48
11	6.36	449.93	3.57	1850.39	326.27	231.48
12	6.36	454.68	5.99	1430.14	252.17	178.91
12	6.36	454.68	5.99	1430.14	252.17	178.91
13	6.36	460.63	5.99	1401.03	247.04	175.26
13	6.36	460.63	5.99	1401.03	247.04	175.26
14	6.36	465.23	3.27	1680.51	296.32	210.23
14	6.36	465.23	3.27	1680.51	296.32	210.23
15	6.36	468.48	3.27	1743.34	307.40	218.09
15	6.36	468.48	3.27	1743.34	307.40	218.09
16	6.36	470.38	0.56	1506.16	265.58	188.42
16	6.36	470.38	0.56	1506.16	265.58	188.42
17	6.36	473.04	4.79	1615.58	284.87	202.11

17	6.36	473.04	4.79	1615.58	284.87	202.11
18	6.36	477.80	4.79	1824.49	321.71	228.24
18	6.36	477.80	4.79	1824.49	321.71	228.24
19	6.36	482.56	4.79	2033.40	358.54	254.37
19	6.36	482.56	4.79	2033.40	358.54	254.37
20	6.36	487.32	4.79	2242.32	395.38	280.51
20	6.36	487.32	4.79	2242.32	395.38	280.51
21	6.36	492.02	4.68	2448.81	431.79	306.34
21	6.36	492.02	4.68	2448.81	431.79	306.34
22	6.36	496.68	4.68	2652.87	467.77	331.87
22	6.36	496.68	4.68	2652.87	467.77	331.87
23	6.36	501.32	4.68	2856.94	503.76	357.40
23	6.36	501.32	4.68	2856.94	503.76	357.40
24	6.36	505.98	4.68	3061.01	539.74	382.92
24	6.36	505.98	4.68	3061.01	539.74	382.92
25	6.36	509.58	2.57	3168.65	558.72	396.39
25	6.36	509.58	2.57	3168.65	558.72	396.39
26	54.09	511.07	0.72	2699.30	475.96	337.68
26	54.09	511.07	0.72	2699.30	475.96	337.68
27	54.09	513.09	6.18	1534.99	1435.37	1018.34
27	54.09	513.09	6.18	1534.99	1435.37	1018.34
28	54.09	516.10	4.10	1415.03	1354.45	960.93
28	54.09	516.10	4.10	1415.03	1354.45	960.93
29	57.17	518.84	5.66	1205.73	1213.27	860.77
29	57.17	518.84	5.66	1205.73	1213.27	860.77
30	57.17	521.82	5.34	1209.91	1016.09	720.88
30	57.17	521.82	5.34	1209.91	1016.09	720.88
31	70.82	523.97	4.27	704.73	675.35	479.13
31	70.82	523.97	4.27	704.73	675.35	479.13
32	70.82	525.78	6.73	514.05	546.73	387.89
32	70.82	525.78	6.73	514.05	546.73	387.89
33	48.04	528.72	5.50	610.90	612.06	434.23
33	48.04	528.72	5.50	610.90	612.06	434.23
34	48.04	532.40	5.50	326.91	420.50	298.33
34	48.04	532.40	5.50	326.91	420.50	298.33
35	52.98	535.81	5.22	15.91	210.73	149.51
35	52.98	535.81	5.22	15.91	210.73	149.51

Table 4 - Base Force Data on the 35 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-33.01	421.13	2.70	582.83	932.35	661.47
1	-33.01	421.13	2.70	582.83	932.35	661.47
2	-37.66	423.54	3.23	1412.56	1599.07	1134.48
2	-37.66	423.54	3.23	1412.56	1599.07	1134.48
3	-37.66	426.10	3.23	2028.18	2014.32	1429.08
3	-37.66	426.10	3.23	2028.18	2014.32	1429.08
4	-37.66	428.29	2.30	2277.79	2455.94	1742.40
4	-37.66	428.29	2.30	2277.79	2455.94	1742.40
5	-37.66	430.09	2.24	3227.44	3072.22	2179.63
5	-37.66	430.09	2.24	3227.44	3072.22	2179.63
6	-18.00	432.87	3.99	4637.86	4724.81	3352.08
6	-18.00	432.87	3.99	4637.86	4724.81	3352.08
7	-18.00	436.67	3.99	6027.40	5662.08	4017.03
7	-18.00	436.67	3.99	6027.40	5662.08	4017.03
8	-18.00	440.00	3.02	4442.77	783.38	555.78
8	-18.00	440.00	3.02	4442.77	783.38	555.78
9	6.36	443.02	3.19	4971.08	876.54	621.87
9	6.36	443.02	3.19	4971.08	876.54	621.87
10	6.36	446.38	3.57	6076.86	1071.51	760.20
10	6.36	446.38	3.57	6076.86	1071.51	760.20
11	6.36	449.93	3.57	6609.51	1165.43	826.83
11	6.36	449.93	3.57	6609.51	1165.43	826.83
12	6.36	454.68	5.99	8562.00	1509.71	1071.08
12	6.36	454.68	5.99	8562.00	1509.71	1071.08
13	6.36	460.63	5.99	8387.67	1478.97	1049.28
13	6.36	460.63	5.99	8387.67	1478.97	1049.28

14	6.36	465.23	3.27	5495.46	969.00	687.47
14	6.36	465.23	3.27	5495.46	969.00	687.47
15	6.36	468.48	3.27	5700.92	1005.23	713.17
15	6.36	468.48	3.27	5700.92	1005.23	713.17
16	6.36	470.38	0.56	846.65	149.29	105.91
16	6.36	470.38	0.56	846.65	149.29	105.91
17	6.36	473.04	4.79	7738.29	1364.47	968.04
17	6.36	473.04	4.79	7738.29	1364.47	968.04
18	6.36	477.80	4.79	8738.93	1540.91	1093.22
18	6.36	477.80	4.79	8738.93	1540.91	1093.22
19	6.36	482.56	4.79	9739.56	1717.35	1218.39
19	6.36	482.56	4.79	9739.56	1717.35	1218.39
20	6.36	487.32	4.79	10740.20	1893.79	1343.57
20	6.36	487.32	4.79	10740.20	1893.79	1343.57
21	6.36	492.02	4.68	11457.39	2020.25	1433.29
21	6.36	492.02	4.68	11457.39	2020.25	1433.29
22	6.36	496.68	4.68	12412.18	2188.60	1552.73
22	6.36	496.68	4.68	12412.18	2188.60	1552.73
23	6.36	501.32	4.68	13366.97	2356.96	1672.17
23	6.36	501.32	4.68	13366.97	2356.96	1672.17
24	6.36	505.98	4.68	14321.76	2525.31	1791.61
24	6.36	505.98	4.68	14321.76	2525.31	1791.61
25	6.36	509.58	2.57	8148.27	1436.76	1019.33
25	6.36	509.58	2.57	8148.27	1436.76	1019.33
26	54.09	511.07	0.72	1942.66	342.54	243.02
26	54.09	511.07	0.72	1942.66	342.54	243.02
27	54.09	513.09	6.18	9479.34	8864.09	6288.74
27	54.09	513.09	6.18	9479.34	8864.09	6288.74
28	54.09	516.10	4.10	5808.46	5559.78	3944.45
28	54.09	516.10	4.10	5808.46	5559.78	3944.45
29	57.17	518.84	5.66	6825.58	6868.30	4872.80
29	57.17	518.84	5.66	6825.58	6868.30	4872.80
30	57.17	521.82	5.34	6459.73	5424.95	3848.80
30	57.17	521.82	5.34	6459.73	5424.95	3848.80
31	70.82	523.97	4.27	3011.10	2885.55	2047.19
31	70.82	523.97	4.27	3011.10	2885.55	2047.19
32	70.82	525.78	6.73	3458.18	3678.03	2609.43
32	70.82	525.78	6.73	3458.18	3678.03	2609.43
33	48.04	528.72	5.50	3359.94	3366.31	2388.27
33	48.04	528.72	5.50	3359.94	3366.31	2388.27
34	48.04	532.40	5.50	1797.99	2312.76	1640.81
34	48.04	532.40	5.50	1797.99	2312.76	1640.81
35	52.98	535.81	5.22	83.05	1100.19	780.54
35	52.98	535.81	5.22	83.05	1100.19	780.54

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 35 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
12	12000.0	0.0	12000.0	90.00	-0.257345E+04

Sum of the Resisting Forces = 65699.22 (lbs)

Average Available Shear Strength = 456.98(psf)

Sum of the Driving Forces = 50882.53 (lbs)

Average Mobilized Shear Stress = 353.92(psf)

Total length of the failure surface = 143.77(ft)

Factor of Safety Balance Check: FS = 1.29119

Janbu's Correction Factor (fo) = 1.0797

Janub's FS Corrected = 1.39407

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

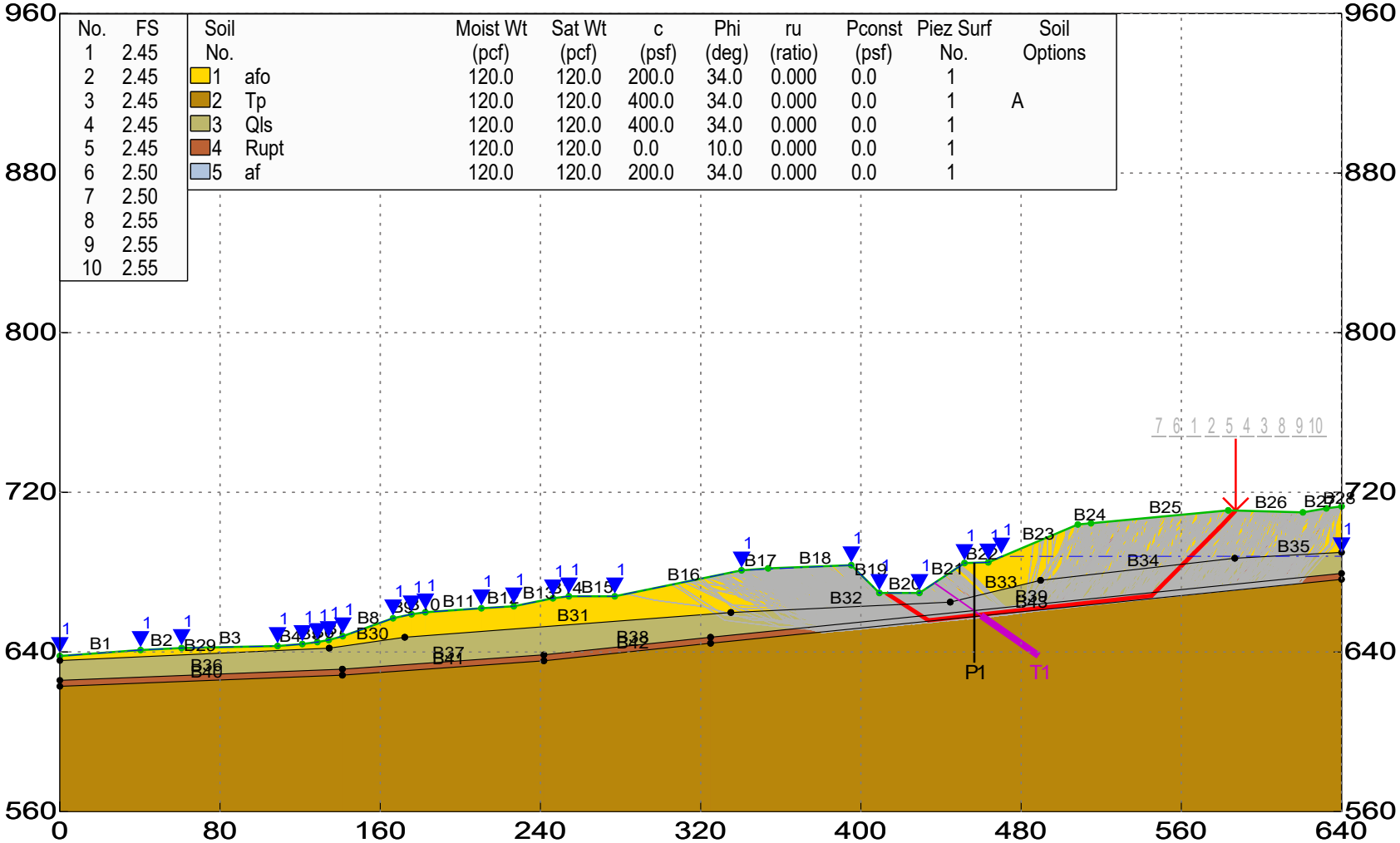
Royal Vista - Cross Section 6
Stage 4 (Temporary Staging Pad - Tieback)

LGC Geotechnical / BPP

\Sec 6 - Stage 4 (Temporary Staging Pad - tieback).gsd

No.	FS
1	2.45
2	2.45
3	2.45
4	2.45
5	2.45
6	2.50
7	2.50
8	2.55
9	2.55
10	2.55

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 2.45

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 4 (Temporary Staging Pad - tieback).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 4 (Temporary Staging Pad - tieback).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 6

DESCRIPTION: Stage 4 (Temporary Staging Pad - Tieback)

BOUNDARY DATA

28 Surface Boundaries
43 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	638.000	40.300	641.000	1
2	40.300	641.000	60.800	642.000	1
3	60.800	642.000	108.700	643.000	1
4	108.700	643.000	121.100	644.000	1
5	121.100	644.000	128.600	645.000	1
6	128.600	645.000	134.200	646.000	1
7	134.200	646.000	141.300	647.900	1
8	141.300	647.900	166.400	656.900	1
9	166.400	656.900	175.600	658.900	1
10	175.600	658.900	182.500	659.900	1
11	182.500	659.900	210.500	661.900	1
12	210.500	661.900	226.700	662.900	1
13	226.700	662.900	246.200	666.900	1
14	246.200	666.900	254.200	667.900	1
15	254.200	667.900	277.100	667.900	1
16	277.100	667.900	340.400	680.900	1
17	340.400	680.900	353.700	681.900	1
18	353.700	681.900	395.200	683.500	1
19	395.200	683.500	409.200	669.600	1
20	409.200	669.600	429.200	669.600	1
21	429.200	669.600	451.700	684.600	1
22	451.700	684.600	463.600	684.900	1
23	463.600	684.900	508.300	703.900	1
24	508.300	703.900	514.900	704.500	1
25	514.900	704.500	583.400	711.000	1
26	583.400	711.000	620.700	710.000	1

27	620.700	710.000	632.400	712.000	1
28	632.400	712.000	640.000	713.000	1
29	0.000	635.700	134.500	641.900	3
30	134.500	641.900	172.200	647.400	3
31	172.200	647.400	335.100	659.800	3
32	335.100	659.800	444.600	665.000	3
33	444.600	665.000	489.700	675.900	3
34	489.700	675.900	586.700	687.000	3
35	586.700	687.000	640.000	689.900	3
36	0.000	625.800	141.100	631.400	4
37	141.100	631.400	241.700	638.600	4
38	241.700	638.600	324.900	647.400	4
39	324.900	647.400	640.000	679.400	4
40	0.000	622.800	141.100	628.400	2
41	141.100	628.400	241.700	635.600	2
42	241.700	635.600	324.900	644.400	2
43	324.900	644.400	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 24 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	638.00
2	40.30	641.00
3	60.80	642.00
4	108.70	643.00
5	121.10	644.00
6	128.60	645.00
7	134.20	646.00
8	141.30	647.90
9	166.40	656.90
10	175.60	658.90
11	182.50	659.90
12	210.50	661.90
13	226.70	662.90
14	246.20	666.90
15	254.20	667.90
16	277.10	667.90
17	340.40	680.90
18	395.20	683.50
19	409.20	669.60
20	429.20	669.60
21	451.70	684.60
22	463.60	684.90
23	470.10	687.90
24	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	436.70	674.60	316500.0	5.0	35.00	28.5	35.0

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

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

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	456.60	684.72	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 25.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	380.00	651.00	475.00	660.00	3.00
2	480.00	662.50	620.00	676.00	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 = 413

Number of Trial Surfaces With Valid FS = 587

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 41.3 %

Statistical Data On All Valid FS Values:
FS Max = 63.660 FS Min = 2.448 FS Ave = 6.281
Standard Deviation = 5.954 Coefficient of Variation = 94.79 %

Critical Surface is Sequence Number 234 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	459.40	658.70

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	456.60	658.39

Factor Of Safety For The Critical or Specified Surface = 2.448

Table 1 - Geometry Data on the 43 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.14	0.07	412.66	669.53	669.60	-44.98	0.00	0.19
2	4.30	1.53	414.88	668.07	669.60	-32.95	0.00	5.12

3	4.30	4.31	419.17	665.29	669.60	-32.95	0.00	5.12
4	3.94	6.98	423.29	662.62	669.60	-32.95	0.00	4.69
5	3.94	9.53	427.23	660.07	669.60	-32.95	0.00	4.69
6	1.06	11.51	429.73	658.44	669.95	-32.95	33.69	1.27
7	3.45	14.47	431.99	656.98	671.46	-32.95	33.69	4.11
8	5.44	18.25	436.43	656.17	674.42	6.30	33.69	5.48
9	5.44	21.28	441.88	656.77	678.05	6.30	33.69	5.48
10	3.55	23.79	446.38	657.26	681.05	6.30	33.69	3.57
11	3.55	25.76	449.93	657.66	683.42	6.30	33.69	3.57
12	5.95	26.49	454.68	658.18	684.68	6.30	1.44	5.99
13	5.95	25.99	460.63	658.84	684.83	6.30	1.44	5.99
14	3.25	26.24	465.23	659.35	685.59	6.30	23.03	3.27
15	3.25	27.27	468.48	659.71	686.97	6.30	23.03	3.27
16	0.56	27.87	470.38	659.92	687.78	6.30	23.03	0.56
17	4.76	28.70	473.04	660.21	688.91	6.30	23.03	4.79
18	4.76	30.20	477.80	660.73	690.94	6.30	23.03	4.79
19	4.76	31.70	482.56	661.26	692.96	6.30	23.03	4.79
20	4.76	33.20	487.32	661.79	694.98	6.30	23.03	4.79
21	4.65	34.68	492.02	662.31	696.98	6.30	23.03	4.68
22	4.65	36.14	496.68	662.82	698.96	6.30	23.03	4.68
23	4.65	37.60	501.32	663.33	700.94	6.30	23.03	4.68
24	4.65	39.07	505.98	663.85	702.91	6.30	23.03	4.68
25	3.30	39.76	509.95	664.29	704.05	6.30	5.19	3.32
26	3.30	39.70	513.25	664.65	704.35	6.30	5.19	3.32
27	5.04	39.63	517.42	665.11	704.74	6.30	5.42	5.07
28	5.04	39.55	522.46	665.67	705.22	6.30	5.42	5.07
29	5.04	39.47	527.50	666.22	705.70	6.30	5.42	5.07
30	5.04	39.39	532.54	666.78	706.17	6.30	5.42	5.07
31	5.04	39.32	537.58	667.34	706.65	6.30	5.42	5.07
32	5.04	39.24	542.62	667.89	707.13	6.30	5.42	5.07
33	1.76	38.39	546.02	669.06	707.45	45.20	5.42	2.50
34	4.67	35.46	549.23	672.30	707.76	45.20	5.42	6.63
35	4.67	31.20	553.90	677.00	708.20	45.20	5.42	6.63
36	4.67	26.95	558.57	681.70	708.64	45.20	5.42	6.63
37	1.85	23.97	561.83	684.98	708.95	45.20	5.42	2.62
38	2.03	22.21	563.77	686.93	709.14	45.24	5.42	2.88
39	5.19	18.91	567.38	690.57	709.48	45.24	5.42	7.37
40	5.19	14.16	572.57	695.81	709.97	45.24	5.42	7.37
41	5.19	9.42	577.76	701.04	710.47	45.24	5.42	7.37
42	3.04	5.57	581.88	705.28	710.86	46.87	5.42	4.45
43	3.74	2.05	585.27	708.90	710.95	46.87	-1.54	5.47

Table 2 - Force Data On The 43 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1.1	0.0	0.8	0.0	0.0	0.0
2	788.2	0.0	488.4	0.0	0.0	0.0
3	2223.5	0.0	1377.8	0.0	0.0	0.0
4	3299.8	0.0	2044.8	0.0	0.0	0.0
5	4506.3	0.0	2792.4	0.0	0.0	0.0
6	1468.4	0.0	630.0	0.0	0.0	0.0
7	5987.0	0.0	2568.4	0.0	0.0	0.0
8	11927.7	0.0	4320.1	0.0	0.0	0.0
9	13906.6	0.0	5036.8	0.0	0.0	0.0
10	10132.5	0.0	3669.9	0.0	0.0	0.0
11	10973.7	0.0	3974.5	0.0	0.0	0.0
12	18916.5	0.0	9890.1	0.0	0.0	0.0
13	18554.5	0.0	9700.8	0.0	0.0	0.0
14	10235.3	0.0	4424.3	0.0	0.0	0.0
15	10634.1	0.0	4616.3	0.0	0.0	0.0
16	1868.1	4.5	981.5	0.0	0.0	0.0
17	16396.2	0.0	8275.9	0.0	0.0	0.0
18	17251.8	0.0	8119.7	0.0	0.0	0.0
19	18107.4	0.0	7963.4	0.0	0.0	0.0
20	18962.9	0.0	7807.2	0.0	0.0	0.0
21	19349.5	0.0	7475.3	0.0	0.0	0.0

22	20165.8	0.0	7326.2	0.0	0.0	0.0
23	20982.2	0.0	7177.1	0.0	0.0	0.0
24	21798.6	0.0	7028.0	0.0	0.0	0.0
25	15746.9	0.0	4897.2	0.0	0.0	0.0
26	15721.4	0.0	4822.1	0.0	0.0	0.0
27	23966.0	0.0	7219.2	0.0	0.0	0.0
28	23918.7	0.0	7044.1	0.0	0.0	0.0
29	23871.3	0.0	6869.0	0.0	0.0	0.0
30	23824.0	0.0	6693.8	0.0	0.0	0.0
31	23776.6	0.0	6518.7	0.0	0.0	0.0
32	23729.3	0.0	6343.6	0.0	0.0	0.0
33	8119.8	0.0	2947.3	0.0	0.0	0.0
34	19869.5	0.0	6470.8	0.0	0.0	0.0
35	17483.7	0.0	4528.3	0.0	0.0	0.0
36	15098.0	0.0	2585.8	0.0	0.0	0.0
37	5315.2	0.0	486.8	0.0	0.0	0.0
38	5409.3	0.0	184.0	0.0	0.0	0.0
39	11777.9	0.0	0.0	0.0	0.0	0.0
40	8823.8	0.0	0.0	0.0	0.0	0.0
41	5869.7	0.0	0.0	0.0	0.0	0.0
42	2033.5	0.0	0.0	0.0	0.0	0.0
43	918.5	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 553710.84(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 376043.63(lbs)

TOTAL AREA OF SLIDING MASS = 4614.26(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 43 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	200.00	34.00	
2	1	200.00	34.00	
3	1	200.00	34.00	
4	3	400.00	34.00	
5	3	400.00	34.00	
6	3	400.00	34.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	3	400.00	34.00	
35	3	400.00	34.00	
36	3	400.00	34.00	
37	1	200.00	34.00	
38	1	200.00	34.00	

39	1	200.00	34.00
40	1	200.00	34.00
41	1	200.00	34.00
42	1	200.00	34.00
43	1	200.00	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 43 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-44.98	412.66	0.19	128.89	286.94	116.25
1	-44.98	412.66	0.19	128.89	286.94	116.25
2	-32.95	414.88	5.12	178.59	320.46	129.83
2	-32.95	414.88	5.12	178.59	320.46	129.83
3	-32.95	419.17	5.12	376.71	454.09	183.97
3	-32.95	419.17	5.12	376.71	454.09	183.97
4	-32.95	423.29	4.69	636.37	829.24	335.96
4	-32.95	423.29	4.69	636.37	829.24	335.96
5	-32.95	427.23	4.69	818.01	951.76	385.59
5	-32.95	427.23	4.69	818.01	951.76	385.59
6	-32.95	429.73	1.27	1231.56	1230.70	498.60
6	-32.95	429.73	1.27	1231.56	1230.70	498.60
7	-32.95	431.99	4.11	1169.91	206.29	83.57
7	-32.95	431.99	4.11	1169.91	206.29	83.57
8	6.30	436.43	5.48	1390.17	245.13	99.31
8	6.30	436.43	5.48	1390.17	245.13	99.31
9	6.30	441.88	5.48	1620.82	285.79	115.79
9	6.30	441.88	5.48	1620.82	285.79	115.79
10	6.30	446.38	3.57	1811.34	319.39	129.40
10	6.30	446.38	3.57	1811.34	319.39	129.40
11	6.30	449.93	3.57	1961.71	345.90	140.14
11	6.30	449.93	3.57	1961.71	345.90	140.14
12	6.30	454.68	5.99	1514.24	267.00	108.17
12	6.30	454.68	5.99	1514.24	267.00	108.17
13	6.30	460.63	5.99	7535.99	1328.80	538.35
13	6.30	460.63	5.99	7535.99	1328.80	538.35
14	6.30	465.23	3.27	1781.10	314.06	127.24
14	6.30	465.23	3.27	1781.10	314.06	127.24
15	6.30	468.48	3.27	1844.57	325.25	131.77
15	6.30	468.48	3.27	1844.57	325.25	131.77
16	6.30	470.38	0.56	1591.58	280.64	113.70
16	6.30	470.38	0.56	1591.58	280.64	113.70
17	6.30	473.04	4.79	1701.89	300.09	121.58
17	6.30	473.04	4.79	1701.89	300.09	121.58
18	6.30	477.80	4.79	1912.45	337.22	136.62
18	6.30	477.80	4.79	1912.45	337.22	136.62
19	6.30	482.56	4.79	2123.02	374.35	151.66
19	6.30	482.56	4.79	2123.02	374.35	151.66
20	6.30	487.32	4.79	2333.59	411.48	166.70
20	6.30	487.32	4.79	2333.59	411.48	166.70
21	6.30	492.02	4.68	2541.72	448.17	181.57
21	6.30	492.02	4.68	2541.72	448.17	181.57
22	6.30	496.68	4.68	2747.41	484.44	196.27
22	6.30	496.68	4.68	2747.41	484.44	196.27
23	6.30	501.32	4.68	2953.10	520.71	210.96
23	6.30	501.32	4.68	2953.10	520.71	210.96
24	6.30	505.98	4.68	3158.78	556.98	225.65
24	6.30	505.98	4.68	3158.78	556.98	225.65
25	6.30	509.95	3.32	3269.01	576.41	233.53
25	6.30	509.95	3.32	3269.01	576.41	233.53
26	6.30	513.25	3.32	3283.77	579.02	234.58
26	6.30	513.25	3.32	3283.77	579.02	234.58

27	6.30	517.42	5.07	3303.62	582.52	236.00
27	6.30	517.42	5.07	3303.62	582.52	236.00
28	6.30	522.46	5.07	3328.56	586.91	237.78
28	6.30	522.46	5.07	3328.56	586.91	237.78
29	6.30	527.50	5.07	3353.49	591.31	239.56
29	6.30	527.50	5.07	3353.49	591.31	239.56
30	6.30	532.54	5.07	3378.42	595.71	241.34
30	6.30	532.54	5.07	3378.42	595.71	241.34
31	6.30	537.58	5.07	3403.36	600.10	243.12
31	6.30	537.58	5.07	3403.36	600.10	243.12
32	6.30	542.62	5.07	3428.29	604.50	244.91
32	6.30	542.62	5.07	3428.29	604.50	244.91
33	45.20	546.02	2.50	3182.61	561.18	227.36
33	45.20	546.02	2.50	3182.61	561.18	227.36
34	45.20	549.23	6.63	2394.61	2015.19	816.43
34	45.20	549.23	6.63	2394.61	2015.19	816.43
35	45.20	553.90	6.63	2226.56	1901.84	770.50
35	45.20	553.90	6.63	2226.56	1901.84	770.50
36	45.20	558.57	6.63	2058.52	1788.49	724.58
36	45.20	558.57	6.63	2058.52	1788.49	724.58
37	45.20	561.83	2.62	2008.96	1555.06	630.01
37	45.20	561.83	2.62	2008.96	1555.06	630.01
38	45.24	563.77	2.88	1938.32	1507.41	610.71
38	45.24	563.77	2.88	1938.32	1507.41	610.71
39	45.24	567.38	7.37	1682.26	1334.70	540.74
39	45.24	567.38	7.37	1682.26	1334.70	540.74
40	45.24	572.57	7.37	1243.31	1038.63	420.79
40	45.24	572.57	7.37	1243.31	1038.63	420.79
41	45.24	577.76	7.37	804.37	742.55	300.84
41	45.24	577.76	7.37	804.37	742.55	300.84
42	46.87	581.88	4.45	438.12	495.52	200.75
42	46.87	581.88	4.45	438.12	495.52	200.75
43	46.87	585.27	5.47	116.10	278.31	112.75
43	46.87	585.27	5.47	116.10	278.31	112.75

Table 4 - Base Force Data on the 43 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-44.98	412.66	0.19	24.96	55.57	22.51
1	-44.98	412.66	0.19	24.96	55.57	22.51
2	-32.95	414.88	5.12	914.24	1640.52	664.63
2	-32.95	414.88	5.12	914.24	1640.52	664.63
3	-32.95	419.17	5.12	1928.47	2324.63	941.79
3	-32.95	419.17	5.12	1928.47	2324.63	941.79
4	-32.95	423.29	4.69	2986.82	3892.03	1576.81
4	-32.95	423.29	4.69	2986.82	3892.03	1576.81
5	-32.95	427.23	4.69	3839.35	4467.07	1809.78
5	-32.95	427.23	4.69	3839.35	4467.07	1809.78
6	-32.95	429.73	1.27	1560.33	1559.24	631.70
6	-32.95	429.73	1.27	1560.33	1559.24	631.70
7	-32.95	431.99	4.11	4805.37	847.32	343.28
7	-32.95	431.99	4.11	4805.37	847.32	343.28
8	6.30	436.43	5.48	7615.49	1342.82	544.02
8	6.30	436.43	5.48	7615.49	1342.82	544.02
9	6.30	441.88	5.48	8879.01	1565.61	634.29
9	6.30	441.88	5.48	8879.01	1565.61	634.29
10	6.30	446.38	3.57	6469.33	1140.72	462.15
10	6.30	446.38	3.57	6469.33	1140.72	462.15
11	6.30	449.93	3.57	7006.41	1235.42	500.51
11	6.30	449.93	3.57	7006.41	1235.42	500.51
12	6.30	454.68	5.99	9064.48	1598.31	647.53
12	6.30	454.68	5.99	9064.48	1598.31	647.53
13	6.30	460.63	5.99	45111.72	7954.41	3222.63
13	6.30	460.63	5.99	45111.72	7954.41	3222.63
14	6.30	465.23	3.27	5823.76	1026.89	416.03
14	6.30	465.23	3.27	5823.76	1026.89	416.03
15	6.30	468.48	3.27	6031.28	1063.48	430.85

15	6.30	468.48	3.27	6031.28	1063.48	430.85
16	6.30	470.38	0.56	894.57	157.74	63.91
16	6.30	470.38	0.56	894.57	157.74	63.91
17	6.30	473.04	4.79	8150.79	1437.20	582.26
17	6.30	473.04	4.79	8150.79	1437.20	582.26
18	6.30	477.80	4.79	9159.26	1615.02	654.31
18	6.30	477.80	4.79	9159.26	1615.02	654.31
19	6.30	482.56	4.79	10167.73	1792.84	726.35
19	6.30	482.56	4.79	10167.73	1792.84	726.35
20	6.30	487.32	4.79	11176.20	1970.67	798.39
20	6.30	487.32	4.79	11176.20	1970.67	798.39
21	6.30	492.02	4.68	11890.84	2096.68	849.44
21	6.30	492.02	4.68	11890.84	2096.68	849.44
22	6.30	496.68	4.68	12853.11	2266.35	918.18
22	6.30	496.68	4.68	12853.11	2266.35	918.18
23	6.30	501.32	4.68	13815.37	2436.02	986.92
23	6.30	501.32	4.68	13815.37	2436.02	986.92
24	6.30	505.98	4.68	14777.63	2605.70	1055.66
24	6.30	505.98	4.68	14777.63	2605.70	1055.66
25	6.30	509.95	3.32	10853.31	1913.73	775.32
25	6.30	509.95	3.32	10853.31	1913.73	775.32
26	6.30	513.25	3.32	10902.32	1922.37	778.82
26	6.30	513.25	3.32	10902.32	1922.37	778.82
27	6.30	517.42	5.07	16750.33	2953.53	1196.59
27	6.30	517.42	5.07	16750.33	2953.53	1196.59
28	6.30	522.46	5.07	16876.75	2975.83	1205.62
28	6.30	522.46	5.07	16876.75	2975.83	1205.62
29	6.30	527.50	5.07	17003.17	2998.12	1214.65
29	6.30	527.50	5.07	17003.17	2998.12	1214.65
30	6.30	532.54	5.07	17129.60	3020.41	1223.68
30	6.30	532.54	5.07	17129.60	3020.41	1223.68
31	6.30	537.58	5.07	17256.02	3042.70	1232.71
31	6.30	537.58	5.07	17256.02	3042.70	1232.71
32	6.30	542.62	5.07	17382.44	3064.99	1241.74
32	6.30	542.62	5.07	17382.44	3064.99	1241.74
33	45.20	546.02	2.50	7959.25	1403.43	568.58
33	45.20	546.02	2.50	7959.25	1403.43	568.58
34	45.20	549.23	6.63	15866.27	13352.26	5409.49
34	45.20	549.23	6.63	15866.27	13352.26	5409.49
35	45.20	553.90	6.63	14752.80	12601.22	5105.22
35	45.20	553.90	6.63	14752.80	12601.22	5105.22
36	45.20	558.57	6.63	13639.34	11850.17	4800.94
36	45.20	558.57	6.63	13639.34	11850.17	4800.94
37	45.20	561.83	2.62	5266.91	4076.92	1651.71
37	45.20	561.83	2.62	5266.91	4076.92	1651.71
38	45.24	563.77	2.88	5588.15	4345.85	1760.67
38	45.24	563.77	2.88	5588.15	4345.85	1760.67
39	45.24	567.38	7.37	12402.19	9839.85	3986.49
39	45.24	567.38	7.37	12402.19	9839.85	3986.49
40	45.24	572.57	7.37	9166.14	7657.10	3102.18
40	45.24	572.57	7.37	9166.14	7657.10	3102.18
41	45.24	577.76	7.37	5930.08	5474.36	2217.86
41	45.24	577.76	7.37	5930.08	5474.36	2217.86
42	46.87	581.88	4.45	1948.99	2204.31	893.05
42	46.87	581.88	4.45	1948.99	2204.31	893.05
43	46.87	585.27	5.47	635.18	1522.63	616.88
43	46.87	585.27	5.47	635.18	1522.63	616.88

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 43 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
13	51852.3	36307.4	63300.0	35.00	0.513762E+05

***Pier/Pile Slice Force Data on the 43 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
12	12000.0	0.0	12000.0	90.00	-0.255087E+04

Sum of the Resisting Forces = 119549.98 (lbs)

Average Available Shear Strength = 606.18(psf)

Sum of the Driving Forces = 52115.39 (lbs)

Average Mobilized Shear Stress = 264.25(psf)

Total length of the failure surface = 197.22(ft)

Factor of Safety Balance Check: FS = 2.29395

Janbu's Correction Factor (fo) = 1.0670

Janub's FS Corrected = 2.44764

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

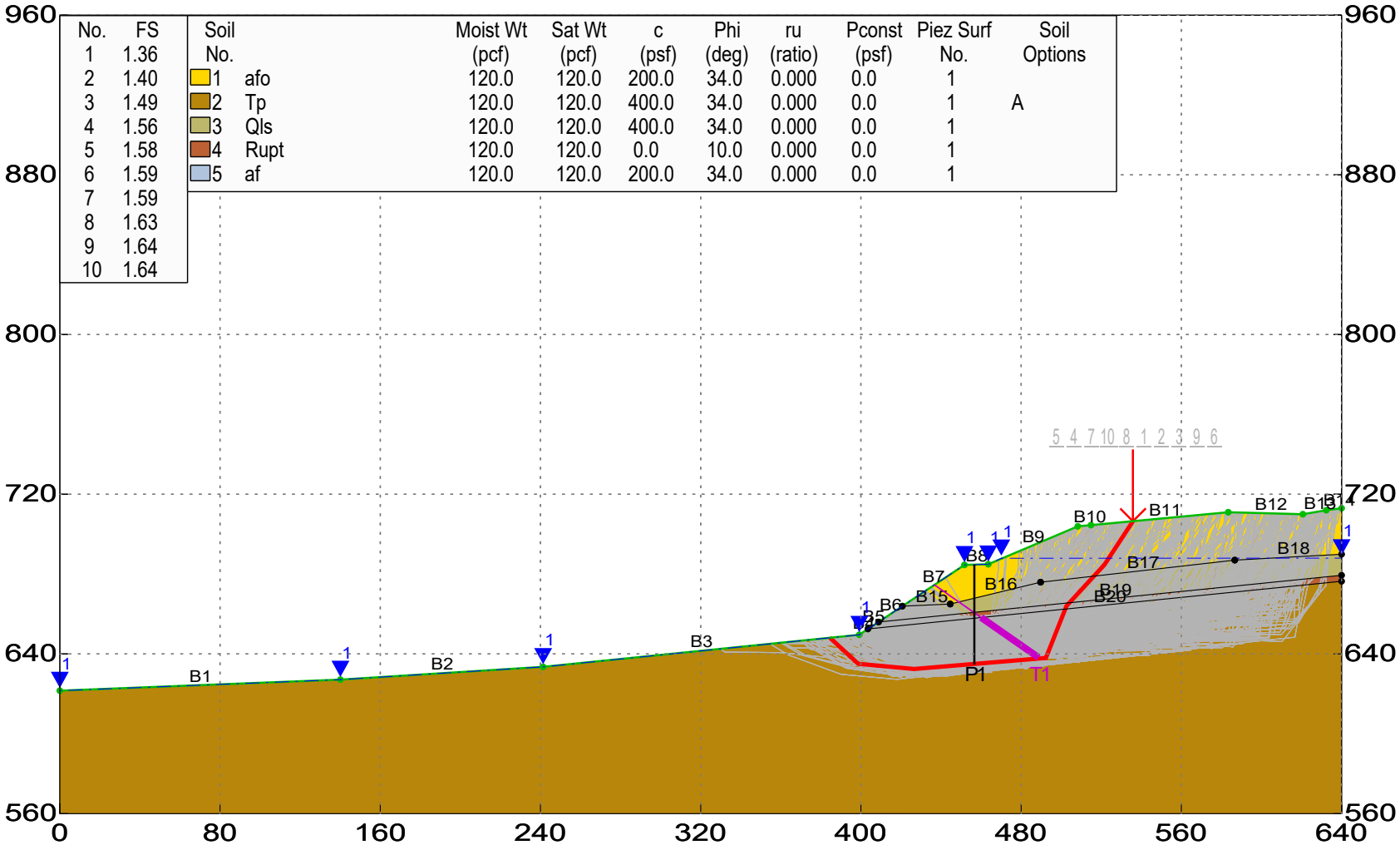
Royal Vista - Cross Section 6
Stage 5 (Temporary Backcut)

LGC Geotechnical / BPP

\Sec 6 - Stage 5 (Temporary Backcut - Along Bedding).gsd

No.	FS
1	1.36
2	1.40
3	1.49
4	1.56
5	1.58
6	1.59
7	1.59
8	1.63
9	1.64
10	1.64

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.36

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

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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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 5 (Temporary Backcut - Along Bedding).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 5 (Temporary Backcut - Along Bedding).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 6

DESCRIPTION: Stage 5 (Temporary Backcut)

BOUNDARY DATA

14 Surface Boundaries
20 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	621.600	140.100	627.100	2
2	140.100	627.100	241.300	633.500	2
3	241.300	633.500	399.200	649.600	2
4	399.200	649.600	403.500	652.500	2
5	403.500	652.500	408.800	656.000	4
6	408.800	656.000	420.700	663.900	3
7	420.700	663.900	451.700	684.600	1
8	451.700	684.600	463.600	684.900	1
9	463.600	684.900	508.300	703.900	1
10	508.300	703.900	514.900	704.500	1
11	514.900	704.500	583.400	711.000	1
12	583.400	711.000	620.700	710.000	1
13	620.700	710.000	632.400	712.000	1
14	632.400	712.000	640.000	713.000	1
15	420.700	663.900	444.600	665.000	3
16	444.600	665.000	489.700	675.900	3
17	489.700	675.900	586.700	687.000	3
18	586.700	687.000	640.000	689.900	3
19	408.800	656.000	640.000	679.400	4
20	403.500	652.500	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	621.60
2	140.10	627.10
3	241.30	633.50
4	399.20	649.60
5	451.70	684.60
6	463.60	684.90
7	470.10	687.90
8	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	436.70	674.58	316500.0	5.0	35.00	28.5	35.0

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

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	456.60	684.72	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 28.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	415.00	641.70	455.00	644.50	30.00
2	460.00	645.00	620.00	662.00	30.00

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 = 88

Number of Trial Surfaces With Valid FS = 912

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 8.8 %

Statistical Data On All Valid FS Values:
FS Max = 892.763 FS Min = 1.358 FS Ave = 5.767

Standard Deviation = 41.650 Coefficient of Variation = 722.25 %

Critical Surface is Sequence Number 97 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	450.45	664.95

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	456.60	635.00

Factor Of Safety For The Critical or Specified Surface = 1.358

Table 1 - Geometry Data on the 41 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.72	2.42	386.86	645.92	648.34	-42.67	5.82	6.42
2	4.72	7.25	391.58	641.57	648.82	-42.67	5.82	6.42
3	4.72	12.09	396.31	637.22	649.30	-42.67	5.82	6.42
4	0.53	14.56	398.93	635.01	649.57	-5.23	5.82	0.54
5	4.30	16.26	401.35	634.79	651.05	-5.23	34.00	4.32
6	0.06	17.93	403.53	634.59	652.52	-5.23	33.44	0.06
7	2.62	18.93	404.87	634.47	653.40	-5.23	33.44	2.63
8	2.62	20.90	407.49	634.23	655.13	-5.23	33.44	2.63
9	5.95	24.14	411.78	633.84	657.98	-5.23	33.58	5.97
10	5.95	28.63	417.73	633.29	661.93	-5.23	33.58	5.97
11	2.93	31.99	422.16	632.89	664.88	-5.23	33.73	2.94
12	2.93	34.21	425.09	632.62	666.83	-5.23	33.73	2.94
13	4.51	36.64	428.81	632.68	669.31	4.78	33.73	4.53
14	4.51	39.27	433.32	633.05	672.33	4.78	33.73	4.53
15	4.51	41.91	437.83	633.43	675.34	4.78	33.73	4.53
16	4.51	44.54	442.34	633.81	678.35	4.78	33.73	4.53
17	3.55	46.90	446.37	634.15	681.04	4.78	33.73	3.56
18	3.55	48.97	449.92	634.44	683.41	4.78	33.73	3.56
19	5.95	49.84	454.68	634.84	684.68	4.78	1.44	5.97
20	5.95	49.49	460.63	635.34	684.83	4.78	1.44	5.97
21	3.25	49.87	465.23	635.72	685.59	4.78	23.03	3.26
22	3.25	50.98	468.48	635.99	686.97	4.78	23.03	3.26
23	0.56	51.63	470.38	636.15	687.78	4.78	23.03	0.56
24	4.76	52.54	473.04	636.38	688.91	4.78	23.03	4.78
25	4.76	54.16	477.80	636.77	690.94	4.78	23.03	4.78
26	4.76	55.79	482.56	637.17	692.96	4.78	23.03	4.78
27	4.76	57.41	487.32	637.57	694.98	4.78	23.03	4.78
28	2.67	58.68	491.04	637.88	696.56	4.78	23.03	2.68
29	4.85	54.05	494.80	644.11	698.16	68.39	23.03	13.16
30	4.85	43.88	499.64	656.34	700.22	68.39	23.03	13.16
31	0.62	38.14	502.38	663.24	701.38	68.39	23.03	1.68
32	1.49	36.99	503.43	664.84	701.83	47.52	23.03	2.21
33	4.12	35.12	506.24	667.90	703.02	47.52	23.03	6.10
34	3.30	32.09	509.95	671.96	704.05	47.52	5.19	4.89
35	3.30	28.79	513.25	675.56	704.35	47.52	5.19	4.89
36	1.45	26.41	515.63	678.16	704.57	47.52	5.42	2.15
37	2.62	24.38	517.66	680.38	704.76	47.52	5.42	3.88
38	2.62	21.77	520.28	683.24	705.01	47.52	5.42	3.88
39	2.13	18.93	522.66	686.30	705.24	56.86	5.42	3.89
40	6.06	13.05	526.75	692.57	705.62	56.86	5.42	11.08
41	6.06	4.35	532.81	701.85	706.20	56.86	5.42	11.08

Table 2 - Force Data On The 41 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1370.5	0.0	959.3	0.0	0.0	0.0
2	4111.4	0.0	2877.8	0.0	0.0	0.0
3	6852.3	0.0	4796.4	0.0	0.0	0.0
4	931.6	0.0	481.5	0.0	0.0	0.0
5	8388.7	0.0	3029.5	0.0	0.0	0.0
6	126.8	0.0	45.7	0.0	0.0	0.0
7	5953.9	0.0	2149.5	0.0	0.0	0.0
8	6573.5	0.0	2375.4	0.0	0.0	0.0
9	17233.1	0.0	6232.0	0.0	0.0	0.0
10	20442.1	0.0	7396.3	0.0	0.0	0.0
11	11228.4	0.0	4063.1	0.0	0.0	0.0
12	12007.9	0.0	4344.5	0.0	0.0	0.0
13	19838.7	0.0	7171.7	0.0	0.0	0.0
14	21265.9	0.0	7686.3	0.0	0.0	0.0
15	22693.1	0.0	8201.0	0.0	0.0	0.0
16	24120.3	0.0	8715.6	0.0	0.0	0.0
17	19978.8	0.0	7218.4	0.0	0.0	0.0
18	20862.2	0.0	7536.9	0.0	0.0	0.0
19	35582.3	0.0	18555.6	0.0	0.0	0.0
20	35334.0	0.0	18426.1	0.0	0.0	0.0
21	19448.6	0.0	8376.4	0.0	0.0	0.0
22	19881.4	0.0	8582.4	0.0	0.0	0.0
23	3461.2	4.5	1810.2	0.0	0.0	0.0
24	30010.6	0.0	15358.9	0.0	0.0	0.0
25	30939.0	0.0	15241.0	0.0	0.0	0.0
26	31867.4	0.0	15123.1	0.0	0.0	0.0
27	32795.7	0.0	15005.3	0.0	0.0	0.0
28	18822.7	0.0	8374.2	0.0	0.0	0.0
29	31439.4	0.0	35968.7	0.0	0.0	0.0
30	25521.8	0.0	25925.6	0.0	0.0	0.0
31	2835.5	0.0	2589.8	0.0	0.0	0.0
32	6620.0	0.0	3180.6	0.0	0.0	0.0
33	17369.8	0.0	7623.4	0.0	0.0	0.0
34	12708.9	0.0	4868.7	0.0	0.0	0.0
35	11400.5	0.0	3770.3	0.0	0.0	0.0
36	4605.3	0.0	1311.8	0.0	0.0	0.0
37	7669.1	0.0	1827.9	0.0	0.0	0.0
38	6846.8	0.0	1134.8	0.0	0.0	0.0
39	4829.4	0.0	394.8	0.0	0.0	0.0
40	9488.7	0.0	0.0	0.0	0.0	0.0
41	3162.9	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 626620.11(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 379512.24(lbs)

TOTAL AREA OF SLIDING MASS = 5221.83(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 41 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	400.00	34.00	A
2	2	400.00	34.00	A
3	2	400.00	34.00	A
4	2	400.00	34.00	A
5	2	400.00	34.00	A
6	2	400.00	34.00	A
7	2	400.00	34.00	A
8	2	400.00	34.00	A
9	2	400.00	34.00	A

10	2	400.00	34.00	A
11	2	400.00	34.00	A
12	2	400.00	34.00	A
13	2	300.00	12.00	A
14	2	300.00	12.00	A
15	2	300.00	12.00	A
16	2	300.00	12.00	A
17	2	300.00	12.00	A
18	2	300.00	12.00	A
19	2	300.00	12.00	A
20	2	300.00	12.00	A
21	2	300.00	12.00	A
22	2	300.00	12.00	A
23	2	300.00	12.00	A
24	2	300.00	12.00	A
25	2	300.00	12.00	A
26	2	300.00	12.00	A
27	2	300.00	12.00	A
28	2	300.00	12.00	A
29	2	400.00	34.00	A
30	2	400.00	34.00	A
31	4	0.00	10.00	
32	4	0.00	10.00	
33	3	400.00	34.00	
34	3	400.00	34.00	
35	3	400.00	34.00	
36	3	400.00	34.00	
37	1	200.00	34.00	
38	1	200.00	34.00	
39	1	200.00	34.00	
40	1	200.00	34.00	
41	1	200.00	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 41 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-42.67	386.86	6.42	577.88	789.79	445.79
1	-42.67	386.86	6.42	577.88	789.79	445.79
2	-42.67	391.58	6.42	1027.27	1092.90	616.89
2	-42.67	391.58	6.42	1027.27	1092.90	616.89
3	-42.67	396.31	6.42	1476.65	1396.02	787.98
3	-42.67	396.31	6.42	1476.65	1396.02	787.98
4	-5.23	398.93	0.54	903.38	1009.34	569.72
4	-5.23	398.93	0.54	903.38	1009.34	569.72
5	-5.23	401.35	4.32	1320.15	1290.45	728.39
5	-5.23	401.35	4.32	1320.15	1290.45	728.39
6	-5.23	403.53	0.06	1453.99	1380.73	779.35
6	-5.23	403.53	0.06	1453.99	1380.73	779.35
7	-5.23	404.87	2.63	1533.95	1434.66	809.79
7	-5.23	404.87	2.63	1533.95	1434.66	809.79
8	-5.23	407.49	2.63	1690.35	1540.15	869.34
8	-5.23	407.49	2.63	1690.35	1540.15	869.34
9	-5.23	411.78	5.97	1947.40	1713.54	967.20
9	-5.23	411.78	5.97	1947.40	1713.54	967.20
10	-5.23	417.73	5.97	2305.10	1954.81	1103.39
10	-5.23	417.73	5.97	2305.10	1954.81	1103.39
11	-5.23	422.16	2.94	2572.58	2135.23	1205.22
11	-5.23	422.16	2.94	2572.58	2135.23	1205.22
12	-5.23	425.09	2.94	2749.84	2254.79	1272.71
12	-5.23	425.09	2.94	2749.84	2254.79	1272.71
13	4.78	428.81	4.53	2768.06	888.37	501.44

13	4.78	428.81	4.53	2768.06	888.37	501.44
14	4.78	433.32	4.53	2968.55	930.98	525.49
14	4.78	433.32	4.53	2968.55	930.98	525.49
15	4.78	437.83	4.53	3169.03	973.60	549.55
15	4.78	437.83	4.53	3169.03	973.60	549.55
16	4.78	442.34	4.53	3369.52	1016.21	573.60
16	4.78	442.34	4.53	3369.52	1016.21	573.60
17	4.78	446.37	3.56	3548.63	1054.28	595.09
17	4.78	446.37	3.56	3548.63	1054.28	595.09
18	4.78	449.92	3.56	13825.78	3238.76	1828.11
18	4.78	449.92	3.56	13825.78	3238.76	1828.11
19	4.78	454.68	5.97	2827.23	900.95	508.54
19	4.78	454.68	5.97	2827.23	900.95	508.54
20	4.78	460.63	5.97	2807.40	896.73	506.16
20	4.78	460.63	5.97	2807.40	896.73	506.16
21	4.78	465.23	3.26	3364.84	1015.22	573.04
21	4.78	465.23	3.26	3364.84	1015.22	573.04
22	4.78	468.48	3.26	3434.07	1029.93	581.34
22	4.78	468.48	3.26	3434.07	1029.93	581.34
23	4.78	470.38	0.56	2927.46	922.25	520.56
23	4.78	470.38	0.56	2927.46	922.25	520.56
24	4.78	473.04	4.78	3041.58	946.51	534.25
24	4.78	473.04	4.78	3041.58	946.51	534.25
25	4.78	477.80	4.78	3258.96	992.71	560.33
25	4.78	477.80	4.78	3258.96	992.71	560.33
26	4.78	482.56	4.78	3476.33	1038.92	586.42
26	4.78	482.56	4.78	3476.33	1038.92	586.42
27	4.78	487.32	4.78	3693.71	1085.12	612.50
27	4.78	487.32	4.78	3693.71	1085.12	612.50
28	4.78	491.04	2.68	3863.43	1121.20	632.86
28	4.78	491.04	2.68	3863.43	1121.20	632.86
29	68.39	494.80	13.16	1556.24	1449.70	818.28
29	68.39	494.80	13.16	1556.24	1449.70	818.28
30	68.39	499.64	13.16	1329.92	1297.04	732.11
30	68.39	499.64	13.16	1329.92	1297.04	732.11
31	68.39	502.38	1.68	2396.71	422.60	238.54
31	68.39	502.38	1.68	2396.71	422.60	238.54
32	47.52	503.43	2.21	2688.08	473.98	267.54
32	47.52	503.43	2.21	2688.08	473.98	267.54
33	47.52	506.24	6.10	1874.24	1664.19	939.35
33	47.52	506.24	6.10	1874.24	1664.19	939.35
34	47.52	509.95	4.89	1797.65	1612.53	910.19
34	47.52	509.95	4.89	1797.65	1612.53	910.19
35	47.52	513.25	4.89	1678.58	1532.22	864.86
35	47.52	513.25	4.89	1678.58	1532.22	864.86
36	47.52	515.63	2.15	1593.07	1474.54	832.30
36	47.52	515.63	2.15	1593.07	1474.54	832.30
37	47.52	517.66	3.88	1611.17	1286.75	726.30
37	47.52	517.66	3.88	1611.17	1286.75	726.30
38	47.52	520.28	3.88	1517.46	1223.54	690.62
38	47.52	520.28	3.88	1517.46	1223.54	690.62
39	56.86	522.66	3.89	1226.09	1027.01	579.69
39	56.86	522.66	3.89	1226.09	1027.01	579.69
40	56.86	526.75	11.08	853.37	775.61	437.79
40	56.86	526.75	11.08	853.37	775.61	437.79
41	56.86	532.81	11.08	208.79	340.83	192.38
41	56.86	532.81	11.08	208.79	340.83	192.38

Table 4 - Base Force Data on the 41 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-42.67	386.86	6.42	3712.35	5073.64	2863.81
1	-42.67	386.86	6.42	3712.35	5073.64	2863.81
2	-42.67	391.58	6.42	6599.24	7020.88	3962.92
2	-42.67	391.58	6.42	6599.24	7020.88	3962.92
3	-42.67	396.31	6.42	9486.14	8968.11	5062.03
3	-42.67	396.31	6.42	9486.14	8968.11	5062.03

4	-5.23	398.93	0.54	483.74	540.48	305.07
4	-5.23	398.93	0.54	483.74	540.48	305.07
5	-5.23	401.35	4.32	5700.36	5572.12	3145.17
5	-5.23	401.35	4.32	5700.36	5572.12	3145.17
6	-5.23	403.53	0.06	86.05	81.71	46.12
6	-5.23	403.53	0.06	86.05	81.71	46.12
7	-5.23	404.87	2.63	4036.55	3775.28	2130.95
7	-5.23	404.87	2.63	4036.55	3775.28	2130.95
8	-5.23	407.49	2.63	4448.12	4052.88	2287.64
8	-5.23	407.49	2.63	4448.12	4052.88	2287.64
9	-5.23	411.78	5.97	11635.42	10238.13	5778.89
9	-5.23	411.78	5.97	11635.42	10238.13	5778.89
10	-5.23	417.73	5.97	13772.61	11679.68	6592.57
10	-5.23	417.73	5.97	13772.61	11679.68	6592.57
11	-5.23	422.16	2.94	7556.60	6271.94	3540.18
11	-5.23	422.16	2.94	7556.60	6271.94	3540.18
12	-5.23	425.09	2.94	8077.29	6623.15	3738.42
12	-5.23	425.09	2.94	8077.29	6623.15	3738.42
13	4.78	428.81	4.53	12534.29	4022.70	2270.61
13	4.78	428.81	4.53	12534.29	4022.70	2270.61
14	4.78	433.32	4.53	13442.14	4215.67	2379.53
14	4.78	433.32	4.53	13442.14	4215.67	2379.53
15	4.78	437.83	4.53	14349.98	4408.64	2488.45
15	4.78	437.83	4.53	14349.98	4408.64	2488.45
16	4.78	442.34	4.53	15257.83	4601.61	2597.37
16	4.78	442.34	4.53	15257.83	4601.61	2597.37
17	4.78	446.37	3.56	12641.64	3755.78	2119.94
17	4.78	446.37	3.56	12641.64	3755.78	2119.94
18	4.78	449.92	3.56	49252.94	11537.75	6512.46
18	4.78	449.92	3.56	49252.94	11537.75	6512.46
19	4.78	454.68	5.97	16880.80	5379.36	3036.37
19	4.78	454.68	5.97	16880.80	5379.36	3036.37
20	4.78	460.63	5.97	16762.39	5354.19	3022.16
20	4.78	460.63	5.97	16762.39	5354.19	3022.16
21	4.78	465.23	3.26	10973.93	3310.99	1868.88
21	4.78	465.23	3.26	10973.93	3310.99	1868.88
22	4.78	468.48	3.26	11199.71	3358.98	1895.97
22	4.78	468.48	3.26	11199.71	3358.98	1895.97
23	4.78	470.38	0.56	1641.19	517.03	291.84
23	4.78	470.38	0.56	1641.19	517.03	291.84
24	4.78	473.04	4.78	14529.52	4521.43	2552.11
24	4.78	473.04	4.78	14529.52	4521.43	2552.11
25	4.78	477.80	4.78	15567.91	4742.15	2676.70
25	4.78	477.80	4.78	15567.91	4742.15	2676.70
26	4.78	482.56	4.78	16606.31	4962.87	2801.28
26	4.78	482.56	4.78	16606.31	4962.87	2801.28
27	4.78	487.32	4.78	17644.71	5183.59	2925.87
27	4.78	487.32	4.78	17644.71	5183.59	2925.87
28	4.78	491.04	2.68	10363.20	3007.48	1697.57
28	4.78	491.04	2.68	10363.20	3007.48	1697.57
29	68.39	494.80	13.16	20478.60	19076.61	10767.75
29	68.39	494.80	13.16	20478.60	19076.61	10767.75
30	68.39	499.64	13.16	17500.46	17067.83	9633.90
30	68.39	499.64	13.16	17500.46	17067.83	9633.90
31	68.39	502.38	1.68	4031.04	710.78	401.20
31	68.39	502.38	1.68	4031.04	710.78	401.20
32	47.52	503.43	2.21	5936.25	1046.72	590.82
32	47.52	503.43	2.21	5936.25	1046.72	590.82
33	47.52	506.24	6.10	11438.96	10156.98	5733.09
33	47.52	506.24	6.10	11438.96	10156.98	5733.09
34	47.52	509.95	4.89	8784.56	7879.94	4447.82
34	47.52	509.95	4.89	8784.56	7879.94	4447.82
35	47.52	513.25	4.89	8202.72	7487.48	4226.30
35	47.52	513.25	4.89	8202.72	7487.48	4226.30
36	47.52	515.63	2.15	3427.74	3172.70	1790.82
36	47.52	515.63	2.15	3427.74	3172.70	1790.82
37	47.52	517.66	3.88	6254.00	4994.71	2819.25
37	47.52	517.66	3.88	6254.00	4994.71	2819.25
38	47.52	520.28	3.88	5890.25	4749.36	2680.76
38	47.52	520.28	3.88	5890.25	4749.36	2680.76
39	56.86	522.66	3.89	4767.42	3993.33	2254.03
39	56.86	522.66	3.89	4767.42	3993.33	2254.03

40	56.86	526.75	11.08	9455.23	8593.61	4850.64
40	56.86	526.75	11.08	9455.23	8593.61	4850.64
41	56.86	532.81	11.08	2313.37	3776.36	2131.56
41	56.86	532.81	11.08	2313.37	3776.36	2131.56

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 41 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 41 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
19	12000.0	0.0	12000.0	90.00	-0.193240E+04

Sum of the Resisting Forces = 185933.12 (lbs)

Average Available Shear Strength = 951.68(psf)

Sum of the Driving Forces = 111650.03 (lbs)

Average Mobilized Shear Stress = 571.47(psf)

Total length of the failure surface = 195.37(ft)

Factor of Safety Balance Check: FS = 1.66532

Janbu's Correction Factor (fo) = 0.8157

Janub's FS Corrected = 1.35846

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

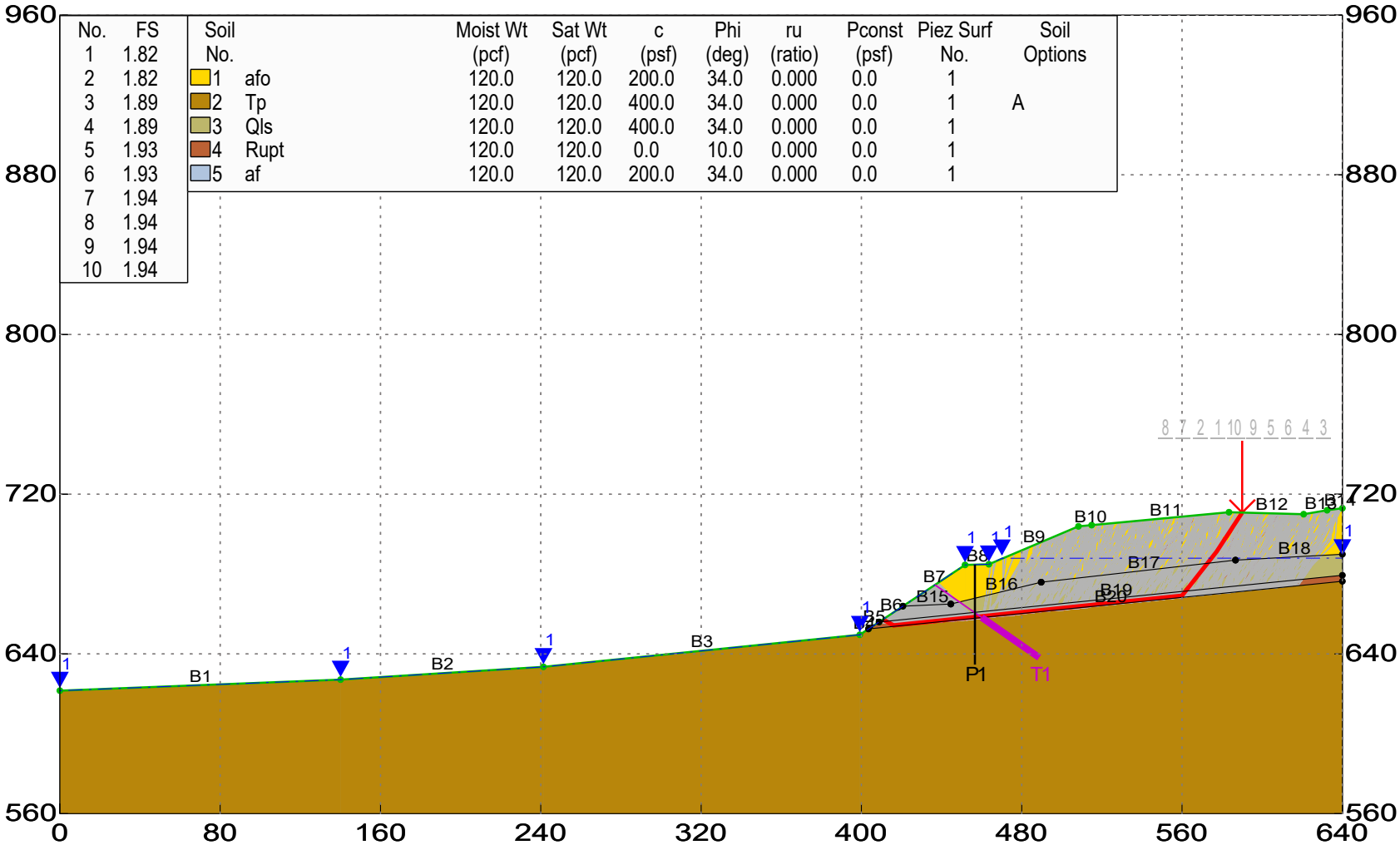
Royal Vista - Cross Section 6
Stage 5 (Temporary Backcut - Rupture)

LGC Geotechnical / BPP

\Sec 6 - Stage 5 (Temporary Backcut - Rupture).gsd

No.	FS
1	1.82
2	1.82
3	1.89
4	1.89
5	1.93
6	1.93
7	1.94
8	1.94
9	1.94
10	1.94

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.82

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 5 (Temporary Backcut - Rupture).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 5 (Temporary Backcut - Rupture).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 6

DESCRIPTION: Stage 5 (Temporary Backcut - Rupture)

BOUNDARY DATA

14 Surface Boundaries
20 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	621.600	140.100	627.100	2
2	140.100	627.100	241.300	633.500	2
3	241.300	633.500	399.200	649.600	2
4	399.200	649.600	403.500	652.500	2
5	403.500	652.500	408.800	656.000	4
6	408.800	656.000	420.700	663.900	3
7	420.700	663.900	451.700	684.600	1
8	451.700	684.600	463.600	684.900	1
9	463.600	684.900	508.300	703.900	1
10	508.300	703.900	514.900	704.500	1
11	514.900	704.500	583.400	711.000	1
12	583.400	711.000	620.700	710.000	1
13	620.700	710.000	632.400	712.000	1
14	632.400	712.000	640.000	713.000	1
15	420.700	663.900	444.600	665.000	3
16	444.600	665.000	489.700	675.900	3
17	489.700	675.900	586.700	687.000	3
18	586.700	687.000	640.000	689.900	3
19	408.800	656.000	640.000	679.400	4
20	403.500	652.500	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	621.60
2	140.10	627.10
3	241.30	633.50
4	399.20	649.60
5	451.70	684.60
6	463.60	684.90
7	470.10	687.90
8	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	436.70	674.58	316500.0	5.0	35.00	28.5	35.0

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

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	456.60	684.72	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 28.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	415.00	655.70	455.00	658.50	3.00
2	460.00	659.00	620.00	676.00	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 = 293

Number of Trial Surfaces With Valid FS = 707

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 29.3 %

Statistical Data On All Valid FS Values:
FS Max = 9.289 FS Min = 1.824 FS Ave = 2.849

Standard Deviation = 0.884 Coefficient of Variation = 31.03 %

Critical Surface is Sequence Number 159 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	459.25	658.80

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	456.60	658.52

Factor Of Safety For The Critical or Specified Surface = 1.824

Table 1 - Geometry Data on the 43 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	1.65	1.01	411.56	656.82	657.83	-29.06	33.58	1.89
2	3.65	4.24	414.21	655.35	659.59	-29.06	33.58	4.17
3	4.67	7.77	418.37	654.58	662.35	5.89	33.58	4.69
4	4.78	10.43	423.09	655.06	665.50	5.89	33.73	4.81
5	4.78	13.13	427.87	655.56	668.69	5.89	33.73	4.81
6	4.78	15.83	432.65	656.05	671.88	5.89	33.73	4.81
7	4.78	18.53	437.43	656.54	675.07	5.89	33.73	4.81
8	4.78	21.23	442.21	657.04	678.26	5.89	33.73	4.81
9	3.55	23.58	446.37	657.47	681.04	5.89	33.73	3.57
10	3.55	25.58	449.92	657.83	683.41	5.89	33.73	3.57
11	5.95	26.35	454.68	658.32	684.68	5.89	1.44	5.98
12	5.95	25.89	460.63	658.94	684.83	5.89	1.44	5.98
13	3.25	26.18	465.23	659.41	685.59	5.89	23.03	3.27
14	3.25	27.22	468.48	659.75	686.97	5.89	23.03	3.27
15	0.56	27.84	470.38	659.95	687.78	5.89	23.03	0.56
16	4.76	28.69	473.04	660.22	688.91	5.89	23.03	4.79
17	4.76	30.22	477.80	660.71	690.94	5.89	23.03	4.79
18	4.76	31.76	482.56	661.20	692.96	5.89	23.03	4.79
19	4.76	33.29	487.32	661.69	694.98	5.89	23.03	4.79
20	4.65	34.80	492.02	662.18	696.98	5.89	23.03	4.67
21	4.65	36.30	496.68	662.66	698.96	5.89	23.03	4.67
22	4.65	37.80	501.32	663.14	700.94	5.89	23.03	4.67
23	4.65	39.29	505.98	663.62	702.91	5.89	23.03	4.67
24	3.30	40.02	509.95	664.03	704.05	5.89	5.19	3.32
25	3.30	39.98	513.25	664.37	704.35	5.89	5.19	3.32
26	5.01	39.94	517.41	664.80	704.74	5.89	5.42	5.04
27	5.01	39.90	522.42	665.32	705.21	5.89	5.42	5.04
28	5.01	39.86	527.43	665.83	705.69	5.89	5.42	5.04
29	5.01	39.81	532.44	666.35	706.16	5.89	5.42	5.04
30	5.01	39.77	537.45	666.87	706.64	5.89	5.42	5.04
31	5.01	39.73	542.46	667.38	707.11	5.89	5.42	5.04
32	5.01	39.69	547.47	667.90	707.59	5.89	5.42	5.04
33	5.01	39.65	552.48	668.42	708.07	5.89	5.42	5.04
34	5.01	39.61	557.49	668.94	708.54	5.89	5.42	5.04
35	1.80	38.52	560.89	670.34	708.86	51.89	5.42	2.91
36	5.46	34.25	564.52	674.96	709.21	51.89	5.42	8.84
37	5.46	27.81	569.97	681.92	709.73	51.89	5.42	8.84
38	2.01	23.40	573.71	686.68	710.08	51.89	5.42	3.26
39	2.56	20.70	575.99	689.59	710.30	51.89	5.42	4.15
40	3.06	16.98	578.80	693.58	710.56	56.94	5.42	5.62
41	3.06	12.57	581.87	698.29	710.85	56.94	5.42	5.62

42	3.31	7.77	585.06	703.19	710.96	56.94	-1.54	6.07
43	3.31	2.59	588.37	708.28	710.87	56.94	-1.54	6.07

Table 2 - Force Data On The 43 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	200.2	0.0	83.1	0.0	0.0	0.0
2	1856.6	0.0	767.4	0.0	0.0	0.0
3	4354.1	0.0	1581.2	0.0	0.0	0.0
4	5983.6	0.0	2171.9	0.0	0.0	0.0
5	7531.4	0.0	2731.0	0.0	0.0	0.0
6	9079.3	0.0	3290.2	0.0	0.0	0.0
7	10627.1	0.0	3849.3	0.0	0.0	0.0
8	12175.0	0.0	4408.4	0.0	0.0	0.0
9	10043.7	0.0	3635.8	0.0	0.0	0.0
10	10897.5	0.0	3944.2	0.0	0.0	0.0
11	18814.5	0.0	9829.3	0.0	0.0	0.0
12	18483.1	0.0	9656.2	0.0	0.0	0.0
13	10209.3	0.0	4409.8	0.0	0.0	0.0
14	10617.2	0.0	4605.5	0.0	0.0	0.0
15	1866.2	4.5	979.7	0.0	0.0	0.0
16	16390.3	0.0	8266.5	0.0	0.0	0.0
17	17265.5	0.0	8120.7	0.0	0.0	0.0
18	18140.7	0.0	7974.8	0.0	0.0	0.0
19	19015.9	0.0	7828.9	0.0	0.0	0.0
20	19420.2	0.0	7506.6	0.0	0.0	0.0
21	20255.2	0.0	7367.4	0.0	0.0	0.0
22	21090.3	0.0	7228.2	0.0	0.0	0.0
23	21925.4	0.0	7089.0	0.0	0.0	0.0
24	15848.3	0.0	4946.5	0.0	0.0	0.0
25	15832.2	0.0	4876.3	0.0	0.0	0.0
26	24011.5	0.0	7269.2	0.0	0.0	0.0
27	23986.5	0.0	7107.6	0.0	0.0	0.0
28	23961.4	0.0	6946.0	0.0	0.0	0.0
29	23936.3	0.0	6784.4	0.0	0.0	0.0
30	23911.3	0.0	6622.9	0.0	0.0	0.0
31	23886.2	0.0	6461.3	0.0	0.0	0.0
32	23861.2	0.0	6299.7	0.0	0.0	0.0
33	23836.1	0.0	6138.1	0.0	0.0	0.0
34	23811.0	0.0	5976.5	0.0	0.0	0.0
35	8304.3	0.0	3199.1	0.0	0.0	0.0
36	22425.2	0.0	7168.7	0.0	0.0	0.0
37	18208.5	0.0	3332.1	0.0	0.0	0.0
38	5646.5	0.0	260.5	0.0	0.0	0.0
39	6359.7	0.0	0.0	0.0	0.0	0.0
40	6245.9	0.0	0.0	0.0	0.0	0.0
41	4621.3	0.0	0.0	0.0	0.0	0.0
42	3088.5	0.0	0.0	0.0	0.0	0.0
43	1029.5	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 609053.54(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 414777.95(lbs)

TOTAL AREA OF SLIDING MASS = 5075.45(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 43 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	4	0.00	10.00	
3	4	0.00	10.00	
4	4	0.00	10.00	
5	4	0.00	10.00	

6	4	0.00	10.00
7	4	0.00	10.00
8	4	0.00	10.00
9	4	0.00	10.00
10	4	0.00	10.00
11	4	0.00	10.00
12	4	0.00	10.00
13	4	0.00	10.00
14	4	0.00	10.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	4	0.00	10.00
28	4	0.00	10.00
29	4	0.00	10.00
30	4	0.00	10.00
31	4	0.00	10.00
32	4	0.00	10.00
33	4	0.00	10.00
34	4	0.00	10.00
35	4	0.00	10.00
36	3	400.00	34.00
37	3	400.00	34.00
38	1	200.00	34.00
39	1	200.00	34.00
40	1	200.00	34.00
41	1	200.00	34.00
42	1	200.00	34.00
43	1	200.00	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 43 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-29.06	411.56	1.89	264.71	578.55	316.60
1	-29.06	411.56	1.89	264.71	578.55	316.60
2	-29.06	414.21	4.17	344.80	60.80	33.27
2	-29.06	414.21	4.17	344.80	60.80	33.27
3	5.89	418.37	4.69	589.63	103.97	56.89
3	5.89	418.37	4.69	589.63	103.97	56.89
4	5.89	423.09	4.81	791.42	139.55	76.36
4	5.89	423.09	4.81	791.42	139.55	76.36
5	5.89	427.87	4.81	996.70	175.75	96.17
5	5.89	427.87	4.81	996.70	175.75	96.17
6	5.89	432.65	4.81	1201.99	211.94	115.98
6	5.89	432.65	4.81	1201.99	211.94	115.98
7	5.89	437.43	4.81	1407.27	248.14	135.79
7	5.89	437.43	4.81	1407.27	248.14	135.79
8	5.89	442.21	4.81	1612.56	284.34	155.60
8	5.89	442.21	4.81	1612.56	284.34	155.60
9	5.89	446.37	3.57	1791.43	315.88	172.86
9	5.89	446.37	3.57	1791.43	315.88	172.86
10	5.89	449.92	3.57	1943.89	342.76	187.57

10	5.89	449.92	3.57	1943.89	342.76	187.57
11	5.89	454.68	5.98	1502.89	265.00	145.01
11	5.89	454.68	5.98	1502.89	265.00	145.01
12	5.89	460.63	5.98	7514.39	1324.99	725.07
12	5.89	460.63	5.98	7514.39	1324.99	725.07
13	5.89	465.23	3.27	1772.82	312.60	171.06
13	5.89	465.23	3.27	1772.82	312.60	171.06
14	5.89	468.48	3.27	1837.74	324.04	177.32
14	5.89	468.48	3.27	1837.74	324.04	177.32
15	5.89	470.38	0.56	1586.54	279.75	153.09
15	5.89	470.38	0.56	1586.54	279.75	153.09
16	5.89	473.04	4.79	1697.71	299.35	163.81
16	5.89	473.04	4.79	1697.71	299.35	163.81
17	5.89	477.80	4.79	1909.79	336.75	184.28
17	5.89	477.80	4.79	1909.79	336.75	184.28
18	5.89	482.56	4.79	2121.87	374.14	204.74
18	5.89	482.56	4.79	2121.87	374.14	204.74
19	5.89	487.32	4.79	2333.95	411.54	225.20
19	5.89	487.32	4.79	2333.95	411.54	225.20
20	5.89	492.02	4.67	2543.58	448.50	245.43
20	5.89	492.02	4.67	2543.58	448.50	245.43
21	5.89	496.68	4.67	2750.74	485.03	265.42
21	5.89	496.68	4.67	2750.74	485.03	265.42
22	5.89	501.32	4.67	2957.91	521.56	285.41
22	5.89	501.32	4.67	2957.91	521.56	285.41
23	5.89	505.98	4.67	3165.08	558.09	305.40
23	5.89	505.98	4.67	3165.08	558.09	305.40
24	5.89	509.95	3.32	3276.70	577.77	316.17
24	5.89	509.95	3.32	3276.70	577.77	316.17
25	5.89	513.25	3.32	3292.79	580.61	317.72
25	5.89	513.25	3.32	3292.79	580.61	317.72
26	5.89	517.41	5.04	3314.24	584.39	319.79
26	5.89	517.41	5.04	3314.24	584.39	319.79
27	5.89	522.42	5.04	3341.03	589.11	322.38
27	5.89	522.42	5.04	3341.03	589.11	322.38
28	5.89	527.43	5.04	3367.83	593.84	324.96
28	5.89	527.43	5.04	3367.83	593.84	324.96
29	5.89	532.44	5.04	3394.62	598.56	327.55
29	5.89	532.44	5.04	3394.62	598.56	327.55
30	5.89	537.45	5.04	3421.42	603.29	330.13
30	5.89	537.45	5.04	3421.42	603.29	330.13
31	5.89	542.46	5.04	3448.21	608.01	332.72
31	5.89	542.46	5.04	3448.21	608.01	332.72
32	5.89	547.47	5.04	3475.01	612.74	335.30
32	5.89	547.47	5.04	3475.01	612.74	335.30
33	5.89	552.48	5.04	3501.80	617.46	337.89
33	5.89	552.48	5.04	3501.80	617.46	337.89
34	5.89	557.49	5.04	3528.60	622.19	340.48
34	5.89	557.49	5.04	3528.60	622.19	340.48
35	51.89	560.89	2.91	3115.23	549.30	300.59
35	51.89	560.89	2.91	3115.23	549.30	300.59
36	51.89	564.52	8.84	1998.42	1747.95	956.52
36	51.89	564.52	8.84	1998.42	1747.95	956.52
37	51.89	569.97	8.84	1772.83	1595.79	873.25
37	51.89	569.97	8.84	1772.83	1595.79	873.25
38	51.89	573.71	3.26	1717.53	1358.49	743.40
38	51.89	573.71	3.26	1717.53	1358.49	743.40
39	51.89	575.99	4.15	1555.29	1249.06	683.51
39	51.89	575.99	4.15	1555.29	1249.06	683.51
40	56.94	578.80	5.62	1158.38	981.34	537.01
40	56.94	578.80	5.62	1158.38	981.34	537.01
41	56.94	581.87	5.62	828.03	758.51	415.08
41	56.94	581.87	5.62	828.03	758.51	415.08
42	56.94	585.06	6.07	469.20	516.48	282.63
42	56.94	585.06	6.07	469.20	516.48	282.63
43	56.94	588.37	6.07	81.91	255.25	139.68
43	56.94	588.37	6.07	81.91	255.25	139.68

Table 4 - Base Force Data on the 43 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-29.06	411.56	1.89	500.89	1094.73	599.06
1	-29.06	411.56	1.89	500.89	1094.73	599.06
2	-29.06	414.21	4.17	1438.88	253.71	138.84
2	-29.06	414.21	4.17	1438.88	253.71	138.84
3	5.89	418.37	4.69	2766.60	487.83	266.95
3	5.89	418.37	4.69	2766.60	487.83	266.95
4	5.89	423.09	4.81	3803.09	670.59	366.96
4	5.89	423.09	4.81	3803.09	670.59	366.96
5	5.89	427.87	4.81	4789.55	844.53	462.15
5	5.89	427.87	4.81	4789.55	844.53	462.15
6	5.89	432.65	4.81	5776.02	1018.47	557.33
6	5.89	432.65	4.81	5776.02	1018.47	557.33
7	5.89	437.43	4.81	6762.49	1192.41	652.52
7	5.89	437.43	4.81	6762.49	1192.41	652.52
8	5.89	442.21	4.81	7748.96	1366.35	747.70
8	5.89	442.21	4.81	7748.96	1366.35	747.70
9	5.89	446.37	3.57	6393.35	1127.32	616.90
9	5.89	446.37	3.57	6393.35	1127.32	616.90
10	5.89	449.92	3.57	6937.46	1223.26	669.40
10	5.89	449.92	3.57	6937.46	1223.26	669.40
11	5.89	454.68	5.98	8989.73	1585.13	867.42
11	5.89	454.68	5.98	8989.73	1585.13	867.42
12	5.89	460.63	5.98	44948.14	7925.57	4337.06
12	5.89	460.63	5.98	44948.14	7925.57	4337.06
13	5.89	465.23	3.27	5792.26	1021.33	558.90
13	5.89	465.23	3.27	5792.26	1021.33	558.90
14	5.89	468.48	3.27	6004.38	1058.73	579.37
14	5.89	468.48	3.27	6004.38	1058.73	579.37
15	5.89	470.38	0.56	891.06	157.12	85.98
15	5.89	470.38	0.56	891.06	157.12	85.98
16	5.89	473.04	4.79	8124.57	1432.58	783.94
16	5.89	473.04	4.79	8124.57	1432.58	783.94
17	5.89	477.80	4.79	9139.52	1611.54	881.88
17	5.89	477.80	4.79	9139.52	1611.54	881.88
18	5.89	482.56	4.79	10154.46	1790.51	979.81
18	5.89	482.56	4.79	10154.46	1790.51	979.81
19	5.89	487.32	4.79	11169.41	1969.47	1077.74
19	5.89	487.32	4.79	11169.41	1969.47	1077.74
20	5.89	492.02	4.67	11890.46	2096.61	1147.31
20	5.89	492.02	4.67	11890.46	2096.61	1147.31
21	5.89	496.68	4.67	12858.90	2267.37	1240.76
21	5.89	496.68	4.67	12858.90	2267.37	1240.76
22	5.89	501.32	4.67	13827.34	2438.13	1334.21
22	5.89	501.32	4.67	13827.34	2438.13	1334.21
23	5.89	505.98	4.67	14795.78	2608.90	1427.65
23	5.89	505.98	4.67	14795.78	2608.90	1427.65
24	5.89	509.95	3.32	10870.56	1916.77	1048.90
24	5.89	509.95	3.32	10870.56	1916.77	1048.90
25	5.89	513.25	3.32	10923.94	1926.19	1054.06
25	5.89	513.25	3.32	10923.94	1926.19	1054.06
26	5.89	517.41	5.04	16692.61	2943.36	1610.68
26	5.89	517.41	5.04	16692.61	2943.36	1610.68
27	5.89	522.42	5.04	16827.57	2967.15	1623.70
27	5.89	522.42	5.04	16827.57	2967.15	1623.70
28	5.89	527.43	5.04	16962.53	2990.95	1636.72
28	5.89	527.43	5.04	16962.53	2990.95	1636.72
29	5.89	532.44	5.04	17097.49	3014.75	1649.74
29	5.89	532.44	5.04	17097.49	3014.75	1649.74
30	5.89	537.45	5.04	17232.45	3038.55	1662.77
30	5.89	537.45	5.04	17232.45	3038.55	1662.77
31	5.89	542.46	5.04	17367.41	3062.34	1675.79
31	5.89	542.46	5.04	17367.41	3062.34	1675.79
32	5.89	547.47	5.04	17502.37	3086.14	1688.81
32	5.89	547.47	5.04	17502.37	3086.14	1688.81
33	5.89	552.48	5.04	17637.33	3109.94	1701.83
33	5.89	552.48	5.04	17637.33	3109.94	1701.83
34	5.89	557.49	5.04	17772.29	3133.73	1714.85
34	5.89	557.49	5.04	17772.29	3133.73	1714.85

35	51.89	560.89	2.91	9066.97	1598.75	874.88
35	51.89	560.89	2.91	9066.97	1598.75	874.88
36	51.89	564.52	8.84	17669.78	15455.16	8457.44
36	51.89	564.52	8.84	17669.78	15455.16	8457.44
37	51.89	569.97	8.84	15675.10	14109.73	7721.19
37	51.89	569.97	8.84	15675.10	14109.73	7721.19
38	51.89	573.71	3.26	5595.94	4426.13	2422.09
38	51.89	573.71	3.26	5595.94	4426.13	2422.09
39	51.89	575.99	4.15	6450.75	5180.61	2834.95
39	51.89	575.99	4.15	6450.75	5180.61	2834.95
40	56.94	578.80	5.62	6507.60	5513.00	3016.85
40	56.94	578.80	5.62	6507.60	5513.00	3016.85
41	56.94	581.87	5.62	4651.73	4261.20	2331.83
41	56.94	581.87	5.62	4651.73	4261.20	2331.83
42	56.94	585.06	6.07	2849.68	3136.82	1716.54
42	56.94	585.06	6.07	2849.68	3136.82	1716.54
43	56.94	588.37	6.07	497.49	1550.24	848.33
43	56.94	588.37	6.07	497.49	1550.24	848.33

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 43 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
12	51852.3	36307.4	63300.0	35.00	0.573923E+05

***Pier/Pile Slice Force Data on the 43 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
11	12000.0	0.0	12000.0	90.00	-0.238418E+04

Sum of the Resisting Forces = 100958.62 (lbs)

Average Available Shear Strength = 499.37(psf)

Sum of the Driving Forces = 58927.78 (lbs)

Average Mobilized Shear Stress = 291.48(psf)

Total length of the failure surface = 202.17(ft)

Factor of Safety Balance Check: FS = 1.71326

Janbu's Correction Factor (fo) = 1.0647

Janub's FS Corrected = 1.82406

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

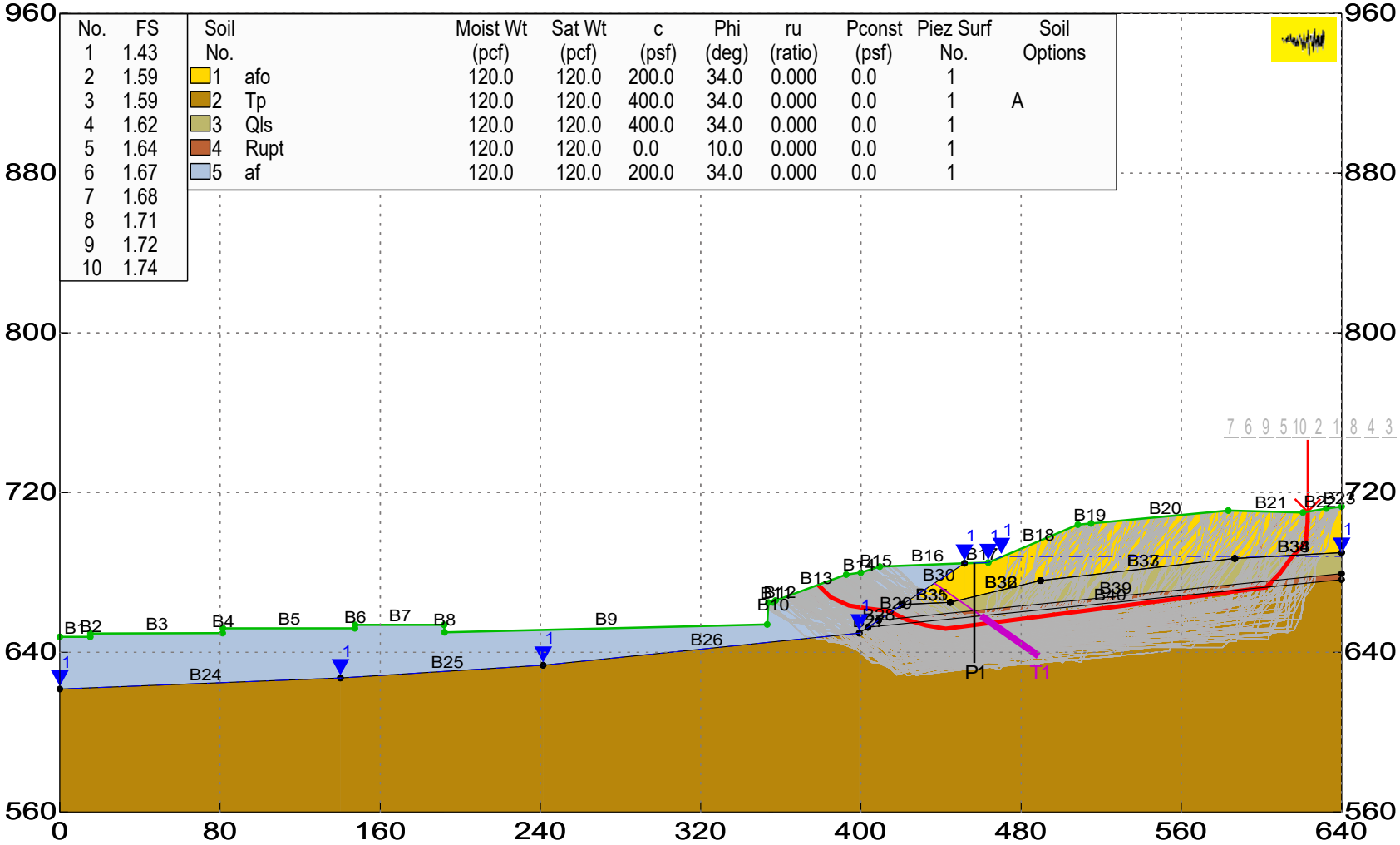
Royal Vista - Cross-Section 6
Stage 6 (Final Condition - Seismic (Along Bedding))

LGC Geotechnical / BPP

\Sec 6 - Stage 6 (Final Condition - Along Bedding(Seismic).gsd

No.	FS
1	1.43
2	1.59
3	1.59
4	1.62
5	1.64
6	1.67
7	1.68
8	1.71
9	1.72
10	1.74

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.43

Simplified Janbu (Corrected) Method

kh = 0.15000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 6 (Final Condition - Along Bedding(Seismic).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 6 (Final Condition - Along Bedding(Seismic).OUT
Unit System: English

PROJECT: Royal Vista - Cross-Section 6

DESCRIPTION: Stage 6 (Final Condition - Seismic (Along Bedding))

BOUNDARY DATA

23 Surface Boundaries
40 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.700	15.200	647.700	5
2	15.200	647.700	15.300	649.400	5
3	15.300	649.400	81.300	649.600	5
4	81.300	649.600	81.400	652.000	5
5	81.400	652.000	147.300	652.000	5
6	147.300	652.000	147.400	653.700	5
7	147.400	653.700	191.900	653.700	5
8	191.900	653.700	192.100	650.000	5
9	192.100	650.000	353.200	653.900	5
10	353.200	653.900	353.800	664.900	5
11	353.800	664.900	356.200	664.900	5
12	356.200	664.900	357.400	665.900	5
13	357.400	665.900	392.700	678.900	5
14	392.700	678.900	400.000	679.900	5
15	400.000	679.900	409.400	682.900	5
16	409.400	682.900	451.700	684.600	5
17	451.700	684.600	463.600	684.900	1
18	463.600	684.900	508.300	703.900	1
19	508.300	703.900	514.900	704.500	1
20	514.900	704.500	583.400	711.000	1
21	583.400	711.000	620.700	710.000	1
22	620.700	710.000	632.400	712.000	1
23	632.400	712.000	640.000	713.000	1
24	0.000	621.600	140.100	627.100	2
25	140.100	627.100	241.300	633.500	2
26	241.300	633.500	399.200	649.600	2

27	399.200	649.600	403.500	652.500	2
28	403.500	652.500	408.800	656.000	4
29	408.800	656.000	420.700	663.900	3
30	420.700	663.900	451.700	684.600	1
31	420.700	663.900	444.600	665.000	3
32	444.600	665.000	489.700	675.900	3
33	489.700	675.900	586.700	687.000	3
34	586.700	687.000	640.000	689.900	3
35	420.700	663.900	444.600	665.000	3
36	444.600	665.000	489.700	675.900	3
37	489.700	675.900	586.700	687.000	3
38	586.700	687.000	640.000	689.900	3
39	408.800	656.000	640.000	679.400	4
40	403.500	652.500	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)

1	0.00	621.60
2	140.10	627.10
3	241.30	633.50
4	399.20	649.60
5	451.70	684.60
6	463.60	684.90
7	470.10	687.90
8	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.15000(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 Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	436.70	674.58	316500.0	5.0	35.00	28.5	35.0

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

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	456.60	684.72	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 10.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	415.00	641.70	455.00	644.50	30.00
2	460.00	645.00	620.00	661.00	30.00

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 = 77

Number of Trial Surfaces With Valid FS = 923

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 7.7 %

Statistical Data On All Valid FS Values:
FS Max = 17.074 FS Min = 1.429 FS Ave = 3.556
Standard Deviation = 1.729 Coefficient of Variation = 48.63 %

Critical Surface is Sequence Number 24 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	458.96	659.00

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	456.60	653.65

Factor Of Safety For The Critical or Specified Surface = 1.429

Table 1 - Geometry Data on the 69 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.14	2.13	380.24	672.18	674.31	-44.69	20.22	4.42
2	3.14	6.40	383.38	669.07	675.47	-44.69	20.22	4.42
3	3.87	10.12	386.89	666.64	676.76	-24.36	20.22	4.25
4	3.87	13.30	390.76	664.88	678.19	-24.36	20.22	4.25
5	1.36	15.30	393.38	663.70	678.99	-24.36	7.80	1.50
6	2.97	16.14	395.55	663.15	679.29	-9.21	7.80	3.01
7	2.97	17.03	398.52	662.67	679.70	-9.21	7.80	3.01
8	3.93	18.42	401.97	662.11	680.53	-9.21	17.70	3.99
9	2.73	19.96	405.30	661.63	681.59	-6.44	17.70	2.75
10	2.73	21.14	408.03	661.33	682.46	-6.44	17.70	2.75

11	4.47	22.07	411.64	660.92	682.99	-6.44	2.30	4.50
12	1.11	22.71	414.43	660.40	683.10	-25.98	2.30	1.24
13	0.02	23.00	414.99	660.12	683.12	-25.98	2.30	0.02
14	2.85	23.76	416.43	659.42	683.18	-25.98	2.30	3.17
15	2.85	25.26	419.28	658.03	683.30	-25.98	2.30	3.17
16	0.23	26.08	420.81	657.28	683.36	-25.98	2.30	0.25
17	1.93	26.65	421.89	656.76	683.40	-25.98	2.30	2.15
18	4.60	27.93	425.16	655.60	683.53	-16.53	2.30	4.80
19	4.99	29.55	429.95	654.18	683.73	-16.53	2.30	5.20
20	4.93	30.90	434.91	653.03	683.93	-9.45	2.30	5.00
21	4.93	31.91	439.85	652.21	684.12	-9.45	2.30	5.00
22	2.29	32.32	443.46	651.95	684.27	7.37	2.30	2.31
23	3.55	32.06	446.37	652.32	684.39	7.37	2.30	3.58
24	3.55	31.75	449.92	652.78	684.53	7.37	2.30	3.58
25	5.95	31.28	454.68	653.40	684.68	7.37	1.44	6.00
26	5.95	30.66	460.63	654.17	684.83	7.37	1.44	6.00
27	3.25	30.83	465.23	654.76	685.59	7.37	23.03	3.28
28	3.25	31.79	468.48	655.18	686.97	7.37	23.03	3.28
29	0.56	32.35	470.38	655.43	687.78	7.37	23.03	0.56
30	4.76	33.14	473.04	655.77	688.91	7.37	23.03	4.80
31	4.76	34.55	477.80	656.39	690.94	7.37	23.03	4.80
32	4.76	35.95	482.56	657.01	692.96	7.37	23.03	4.80
33	4.76	37.36	487.32	657.62	694.98	7.37	23.03	4.80
34	4.65	38.75	492.02	658.23	696.98	7.37	23.03	4.69
35	4.65	40.13	496.68	658.83	698.96	7.37	23.03	4.69
36	4.65	41.50	501.32	659.43	700.94	7.37	23.03	4.69
37	4.65	42.88	505.98	660.04	702.91	7.37	23.03	4.69
38	3.30	43.50	509.95	660.55	704.05	7.37	5.19	3.33
39	3.30	43.37	513.25	660.98	704.35	7.37	5.19	3.33
40	4.89	43.22	517.35	661.51	704.73	7.37	5.42	4.93
41	4.89	43.06	522.24	662.14	705.20	7.37	5.42	4.93
42	4.89	42.89	527.13	662.77	705.66	7.37	5.42	4.93
43	4.89	42.72	532.02	663.41	706.12	7.37	5.42	4.93
44	4.89	42.55	536.92	664.04	706.59	7.37	5.42	4.93
45	4.89	42.38	541.81	664.67	707.05	7.37	5.42	4.93
46	4.89	42.21	546.70	665.31	707.52	7.37	5.42	4.93
47	4.89	42.04	551.60	665.94	707.98	7.37	5.42	4.93
48	4.89	41.87	556.49	666.57	708.45	7.37	5.42	4.93
49	4.89	41.71	561.38	667.21	708.91	7.37	5.42	4.93
50	4.89	41.54	566.27	667.84	709.38	7.37	5.42	4.93
51	4.89	41.37	571.17	668.47	709.84	7.37	5.42	4.93
52	4.89	41.20	576.06	669.10	710.30	7.37	5.42	4.93
53	4.89	41.03	580.95	669.74	710.77	7.37	5.42	4.93
54	3.30	40.69	585.05	670.27	710.96	7.37	-1.54	3.33
55	5.20	40.02	589.30	670.82	710.84	7.37	-1.54	5.24
56	5.20	39.21	594.50	671.49	710.70	7.37	-1.54	5.24
57	5.20	38.40	599.70	672.16	710.56	7.37	-1.54	5.24
58	0.10	37.94	602.34	672.55	710.49	45.93	-1.54	0.14
59	2.31	36.67	603.54	673.79	710.46	45.93	-1.54	3.31
60	0.91	34.97	605.15	675.45	710.42	45.93	-1.54	1.31
61	3.64	32.55	607.43	677.80	710.36	45.93	-1.54	5.24
62	2.95	28.57	610.73	681.70	710.27	53.78	-1.54	5.00
63	2.95	24.45	613.68	685.73	710.19	53.78	-1.54	5.00
64	0.22	22.28	615.27	687.87	710.15	46.28	-1.54	0.32
65	0.58	21.85	615.68	688.29	710.13	46.28	-1.54	0.84
66	4.73	19.00	618.33	691.07	710.06	46.28	-1.54	6.85
67	1.37	15.86	621.39	694.26	710.12	46.28	9.70	1.99
68	0.95	10.36	622.55	699.95	710.32	84.53	9.70	10.00
69	0.02	2.73	623.04	707.67	710.40	89.78	9.70	5.47

Table 2 - Force Data On The 69 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	804.6	0.0	0.0	120.7	0.0	0.0
2	2413.8	0.0	0.0	362.1	0.0	0.0
3	4704.8	0.0	0.0	705.7	0.0	0.0

4	6182.7	0.0	0.0	927.4	0.0	0.0
5	2503.4	0.0	0.0	375.5	0.0	0.0
6	5749.3	0.0	0.0	862.4	0.0	0.0
7	6065.6	0.0	0.0	909.8	0.0	0.0
8	8698.2	0.0	0.0	1304.7	0.0	0.0
9	6544.5	0.0	0.0	981.7	0.0	0.0
10	6931.5	0.0	0.0	1039.7	0.0	0.0
11	11843.7	0.0	0.0	1776.6	0.0	0.0
12	3035.1	0.0	0.0	455.3	0.0	0.0
13	41.5	0.0	0.0	6.2	0.0	0.0
14	8124.9	0.0	227.6	1218.7	0.0	0.0
15	8639.0	0.0	677.9	1295.8	0.0	0.0
16	715.1	0.0	73.9	107.3	0.0	0.0
17	6179.4	0.0	740.5	926.9	0.0	0.0
18	15406.4	0.0	2341.3	2311.0	0.0	0.0
19	17691.0	0.0	3580.0	2653.7	0.0	0.0
20	18286.1	0.0	4402.0	2742.9	0.0	0.0
21	18889.2	0.0	5289.5	2833.4	0.0	0.0
22	8874.3	0.0	2706.7	1331.1	0.0	0.0
23	13658.3	0.0	4442.1	2048.7	0.0	0.0
24	13523.4	0.0	4737.1	2028.5	0.0	0.0
25	22331.7	0.0	11701.8	3349.7	0.0	0.0
26	21889.1	0.0	11469.9	3283.4	0.0	0.0
27	12022.7	0.0	5206.9	1803.4	0.0	0.0
28	12397.5	0.0	5388.9	1859.6	0.0	0.0
29	2168.8	4.5	1141.4	325.3	0.0	0.0
30	18929.6	0.0	9622.8	2839.4	0.0	0.0
31	19733.6	0.0	9439.2	2960.0	0.0	0.0
32	20537.6	0.0	9255.5	3080.6	0.0	0.0
33	21341.6	0.0	9071.9	3201.2	0.0	0.0
34	21623.2	0.0	8684.3	3243.5	0.0	0.0
35	22390.3	0.0	8509.1	3358.6	0.0	0.0
36	23157.5	0.0	8333.8	3473.6	0.0	0.0
37	23924.7	0.0	8158.6	3588.7	0.0	0.0
38	17225.9	0.0	5683.7	2583.9	0.0	0.0
39	17175.6	0.0	5595.4	2576.3	0.0	0.0
40	25379.1	0.0	8133.8	3806.9	0.0	0.0
41	25280.0	0.0	7939.8	3792.0	0.0	0.0
42	25180.9	0.0	7745.7	3777.1	0.0	0.0
43	25081.7	0.0	7551.7	3762.3	0.0	0.0
44	24982.6	0.0	7357.7	3747.4	0.0	0.0
45	24883.5	0.0	7163.7	3732.5	0.0	0.0
46	24784.4	0.0	6969.7	3717.7	0.0	0.0
47	24685.3	0.0	6775.6	3702.8	0.0	0.0
48	24586.1	0.0	6581.6	3687.9	0.0	0.0
49	24487.0	0.0	6387.6	3673.1	0.0	0.0
50	24387.9	0.0	6193.6	3658.2	0.0	0.0
51	24288.8	0.0	5999.6	3643.3	0.0	0.0
52	24189.7	0.0	5805.5	3628.5	0.0	0.0
53	24090.5	0.0	5611.5	3613.6	0.0	0.0
54	16112.4	0.0	3675.1	2416.9	0.0	0.0
55	24967.0	0.0	5610.2	3745.1	0.0	0.0
56	24460.5	0.0	5391.2	3669.1	0.0	0.0
57	23954.0	0.0	5172.2	3593.1	0.0	0.0
58	442.2	0.0	134.4	66.3	0.0	0.0
59	10144.6	0.0	2934.4	1521.7	0.0	0.0
60	3811.8	0.0	1021.1	571.8	0.0	0.0
61	14238.8	0.0	3328.5	2135.8	0.0	0.0
62	10129.1	0.0	1960.1	1519.4	0.0	0.0
63	8670.8	0.0	702.2	1300.6	0.0	0.0
64	600.5	0.0	2.4	90.1	0.0	0.0
65	1521.4	0.0	0.0	228.2	0.0	0.0
66	10792.9	0.0	0.0	1618.9	0.0	0.0
67	2611.0	0.0	0.0	391.6	0.0	0.0
68	1186.3	0.0	0.0	177.9	0.0	0.0
69	6.9	0.0	0.0	1.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 972292.61(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 705591.98(lbs)

TOTAL AREA OF SLIDING MASS = 8102.44(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 69 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	34.00	
2	5	200.00	34.00	
3	5	200.00	34.00	
4	5	200.00	34.00	
5	5	200.00	34.00	
6	5	200.00	34.00	
7	5	200.00	34.00	
8	5	200.00	34.00	
9	5	200.00	34.00	
10	5	200.00	34.00	
11	5	200.00	34.00	
12	5	200.00	34.00	
13	5	200.00	34.00	
14	3	400.00	34.00	
15	3	400.00	34.00	
16	3	400.00	34.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	2	400.00	34.00	A
20	2	400.00	34.00	A
21	2	400.00	34.00	A
22	2	300.00	12.00	A
23	2	300.00	12.00	A
24	2	300.00	12.00	A
25	2	300.00	12.00	A
26	2	300.00	12.00	A
27	2	300.00	12.00	A
28	2	300.00	12.00	A
29	2	300.00	12.00	A
30	2	300.00	12.00	A
31	2	300.00	12.00	A
32	2	300.00	12.00	A
33	2	300.00	12.00	A
34	2	300.00	12.00	A
35	2	300.00	12.00	A
36	2	300.00	12.00	A
37	2	300.00	12.00	A
38	2	300.00	12.00	A
39	2	300.00	12.00	A
40	2	300.00	12.00	A
41	2	300.00	12.00	A
42	2	300.00	12.00	A
43	2	300.00	12.00	A
44	2	300.00	12.00	A
45	2	300.00	12.00	A
46	2	300.00	12.00	A
47	2	300.00	12.00	A
48	2	300.00	12.00	A
49	2	300.00	12.00	A
50	2	300.00	12.00	A
51	2	300.00	12.00	A
52	2	300.00	12.00	A
53	2	300.00	12.00	A
54	2	300.00	12.00	A
55	2	300.00	12.00	A
56	2	300.00	12.00	A
57	2	300.00	12.00	A
58	2	400.00	34.00	A
59	4	0.00	10.00	
60	4	0.00	10.00	
61	3	400.00	34.00	
62	3	400.00	34.00	
63	3	400.00	34.00	
64	3	400.00	34.00	
65	3	400.00	34.00	
66	1	200.00	34.00	

67	1	200.00	34.00
68	1	200.00	34.00
69	1	200.00	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 69 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-44.69	380.24	4.42	621.16	618.98	338.93
1	-44.69	380.24	4.42	621.16	618.98	338.93
2	-44.69	383.38	4.42	1471.55	1192.58	653.02
2	-44.69	383.38	4.42	1471.55	1192.58	653.02
3	-24.36	386.89	4.25	1551.42	1246.45	682.52
3	-24.36	386.89	4.25	1551.42	1246.45	682.52
4	-24.36	390.76	4.25	2018.02	1561.17	854.85
4	-24.36	390.76	4.25	2018.02	1561.17	854.85
5	-24.36	393.38	1.50	2310.33	1758.34	962.82
5	-24.36	393.38	1.50	2310.33	1758.34	962.82
6	-9.21	395.55	3.01	2092.93	1611.70	882.52
6	-9.21	395.55	3.01	2092.93	1611.70	882.52
7	-9.21	398.52	3.01	2206.92	1688.58	924.62
7	-9.21	398.52	3.01	2206.92	1688.58	924.62
8	-9.21	401.97	3.99	2385.48	1809.03	990.57
8	-9.21	401.97	3.99	2385.48	1809.03	990.57
9	-6.44	405.30	2.75	2522.93	1901.74	1041.34
9	-6.44	405.30	2.75	2522.93	1901.74	1041.34
10	-6.44	408.03	2.75	2671.31	2001.82	1096.14
10	-6.44	408.03	2.75	2671.31	2001.82	1096.14
11	-6.44	411.64	4.50	2788.50	2080.87	1139.43
11	-6.44	411.64	4.50	2788.50	2080.87	1139.43
12	-25.98	414.43	1.24	3461.46	2534.78	1387.98
12	-25.98	414.43	1.24	3461.46	2534.78	1387.98
13	-25.98	414.99	0.02	3505.44	2564.45	1404.22
13	-25.98	414.99	0.02	3505.44	2564.45	1404.22
14	-25.98	416.43	3.17	3601.70	2829.37	1549.29
14	-25.98	416.43	3.17	3601.70	2829.37	1549.29
15	-25.98	419.28	3.17	3649.37	2861.53	1566.89
15	-25.98	419.28	3.17	3649.37	2861.53	1566.89
16	-25.98	420.81	0.25	3675.12	2878.90	1576.41
16	-25.98	420.81	0.25	3675.12	2878.90	1576.41
17	-25.98	421.89	2.15	3007.11	530.23	290.34
17	-25.98	421.89	2.15	3007.11	530.23	290.34
18	-16.53	425.16	4.80	2955.56	521.14	285.36
18	-16.53	425.16	4.80	2955.56	521.14	285.36
19	-16.53	429.95	5.20	3325.53	2643.10	1447.29
19	-16.53	429.95	5.20	3325.53	2643.10	1447.29
20	-9.45	434.91	5.00	3072.41	2472.37	1353.80
20	-9.45	434.91	5.00	3072.41	2472.37	1353.80
21	-9.45	439.85	5.00	3013.22	2432.44	1331.94
21	-9.45	439.85	5.00	3013.22	2432.44	1331.94
22	7.37	443.46	2.31	2639.03	860.94	471.43
22	7.37	443.46	2.31	2639.03	860.94	471.43
23	7.37	446.37	3.58	2541.63	840.24	460.09
23	7.37	446.37	3.58	2541.63	840.24	460.09
24	7.37	449.92	3.58	2423.17	815.06	446.30
24	7.37	449.92	3.58	2423.17	815.06	446.30
25	7.37	454.68	6.00	1750.92	672.17	368.06
25	7.37	454.68	6.00	1750.92	672.17	368.06
26	7.37	460.63	6.00	7719.39	1940.81	1062.73
26	7.37	460.63	6.00	7719.39	1940.81	1062.73
27	7.37	465.23	3.28	2053.59	736.50	403.29
27	7.37	465.23	3.28	2053.59	736.50	403.29

28	7.37	468.48	3.28	2112.41	749.01	410.13
28	7.37	468.48	3.28	2112.41	749.01	410.13
29	7.37	470.38	0.56	1810.60	684.85	375.01
29	7.37	470.38	0.56	1810.60	684.85	375.01
30	7.37	473.04	4.80	1917.19	707.51	387.41
30	7.37	473.04	4.80	1917.19	707.51	387.41
31	7.37	477.80	4.80	2121.00	750.83	411.13
31	7.37	477.80	4.80	2121.00	750.83	411.13
32	7.37	482.56	4.80	2324.81	794.15	434.86
32	7.37	482.56	4.80	2324.81	794.15	434.86
33	7.37	487.32	4.80	2528.62	837.48	458.58
33	7.37	487.32	4.80	2528.62	837.48	458.58
34	7.37	492.02	4.69	2730.07	880.30	482.02
34	7.37	492.02	4.69	2730.07	880.30	482.02
35	7.37	496.68	4.69	2929.16	922.61	505.20
35	7.37	496.68	4.69	2929.16	922.61	505.20
36	7.37	501.32	4.69	3128.25	964.93	528.37
36	7.37	501.32	4.69	3128.25	964.93	528.37
37	7.37	505.98	4.69	3327.34	1007.25	551.54
37	7.37	505.98	4.69	3327.34	1007.25	551.54
38	7.37	509.95	3.33	3432.44	1029.59	563.77
38	7.37	509.95	3.33	3432.44	1029.59	563.77
39	7.37	513.25	3.33	3443.54	1031.95	565.06
39	7.37	513.25	3.33	3443.54	1031.95	565.06
40	7.37	517.35	4.93	3458.47	1035.12	566.80
40	7.37	517.35	4.93	3458.47	1035.12	566.80
41	7.37	522.24	4.93	3477.23	1039.11	568.99
41	7.37	522.24	4.93	3477.23	1039.11	568.99
42	7.37	527.13	4.93	3495.99	1043.10	571.17
42	7.37	527.13	4.93	3495.99	1043.10	571.17
43	7.37	532.02	4.93	3514.75	1047.08	573.35
43	7.37	532.02	4.93	3514.75	1047.08	573.35
44	7.37	536.92	4.93	3533.51	1051.07	575.54
44	7.37	536.92	4.93	3533.51	1051.07	575.54
45	7.37	541.81	4.93	3552.27	1055.06	577.72
45	7.37	541.81	4.93	3552.27	1055.06	577.72
46	7.37	546.70	4.93	3571.03	1059.05	579.90
46	7.37	546.70	4.93	3571.03	1059.05	579.90
47	7.37	551.60	4.93	3589.79	1063.03	582.09
47	7.37	551.60	4.93	3589.79	1063.03	582.09
48	7.37	556.49	4.93	3608.55	1067.02	584.27
48	7.37	556.49	4.93	3608.55	1067.02	584.27
49	7.37	561.38	4.93	3627.31	1071.01	586.45
49	7.37	561.38	4.93	3627.31	1071.01	586.45
50	7.37	566.27	4.93	3646.07	1075.00	588.64
50	7.37	566.27	4.93	3646.07	1075.00	588.64
51	7.37	571.17	4.93	3664.83	1078.98	590.82
51	7.37	571.17	4.93	3664.83	1078.98	590.82
52	7.37	576.06	4.93	3683.59	1082.97	593.00
52	7.37	576.06	4.93	3683.59	1082.97	593.00
53	7.37	580.95	4.93	3702.35	1086.96	595.19
53	7.37	580.95	4.93	3702.35	1086.96	595.19
54	7.37	585.05	3.33	3694.35	1085.26	594.26
54	7.37	585.05	3.33	3694.35	1085.26	594.26
55	7.37	589.30	5.24	3649.59	1075.74	589.05
55	7.37	589.30	5.24	3649.59	1075.74	589.05
56	7.37	594.50	5.24	3594.83	1064.10	582.67
56	7.37	594.50	5.24	3594.83	1064.10	582.67
57	7.37	599.70	5.24	3540.07	1052.46	576.30
57	7.37	599.70	5.24	3540.07	1052.46	576.30
58	45.93	602.34	0.14	2362.55	1993.56	1091.62
58	45.93	602.34	0.14	2362.55	1993.56	1091.62
59	45.93	603.54	3.31	3170.68	559.08	306.13
59	45.93	603.54	3.31	3170.68	559.08	306.13
60	45.93	605.15	1.31	3079.73	543.04	297.35
60	45.93	605.15	1.31	3079.73	543.04	297.35
61	45.93	607.43	5.24	2137.14	1841.52	1008.36
61	45.93	607.43	5.24	2137.14	1841.52	1008.36
62	53.78	610.73	5.00	1749.73	1580.21	865.28
62	53.78	610.73	5.00	1749.73	1580.21	865.28
63	53.78	613.68	5.00	1593.54	1474.85	807.59
63	53.78	613.68	5.00	1593.54	1474.85	807.59

64	46.28	615.27	0.32	1701.17	1547.45	847.34
64	46.28	615.27	0.32	1701.17	1547.45	847.34
65	46.28	615.68	0.84	1669.87	1526.34	835.78
65	46.28	615.68	0.84	1669.87	1526.34	835.78
66	46.28	618.33	6.85	1516.90	1223.16	669.77
66	46.28	618.33	6.85	1516.90	1223.16	669.77
67	46.28	621.39	1.99	1251.75	1044.32	571.84
67	46.28	621.39	1.99	1251.75	1044.32	571.84
68	84.53	622.55	10.00	239.28	161.40	88.38
68	84.53	622.55	10.00	239.28	161.40	88.38
69	89.78	623.04	5.47	3.12	2.11	1.15
69	89.78	623.04	5.47	3.12	2.11	1.15

Table 4 - Base Force Data on the 69 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-44.69	380.24	4.42	2746.18	2736.53	1498.45
1	-44.69	380.24	4.42	2746.18	2736.53	1498.45
2	-44.69	383.38	4.42	6505.81	5272.44	2887.04
2	-44.69	383.38	4.42	6505.81	5272.44	2887.04
3	-24.36	386.89	4.25	6595.71	5299.14	2901.66
3	-24.36	386.89	4.25	6595.71	5299.14	2901.66
4	-24.36	390.76	4.25	8579.40	6637.16	3634.32
4	-24.36	390.76	4.25	8579.40	6637.16	3634.32
5	-24.36	393.38	1.50	3459.04	2632.59	1441.53
5	-24.36	393.38	1.50	3459.04	2632.59	1441.53
6	-9.21	395.55	3.01	6293.11	4846.13	2653.60
6	-9.21	395.55	3.01	6293.11	4846.13	2653.60
7	-9.21	398.52	3.01	6635.87	5077.32	2780.20
7	-9.21	398.52	3.01	6635.87	5077.32	2780.20
8	-9.21	401.97	3.99	9509.26	7211.33	3948.72
8	-9.21	401.97	3.99	9509.26	7211.33	3948.72
9	-6.44	405.30	2.75	6937.79	5229.58	2863.57
9	-6.44	405.30	2.75	6937.79	5229.58	2863.57
10	-6.44	408.03	2.75	7345.82	5504.79	3014.27
10	-6.44	408.03	2.75	7345.82	5504.79	3014.27
11	-6.44	411.64	4.50	12548.86	9364.36	5127.65
11	-6.44	411.64	4.50	12548.86	9364.36	5127.65
12	-25.98	414.43	1.24	4289.12	3140.87	1719.85
12	-25.98	414.43	1.24	4289.12	3140.87	1719.85
13	-25.98	414.99	0.02	58.69	42.94	23.51
13	-25.98	414.99	0.02	58.69	42.94	23.51
14	-25.98	416.43	3.17	11417.45	8969.17	4911.27
14	-25.98	416.43	3.17	11417.45	8969.17	4911.27
15	-25.98	419.28	3.17	11568.59	9071.12	4967.09
15	-25.98	419.28	3.17	11568.59	9071.12	4967.09
16	-25.98	420.81	0.25	934.35	731.92	400.78
16	-25.98	420.81	0.25	934.35	731.92	400.78
17	-25.98	421.89	2.15	6464.91	1139.94	624.20
17	-25.98	421.89	2.15	6464.91	1139.94	624.20
18	-16.53	425.16	4.80	14171.95	2498.90	1368.33
18	-16.53	425.16	4.80	14171.95	2498.90	1368.33
19	-16.53	429.95	5.20	17309.34	13757.29	7533.10
19	-16.53	429.95	5.20	17309.34	13757.29	7533.10
20	-9.45	434.91	5.00	15362.07	12361.85	6769.00
20	-9.45	434.91	5.00	15362.07	12361.85	6769.00
21	-9.45	439.85	5.00	15066.11	12162.22	6659.68
21	-9.45	439.85	5.00	15066.11	12162.22	6659.68
22	7.37	443.46	2.31	6088.40	1986.25	1087.61
22	7.37	443.46	2.31	6088.40	1986.25	1087.61
23	7.37	446.37	3.58	9098.00	3007.72	1646.94
23	7.37	446.37	3.58	9098.00	3007.72	1646.94
24	7.37	449.92	3.58	8673.98	2917.59	1597.59
24	7.37	449.92	3.58	8673.98	2917.59	1597.59
25	7.37	454.68	6.00	10504.84	4032.75	2208.22
25	7.37	454.68	6.00	10504.84	4032.75	2208.22
26	7.37	460.63	6.00	46313.27	11644.07	6375.96

26	7.37	460.63	6.00	46313.27	11644.07	6375.96
27	7.37	465.23	3.28	6729.82	2413.60	1321.62
27	7.37	465.23	3.28	6729.82	2413.60	1321.62
28	7.37	468.48	3.28	6922.56	2454.56	1344.05
28	7.37	468.48	3.28	6922.56	2454.56	1344.05
29	7.37	470.38	0.56	1019.96	385.80	211.25
29	7.37	470.38	0.56	1019.96	385.80	211.25
30	7.37	473.04	4.80	9202.52	3396.06	1859.59
30	7.37	473.04	4.80	9202.52	3396.06	1859.59
31	7.37	477.80	4.80	10180.83	3604.01	1973.45
31	7.37	477.80	4.80	10180.83	3604.01	1973.45
32	7.37	482.56	4.80	11159.13	3811.95	2087.32
32	7.37	482.56	4.80	11159.13	3811.95	2087.32
33	7.37	487.32	4.80	12137.44	4019.90	2201.18
33	7.37	487.32	4.80	12137.44	4019.90	2201.18
34	7.37	492.02	4.69	12800.67	4127.50	2260.10
34	7.37	492.02	4.69	12800.67	4127.50	2260.10
35	7.37	496.68	4.69	13734.15	4325.91	2368.75
35	7.37	496.68	4.69	13734.15	4325.91	2368.75
36	7.37	501.32	4.69	14667.63	4524.33	2477.40
36	7.37	501.32	4.69	14667.63	4524.33	2477.40
37	7.37	505.98	4.69	15601.11	4722.75	2586.04
37	7.37	505.98	4.69	15601.11	4722.75	2586.04
38	7.37	509.95	3.33	11421.46	3425.96	1875.96
38	7.37	509.95	3.33	11421.46	3425.96	1875.96
39	7.37	513.25	3.33	11458.41	3433.81	1880.26
39	7.37	513.25	3.33	11458.41	3433.81	1880.26
40	7.37	517.35	4.93	17062.86	5106.92	2796.40
40	7.37	517.35	4.93	17062.86	5106.92	2796.40
41	7.37	522.24	4.93	17155.42	5126.59	2807.17
41	7.37	522.24	4.93	17155.42	5126.59	2807.17
42	7.37	527.13	4.93	17247.97	5146.26	2817.95
42	7.37	527.13	4.93	17247.97	5146.26	2817.95
43	7.37	532.02	4.93	17340.53	5165.94	2828.72
43	7.37	532.02	4.93	17340.53	5165.94	2828.72
44	7.37	536.92	4.93	17433.08	5185.61	2839.49
44	7.37	536.92	4.93	17433.08	5185.61	2839.49
45	7.37	541.81	4.93	17525.64	5205.28	2850.27
45	7.37	541.81	4.93	17525.64	5205.28	2850.27
46	7.37	546.70	4.93	17618.20	5224.96	2861.04
46	7.37	546.70	4.93	17618.20	5224.96	2861.04
47	7.37	551.60	4.93	17710.75	5244.63	2871.81
47	7.37	551.60	4.93	17710.75	5244.63	2871.81
48	7.37	556.49	4.93	17803.31	5264.30	2882.58
48	7.37	556.49	4.93	17803.31	5264.30	2882.58
49	7.37	561.38	4.93	17895.87	5283.98	2893.36
49	7.37	561.38	4.93	17895.87	5283.98	2893.36
50	7.37	566.27	4.93	17988.42	5303.65	2904.13
50	7.37	566.27	4.93	17988.42	5303.65	2904.13
51	7.37	571.17	4.93	18080.98	5323.32	2914.90
51	7.37	571.17	4.93	18080.98	5323.32	2914.90
52	7.37	576.06	4.93	18173.54	5343.00	2925.67
52	7.37	576.06	4.93	18173.54	5343.00	2925.67
53	7.37	580.95	4.93	18266.09	5362.67	2936.45
53	7.37	580.95	4.93	18266.09	5362.67	2936.45
54	7.37	585.05	3.33	12292.99	3611.21	1977.40
54	7.37	585.05	3.33	12292.99	3611.21	1977.40
55	7.37	589.30	5.24	19129.84	5638.67	3087.57
55	7.37	589.30	5.24	19129.84	5638.67	3087.57
56	7.37	594.50	5.24	18842.81	5577.66	3054.17
56	7.37	594.50	5.24	18842.81	5577.66	3054.17
57	7.37	599.70	5.24	18555.78	5516.65	3020.76
57	7.37	599.70	5.24	18555.78	5516.65	3020.76
58	45.93	602.34	0.14	329.84	278.32	152.40
58	45.93	602.34	0.14	329.84	278.32	152.40
59	45.93	603.54	3.31	10508.71	1852.97	1014.63
59	45.93	603.54	3.31	10508.71	1852.97	1014.63
60	45.93	605.15	1.31	4022.16	709.22	388.35
60	45.93	605.15	1.31	4022.16	709.22	388.35
61	45.93	607.43	5.24	11198.68	9649.62	5283.86
61	45.93	607.43	5.24	11198.68	9649.62	5283.86
62	53.78	610.73	5.00	8748.63	7901.03	4326.38

62	53.78	610.73	5.00	8748.63	7901.03	4326.38
63	53.78	613.68	5.00	7967.69	7374.27	4037.94
63	53.78	613.68	5.00	7967.69	7374.27	4037.94
64	46.28	615.27	0.32	552.82	502.87	275.36
64	46.28	615.27	0.32	552.82	502.87	275.36
65	46.28	615.68	0.84	1402.06	1281.56	701.74
65	46.28	615.68	0.84	1402.06	1281.56	701.74
66	46.28	618.33	6.85	10391.10	8378.93	4588.06
66	46.28	618.33	6.85	10391.10	8378.93	4588.06
67	46.28	621.39	1.99	2484.97	2073.17	1135.21
67	46.28	621.39	1.99	2484.97	2073.17	1135.21
68	84.53	622.55	10.00	2392.79	1613.96	883.76
68	84.53	622.55	10.00	2392.79	1613.96	883.76
69	89.78	623.04	5.47	17.08	11.52	6.31
69	89.78	623.04	5.47	17.08	11.52	6.31

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 69 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 69 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
25	12000.0	0.0	12000.0	90.00	-0.298898E+04

Sum of the Resisting Forces = 303242.07 (lbs)

Average Available Shear Strength = 1100.19(psf)

Sum of the Driving Forces = 180770.26 (lbs)

Average Mobilized Shear Stress = 655.85(psf)

Total length of the failure surface = 275.63(ft)

Factor of Safety Balance Check: FS = 1.67750

Janbu's Correction Factor (fo) = 0.8516

Janub's FS Corrected = 1.42852

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.34767(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 665.648(ft)

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

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

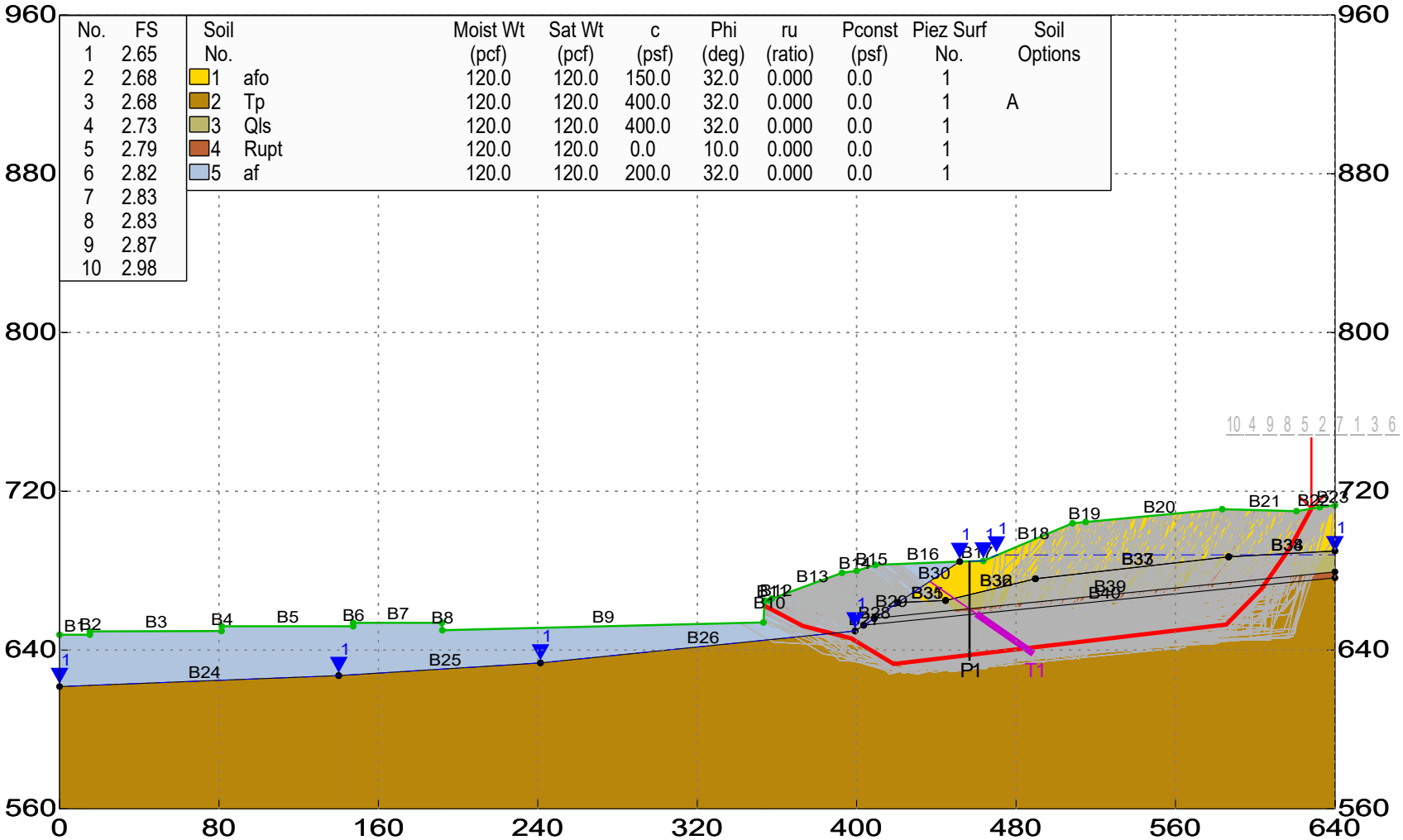
Royal Vista - Cross-Section 6
Stage 6 (Final Condition - Static (Along Bedding))

LGC Geotechnical / BPP

\Sec 6 - Stage 6 (Final Condition - Along Bedding(Static).gsd

No.	FS
1	2.65
2	2.68
3	2.68
4	2.73
5	2.79
6	2.82
7	2.83
8	2.83
9	2.87
10	2.98

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 2.65

Simplified Janbu (Corrected) Method

GEOSTASE
Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 6 (Final Condition - Along Bedding(Static).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 6 (Final Condition - Along Bedding(Static).OUT
Unit System: English

PROJECT: Royal Vista - Cross-Section 6

DESCRIPTION: Stage 6 (Final Condition - Static (Along Bedding))

BOUNDARY DATA

23 Surface Boundaries
40 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.700	15.200	647.700	5
2	15.200	647.700	15.300	649.400	5
3	15.300	649.400	81.300	649.600	5
4	81.300	649.600	81.400	652.000	5
5	81.400	652.000	147.300	652.000	5
6	147.300	652.000	147.400	653.700	5
7	147.400	653.700	191.900	653.700	5
8	191.900	653.700	192.100	650.000	5
9	192.100	650.000	353.200	653.900	5
10	353.200	653.900	353.800	664.900	5
11	353.800	664.900	356.200	664.900	5
12	356.200	664.900	357.400	665.900	5
13	357.400	665.900	392.700	678.900	5
14	392.700	678.900	400.000	679.900	5
15	400.000	679.900	409.400	682.900	5
16	409.400	682.900	451.700	684.600	5
17	451.700	684.600	463.600	684.900	1
18	463.600	684.900	508.300	703.900	1
19	508.300	703.900	514.900	704.500	1
20	514.900	704.500	583.400	711.000	1
21	583.400	711.000	620.700	710.000	1
22	620.700	710.000	632.400	712.000	1
23	632.400	712.000	640.000	713.000	1
24	0.000	621.600	140.100	627.100	2
25	140.100	627.100	241.300	633.500	2
26	241.300	633.500	399.200	649.600	2

27	399.200	649.600	403.500	652.500	2
28	403.500	652.500	408.800	656.000	4
29	408.800	656.000	420.700	663.900	3
30	420.700	663.900	451.700	684.600	1
31	420.700	663.900	444.600	665.000	3
32	444.600	665.000	489.700	675.900	3
33	489.700	675.900	586.700	687.000	3
34	586.700	687.000	640.000	689.900	3
35	420.700	663.900	444.600	665.000	3
36	444.600	665.000	489.700	675.900	3
37	489.700	675.900	586.700	687.000	3
38	586.700	687.000	640.000	689.900	3
39	408.800	656.000	640.000	679.400	4
40	403.500	652.500	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	32.00
2	8.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)

1	0.00	621.60
2	140.10	627.10
3	241.30	633.50
4	399.20	649.60
5	451.70	684.60
6	463.60	684.90
7	470.10	687.90
8	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	436.70	674.58	316500.0	5.0	35.00	28.5	35.0

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

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	456.60	684.72	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 25.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	415.00	641.70	455.00	644.50	30.00
2	460.00	645.00	620.00	661.00	30.00

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 = 232

Number of Trial Surfaces With Valid FS = 768

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 23.2 %

Statistical Data On All Valid FS Values:
FS Max = 52.206 FS Min = 2.650 FS Ave = 7.284
Standard Deviation = 4.134 Coefficient of Variation = 56.75 %

Critical Surface is Sequence Number 100 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	458.12	659.58

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	456.60	637.51

Factor Of Safety For The Critical or Specified Surface = 2.650

Table 1 - Geometry Data on the 73 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.14	1.29	353.73	662.36	663.65	-27.96	86.88	0.15
2	2.40	3.21	355.00	661.69	664.90	-27.96	0.00	2.72
3	1.20	4.67	356.80	660.73	665.40	-27.96	39.81	1.36
4	5.19	7.82	360.00	659.03	666.86	-27.96	20.22	5.88
5	5.19	12.49	365.19	656.28	668.77	-27.96	20.22	5.88
6	5.19	17.16	370.39	653.52	670.68	-27.96	20.22	5.88
7	4.86	21.01	375.41	651.52	672.53	-14.36	20.22	5.01
8	4.86	24.04	380.27	650.28	674.32	-14.36	20.22	5.01
9	4.86	27.08	385.12	649.03	676.11	-14.36	20.22	5.01
10	2.57	29.40	388.84	648.08	677.48	-14.36	20.22	2.66
11	2.57	31.00	391.41	647.42	678.43	-14.36	20.22	2.66
12	4.50	32.69	394.95	646.52	679.21	-14.36	7.80	4.65
13	2.00	34.32	398.20	645.34	679.65	-31.22	7.80	2.34
14	0.80	35.36	399.60	644.49	679.85	-31.22	7.80	0.94
15	3.50	37.27	401.75	643.18	680.46	-31.22	17.70	4.09
16	0.06	38.92	403.53	642.11	681.03	-31.22	17.70	0.07
17	2.62	40.16	404.87	641.29	681.45	-31.22	17.70	3.06
18	2.62	42.58	407.49	639.71	682.29	-31.22	17.70	3.06
19	0.60	44.07	409.10	638.73	682.80	-31.22	17.70	0.70
20	4.59	45.83	411.70	637.16	682.99	-31.22	2.30	5.37
21	4.59	48.80	416.29	634.38	683.18	-31.22	2.30	5.37

22	2.12	50.20	419.64	633.11	683.31	6.79	2.30	2.13
23	4.78	49.93	423.09	633.52	683.45	6.79	2.30	4.81
24	4.78	49.55	427.87	634.09	683.64	6.79	2.30	4.81
25	4.78	49.18	432.65	634.66	683.83	6.79	2.30	4.81
26	4.78	48.80	437.43	635.23	684.03	6.79	2.30	4.81
27	4.78	48.42	442.21	635.80	684.22	6.79	2.30	4.81
28	3.55	48.09	446.37	636.29	684.39	6.79	2.30	3.58
29	3.55	47.81	449.92	636.71	684.53	6.79	2.30	3.58
30	5.95	47.40	454.68	637.28	684.68	6.79	1.44	5.99
31	5.95	46.84	460.63	637.99	684.83	6.79	1.44	5.99
32	3.25	47.06	465.23	638.53	685.59	6.79	23.03	3.27
33	3.25	48.05	468.48	638.92	686.97	6.79	23.03	3.27
34	0.56	48.63	470.38	639.15	687.78	6.79	23.03	0.56
35	4.76	49.45	473.04	639.46	688.91	6.79	23.03	4.79
36	4.76	50.90	477.80	640.03	690.94	6.79	23.03	4.79
37	4.76	52.36	482.56	640.60	692.96	6.79	23.03	4.79
38	4.76	53.82	487.32	641.16	694.98	6.79	23.03	4.79
39	4.65	55.26	492.02	641.72	696.98	6.79	23.03	4.68
40	4.65	56.68	496.68	642.28	698.96	6.79	23.03	4.68
41	4.65	58.11	501.32	642.83	700.94	6.79	23.03	4.68
42	4.65	59.53	505.98	643.38	702.91	6.79	23.03	4.68
43	3.30	60.19	509.95	643.86	704.05	6.79	5.19	3.32
44	3.30	60.10	513.25	644.25	704.35	6.79	5.19	3.32
45	4.89	60.00	517.35	644.74	704.73	6.79	5.42	4.93
46	4.89	59.88	522.24	645.32	705.20	6.79	5.42	4.93
47	4.89	59.76	527.13	645.90	705.66	6.79	5.42	4.93
48	4.89	59.64	532.02	646.48	706.12	6.79	5.42	4.93
49	4.89	59.52	536.92	647.07	706.59	6.79	5.42	4.93
50	4.89	59.41	541.81	647.65	707.05	6.79	5.42	4.93
51	4.89	59.29	546.70	648.23	707.52	6.79	5.42	4.93
52	4.89	59.17	551.60	648.81	707.98	6.79	5.42	4.93
53	4.89	59.05	556.49	649.39	708.45	6.79	5.42	4.93
54	4.89	58.93	561.38	649.98	708.91	6.79	5.42	4.93
55	4.89	58.82	566.27	650.56	709.38	6.79	5.42	4.93
56	4.89	58.70	571.17	651.14	709.84	6.79	5.42	4.93
57	4.89	58.58	576.06	651.72	710.30	6.79	5.42	4.93
58	4.89	58.46	580.95	652.31	710.77	6.79	5.42	4.93
59	2.10	58.25	584.45	652.72	710.97	6.79	-1.54	2.11
60	1.20	57.47	586.10	653.46	710.93	45.58	-1.54	1.72
61	5.43	53.99	589.42	656.84	710.84	45.58	-1.54	7.76
62	5.43	48.31	594.85	662.39	710.69	45.58	-1.54	7.76
63	5.43	42.62	600.28	667.93	710.55	45.58	-1.54	7.76
64	1.46	38.70	603.73	671.76	710.46	55.21	-1.54	2.56
65	0.24	37.45	604.58	672.98	710.43	55.21	-1.54	0.42
66	2.00	35.81	605.70	674.59	710.40	55.21	-1.54	3.50
67	4.15	31.30	608.77	679.02	710.32	55.21	-1.54	7.28
68	4.15	25.21	612.93	685.00	710.21	55.21	-1.54	7.28
69	0.40	21.87	615.20	688.27	710.15	55.21	-1.54	0.70
70	1.86	20.22	616.33	689.90	710.12	55.21	-1.54	3.25
71	3.44	15.66	618.98	694.38	710.05	61.39	-1.54	7.18
72	3.75	9.35	622.57	700.97	710.32	61.39	9.70	7.83
73	3.75	3.12	626.32	707.85	710.96	61.39	9.70	7.83

Table 2 - Force Data On The 73 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	21.1	0.0	0.0	0.0	0.0	0.0
2	925.3	0.0	0.0	0.0	0.0	0.0
3	672.2	0.0	0.0	0.0	0.0	0.0
4	4875.4	0.0	0.0	0.0	0.0	0.0
5	7786.1	0.0	0.0	0.0	0.0	0.0
6	10696.8	0.0	0.0	0.0	0.0	0.0
7	12245.0	0.0	0.0	0.0	0.0	0.0
8	14011.9	0.0	0.0	0.0	0.0	0.0
9	15778.8	0.0	0.0	0.0	0.0	0.0
10	9079.6	0.0	75.6	0.0	0.0	0.0

11	9576.0	0.0	226.8	0.0	0.0	0.0
12	17659.1	0.0	760.2	0.0	0.0	0.0
13	8229.6	0.0	600.7	0.0	0.0	0.0
14	3394.3	0.0	217.4	0.0	0.0	0.0
15	15654.9	0.0	1434.7	0.0	0.0	0.0
16	275.2	0.0	30.9	0.0	0.0	0.0
17	12628.7	0.0	1599.7	0.0	0.0	0.0
18	13391.1	0.0	2041.2	0.0	0.0	0.0
19	3173.3	0.0	529.5	0.0	0.0	0.0
20	25250.0	0.0	4817.2	0.0	0.0	0.0
21	26884.4	0.0	6172.2	0.0	0.0	0.0
22	12762.0	0.0	2775.7	0.0	0.0	0.0
23	28639.7	0.0	6655.8	0.0	0.0	0.0
24	28423.6	0.0	7200.2	0.0	0.0	0.0
25	28207.5	0.0	7744.6	0.0	0.0	0.0
26	27991.5	0.0	8289.0	0.0	0.0	0.0
27	27775.4	0.0	8833.4	0.0	0.0	0.0
28	20488.4	0.0	6912.6	0.0	0.0	0.0
29	20369.2	0.0	7212.9	0.0	0.0	0.0
30	33840.8	0.0	17710.1	0.0	0.0	0.0
31	33442.4	0.0	17501.6	0.0	0.0	0.0
32	18352.0	0.0	7932.7	0.0	0.0	0.0
33	18740.0	0.0	8120.1	0.0	0.0	0.0
34	3260.4	4.5	1711.5	0.0	0.0	0.0
35	28246.7	0.0	14489.7	0.0	0.0	0.0
36	29078.9	0.0	14321.1	0.0	0.0	0.0
37	29911.2	0.0	14152.5	0.0	0.0	0.0
38	30743.5	0.0	13983.8	0.0	0.0	0.0
39	30834.5	0.0	13496.9	0.0	0.0	0.0
40	31628.6	0.0	13336.1	0.0	0.0	0.0
41	32422.8	0.0	13175.2	0.0	0.0	0.0
42	33216.9	0.0	13014.3	0.0	0.0	0.0
43	23836.8	0.0	9138.3	0.0	0.0	0.0
44	23800.1	0.0	9057.3	0.0	0.0	0.0
45	35226.1	0.0	13280.0	0.0	0.0	0.0
46	35156.9	0.0	13101.9	0.0	0.0	0.0
47	35087.6	0.0	12923.8	0.0	0.0	0.0
48	35018.4	0.0	12745.6	0.0	0.0	0.0
49	34949.2	0.0	12567.5	0.0	0.0	0.0
50	34879.9	0.0	12389.4	0.0	0.0	0.0
51	34810.7	0.0	12211.3	0.0	0.0	0.0
52	34741.4	0.0	12033.1	0.0	0.0	0.0
53	34672.2	0.0	11855.0	0.0	0.0	0.0
54	34603.0	0.0	11676.9	0.0	0.0	0.0
55	34533.7	0.0	11498.7	0.0	0.0	0.0
56	34464.5	0.0	11320.6	0.0	0.0	0.0
57	34395.2	0.0	11142.5	0.0	0.0	0.0
58	34326.0	0.0	10964.4	0.0	0.0	0.0
59	14665.6	0.0	4646.9	0.0	0.0	0.0
60	8288.9	0.0	3698.1	0.0	0.0	0.0
61	35194.4	0.0	15073.8	0.0	0.0	0.0
62	31486.3	0.0	12390.8	0.0	0.0	0.0
63	27778.2	0.0	9707.9	0.0	0.0	0.0
64	6796.4	0.0	2596.4	0.0	0.0	0.0
65	1072.5	0.0	391.4	0.0	0.0	0.0
66	8592.5	0.0	2927.6	0.0	0.0	0.0
67	15602.1	0.0	4071.4	0.0	0.0	0.0
68	12566.9	0.0	1357.1	0.0	0.0	0.0
69	1051.5	0.0	0.0	0.0	0.0	0.0
70	4502.7	0.0	0.0	0.0	0.0	0.0
71	6463.7	0.0	0.0	0.0	0.0	0.0
72	4204.8	0.0	0.0	0.0	0.0	0.0
73	1401.6	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1474755.12(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 1015491.69(lbs)

TOTAL AREA OF SLIDING MASS = 12289.63(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 73 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	5	200.00	32.00	
5	5	200.00	32.00	
6	5	200.00	32.00	
7	5	200.00	32.00	
8	5	200.00	32.00	
9	5	200.00	32.00	
10	2	400.00	32.00	A
11	2	400.00	32.00	A
12	2	400.00	32.00	A
13	2	400.00	32.00	A
14	2	400.00	32.00	A
15	2	400.00	32.00	A
16	2	400.00	32.00	A
17	2	400.00	32.00	A
18	2	400.00	32.00	A
19	2	400.00	32.00	A
20	2	400.00	32.00	A
21	2	400.00	32.00	A
22	2	250.00	10.00	A
23	2	250.00	10.00	A
24	2	250.00	10.00	A
25	2	250.00	10.00	A
26	2	250.00	10.00	A
27	2	250.00	10.00	A
28	2	250.00	10.00	A
29	2	250.00	10.00	A
30	2	250.00	10.00	A
31	2	250.00	10.00	A
32	2	250.00	10.00	A
33	2	250.00	10.00	A
34	2	250.00	10.00	A
35	2	250.00	10.00	A
36	2	250.00	10.00	A
37	2	250.00	10.00	A
38	2	250.00	10.00	A
39	2	250.00	10.00	A
40	2	250.00	10.00	A
41	2	250.00	10.00	A
42	2	250.00	10.00	A
43	2	250.00	10.00	A
44	2	250.00	10.00	A
45	2	250.00	10.00	A
46	2	250.00	10.00	A
47	2	250.00	10.00	A
48	2	250.00	10.00	A
49	2	250.00	10.00	A
50	2	250.00	10.00	A
51	2	250.00	10.00	A
52	2	250.00	10.00	A
53	2	250.00	10.00	A
54	2	250.00	10.00	A
55	2	250.00	10.00	A
56	2	250.00	10.00	A
57	2	250.00	10.00	A
58	2	250.00	10.00	A
59	2	250.00	10.00	A
60	2	400.00	32.00	A
61	2	400.00	32.00	A
62	2	400.00	32.00	A
63	2	400.00	32.00	A
64	2	400.00	32.00	A
65	4	0.00	10.00	
66	4	0.00	10.00	
67	3	400.00	32.00	
68	3	400.00	32.00	
69	3	400.00	32.00	

70	1	150.00	32.00
71	1	150.00	32.00
72	1	150.00	32.00
73	1	150.00	32.00

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 73 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-27.96	353.73	0.15	208.75	330.44	93.38
1	-27.96	353.73	0.15	208.75	330.44	93.38
2	-27.96	355.00	2.72	466.11	491.26	138.83
2	-27.96	355.00	2.72	466.11	491.26	138.83
3	-27.96	356.80	1.36	660.68	612.84	173.19
3	-27.96	356.80	1.36	660.68	612.84	173.19
4	-27.96	360.00	5.88	1082.28	876.28	247.64
4	-27.96	360.00	5.88	1082.28	876.28	247.64
5	-27.96	365.19	5.88	1706.61	1266.41	357.90
5	-27.96	365.19	5.88	1706.61	1266.41	357.90
6	-27.96	370.39	5.88	2330.95	1656.54	468.15
6	-27.96	370.39	5.88	2330.95	1656.54	468.15
7	-14.36	375.41	5.01	2669.19	1867.89	527.88
7	-14.36	375.41	5.01	2669.19	1867.89	527.88
8	-14.36	380.27	5.01	3051.94	2107.06	595.47
8	-14.36	380.27	5.01	3051.94	2107.06	595.47
9	-14.36	385.12	5.01	3434.69	2346.23	663.06
9	-14.36	385.12	5.01	3434.69	2346.23	663.06
10	-14.36	388.84	2.66	3714.20	2720.89	768.94
10	-14.36	388.84	2.66	3714.20	2720.89	768.94
11	-14.36	391.41	2.66	3857.20	2810.25	794.20
11	-14.36	391.41	2.66	3857.20	2810.25	794.20
12	-14.36	394.95	4.65	3988.02	2891.99	817.30
12	-14.36	394.95	4.65	3988.02	2891.99	817.30
13	-31.22	398.20	2.34	4457.44	3185.32	900.19
13	-31.22	398.20	2.34	4457.44	3185.32	900.19
14	-31.22	399.60	0.94	4626.69	3291.08	930.08
14	-31.22	399.60	0.94	4626.69	3291.08	930.08
15	-31.22	401.75	4.09	4753.25	3370.16	952.43
15	-31.22	401.75	4.09	4753.25	3370.16	952.43
16	-31.22	403.53	0.07	4866.19	3440.73	972.38
16	-31.22	403.53	0.07	4866.19	3440.73	972.38
17	-31.22	404.87	3.06	4951.22	3493.86	987.39
17	-31.22	404.87	3.06	4951.22	3493.86	987.39
18	-31.22	407.49	3.06	5117.54	3597.79	1016.76
18	-31.22	407.49	3.06	5117.54	3597.79	1016.76
19	-31.22	409.10	0.70	5219.74	3661.66	1034.81
19	-31.22	409.10	0.70	5219.74	3661.66	1034.81
20	-31.22	411.70	5.37	5297.45	3710.21	1048.53
20	-31.22	411.70	5.37	5297.45	3710.21	1048.53
21	-31.22	416.29	5.37	5414.78	3783.53	1069.25
21	-31.22	416.29	5.37	5414.78	3783.53	1069.25
22	6.79	419.64	2.13	4683.57	1075.84	304.04
22	6.79	419.64	2.13	4683.57	1075.84	304.04
23	6.79	423.09	4.81	4570.08	1055.83	298.39
23	6.79	423.09	4.81	4570.08	1055.83	298.39
24	6.79	427.87	4.81	4412.81	1028.10	290.55
24	6.79	427.87	4.81	4412.81	1028.10	290.55
25	6.79	432.65	4.81	4255.53	1000.37	282.71
25	6.79	432.65	4.81	4255.53	1000.37	282.71
26	6.79	437.43	4.81	4098.26	972.63	274.87
26	6.79	437.43	4.81	4098.26	972.63	274.87
27	6.79	442.21	4.81	3940.98	944.90	267.04

27	6.79	442.21	4.81	3940.98	944.90	267.04
28	6.79	446.37	3.58	3803.95	920.74	260.21
28	6.79	446.37	3.58	3803.95	920.74	260.21
29	6.79	449.92	3.58	3687.14	900.14	254.39
29	6.79	449.92	3.58	3687.14	900.14	254.39
30	6.79	454.68	5.99	2705.17	726.99	205.45
30	6.79	454.68	5.99	2705.17	726.99	205.45
31	6.79	460.63	5.99	8736.00	1790.39	505.98
31	6.79	460.63	5.99	8736.00	1790.39	505.98
32	6.79	465.23	3.27	3193.16	813.04	229.77
32	6.79	465.23	3.27	3193.16	813.04	229.77
33	6.79	468.48	3.27	3254.86	823.92	232.85
33	6.79	468.48	3.27	3254.86	823.92	232.85
34	6.79	470.38	0.56	2774.15	739.16	208.89
34	6.79	470.38	0.56	2774.15	739.16	208.89
35	6.79	473.04	4.79	2883.37	758.42	214.33
35	6.79	473.04	4.79	2883.37	758.42	214.33
36	6.79	477.80	4.79	3092.02	795.21	224.73
36	6.79	477.80	4.79	3092.02	795.21	224.73
37	6.79	482.56	4.79	3300.68	832.00	235.13
37	6.79	482.56	4.79	3300.68	832.00	235.13
38	6.79	487.32	4.79	3509.33	868.79	245.53
38	6.79	487.32	4.79	3509.33	868.79	245.53
39	6.79	492.02	4.68	3715.57	905.15	255.80
39	6.79	492.02	4.68	3715.57	905.15	255.80
40	6.79	496.68	4.68	3919.39	941.09	265.96
40	6.79	496.68	4.68	3919.39	941.09	265.96
41	6.79	501.32	4.68	4123.20	977.03	276.12
41	6.79	501.32	4.68	4123.20	977.03	276.12
42	6.79	505.98	4.68	4327.02	1012.97	286.27
42	6.79	505.98	4.68	4327.02	1012.97	286.27
43	6.79	509.95	3.32	4435.52	1032.10	291.68
43	6.79	509.95	3.32	4435.52	1032.10	291.68
44	6.79	513.25	3.32	4448.70	1034.43	292.34
44	6.79	513.25	3.32	4448.70	1034.43	292.34
45	6.79	517.35	4.93	4466.21	1037.51	293.21
45	6.79	517.35	4.93	4466.21	1037.51	293.21
46	6.79	522.24	4.93	4488.07	1041.37	294.30
46	6.79	522.24	4.93	4488.07	1041.37	294.30
47	6.79	527.13	4.93	4509.93	1045.22	295.39
47	6.79	527.13	4.93	4509.93	1045.22	295.39
48	6.79	532.02	4.93	4531.78	1049.08	296.48
48	6.79	532.02	4.93	4531.78	1049.08	296.48
49	6.79	536.92	4.93	4553.64	1052.93	297.57
49	6.79	536.92	4.93	4553.64	1052.93	297.57
50	6.79	541.81	4.93	4575.50	1056.78	298.65
50	6.79	541.81	4.93	4575.50	1056.78	298.65
51	6.79	546.70	4.93	4597.36	1060.64	299.74
51	6.79	546.70	4.93	4597.36	1060.64	299.74
52	6.79	551.60	4.93	4619.21	1064.49	300.83
52	6.79	551.60	4.93	4619.21	1064.49	300.83
53	6.79	556.49	4.93	4641.07	1068.35	301.92
53	6.79	556.49	4.93	4641.07	1068.35	301.92
54	6.79	561.38	4.93	4662.93	1072.20	303.01
54	6.79	561.38	4.93	4662.93	1072.20	303.01
55	6.79	566.27	4.93	4684.79	1076.05	304.10
55	6.79	566.27	4.93	4684.79	1076.05	304.10
56	6.79	571.17	4.93	4706.64	1079.91	305.19
56	6.79	571.17	4.93	4706.64	1079.91	305.19
57	6.79	576.06	4.93	4728.50	1083.76	306.28
57	6.79	576.06	4.93	4728.50	1083.76	306.28
58	6.79	580.95	4.93	4750.36	1087.62	307.37
58	6.79	580.95	4.93	4750.36	1087.62	307.37
59	6.79	584.45	2.11	4750.75	1087.69	307.39
59	6.79	584.45	2.11	4750.75	1087.69	307.39
60	45.58	586.10	1.72	3856.93	2810.08	794.15
60	45.58	586.10	1.72	3856.93	2810.08	794.15
61	45.58	589.42	7.76	3685.03	2702.66	763.79
61	45.58	589.42	7.76	3685.03	2702.66	763.79
62	45.58	594.85	7.76	3403.52	2526.76	714.08
62	45.58	594.85	7.76	3403.52	2526.76	714.08
63	45.58	600.28	7.76	3122.01	2350.85	664.37

63	45.58	600.28	7.76	3122.01	2350.85	664.37
64	55.21	603.73	2.56	2702.88	2088.95	590.35
64	55.21	603.73	2.56	2702.88	2088.95	590.35
65	55.21	604.58	0.42	3299.64	581.82	164.43
65	55.21	604.58	0.42	3299.64	581.82	164.43
66	55.21	605.70	3.50	3210.24	566.05	159.97
66	55.21	605.70	3.50	3210.24	566.05	159.97
67	55.21	608.77	7.28	2362.63	1876.34	530.27
67	55.21	608.77	7.28	2362.63	1876.34	530.27
68	55.21	612.93	7.28	2082.59	1701.35	480.81
68	55.21	612.93	7.28	2082.59	1701.35	480.81
69	55.21	615.20	0.70	1914.99	1596.62	451.22
69	55.21	615.20	0.70	1914.99	1596.62	451.22
70	55.21	616.33	3.25	1846.66	1303.92	368.50
70	55.21	616.33	3.25	1846.66	1303.92	368.50
71	61.39	618.98	7.18	1325.38	978.19	276.44
71	61.39	618.98	7.18	1325.38	978.19	276.44
72	61.39	622.57	7.83	765.72	628.48	177.61
72	61.39	622.57	7.83	765.72	628.48	177.61
73	61.39	626.32	7.83	213.41	283.35	80.08
73	61.39	626.32	7.83	213.41	283.35	80.08

Table 4 - Base Force Data on the 73 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-27.96	353.73	0.15	32.27	51.09	14.44
1	-27.96	353.73	0.15	32.27	51.09	14.44
2	-27.96	355.00	2.72	1266.45	1334.78	377.22
2	-27.96	355.00	2.72	1266.45	1334.78	377.22
3	-27.96	356.80	1.36	897.56	832.57	235.29
3	-27.96	356.80	1.36	897.56	832.57	235.29
4	-27.96	360.00	5.88	6364.37	5153.01	1456.28
4	-27.96	360.00	5.88	6364.37	5153.01	1456.28
5	-27.96	365.19	5.88	10035.80	7447.17	2104.63
5	-27.96	365.19	5.88	10035.80	7447.17	2104.63
6	-27.96	370.39	5.88	13707.23	9741.34	2752.97
6	-27.96	370.39	5.88	13707.23	9741.34	2752.97
7	-14.36	375.41	5.01	13380.74	9363.82	2646.28
7	-14.36	375.41	5.01	13380.74	9363.82	2646.28
8	-14.36	380.27	5.01	15299.47	10562.78	2985.12
8	-14.36	380.27	5.01	15299.47	10562.78	2985.12
9	-14.36	385.12	5.01	17218.21	11761.74	3323.95
9	-14.36	385.12	5.01	17218.21	11761.74	3323.95
10	-14.36	388.84	2.66	9868.79	7229.52	2043.12
10	-14.36	388.84	2.66	9868.79	7229.52	2043.12
11	-14.36	391.41	2.66	10248.74	7466.94	2110.21
11	-14.36	391.41	2.66	10248.74	7466.94	2110.21
12	-14.36	394.95	4.65	18531.61	13438.56	3797.84
12	-14.36	394.95	4.65	18531.61	13438.56	3797.84
13	-31.22	398.20	2.34	10416.05	7443.38	2103.55
13	-31.22	398.20	2.34	10416.05	7443.38	2103.55
14	-31.22	399.60	0.94	4328.07	3078.66	870.05
14	-31.22	399.60	0.94	4328.07	3078.66	870.05
15	-31.22	401.75	4.09	19453.23	13792.78	3897.94
15	-31.22	401.75	4.09	19453.23	13792.78	3897.94
16	-31.22	403.53	0.07	335.34	237.11	67.01
16	-31.22	403.53	0.07	335.34	237.11	67.01
17	-31.22	404.87	3.06	15171.73	10706.05	3025.61
17	-31.22	404.87	3.06	15171.73	10706.05	3025.61
18	-31.22	407.49	3.06	15681.38	11024.51	3115.61
18	-31.22	407.49	3.06	15681.38	11024.51	3115.61
19	-31.22	409.10	0.70	3662.13	2568.99	726.02
19	-31.22	409.10	0.70	3662.13	2568.99	726.02
20	-31.22	411.70	5.37	28437.13	19916.72	5628.61
20	-31.22	411.70	5.37	28437.13	19916.72	5628.61
21	-31.22	416.29	5.37	29066.98	20310.30	5739.84
21	-31.22	416.29	5.37	29066.98	20310.30	5739.84

22	6.79	419.64	2.13	9991.94	2295.20	648.64
22	6.79	419.64	2.13	9991.94	2295.20	648.64
23	6.79	423.09	4.81	21999.11	5082.47	1436.34
23	6.79	423.09	4.81	21999.11	5082.47	1436.34
24	6.79	427.87	4.81	21242.03	4948.97	1398.62
24	6.79	427.87	4.81	21242.03	4948.97	1398.62
25	6.79	432.65	4.81	20484.96	4815.48	1360.89
25	6.79	432.65	4.81	20484.96	4815.48	1360.89
26	6.79	437.43	4.81	19727.88	4681.99	1323.16
26	6.79	437.43	4.81	19727.88	4681.99	1323.16
27	6.79	442.21	4.81	18970.80	4548.49	1285.44
27	6.79	442.21	4.81	18970.80	4548.49	1285.44
28	6.79	446.37	3.58	13599.27	3291.68	930.25
28	6.79	446.37	3.58	13599.27	3291.68	930.25
29	6.79	449.92	3.58	13181.69	3218.05	909.44
29	6.79	449.92	3.58	13181.69	3218.05	909.44
30	6.79	454.68	5.99	16209.32	4356.13	1231.08
30	6.79	454.68	5.99	16209.32	4356.13	1231.08
31	6.79	460.63	5.99	52345.89	10727.99	3031.81
31	6.79	460.63	5.99	52345.89	10727.99	3031.81
32	6.79	465.23	3.27	10450.99	2661.02	752.02
32	6.79	465.23	3.27	10450.99	2661.02	752.02
33	6.79	468.48	3.27	10652.92	2696.63	762.09
33	6.79	468.48	3.27	10652.92	2696.63	762.09
34	6.79	470.38	0.56	1560.76	415.86	117.52
34	6.79	470.38	0.56	1560.76	415.86	117.52
35	6.79	473.04	4.79	13822.62	3635.78	1027.50
35	6.79	473.04	4.79	13822.62	3635.78	1027.50
36	6.79	477.80	4.79	14822.90	3812.16	1077.34
36	6.79	477.80	4.79	14822.90	3812.16	1077.34
37	6.79	482.56	4.79	15823.17	3988.53	1127.19
37	6.79	482.56	4.79	15823.17	3988.53	1127.19
38	6.79	487.32	4.79	16823.44	4164.91	1177.03
38	6.79	487.32	4.79	16823.44	4164.91	1177.03
39	6.79	492.02	4.68	17399.28	4238.66	1197.88
39	6.79	492.02	4.68	17399.28	4238.66	1197.88
40	6.79	496.68	4.68	18353.72	4406.96	1245.44
40	6.79	496.68	4.68	18353.72	4406.96	1245.44
41	6.79	501.32	4.68	19308.16	4575.25	1293.00
41	6.79	501.32	4.68	19308.16	4575.25	1293.00
42	6.79	505.98	4.68	20262.60	4743.54	1340.56
42	6.79	505.98	4.68	20262.60	4743.54	1340.56
43	6.79	509.95	3.32	14740.48	3429.96	969.33
43	6.79	509.95	3.32	14740.48	3429.96	969.33
44	6.79	513.25	3.32	14784.26	3437.68	971.51
44	6.79	513.25	3.32	14784.26	3437.68	971.51
45	6.79	517.35	4.93	22006.70	5112.22	1444.75
45	6.79	517.35	4.93	22006.70	5112.22	1444.75
46	6.79	522.24	4.93	22114.40	5131.21	1450.12
46	6.79	522.24	4.93	22114.40	5131.21	1450.12
47	6.79	527.13	4.93	22222.10	5150.20	1455.48
47	6.79	527.13	4.93	22222.10	5150.20	1455.48
48	6.79	532.02	4.93	22329.80	5169.19	1460.85
48	6.79	532.02	4.93	22329.80	5169.19	1460.85
49	6.79	536.92	4.93	22437.50	5188.18	1466.22
49	6.79	536.92	4.93	22437.50	5188.18	1466.22
50	6.79	541.81	4.93	22545.20	5207.17	1471.58
50	6.79	541.81	4.93	22545.20	5207.17	1471.58
51	6.79	546.70	4.93	22652.90	5226.16	1476.95
51	6.79	546.70	4.93	22652.90	5226.16	1476.95
52	6.79	551.60	4.93	22760.60	5245.15	1482.32
52	6.79	551.60	4.93	22760.60	5245.15	1482.32
53	6.79	556.49	4.93	22868.30	5264.14	1487.68
53	6.79	556.49	4.93	22868.30	5264.14	1487.68
54	6.79	561.38	4.93	22976.00	5283.13	1493.05
54	6.79	561.38	4.93	22976.00	5283.13	1493.05
55	6.79	566.27	4.93	23083.70	5302.12	1498.42
55	6.79	566.27	4.93	23083.70	5302.12	1498.42
56	6.79	571.17	4.93	23191.40	5321.11	1503.79
56	6.79	571.17	4.93	23191.40	5321.11	1503.79
57	6.79	576.06	4.93	23299.10	5340.10	1509.15
57	6.79	576.06	4.93	23299.10	5340.10	1509.15

58	6.79	580.95	4.93	23406.80	5359.09	1514.52
58	6.79	580.95	4.93	23406.80	5359.09	1514.52
59	6.79	584.45	2.11	10037.62	2298.11	649.46
59	6.79	584.45	2.11	10037.62	2298.11	649.46
60	45.58	586.10	1.72	6623.68	4825.87	1363.83
60	45.58	586.10	1.72	6623.68	4825.87	1363.83
61	45.58	589.42	7.76	28599.08	20975.04	5927.70
61	45.58	589.42	7.76	28599.08	20975.04	5927.70
62	45.58	594.85	7.76	26414.34	19609.86	5541.89
62	45.58	594.85	7.76	26414.34	19609.86	5541.89
63	45.58	600.28	7.76	24229.59	18244.68	5156.08
63	45.58	600.28	7.76	24229.59	18244.68	5156.08
64	55.21	603.73	2.56	6932.19	5357.61	1514.10
64	55.21	603.73	2.56	6932.19	5357.61	1514.10
65	55.21	604.58	0.42	1380.00	243.33	68.77
65	55.21	604.58	0.42	1380.00	243.33	68.77
66	55.21	605.70	3.50	11248.85	1983.48	560.54
66	55.21	605.70	3.50	11248.85	1983.48	560.54
67	55.21	608.77	7.28	17198.52	13658.58	3860.02
67	55.21	608.77	7.28	17198.52	13658.58	3860.02
68	55.21	612.93	7.28	15159.96	12384.75	3500.02
68	55.21	612.93	7.28	15159.96	12384.75	3500.02
69	55.21	615.20	0.70	1344.38	1120.87	316.77
69	55.21	615.20	0.70	1344.38	1120.87	316.77
70	55.21	616.33	3.25	6005.67	4240.59	1198.42
70	55.21	616.33	3.25	6005.67	4240.59	1198.42
71	61.39	618.98	7.18	9518.78	7025.28	1985.40
71	61.39	618.98	7.18	9518.78	7025.28	1985.40
72	61.39	622.57	7.83	5994.17	4919.80	1390.37
72	61.39	622.57	7.83	5994.17	4919.80	1390.37
73	61.39	626.32	7.83	1670.62	2218.14	626.86
73	61.39	626.32	7.83	1670.62	2218.14	626.86

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 73 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 73 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
30	12000.0	0.0	12000.0	90.00	-0.274872E+04

Sum of the Resisting Forces = 397990.98 (lbs)

Average Available Shear Strength = 1272.33(psf)

Sum of the Driving Forces = 122912.51 (lbs)

Average Mobilized Shear Stress = 392.94(psf)

Total length of the failure surface = 312.80(ft)

Factor of Safety Balance Check: FS = 3.23800

Janbu's Correction Factor (fo) = 0.8185

Janub's FS Corrected = 2.65037

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

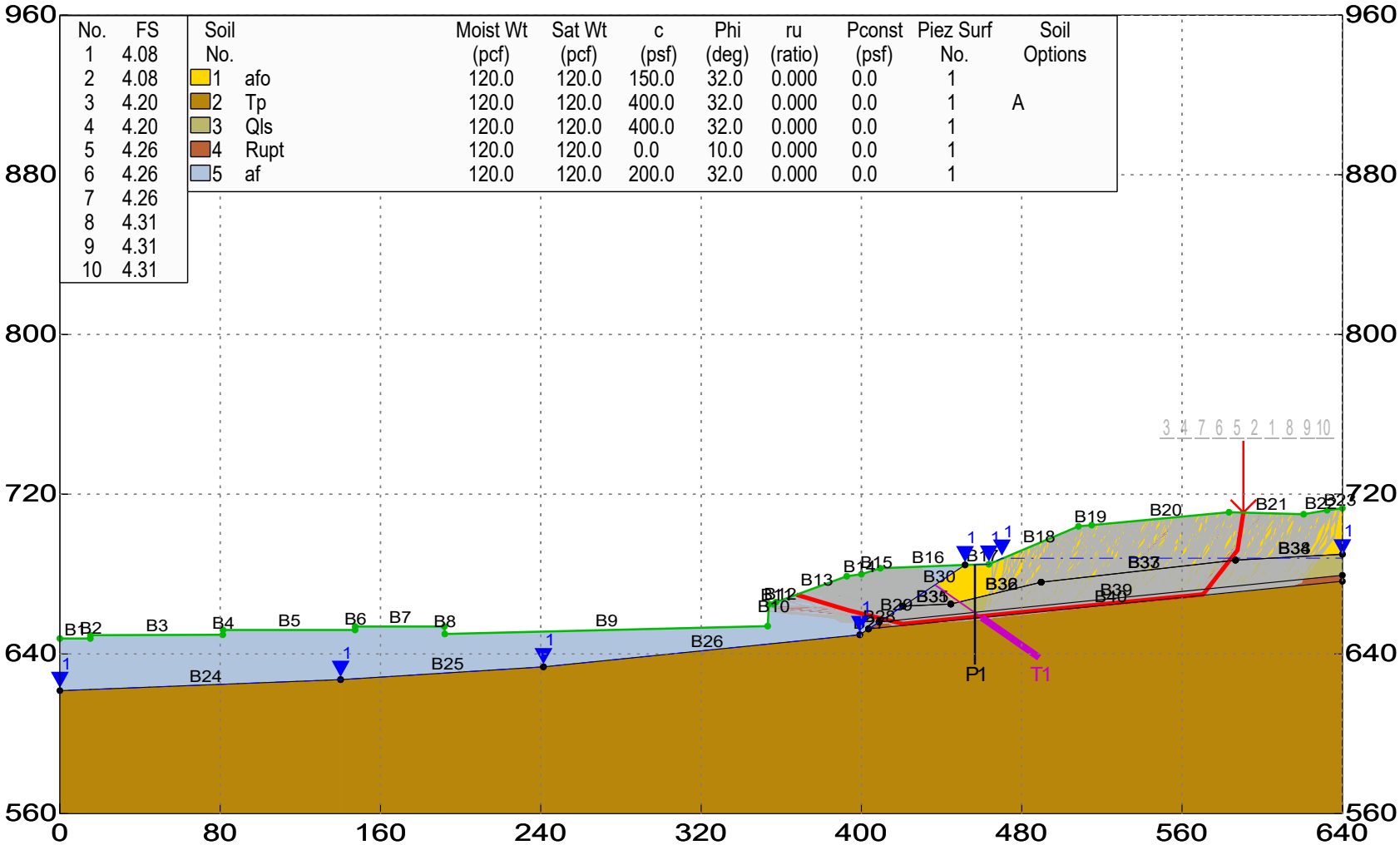
Royal Vista - Cross Section 6
Stage 6 (Final Condition - Static (Rupture))

LGC Geotechnical / BPP

\Sec 6 - Stage 6 (Final Condition - Rupture(Static).gsd

No.	FS
1	4.08
2	4.08
3	4.20
4	4.20
5	4.26
6	4.26
7	4.26
8	4.31
9	4.31
10	4.31

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 4.08

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 6 (Final Condition - Rupture(Static).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 6 (Final Condition - Rupture(Static).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 6

DESCRIPTION: Stage 6 (Final Condition - Static (Rupture))

BOUNDARY DATA

23 Surface Boundaries
40 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.700	15.200	647.700	5
2	15.200	647.700	15.300	649.400	5
3	15.300	649.400	81.300	649.600	5
4	81.300	649.600	81.400	652.000	5
5	81.400	652.000	147.300	652.000	5
6	147.300	652.000	147.400	653.700	5
7	147.400	653.700	191.900	653.700	5
8	191.900	653.700	192.100	650.000	5
9	192.100	650.000	353.200	653.900	5
10	353.200	653.900	353.800	664.900	5
11	353.800	664.900	356.200	664.900	5
12	356.200	664.900	357.400	665.900	5
13	357.400	665.900	392.700	678.900	5
14	392.700	678.900	400.000	679.900	5
15	400.000	679.900	409.400	682.900	5
16	409.400	682.900	451.700	684.600	5
17	451.700	684.600	463.600	684.900	1
18	463.600	684.900	508.300	703.900	1
19	508.300	703.900	514.900	704.500	1
20	514.900	704.500	583.400	711.000	1
21	583.400	711.000	620.700	710.000	1
22	620.700	710.000	632.400	712.000	1
23	632.400	712.000	640.000	713.000	1
24	0.000	621.600	140.100	627.100	2
25	140.100	627.100	241.300	633.500	2
26	241.300	633.500	399.200	649.600	2

27	399.200	649.600	403.500	652.500	2
28	403.500	652.500	408.800	656.000	4
29	408.800	656.000	420.700	663.900	3
30	420.700	663.900	451.700	684.600	1
31	420.700	663.900	444.600	665.000	3
32	444.600	665.000	489.700	675.900	3
33	489.700	675.900	586.700	687.000	3
34	586.700	687.000	640.000	689.900	3
35	420.700	663.900	444.600	665.000	3
36	444.600	665.000	489.700	675.900	3
37	489.700	675.900	586.700	687.000	3
38	586.700	687.000	640.000	689.900	3
39	408.800	656.000	640.000	679.400	4
40	403.500	652.500	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	32.00
2	8.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)

1	0.00	621.60
2	140.10	627.10
3	241.30	633.50
4	399.20	649.60
5	451.70	684.60
6	463.60	684.90
7	470.10	687.90
8	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	436.70	674.58	316500.0	5.0	35.00	28.5	35.0

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

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	456.60	684.72	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 28.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	415.00	655.70	455.00	658.50	3.00
2	460.00	659.00	620.00	676.00	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 = 486

Number of Trial Surfaces With Valid FS = 514

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 48.6 %

Statistical Data On All Valid FS Values:
FS Max = 103.769 FS Min = 4.084 FS Ave = 6.655
Standard Deviation = 7.217 Coefficient of Variation = 108.45 %

Critical Surface is Sequence Number 393 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	459.18	658.84

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	456.60	658.59

Factor Of Safety For The Critical or Specified Surface = 4.084

Table 1 - Geometry Data on the 55 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	5.01	1.68	370.16	668.92	670.60	-16.83	20.22	5.23
2	5.01	5.04	375.17	667.41	672.44	-16.83	20.22	5.23
3	5.01	8.40	380.18	665.89	674.29	-16.83	20.22	5.23
4	5.01	11.76	385.19	664.38	676.13	-16.83	20.22	5.23
5	5.01	15.12	390.20	662.86	677.98	-16.83	20.22	5.23
6	0.84	16.98	393.12	661.98	678.96	-16.83	7.80	0.88
7	3.23	17.79	395.16	661.44	679.24	-14.07	7.80	3.33
8	3.23	19.04	398.39	660.64	679.68	-14.07	7.80	3.33
9	4.70	21.01	402.35	659.64	680.65	-14.07	17.70	4.85
10	4.70	23.69	407.05	658.46	682.15	-14.07	17.70	4.85
11	1.61	25.26	410.20	657.67	682.93	-14.07	2.30	1.66
12	0.01	25.49	411.01	657.47	682.96	-14.07	2.30	0.01
13	3.54	26.01	412.78	657.03	683.04	-14.07	2.30	3.65
14	3.07	26.97	416.09	656.20	683.17	-14.07	2.30	3.17
15	3.07	27.87	419.16	655.43	683.29	-14.07	2.30	3.17
16	4.78	28.17	423.09	655.28	683.45	5.64	2.30	4.80
17	4.78	27.89	427.87	655.75	683.64	5.64	2.30	4.80
18	4.78	27.61	432.65	656.22	683.83	5.64	2.30	4.80
19	4.78	27.33	437.43	656.69	684.03	5.64	2.30	4.80
20	4.78	27.05	442.21	657.17	684.22	5.64	2.30	4.80
21	3.55	26.81	446.37	657.58	684.39	5.64	2.30	3.57

22	3.55	26.60	449.92	657.93	684.53	5.64	2.30	3.57
23	5.95	26.28	454.68	658.40	684.68	5.64	1.44	5.98
24	5.95	25.84	460.63	658.98	684.83	5.64	1.44	5.98
25	3.25	26.15	465.23	659.44	685.59	5.64	23.03	3.27
26	3.25	27.21	468.48	659.76	686.97	5.64	23.03	3.27
27	0.56	27.83	470.38	659.95	687.78	5.64	23.03	0.56
28	4.76	28.70	473.04	660.21	688.91	5.64	23.03	4.78
29	4.76	30.25	477.80	660.68	690.94	5.64	23.03	4.78
30	4.76	31.81	482.56	661.15	692.96	5.64	23.03	4.78
31	4.76	33.36	487.32	661.62	694.98	5.64	23.03	4.78
32	4.65	34.90	492.02	662.09	696.98	5.64	23.03	4.67
33	4.65	36.41	496.68	662.54	698.96	5.64	23.03	4.67
34	4.65	37.93	501.32	663.00	700.94	5.64	23.03	4.67
35	4.65	39.45	505.98	663.46	702.91	5.64	23.03	4.67
36	3.30	40.19	509.95	663.86	704.05	5.64	5.19	3.32
37	3.30	40.17	513.25	664.18	704.35	5.64	5.19	3.32
38	5.06	40.15	517.43	664.59	704.74	5.64	5.42	5.08
39	5.06	40.13	522.49	665.09	705.22	5.64	5.42	5.08
40	5.06	40.11	527.54	665.59	705.70	5.64	5.42	5.08
41	5.06	40.09	532.60	666.09	706.18	5.64	5.42	5.08
42	5.06	40.07	537.66	666.59	706.66	5.64	5.42	5.08
43	5.06	40.05	542.72	667.09	707.14	5.64	5.42	5.08
44	5.06	40.03	547.78	667.59	707.62	5.64	5.42	5.08
45	5.06	40.01	552.83	668.09	708.10	5.64	5.42	5.08
46	5.06	39.99	557.89	668.59	708.58	5.64	5.42	5.08
47	5.06	39.97	562.95	669.09	709.06	5.64	5.42	5.08
48	5.06	39.95	568.01	669.59	709.54	5.64	5.42	5.08
49	2.13	38.67	571.60	671.21	709.88	52.23	5.42	3.47
50	5.37	34.19	575.35	676.05	710.24	52.23	5.42	8.76
51	5.37	27.77	580.72	682.98	710.75	52.23	5.42	8.76
52	0.16	24.46	583.48	686.54	711.00	52.23	-1.54	0.25
53	1.03	23.68	584.07	687.30	710.98	52.23	-1.54	1.68
54	3.10	20.96	586.14	689.97	710.93	52.23	-1.54	5.07
55	2.94	9.46	589.15	701.39	710.85	81.14	-1.54	19.06

Table 2 - Force Data On The 55 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1009.4	0.0	0.0	0.0	0.0	0.0
2	3028.2	0.0	0.0	0.0	0.0	0.0
3	5047.0	0.0	0.0	0.0	0.0	0.0
4	7065.7	0.0	0.0	0.0	0.0	0.0
5	9084.5	0.0	0.0	0.0	0.0	0.0
6	1713.4	0.0	0.0	0.0	0.0	0.0
7	6895.1	0.0	0.0	0.0	0.0	0.0
8	7380.3	0.0	0.0	0.0	0.0	0.0
9	11848.8	0.0	0.0	0.0	0.0	0.0
10	13359.2	0.0	0.0	0.0	0.0	0.0
11	4872.1	0.0	0.0	0.0	0.0	0.0
12	20.7	0.0	0.0	0.0	0.0	0.0
13	11050.9	0.0	257.0	0.0	0.0	0.0
14	9944.8	0.0	638.1	0.0	0.0	0.0
15	10276.6	0.0	1024.1	0.0	0.0	0.0
16	16159.1	0.0	2126.6	0.0	0.0	0.0
17	15998.6	0.0	2689.9	0.0	0.0	0.0
18	15838.0	0.0	3253.1	0.0	0.0	0.0
19	15677.5	0.0	3816.4	0.0	0.0	0.0
20	15516.9	0.0	4379.7	0.0	0.0	0.0
21	11420.5	0.0	3617.3	0.0	0.0	0.0
22	11331.9	0.0	3928.0	0.0	0.0	0.0
23	18762.5	0.0	9797.7	0.0	0.0	0.0
24	18450.1	0.0	9634.6	0.0	0.0	0.0
25	10199.3	0.0	4403.5	0.0	0.0	0.0
26	10612.9	0.0	4601.6	0.0	0.0	0.0
27	1866.0	4.5	979.2	0.0	0.0	0.0
28	16395.5	0.0	8265.6	0.0	0.0	0.0

29	17282.8	0.0	8126.1	0.0	0.0	0.0
30	18170.2	0.0	7986.6	0.0	0.0	0.0
31	19057.5	0.0	7847.1	0.0	0.0	0.0
32	19472.5	0.0	7530.6	0.0	0.0	0.0
33	20319.2	0.0	7397.5	0.0	0.0	0.0
34	21165.8	0.0	7264.4	0.0	0.0	0.0
35	22012.5	0.0	7131.3	0.0	0.0	0.0
36	15917.1	0.0	4980.2	0.0	0.0	0.0
37	15906.8	0.0	4913.2	0.0	0.0	0.0
38	24366.7	0.0	7400.3	0.0	0.0	0.0
39	24354.8	0.0	7242.9	0.0	0.0	0.0
40	24343.0	0.0	7085.4	0.0	0.0	0.0
41	24331.1	0.0	6927.9	0.0	0.0	0.0
42	24319.3	0.0	6770.5	0.0	0.0	0.0
43	24307.4	0.0	6613.0	0.0	0.0	0.0
44	24295.6	0.0	6455.6	0.0	0.0	0.0
45	24283.7	0.0	6298.1	0.0	0.0	0.0
46	24271.9	0.0	6140.6	0.0	0.0	0.0
47	24260.0	0.0	5983.2	0.0	0.0	0.0
48	24248.2	0.0	5825.7	0.0	0.0	0.0
49	9875.5	0.0	3631.3	0.0	0.0	0.0
50	22019.6	0.0	6514.4	0.0	0.0	0.0
51	17886.1	0.0	2728.5	0.0	0.0	0.0
52	458.2	0.0	22.7	0.0	0.0	0.0
53	2921.9	0.0	69.5	0.0	0.0	0.0
54	7802.7	0.0	0.0	0.0	0.0	0.0
55	3331.3	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 781806.72(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 575549.69(lbs)

TOTAL AREA OF SLIDING MASS = 6515.06(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 55 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	5	200.00	32.00	
5	5	200.00	32.00	
6	5	200.00	32.00	
7	5	200.00	32.00	
8	5	200.00	32.00	
9	5	200.00	32.00	
10	5	200.00	32.00	
11	5	200.00	32.00	
12	5	200.00	32.00	
13	3	400.00	32.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	

34	4	0.00	10.00
35	4	0.00	10.00
36	4	0.00	10.00
37	4	0.00	10.00
38	4	0.00	10.00
39	4	0.00	10.00
40	4	0.00	10.00
41	4	0.00	10.00
42	4	0.00	10.00
43	4	0.00	10.00
44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	4	0.00	10.00
48	4	0.00	10.00
49	4	0.00	10.00
50	3	400.00	32.00
51	3	400.00	32.00
52	3	400.00	32.00
53	1	150.00	32.00
54	1	150.00	32.00
55	1	150.00	32.00

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 55 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-16.83	370.16	5.23	228.56	342.82	83.17
1	-16.83	370.16	5.23	228.56	342.82	83.17
2	-16.83	375.17	5.23	652.53	607.75	147.45
2	-16.83	375.17	5.23	652.53	607.75	147.45
3	-16.83	380.18	5.23	1076.50	872.67	211.72
3	-16.83	380.18	5.23	1076.50	872.67	211.72
4	-16.83	385.19	5.23	1500.48	1137.60	276.00
4	-16.83	385.19	5.23	1500.48	1137.60	276.00
5	-16.83	390.20	5.23	1924.45	1402.53	340.28
5	-16.83	390.20	5.23	1924.45	1402.53	340.28
6	-16.83	393.12	0.88	2159.76	1549.57	375.95
6	-16.83	393.12	0.88	2159.76	1549.57	375.95
7	-14.07	395.16	3.33	2239.37	1599.31	388.02
7	-14.07	395.16	3.33	2239.37	1599.31	388.02
8	-14.07	398.39	3.33	2395.99	1697.18	411.76
8	-14.07	398.39	3.33	2395.99	1697.18	411.76
9	-14.07	402.35	4.85	2641.81	1850.78	449.03
9	-14.07	402.35	4.85	2641.81	1850.78	449.03
10	-14.07	407.05	4.85	2976.83	2060.13	499.82
10	-14.07	407.05	4.85	2976.83	2060.13	499.82
11	-14.07	410.20	1.66	3173.59	2183.08	529.65
11	-14.07	410.20	1.66	3173.59	2183.08	529.65
12	-14.07	411.01	0.01	3202.81	2201.34	534.08
12	-14.07	411.01	0.01	3202.81	2201.34	534.08
13	-14.07	412.78	3.65	3207.68	2404.38	583.34
13	-14.07	412.78	3.65	3207.68	2404.38	583.34
14	-14.07	416.09	3.17	3070.46	541.41	131.35
14	-14.07	416.09	3.17	3070.46	541.41	131.35
15	-14.07	419.16	3.17	3055.77	538.81	130.72
15	-14.07	419.16	3.17	3055.77	538.81	130.72
16	5.64	423.09	4.80	2924.65	515.69	125.12
16	5.64	423.09	4.80	2924.65	515.69	125.12
17	5.64	427.87	4.80	2774.47	489.21	118.69
17	5.64	427.87	4.80	2774.47	489.21	118.69
18	5.64	432.65	4.80	2624.29	462.73	112.27

18	5.64	432.65	4.80	2624.29	462.73	112.27
19	5.64	437.43	4.80	2474.11	436.25	105.84
19	5.64	437.43	4.80	2474.11	436.25	105.84
20	5.64	442.21	4.80	2323.93	409.77	99.42
20	5.64	442.21	4.80	2323.93	409.77	99.42
21	5.64	446.37	3.57	2193.08	386.70	93.82
21	5.64	446.37	3.57	2193.08	386.70	93.82
22	5.64	449.92	3.57	2081.54	367.03	89.05
22	5.64	449.92	3.57	2081.54	367.03	89.05
23	5.64	454.68	5.98	1507.82	265.87	64.50
23	5.64	454.68	5.98	1507.82	265.87	64.50
24	5.64	460.63	5.98	7557.25	1332.55	323.30
24	5.64	460.63	5.98	7557.25	1332.55	323.30
25	5.64	465.23	3.27	1781.80	314.18	76.22
25	5.64	465.23	3.27	1781.80	314.18	76.22
26	5.64	468.48	3.27	1848.10	325.87	79.06
26	5.64	468.48	3.27	1848.10	325.87	79.06
27	5.64	470.38	0.56	1595.99	281.42	68.28
27	5.64	470.38	0.56	1595.99	281.42	68.28
28	5.64	473.04	4.78	1708.51	301.26	73.09
28	5.64	473.04	4.78	1708.51	301.26	73.09
29	5.64	477.80	4.78	1923.10	339.09	82.27
29	5.64	477.80	4.78	1923.10	339.09	82.27
30	5.64	482.56	4.78	2137.68	376.93	91.45
30	5.64	482.56	4.78	2137.68	376.93	91.45
31	5.64	487.32	4.78	2352.26	414.77	100.63
31	5.64	487.32	4.78	2352.26	414.77	100.63
32	5.64	492.02	4.67	2564.36	452.17	109.70
32	5.64	492.02	4.67	2564.36	452.17	109.70
33	5.64	496.68	4.67	2773.97	489.13	118.67
33	5.64	496.68	4.67	2773.97	489.13	118.67
34	5.64	501.32	4.67	2983.58	526.09	127.64
34	5.64	501.32	4.67	2983.58	526.09	127.64
35	5.64	505.98	4.67	3193.19	563.05	136.60
35	5.64	505.98	4.67	3193.19	563.05	136.60
36	5.64	509.95	3.32	3306.52	583.03	141.45
36	5.64	509.95	3.32	3306.52	583.03	141.45
37	5.64	513.25	3.32	3323.55	586.03	142.18
37	5.64	513.25	3.32	3323.55	586.03	142.18
38	5.64	517.43	5.08	3346.32	590.05	143.15
38	5.64	517.43	5.08	3346.32	590.05	143.15
39	5.64	522.49	5.08	3374.83	595.07	144.37
39	5.64	522.49	5.08	3374.83	595.07	144.37
40	5.64	527.54	5.08	3403.34	600.10	145.59
40	5.64	527.54	5.08	3403.34	600.10	145.59
41	5.64	532.60	5.08	3431.84	605.13	146.81
41	5.64	532.60	5.08	3431.84	605.13	146.81
42	5.64	537.66	5.08	3460.35	610.15	148.03
42	5.64	537.66	5.08	3460.35	610.15	148.03
43	5.64	542.72	5.08	3488.86	615.18	149.25
43	5.64	542.72	5.08	3488.86	615.18	149.25
44	5.64	547.78	5.08	3517.37	620.21	150.47
44	5.64	547.78	5.08	3517.37	620.21	150.47
45	5.64	552.83	5.08	3545.88	625.23	151.69
45	5.64	552.83	5.08	3545.88	625.23	151.69
46	5.64	557.89	5.08	3574.39	630.26	152.91
46	5.64	557.89	5.08	3574.39	630.26	152.91
47	5.64	562.95	5.08	3602.90	635.29	154.13
47	5.64	562.95	5.08	3602.90	635.29	154.13
48	5.64	568.01	5.08	3631.41	640.32	155.35
48	5.64	568.01	5.08	3631.41	640.32	155.35
49	52.23	571.60	3.47	3394.06	598.46	145.20
49	52.23	571.60	3.47	3394.06	598.46	145.20
50	52.23	575.35	8.76	2665.08	2065.33	501.08
50	52.23	575.35	8.76	2665.08	2065.33	501.08
51	52.23	580.72	8.76	2385.68	1890.74	458.72
51	52.23	580.72	8.76	2385.68	1890.74	458.72
52	52.23	583.48	0.25	2240.97	1800.32	436.78
52	52.23	583.48	0.25	2240.97	1800.32	436.78
53	52.23	584.07	1.68	2272.43	1569.97	380.90
53	52.23	584.07	1.68	2272.43	1569.97	380.90
54	52.23	586.14	5.07	2036.77	1422.72	345.17

54	52.23	586.14	5.07	2036.77	1422.72	345.17
55	81.14	589.15	19.06	432.61	420.32	101.98
55	81.14	589.15	19.06	432.61	420.32	101.98

Table 4 - Base Force Data on the 55 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-16.83	370.16	5.23	1195.84	1793.68	435.17
1	-16.83	370.16	5.23	1195.84	1793.68	435.17
2	-16.83	375.17	5.23	3414.14	3179.82	771.48
2	-16.83	375.17	5.23	3414.14	3179.82	771.48
3	-16.83	380.18	5.23	5632.44	4565.97	1107.78
3	-16.83	380.18	5.23	5632.44	4565.97	1107.78
4	-16.83	385.19	5.23	7850.74	5952.12	1444.08
4	-16.83	385.19	5.23	7850.74	5952.12	1444.08
5	-16.83	390.20	5.23	10069.04	7338.27	1780.38
5	-16.83	390.20	5.23	10069.04	7338.27	1780.38
6	-16.83	393.12	0.88	1897.26	1361.23	330.26
6	-16.83	393.12	0.88	1897.26	1361.23	330.26
7	-14.07	395.16	3.33	7455.95	5324.89	1291.90
7	-14.07	395.16	3.33	7455.95	5324.89	1291.90
8	-14.07	398.39	3.33	7977.40	5650.73	1370.96
8	-14.07	398.39	3.33	7977.40	5650.73	1370.96
9	-14.07	402.35	4.85	12800.58	8967.77	2175.72
9	-14.07	402.35	4.85	12800.58	8967.77	2175.72
10	-14.07	407.05	4.85	14423.92	9982.14	2421.82
10	-14.07	407.05	4.85	14423.92	9982.14	2421.82
11	-14.07	410.20	1.66	5258.93	3617.56	877.68
11	-14.07	410.20	1.66	5258.93	3617.56	877.68
12	-14.07	411.01	0.01	22.32	15.34	3.72
12	-14.07	411.01	0.01	22.32	15.34	3.72
13	-14.07	412.78	3.65	11708.45	8776.30	2129.27
13	-14.07	412.78	3.65	11708.45	8776.30	2129.27
14	-14.07	416.09	3.17	9726.24	1715.00	416.09
14	-14.07	416.09	3.17	9726.24	1715.00	416.09
15	-14.07	419.16	3.17	9681.84	1707.17	414.19
15	-14.07	419.16	3.17	9681.84	1707.17	414.19
16	5.64	423.09	4.80	14047.41	2476.94	600.94
16	5.64	423.09	4.80	14047.41	2476.94	600.94
17	5.64	427.87	4.80	13326.09	2349.75	570.09
17	5.64	427.87	4.80	13326.09	2349.75	570.09
18	5.64	432.65	4.80	12604.76	2222.56	539.23
18	5.64	432.65	4.80	12604.76	2222.56	539.23
19	5.64	437.43	4.80	11883.44	2095.37	508.37
19	5.64	437.43	4.80	11883.44	2095.37	508.37
20	5.64	442.21	4.80	11162.12	1968.18	477.51
20	5.64	442.21	4.80	11162.12	1968.18	477.51
21	5.64	446.37	3.57	7823.29	1379.46	334.68
21	5.64	446.37	3.57	7823.29	1379.46	334.68
22	5.64	449.92	3.57	7425.41	1309.30	317.66
22	5.64	449.92	3.57	7425.41	1309.30	317.66
23	5.64	454.68	5.98	9015.17	1589.62	385.67
23	5.64	454.68	5.98	9015.17	1589.62	385.67
24	5.64	460.63	5.98	45184.37	7967.22	1932.97
24	5.64	460.63	5.98	45184.37	7967.22	1932.97
25	5.64	465.23	3.27	5819.01	1026.05	248.94
25	5.64	465.23	3.27	5819.01	1026.05	248.94
26	5.64	468.48	3.27	6035.55	1064.23	258.20
26	5.64	468.48	3.27	6035.55	1064.23	258.20
27	5.64	470.38	0.56	895.97	157.98	38.33
27	5.64	470.38	0.56	895.97	157.98	38.33
28	5.64	473.04	4.78	8172.64	1441.06	349.62
28	5.64	473.04	4.78	8172.64	1441.06	349.62
29	5.64	477.80	4.78	9199.10	1622.05	393.53
29	5.64	477.80	4.78	9199.10	1622.05	393.53
30	5.64	482.56	4.78	10225.56	1803.04	437.45
30	5.64	482.56	4.78	10225.56	1803.04	437.45

31	5.64	487.32	4.78	11252.03	1984.04	481.36
31	5.64	487.32	4.78	11252.03	1984.04	481.36
32	5.64	492.02	4.67	11982.28	2112.80	512.60
32	5.64	492.02	4.67	11982.28	2112.80	512.60
33	5.64	496.68	4.67	12961.71	2285.50	554.50
33	5.64	496.68	4.67	12961.71	2285.50	554.50
34	5.64	501.32	4.67	13941.14	2458.20	596.40
34	5.64	501.32	4.67	13941.14	2458.20	596.40
35	5.64	505.98	4.67	14920.58	2630.90	638.30
35	5.64	505.98	4.67	14920.58	2630.90	638.30
36	5.64	509.95	3.32	10964.57	1933.35	469.06
36	5.64	509.95	3.32	10964.57	1933.35	469.06
37	5.64	513.25	3.32	11021.05	1943.31	471.48
37	5.64	513.25	3.32	11021.05	1943.31	471.48
38	5.64	517.43	5.08	17007.72	2998.92	727.59
38	5.64	517.43	5.08	17007.72	2998.92	727.59
39	5.64	522.49	5.08	17152.62	3024.47	733.78
39	5.64	522.49	5.08	17152.62	3024.47	733.78
40	5.64	527.54	5.08	17297.52	3050.02	739.98
40	5.64	527.54	5.08	17297.52	3050.02	739.98
41	5.64	532.60	5.08	17442.42	3075.57	746.18
41	5.64	532.60	5.08	17442.42	3075.57	746.18
42	5.64	537.66	5.08	17587.32	3101.12	752.38
42	5.64	537.66	5.08	17587.32	3101.12	752.38
43	5.64	542.72	5.08	17732.22	3126.67	758.58
43	5.64	542.72	5.08	17732.22	3126.67	758.58
44	5.64	547.78	5.08	17877.12	3152.22	764.78
44	5.64	547.78	5.08	17877.12	3152.22	764.78
45	5.64	552.83	5.08	18022.01	3177.77	770.98
45	5.64	552.83	5.08	18022.01	3177.77	770.98
46	5.64	557.89	5.08	18166.91	3203.32	777.18
46	5.64	557.89	5.08	18166.91	3203.32	777.18
47	5.64	562.95	5.08	18311.81	3228.87	783.37
47	5.64	562.95	5.08	18311.81	3228.87	783.37
48	5.64	568.01	5.08	18456.71	3254.42	789.57
48	5.64	568.01	5.08	18456.71	3254.42	789.57
49	52.23	571.60	3.47	11793.17	2079.45	504.51
49	52.23	571.60	3.47	11793.17	2079.45	504.51
50	52.23	575.35	8.76	23354.05	18098.42	4390.96
50	52.23	575.35	8.76	23354.05	18098.42	4390.96
51	52.23	580.72	8.76	20905.67	16568.51	4019.78
51	52.23	580.72	8.76	20905.67	16568.51	4019.78
52	52.23	583.48	0.25	571.23	458.91	111.34
52	52.23	583.48	0.25	571.23	458.91	111.34
53	52.23	584.07	1.68	3815.25	2635.87	639.50
53	52.23	584.07	1.68	3815.25	2635.87	639.50
54	52.23	586.14	5.07	10317.37	7206.84	1748.49
54	52.23	586.14	5.07	10317.37	7206.84	1748.49
55	81.14	589.15	19.06	8246.50	8012.32	1943.91
55	81.14	589.15	19.06	8246.50	8012.32	1943.91

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 55 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
24	51852.3	36307.4	63300.0	35.00	0.597916E+05

***Pier/Pile Slice Force Data on the 55 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
23	12000.0	0.0	12000.0	90.00	-0.228113E+04

Sum of the Resisting Forces = 177415.68 (lbs)

Average Available Shear Strength = 702.17(psf)

Sum of the Driving Forces = 46190.34 (lbs)

Average Mobilized Shear Stress = 182.81(psf)

Total length of the failure surface = 252.67(ft)

Factor of Safety Balance Check: FS = 3.84097

Janbu's Correction Factor (fo) = 1.0634

Janub's FS Corrected = 4.08442

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

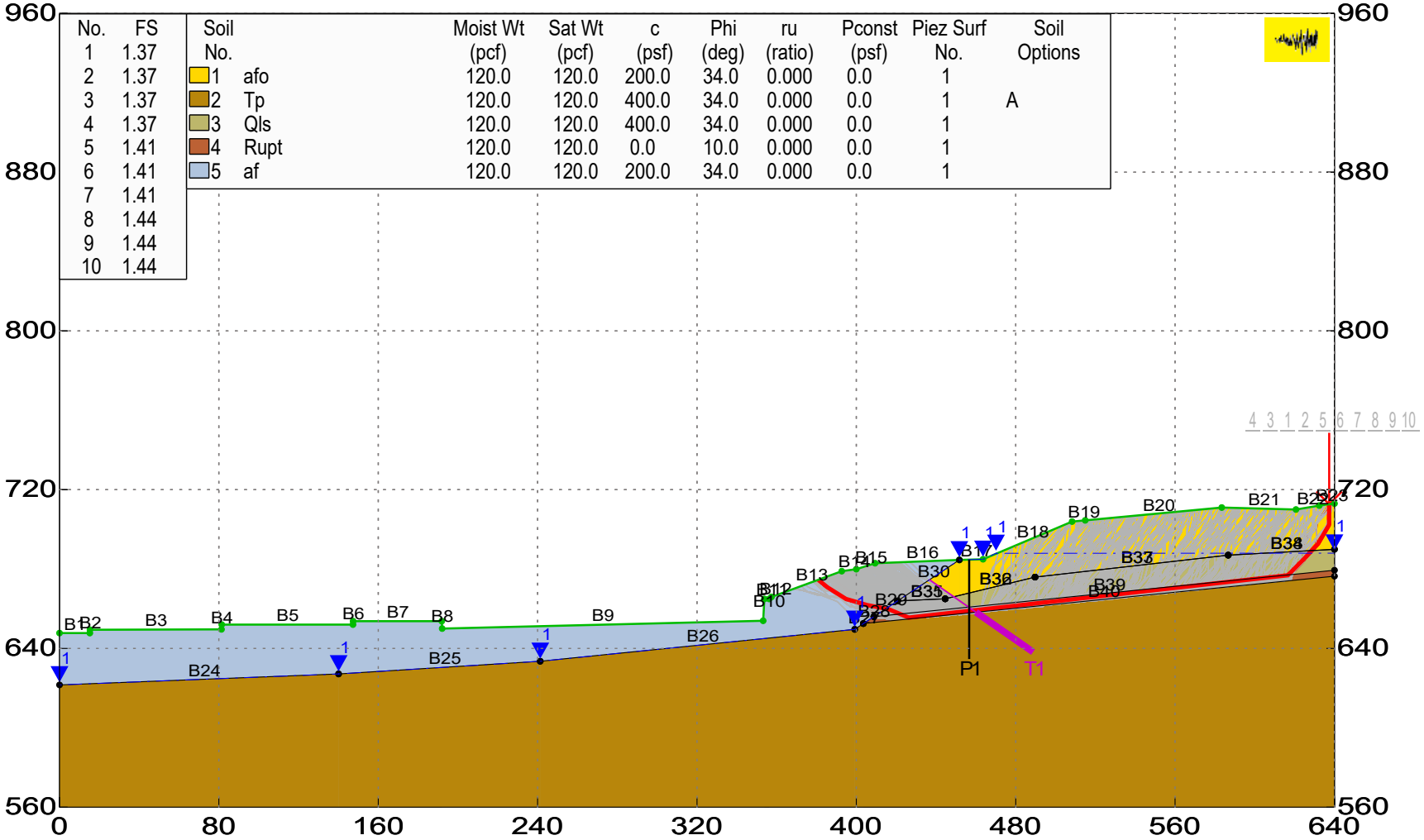
Royal Vista - Cross Section 6
Stage 6 (Final Condition - Rupture (Seismic))

LGC Geotechnical / BPP

\Sec 6 - Stage 6 (Final Condition - Rupture(Seismic).gsd

No.	FS
1	1.37
2	1.37
3	1.37
4	1.37
5	1.41
6	1.41
7	1.41
8	1.44
9	1.44
10	1.44

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.37

Simplified Janbu (Corrected) Method

kh = 0.15000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 6 (Final Condition - Rupture(Seismic).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\6-6'\Sec 6 - Stage 6 (Final Condition - Rupture(Seismic).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 6

DESCRIPTION: Stage 6 (Final Condition - Rupture (Seismic))

BOUNDARY DATA

23 Surface Boundaries
40 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.700	15.200	647.700	5
2	15.200	647.700	15.300	649.400	5
3	15.300	649.400	81.300	649.600	5
4	81.300	649.600	81.400	652.000	5
5	81.400	652.000	147.300	652.000	5
6	147.300	652.000	147.400	653.700	5
7	147.400	653.700	191.900	653.700	5
8	191.900	653.700	192.100	650.000	5
9	192.100	650.000	353.200	653.900	5
10	353.200	653.900	353.800	664.900	5
11	353.800	664.900	356.200	664.900	5
12	356.200	664.900	357.400	665.900	5
13	357.400	665.900	392.700	678.900	5
14	392.700	678.900	400.000	679.900	5
15	400.000	679.900	409.400	682.900	5
16	409.400	682.900	451.700	684.600	5
17	451.700	684.600	463.600	684.900	1
18	463.600	684.900	508.300	703.900	1
19	508.300	703.900	514.900	704.500	1
20	514.900	704.500	583.400	711.000	1
21	583.400	711.000	620.700	710.000	1
22	620.700	710.000	632.400	712.000	1
23	632.400	712.000	640.000	713.000	1
24	0.000	621.600	140.100	627.100	2
25	140.100	627.100	241.300	633.500	2
26	241.300	633.500	399.200	649.600	2

27	399.200	649.600	403.500	652.500	2
28	403.500	652.500	408.800	656.000	4
29	408.800	656.000	420.700	663.900	3
30	420.700	663.900	451.700	684.600	1
31	420.700	663.900	444.600	665.000	3
32	444.600	665.000	489.700	675.900	3
33	489.700	675.900	586.700	687.000	3
34	586.700	687.000	640.000	689.900	3
35	420.700	663.900	444.600	665.000	3
36	444.600	665.000	489.700	675.900	3
37	489.700	675.900	586.700	687.000	3
38	586.700	687.000	640.000	689.900	3
39	408.800	656.000	640.000	679.400	4
40	403.500	652.500	640.000	676.400	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)

1	0.00	621.60
2	140.10	627.10
3	241.30	633.50
4	399.20	649.60
5	451.70	684.60
6	463.60	684.90
7	470.10	687.90
8	640.00	688.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.15000(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 Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	436.70	674.58	316500.0	5.0	35.00	28.5	35.0

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

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	456.60	684.72	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	415.00	655.70	455.00	658.50	3.00
2	460.00	659.00	620.00	676.00	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 = 217

Number of Trial Surfaces With Valid FS = 783

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 21.7 %

Statistical Data On All Valid FS Values:
FS Max = 10.908 FS Min = 1.368 FS Ave = 2.309
Standard Deviation = 1.049 Coefficient of Variation = 45.42 %

Critical Surface is Sequence Number 28 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	458.71	659.17

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	456.60	658.93

Factor Of Safety For The Critical or Specified Surface = 1.368

Table 1 - Geometry Data on the 67 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.59	2.72	383.19	672.68	675.40	-39.22	20.22	5.92
2	3.61	7.24	387.28	669.67	676.91	-32.27	20.22	4.27
3	3.61	10.85	390.89	667.39	678.24	-32.27	20.22	4.27
4	2.08	13.45	393.74	665.59	679.04	-32.27	7.80	2.46
5	2.61	14.81	396.08	664.55	679.36	-16.32	7.80	2.72
6	2.61	15.93	398.69	663.79	679.72	-16.32	7.80	2.72
7	2.67	17.31	401.33	663.02	680.33	-16.32	17.70	2.78
8	2.67	18.94	404.00	662.24	681.18	-16.32	17.70	2.78
9	4.06	20.79	407.37	661.46	682.25	-10.76	17.70	4.14
10	2.73	22.14	410.76	660.81	682.95	-10.76	2.30	2.78

11	2.73	22.77	413.49	660.29	683.06	-10.76	2.30	2.78
12	0.02	23.09	414.86	660.03	683.12	-10.76	2.30	0.02
13	1.27	23.23	415.51	659.91	683.15	-10.76	2.30	1.29
14	4.56	24.43	418.42	658.83	683.26	-22.76	2.30	4.94
15	1.30	25.77	421.35	657.61	683.38	-22.76	2.30	1.40
16	4.29	27.06	424.14	656.44	683.49	-22.76	2.30	4.65
17	4.58	27.88	428.58	655.79	683.67	6.40	2.30	4.61
18	4.58	27.55	433.15	656.31	683.85	6.40	2.30	4.61
19	4.58	27.22	437.73	656.82	684.04	6.40	2.30	4.61
20	4.58	26.89	442.31	657.33	684.22	6.40	2.30	4.61
21	3.55	26.60	446.37	657.79	684.39	6.40	2.30	3.57
22	3.55	26.34	449.92	658.19	684.53	6.40	2.30	3.57
23	5.95	25.96	454.68	658.72	684.68	6.40	1.44	5.99
24	5.95	25.44	460.63	659.39	684.83	6.40	1.44	5.99
25	3.25	25.69	465.23	659.90	685.59	6.40	23.03	3.27
26	3.25	26.71	468.48	660.27	686.97	6.40	23.03	3.27
27	0.56	27.30	470.38	660.48	687.78	6.40	23.03	0.56
28	4.76	28.13	473.04	660.78	688.91	6.40	23.03	4.79
29	4.76	29.62	477.80	661.31	690.94	6.40	23.03	4.79
30	4.76	31.11	482.56	661.85	692.96	6.40	23.03	4.79
31	4.76	32.60	487.32	662.38	694.98	6.40	23.03	4.79
32	4.65	34.08	492.02	662.91	696.98	6.40	23.03	4.68
33	4.65	35.53	496.68	663.43	698.96	6.40	23.03	4.68
34	4.65	36.99	501.32	663.95	700.94	6.40	23.03	4.68
35	4.65	38.44	505.98	664.47	702.91	6.40	23.03	4.68
36	3.30	39.13	509.95	664.92	704.05	6.40	5.19	3.32
37	3.30	39.06	513.25	665.29	704.35	6.40	5.19	3.32
38	4.89	38.99	517.35	665.75	704.73	6.40	5.42	4.92
39	4.89	38.90	522.24	666.29	705.20	6.40	5.42	4.92
40	4.89	38.82	527.13	666.84	705.66	6.40	5.42	4.92
41	4.89	38.73	532.02	667.39	706.12	6.40	5.42	4.92
42	4.89	38.65	536.92	667.94	706.59	6.40	5.42	4.92
43	4.89	38.57	541.81	668.49	707.05	6.40	5.42	4.92
44	4.89	38.48	546.70	669.04	707.52	6.40	5.42	4.92
45	4.89	38.40	551.60	669.59	707.98	6.40	5.42	4.92
46	4.89	38.31	556.49	670.13	708.45	6.40	5.42	4.92
47	4.89	38.23	561.38	670.68	708.91	6.40	5.42	4.92
48	4.89	38.14	566.27	671.23	709.38	6.40	5.42	4.92
49	4.89	38.06	571.17	671.78	709.84	6.40	5.42	4.92
50	4.89	37.97	576.06	672.33	710.30	6.40	5.42	4.92
51	4.89	37.89	580.95	672.88	710.77	6.40	5.42	4.92
52	3.30	37.62	585.05	673.34	710.96	6.40	-1.54	3.32
53	4.50	37.08	588.95	673.77	710.85	6.40	-1.54	4.53
54	4.50	36.45	593.45	674.28	710.73	6.40	-1.54	4.53
55	4.50	35.83	597.95	674.78	710.61	6.40	-1.54	4.53
56	4.50	35.20	602.45	675.29	710.49	6.40	-1.54	4.53
57	5.97	34.48	607.68	675.87	710.35	6.40	-1.54	6.00
58	5.97	33.65	613.65	676.54	710.19	6.40	-1.54	6.00
59	0.17	33.14	616.72	676.96	710.11	45.54	-1.54	0.24
60	3.90	31.01	618.75	679.04	710.05	45.54	-1.54	5.56
61	3.64	27.43	622.52	682.88	710.31	45.54	9.70	5.19
62	3.01	24.52	625.84	686.36	710.88	47.32	9.70	4.44
63	1.18	22.60	627.94	688.63	711.24	47.32	9.70	1.75
64	3.26	20.57	630.16	691.05	711.62	47.32	9.70	4.81
65	0.61	18.61	632.10	693.34	711.95	59.82	9.70	1.21
66	4.92	14.23	634.86	698.09	712.32	59.82	7.50	9.79
67	0.03	5.16	637.34	707.49	712.65	89.82	7.50	10.33

Table 2 - Force Data On The 67 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1494.4	0.0	0.0	224.2	0.0	0.0
2	3135.3	0.0	0.0	470.3	0.0	0.0
3	4699.2	0.0	0.0	704.9	0.0	0.0
4	3356.7	0.0	0.0	503.5	0.0	0.0
5	4638.5	0.0	0.0	695.8	0.0	0.0

6	4989.9	0.0	0.0	748.5	0.0	0.0
7	5542.0	0.0	0.0	831.3	0.0	0.0
8	6064.9	0.0	0.0	909.7	0.0	0.0
9	10139.4	0.0	0.0	1520.9	0.0	0.0
10	7244.9	0.0	0.0	1086.7	0.0	0.0
11	7450.4	0.0	0.0	1117.6	0.0	0.0
12	55.0	0.0	0.0	8.3	0.0	0.0
13	3539.8	0.0	31.3	531.0	0.0	0.0
14	13358.4	0.0	764.2	2003.8	0.0	0.0
15	4006.6	0.0	410.1	601.0	0.0	0.0
16	13932.5	0.0	1968.4	2089.9	0.0	0.0
17	15316.5	0.0	2665.3	2297.5	0.0	0.0
18	15135.5	0.0	3170.6	2270.3	0.0	0.0
19	14954.6	0.0	3675.9	2243.2	0.0	0.0
20	14773.6	0.0	4181.2	2216.0	0.0	0.0
21	11330.8	0.0	3589.8	1699.6	0.0	0.0
22	11222.0	0.0	3893.6	1683.3	0.0	0.0
23	18532.9	0.0	9691.4	2779.9	0.0	0.0
24	18163.7	0.0	9498.3	2724.6	0.0	0.0
25	10018.8	0.0	4331.8	1502.8	0.0	0.0
26	10415.5	0.0	4522.8	1562.3	0.0	0.0
27	1830.3	4.5	961.9	274.6	0.0	0.0
28	16071.6	0.0	8107.6	2410.7	0.0	0.0
29	16922.5	0.0	7948.9	2538.4	0.0	0.0
30	17773.5	0.0	7790.2	2666.0	0.0	0.0
31	18624.4	0.0	7631.5	2793.7	0.0	0.0
32	19014.4	0.0	7301.4	2852.2	0.0	0.0
33	19826.3	0.0	7150.0	2973.9	0.0	0.0
34	20638.3	0.0	6998.5	3095.7	0.0	0.0
35	21450.3	0.0	6847.1	3217.5	0.0	0.0
36	15497.0	0.0	4767.4	2324.6	0.0	0.0
37	15469.3	0.0	4691.1	2320.4	0.0	0.0
38	22890.8	0.0	6815.0	3433.6	0.0	0.0
39	22841.3	0.0	6647.4	3426.2	0.0	0.0
40	22791.8	0.0	6479.7	3418.8	0.0	0.0
41	22742.3	0.0	6312.1	3411.3	0.0	0.0
42	22692.8	0.0	6144.4	3403.9	0.0	0.0
43	22643.3	0.0	5976.7	3396.5	0.0	0.0
44	22593.8	0.0	5809.1	3389.1	0.0	0.0
45	22544.3	0.0	5641.4	3381.6	0.0	0.0
46	22494.7	0.0	5473.8	3374.2	0.0	0.0
47	22445.2	0.0	5306.1	3366.8	0.0	0.0
48	22395.7	0.0	5138.4	3359.4	0.0	0.0
49	22346.2	0.0	4970.8	3351.9	0.0	0.0
50	22296.7	0.0	4803.1	3344.5	0.0	0.0
51	22247.2	0.0	4635.5	3337.1	0.0	0.0
52	14897.2	0.0	3031.7	2234.6	0.0	0.0
53	20019.0	0.0	4010.7	3002.8	0.0	0.0
54	19681.4	0.0	3868.9	2952.2	0.0	0.0
55	19343.9	0.0	3727.1	2901.6	0.0	0.0
56	19006.4	0.0	3585.4	2851.0	0.0	0.0
57	24684.4	0.0	4536.0	3702.7	0.0	0.0
58	24090.9	0.0	4286.7	3613.6	0.0	0.0
59	681.8	0.0	168.3	102.3	0.0	0.0
60	14506.1	0.0	3107.7	2175.9	0.0	0.0
61	11968.1	0.0	1656.1	1795.2	0.0	0.0
62	8855.7	0.0	451.9	1328.4	0.0	0.0
63	3209.9	0.0	0.0	481.5	0.0	0.0
64	8057.0	0.0	0.0	1208.5	0.0	0.0
65	1356.7	0.0	0.0	203.5	0.0	0.0
66	8406.0	0.0	0.0	1260.9	0.0	0.0
67	20.2	0.0	0.0	3.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 931380.70(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 699490.63(lbs)

TOTAL AREA OF SLIDING MASS = 7761.51(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 67 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	34.00	
2	5	200.00	34.00	
3	5	200.00	34.00	
4	5	200.00	34.00	
5	5	200.00	34.00	
6	5	200.00	34.00	
7	5	200.00	34.00	
8	5	200.00	34.00	
9	5	200.00	34.00	
10	5	200.00	34.00	
11	5	200.00	34.00	
12	5	200.00	34.00	
13	3	400.00	34.00	
14	3	400.00	34.00	
15	3	400.00	34.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	4	0.00	10.00	
40	4	0.00	10.00	
41	4	0.00	10.00	
42	4	0.00	10.00	
43	4	0.00	10.00	
44	4	0.00	10.00	
45	4	0.00	10.00	
46	4	0.00	10.00	
47	4	0.00	10.00	
48	4	0.00	10.00	
49	4	0.00	10.00	
50	4	0.00	10.00	
51	4	0.00	10.00	
52	4	0.00	10.00	
53	4	0.00	10.00	
54	4	0.00	10.00	
55	4	0.00	10.00	
56	4	0.00	10.00	
57	4	0.00	10.00	
58	4	0.00	10.00	
59	4	0.00	10.00	
60	3	400.00	34.00	
61	3	400.00	34.00	
62	3	400.00	34.00	
63	3	400.00	34.00	
64	1	200.00	34.00	
65	1	200.00	34.00	
66	1	200.00	34.00	
67	1	200.00	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 67 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-39.22	383.19	5.92	783.55	728.51	519.29
1	-39.22	383.19	5.92	783.55	728.51	519.29
2	-32.27	387.28	4.27	1436.34	1168.83	833.16
2	-32.27	387.28	4.27	1436.34	1168.83	833.16
3	-32.27	390.89	4.27	2080.68	1603.43	1142.95
3	-32.27	390.89	4.27	2080.68	1603.43	1142.95
4	-32.27	393.74	2.46	2545.48	1916.95	1366.43
4	-32.27	393.74	2.46	2545.48	1916.95	1366.43
5	-16.32	396.08	2.72	2148.95	1649.49	1175.78
5	-16.32	396.08	2.72	2148.95	1649.49	1175.78
6	-16.32	398.69	2.72	2307.73	1756.58	1252.12
6	-16.32	398.69	2.72	2307.73	1756.58	1252.12
7	-16.32	401.33	2.78	2502.66	1888.07	1345.84
7	-16.32	401.33	2.78	2502.66	1888.07	1345.84
8	-16.32	404.00	2.78	2733.76	2043.94	1456.95
8	-16.32	404.00	2.78	2733.76	2043.94	1456.95
9	-10.76	407.37	4.14	2800.82	2089.18	1489.20
9	-10.76	407.37	4.14	2800.82	2089.18	1489.20
10	-10.76	410.76	2.78	2980.38	2210.29	1575.53
10	-10.76	410.76	2.78	2980.38	2210.29	1575.53
11	-10.76	413.49	2.78	3063.97	2266.68	1615.72
11	-10.76	413.49	2.78	3063.97	2266.68	1615.72
12	-10.76	414.86	0.02	3105.67	2294.80	1635.77
12	-10.76	414.86	0.02	3105.67	2294.80	1635.77
13	-10.76	415.51	1.29	3131.43	2512.17	1790.72
13	-10.76	415.51	1.29	3131.43	2512.17	1790.72
14	-22.76	418.42	4.94	3714.79	2905.66	2071.20
14	-22.76	418.42	4.94	3714.79	2905.66	2071.20
15	-22.76	421.35	1.40	3745.61	2926.45	2086.02
15	-22.76	421.35	1.40	3745.61	2926.45	2086.02
16	-22.76	424.14	4.65	2994.28	527.97	376.35
16	-22.76	424.14	4.65	2994.28	527.97	376.35
17	6.40	428.58	4.61	2725.42	480.57	342.55
17	6.40	428.58	4.61	2725.42	480.57	342.55
18	6.40	433.15	4.61	2578.46	454.65	324.08
18	6.40	433.15	4.61	2578.46	454.65	324.08
19	6.40	437.73	4.61	2431.50	428.74	305.61
19	6.40	437.73	4.61	2431.50	428.74	305.61
20	6.40	442.31	4.61	2284.53	402.82	287.14
20	6.40	442.31	4.61	2284.53	402.82	287.14
21	6.40	446.37	3.57	2154.07	379.82	270.74
21	6.40	446.37	3.57	2154.07	379.82	270.74
22	6.40	449.92	3.57	2040.12	359.73	256.42
22	6.40	449.92	3.57	2040.12	359.73	256.42
23	6.40	454.68	5.99	1473.70	259.85	185.23
23	6.40	454.68	5.99	1473.70	259.85	185.23
24	6.40	460.63	5.99	7454.96	1314.51	937.00
24	6.40	460.63	5.99	7454.96	1314.51	937.00
25	6.40	465.23	3.27	1731.81	305.36	217.67
25	6.40	465.23	3.27	1731.81	305.36	217.67
26	6.40	468.48	3.27	1794.48	316.42	225.55
26	6.40	468.48	3.27	1794.48	316.42	225.55
27	6.40	470.38	0.56	1549.04	273.14	194.70
27	6.40	470.38	0.56	1549.04	273.14	194.70
28	6.40	473.04	4.79	1658.36	292.41	208.44
28	6.40	473.04	4.79	1658.36	292.41	208.44
29	6.40	477.80	4.79	1867.07	329.22	234.67
29	6.40	477.80	4.79	1867.07	329.22	234.67
30	6.40	482.56	4.79	2075.79	366.02	260.90
30	6.40	482.56	4.79	2075.79	366.02	260.90

31	6.40	487.32	4.79	2284.50	402.82	287.14
31	6.40	487.32	4.79	2284.50	402.82	287.14
32	6.40	492.02	4.68	2490.80	439.19	313.06
32	6.40	492.02	4.68	2490.80	439.19	313.06
33	6.40	496.68	4.68	2694.67	475.14	338.69
33	6.40	496.68	4.68	2694.67	475.14	338.69
34	6.40	501.32	4.68	2898.55	511.09	364.31
34	6.40	501.32	4.68	2898.55	511.09	364.31
35	6.40	505.98	4.68	3102.43	547.04	389.94
35	6.40	505.98	4.68	3102.43	547.04	389.94
36	6.40	509.95	3.32	3211.54	566.28	403.65
36	6.40	509.95	3.32	3211.54	566.28	403.65
37	6.40	513.25	3.32	3225.89	568.81	405.46
37	6.40	513.25	3.32	3225.89	568.81	405.46
38	6.40	517.35	4.92	3244.85	572.15	407.84
38	6.40	517.35	4.92	3244.85	572.15	407.84
39	6.40	522.24	4.92	3268.43	576.31	410.80
39	6.40	522.24	4.92	3268.43	576.31	410.80
40	6.40	527.13	4.92	3292.00	580.47	413.77
40	6.40	527.13	4.92	3292.00	580.47	413.77
41	6.40	532.02	4.92	3315.58	584.63	416.73
41	6.40	532.02	4.92	3315.58	584.63	416.73
42	6.40	536.92	4.92	3339.16	588.78	419.69
42	6.40	536.92	4.92	3339.16	588.78	419.69
43	6.40	541.81	4.92	3362.73	592.94	422.66
43	6.40	541.81	4.92	3362.73	592.94	422.66
44	6.40	546.70	4.92	3386.31	597.10	425.62
44	6.40	546.70	4.92	3386.31	597.10	425.62
45	6.40	551.60	4.92	3409.89	601.26	428.58
45	6.40	551.60	4.92	3409.89	601.26	428.58
46	6.40	556.49	4.92	3433.46	605.41	431.55
46	6.40	556.49	4.92	3433.46	605.41	431.55
47	6.40	561.38	4.92	3457.04	609.57	434.51
47	6.40	561.38	4.92	3457.04	609.57	434.51
48	6.40	566.27	4.92	3480.62	613.73	437.47
48	6.40	566.27	4.92	3480.62	613.73	437.47
49	6.40	571.17	4.92	3504.19	617.88	440.44
49	6.40	571.17	4.92	3504.19	617.88	440.44
50	6.40	576.06	4.92	3527.77	622.04	443.40
50	6.40	576.06	4.92	3527.77	622.04	443.40
51	6.40	580.95	4.92	3551.35	626.20	446.36
51	6.40	580.95	4.92	3551.35	626.20	446.36
52	6.40	585.05	3.32	3547.35	625.49	445.86
52	6.40	585.05	3.32	3547.35	625.49	445.86
53	6.40	588.95	4.53	3510.04	618.92	441.17
53	6.40	588.95	4.53	3510.04	618.92	441.17
54	6.40	593.45	4.53	3467.00	611.33	435.76
54	6.40	593.45	4.53	3467.00	611.33	435.76
55	6.40	597.95	4.53	3423.96	603.74	430.35
55	6.40	597.95	4.53	3423.96	603.74	430.35
56	6.40	602.45	4.53	3380.91	596.15	424.94
56	6.40	602.45	4.53	3380.91	596.15	424.94
57	6.40	607.68	6.00	3330.85	587.32	418.65
57	6.40	607.68	6.00	3330.85	587.32	418.65
58	6.40	613.65	6.00	3273.77	577.25	411.48
58	6.40	613.65	6.00	3273.77	577.25	411.48
59	45.54	616.72	0.24	2889.67	509.53	363.20
59	45.54	616.72	0.24	2889.67	509.53	363.20
60	45.54	618.75	5.56	1863.63	1657.03	1181.16
60	45.54	618.75	5.56	1863.63	1657.03	1181.16
61	45.54	622.52	5.19	1739.23	1573.13	1121.35
61	45.54	622.52	5.19	1739.23	1573.13	1121.35
62	47.32	625.84	4.44	1603.72	1481.72	1056.19
62	47.32	625.84	4.44	1603.72	1481.72	1056.19
63	47.32	627.94	1.75	1521.79	1426.46	1016.80
63	47.32	627.94	1.75	1521.79	1426.46	1016.80
64	47.32	630.16	4.81	1472.65	1193.31	850.61
64	47.32	630.16	4.81	1472.65	1193.31	850.61
65	59.82	632.10	1.21	1040.05	901.52	642.62
65	59.82	632.10	1.21	1040.05	901.52	642.62
66	59.82	634.86	9.79	762.43	714.27	509.14
66	59.82	634.86	9.79	762.43	714.27	509.14

67	89.82	637.34	10.33	3.75	2.53	1.80
67	89.82	637.34	10.33	3.75	2.53	1.80

Table 4 - Base Force Data on the 67 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-39.22	383.19	5.92	4637.90	4312.12	3073.75
1	-39.22	383.19	5.92	4637.90	4312.12	3073.75
2	-32.27	387.28	4.27	6133.41	4991.07	3557.71
2	-32.27	387.28	4.27	6133.41	4991.07	3557.71
3	-32.27	390.89	4.27	8884.81	6846.91	4880.58
3	-32.27	390.89	4.27	8884.81	6846.91	4880.58
4	-32.27	393.74	2.46	6261.11	4715.11	3361.00
4	-32.27	393.74	2.46	6261.11	4715.11	3361.00
5	-16.32	396.08	2.72	5844.55	4486.14	3197.79
5	-16.32	396.08	2.72	5844.55	4486.14	3197.79
6	-16.32	398.69	2.72	6276.38	4777.41	3405.41
6	-16.32	398.69	2.72	6276.38	4777.41	3405.41
7	-16.32	401.33	2.78	6958.10	5249.35	3741.82
7	-16.32	401.33	2.78	6958.10	5249.35	3741.82
8	-16.32	404.00	2.78	7600.61	5682.73	4050.74
8	-16.32	404.00	2.78	7600.61	5682.73	4050.74
9	-10.76	407.37	4.14	11585.22	8641.60	6159.87
9	-10.76	407.37	4.14	11585.22	8641.60	6159.87
10	-10.76	410.76	2.78	8272.17	6134.76	4372.95
10	-10.76	410.76	2.78	8272.17	6134.76	4372.95
11	-10.76	413.49	2.78	8504.20	6291.26	4484.51
11	-10.76	413.49	2.78	8504.20	6291.26	4484.51
12	-10.76	414.86	0.02	62.77	46.38	33.06
12	-10.76	414.86	0.02	62.77	46.38	33.06
13	-10.76	415.51	1.29	4046.86	3246.57	2314.21
13	-10.76	415.51	1.29	4046.86	3246.57	2314.21
14	-22.76	418.42	4.94	18357.73	14359.16	10235.43
14	-22.76	418.42	4.94	18357.73	14359.16	10235.43
15	-22.76	421.35	1.40	5262.03	4111.23	2930.54
15	-22.76	421.35	1.40	5262.03	4111.23	2930.54
16	-22.76	424.14	4.65	13933.44	2456.84	1751.27
16	-22.76	424.14	4.65	13933.44	2456.84	1751.27
17	6.40	428.58	4.61	12556.12	2213.98	1578.16
17	6.40	428.58	4.61	12556.12	2213.98	1578.16
18	6.40	433.15	4.61	11879.05	2094.60	1493.06
18	6.40	433.15	4.61	11879.05	2094.60	1493.06
19	6.40	437.73	4.61	11201.98	1975.21	1407.96
19	6.40	437.73	4.61	11201.98	1975.21	1407.96
20	6.40	442.31	4.61	10524.91	1855.83	1322.86
20	6.40	442.31	4.61	10524.91	1855.83	1322.86
21	6.40	446.37	3.57	7694.87	1356.81	967.16
21	6.40	446.37	3.57	7694.87	1356.81	967.16
22	6.40	449.92	3.57	7287.80	1285.04	915.99
22	6.40	449.92	3.57	7287.80	1285.04	915.99
23	6.40	454.68	5.99	8823.45	1555.81	1109.01
23	6.40	454.68	5.99	8823.45	1555.81	1109.01
24	6.40	460.63	5.99	44634.95	7870.35	5610.10
24	6.40	460.63	5.99	44634.95	7870.35	5610.10
25	6.40	465.23	3.27	5663.64	998.65	711.85
25	6.40	465.23	3.27	5663.64	998.65	711.85
26	6.40	468.48	3.27	5868.60	1034.79	737.62
26	6.40	468.48	3.27	5868.60	1034.79	737.62
27	6.40	470.38	0.56	870.82	153.55	109.45
27	6.40	470.38	0.56	870.82	153.55	109.45
28	6.40	473.04	4.79	7943.80	1400.71	998.44
28	6.40	473.04	4.79	7943.80	1400.71	998.44
29	6.40	477.80	4.79	8943.57	1576.99	1124.10
29	6.40	477.80	4.79	8943.57	1576.99	1124.10
30	6.40	482.56	4.79	9943.35	1753.28	1249.77
30	6.40	482.56	4.79	9943.35	1753.28	1249.77
31	6.40	487.32	4.79	10943.13	1929.57	1375.43

31	6.40	487.32	4.79	10943.13	1929.57	1375.43
32	6.40	492.02	4.68	11654.78	2055.05	1464.87
32	6.40	492.02	4.68	11654.78	2055.05	1464.87
33	6.40	496.68	4.68	12608.75	2223.26	1584.78
33	6.40	496.68	4.68	12608.75	2223.26	1584.78
34	6.40	501.32	4.68	13562.72	2391.47	1704.68
34	6.40	501.32	4.68	13562.72	2391.47	1704.68
35	6.40	505.98	4.68	14516.69	2559.68	1824.58
35	6.40	505.98	4.68	14516.69	2559.68	1824.58
36	6.40	509.95	3.32	10664.49	1880.44	1340.40
36	6.40	509.95	3.32	10664.49	1880.44	1340.40
37	6.40	513.25	3.32	10712.14	1888.84	1346.39
37	6.40	513.25	3.32	10712.14	1888.84	1346.39
38	6.40	517.35	4.92	15976.08	2817.01	2008.01
38	6.40	517.35	4.92	15976.08	2817.01	2008.01
39	6.40	522.24	4.92	16092.16	2837.48	2022.60
39	6.40	522.24	4.92	16092.16	2837.48	2022.60
40	6.40	527.13	4.92	16208.24	2857.95	2037.19
40	6.40	527.13	4.92	16208.24	2857.95	2037.19
41	6.40	532.02	4.92	16324.32	2878.42	2051.78
41	6.40	532.02	4.92	16324.32	2878.42	2051.78
42	6.40	536.92	4.92	16440.40	2898.89	2066.37
42	6.40	536.92	4.92	16440.40	2898.89	2066.37
43	6.40	541.81	4.92	16556.48	2919.35	2080.96
43	6.40	541.81	4.92	16556.48	2919.35	2080.96
44	6.40	546.70	4.92	16672.55	2939.82	2095.55
44	6.40	546.70	4.92	16672.55	2939.82	2095.55
45	6.40	551.60	4.92	16788.63	2960.29	2110.14
45	6.40	551.60	4.92	16788.63	2960.29	2110.14
46	6.40	556.49	4.92	16904.71	2980.76	2124.73
46	6.40	556.49	4.92	16904.71	2980.76	2124.73
47	6.40	561.38	4.92	17020.79	3001.22	2139.32
47	6.40	561.38	4.92	17020.79	3001.22	2139.32
48	6.40	566.27	4.92	17136.87	3021.69	2153.91
48	6.40	566.27	4.92	17136.87	3021.69	2153.91
49	6.40	571.17	4.92	17252.95	3042.16	2168.50
49	6.40	571.17	4.92	17252.95	3042.16	2168.50
50	6.40	576.06	4.92	17369.03	3062.63	2183.09
50	6.40	576.06	4.92	17369.03	3062.63	2183.09
51	6.40	580.95	4.92	17485.11	3083.10	2197.68
51	6.40	580.95	4.92	17485.11	3083.10	2197.68
52	6.40	585.05	3.32	11779.60	2077.06	1480.56
52	6.40	585.05	3.32	11779.60	2077.06	1480.56
53	6.40	588.95	4.53	15891.88	2802.17	1997.43
53	6.40	588.95	4.53	15891.88	2802.17	1997.43
54	6.40	593.45	4.53	15697.00	2767.80	1972.93
54	6.40	593.45	4.53	15697.00	2767.80	1972.93
55	6.40	597.95	4.53	15502.12	2733.44	1948.44
55	6.40	597.95	4.53	15502.12	2733.44	1948.44
56	6.40	602.45	4.53	15307.24	2699.08	1923.95
56	6.40	602.45	4.53	15307.24	2699.08	1923.95
57	6.40	607.68	6.00	19998.79	3526.33	2513.62
57	6.40	607.68	6.00	19998.79	3526.33	2513.62
58	6.40	613.65	6.00	19656.06	3465.89	2470.54
58	6.40	613.65	6.00	19656.06	3465.89	2470.54
59	45.54	616.72	0.24	707.27	124.71	88.90
59	45.54	616.72	0.24	707.27	124.71	88.90
60	45.54	618.75	5.56	10370.90	9221.22	6573.03
60	45.54	618.75	5.56	10370.90	9221.22	6573.03
61	45.54	622.52	5.19	9027.20	8165.06	5820.18
61	45.54	622.52	5.19	9027.20	8165.06	5820.18
62	47.32	625.84	4.44	7120.43	6578.77	4689.45
62	47.32	625.84	4.44	7120.43	6578.77	4689.45
63	47.32	627.94	1.75	2656.56	2490.14	1775.01
63	47.32	627.94	1.75	2656.56	2490.14	1775.01
64	47.32	630.16	4.81	7089.88	5745.06	4095.17
64	47.32	630.16	4.81	7089.88	5745.06	4095.17
65	59.82	632.10	1.21	1256.90	1089.49	776.61
65	59.82	632.10	1.21	1256.90	1089.49	776.61
66	59.82	634.86	9.79	7465.34	6993.73	4985.24
66	59.82	634.86	9.79	7465.34	6993.73	4985.24
67	89.82	637.34	10.33	38.71	26.11	18.61

67	89.82	637.34	10.33	38.71	26.11	18.61

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 67 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
24	51852.3	36307.4	63300.0	35.00	0.805909E+05

***Pier/Pile Slice Force Data on the 67 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
23	12000.0	0.0	12000.0	90.00	-0.259003E+04

Sum of the Resisting Forces = 209102.46 (lbs)

Average Available Shear Strength = 734.25(psf)

Sum of the Driving Forces = 161038.14 (lbs)

Average Mobilized Shear Stress = 565.47(psf)

Total length of the failure surface = 284.78(ft)

Factor of Safety Balance Check: FS = 1.29847

Janbu's Correction Factor (fo) = 1.0538

Janub's FS Corrected = 1.36826

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.24090(g)
Calculated Newmark Seismic Displacement = 0.000(ft)

Average Elevation of Point of Application of kh on Sliding Mass = 668.278(ft)

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

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

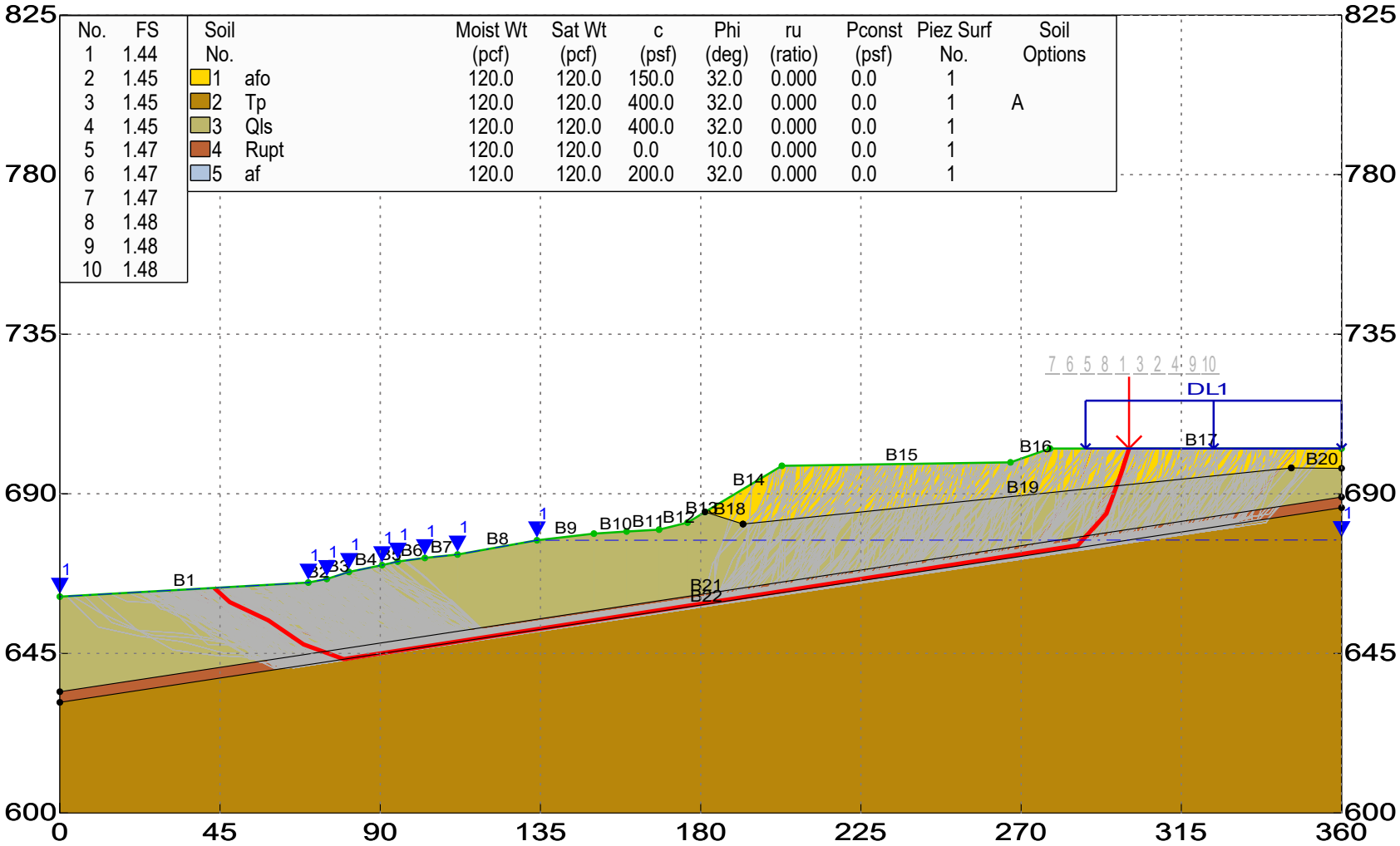
Royal Vista - Cross Section 7
Stage 1 (Existing Condition)

LGC Geotechnical / BPP

\Sec 7 - Stage 1 (Existing Condition).gsd

No.	FS
1	1.44
2	1.45
3	1.45
4	1.45
5	1.47
6	1.47
7	1.47
8	1.48
9	1.48
10	1.48

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 1.44

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 1 (Existing Condition).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 1 (Existing Condition).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 1 (Existing Condition)

BOUNDARY DATA

17 Surface Boundaries
22 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	661.000	69.800	665.000	3
2	69.800	665.000	75.000	666.000	3
3	75.000	666.000	81.200	668.000	3
4	81.200	668.000	90.500	669.900	3
5	90.500	669.900	94.900	670.900	3
6	94.900	670.900	102.500	671.900	3
7	102.500	671.900	111.700	672.900	3
8	111.700	672.900	134.000	676.900	3
9	134.000	676.900	150.000	678.800	3
10	150.000	678.800	159.200	679.400	3
11	159.200	679.400	168.300	679.900	3
12	168.300	679.900	176.300	681.900	3
13	176.300	681.900	181.200	684.900	3
14	181.200	684.900	202.800	697.900	1
15	202.800	697.900	267.000	698.900	1
16	267.000	698.900	278.100	702.800	1
17	278.100	702.800	360.000	702.800	1
18	181.200	684.900	191.900	681.500	3
19	191.900	681.500	345.900	697.300	3
20	345.900	697.300	360.000	697.200	3
21	0.000	634.200	360.000	689.100	4
22	0.000	631.200	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	32.00
2	10.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 10 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	661.00
2	69.80	665.00
3	75.00	666.00
4	81.20	668.00
5	90.50	669.90
6	94.90	670.90
7	102.50	671.90
8	111.70	672.90
9	134.00	676.90
10	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	17	288.100	702.800	250.000	360.000	702.800	250.000	0.00

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

PIER/PILE LOAD DATA HAS BEEN SUPPRESSED

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 = 12.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	60.00	641.50	120.00	650.50	3.00
2	180.00	659.50	340.00	683.50	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 = 33

Number of Trial Surfaces With Valid FS = 967

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 3.3 %

Statistical Data On All Valid FS Values:

FS Max = 2.424 FS Min = 1.442 FS Ave = 1.720
Standard Deviation = 0.181 Coefficient of Variation = 10.53 %

Critical Surface is Sequence Number 48 of Those Analyzed.

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

Factor Of Safety For The Critical or Specified Surface = 1.442

Table 1 - Geometry Data on the 61 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.37	2.13	45.54	661.48	663.61	-42.57	3.28	5.93
2	5.42	5.70	50.43	658.19	663.89	-25.33	3.28	6.00
3	5.42	8.58	55.85	655.62	664.20	-25.33	3.28	6.00
4	4.94	11.86	61.04	652.64	664.50	-34.50	3.28	6.00
5	4.94	15.54	65.98	649.24	664.78	-34.50	3.28	6.00
6	1.35	17.67	69.13	647.29	664.96	-20.25	3.28	1.43
7	4.22	19.14	71.91	646.27	665.41	-20.25	10.89	4.50
8	0.98	20.60	74.51	645.31	665.91	-20.25	10.89	1.04
9	4.71	22.50	77.36	644.26	666.76	-20.25	17.88	5.02
10	1.49	24.25	80.46	643.51	667.76	8.84	17.88	1.50
11	4.65	24.49	83.52	643.98	668.47	8.84	11.55	4.71
12	4.65	24.72	88.17	644.71	669.42	8.84	11.55	4.71
13	4.40	24.99	92.70	645.41	670.40	8.84	12.80	4.45
14	3.80	25.10	96.80	646.05	671.15	8.84	7.50	3.85
15	3.80	25.01	100.60	646.64	671.65	8.84	7.50	3.85
16	4.60	24.86	104.80	647.29	672.15	8.84	6.20	4.66
17	4.60	24.64	109.40	648.01	672.65	8.84	6.20	4.66
18	5.57	24.60	114.49	648.80	673.40	8.84	10.17	5.64
19	5.57	24.73	120.06	649.67	674.40	8.84	10.17	5.64
20	5.57	24.87	125.64	650.53	675.40	8.84	10.17	5.64
21	5.58	25.00	131.21	651.40	676.40	8.84	10.17	5.64
22	5.33	24.97	136.67	652.25	677.22	8.84	6.77	5.40
23	5.33	24.77	142.00	653.08	677.85	8.84	6.77	5.40
24	5.33	24.57	147.33	653.91	678.48	8.84	6.77	5.40
25	4.60	24.27	152.30	654.68	678.95	8.84	3.73	4.66
26	4.60	23.85	156.90	655.40	679.25	8.84	3.73	4.66
27	4.55	23.42	161.47	656.11	679.52	8.84	3.14	4.60
28	4.55	22.96	166.03	656.82	679.77	8.84	3.14	4.60
29	4.00	22.92	170.30	657.48	680.40	8.84	14.04	4.05
30	4.00	23.30	174.30	658.10	681.40	8.84	14.04	4.05
31	4.90	24.60	178.75	658.80	683.40	8.84	31.48	4.96
32	5.35	26.92	183.88	659.59	686.51	8.84	31.04	5.41
33	5.35	29.30	189.23	660.43	689.73	8.84	31.04	5.41
34	5.45	31.71	194.62	661.27	692.98	8.84	31.04	5.52
35	5.45	34.15	200.08	662.11	696.26	8.84	31.04	5.52
36	4.94	35.02	205.27	662.92	697.94	8.84	0.89	5.00
37	4.94	34.33	210.21	663.69	698.02	8.84	0.89	5.00
38	4.94	33.63	215.15	664.46	698.09	8.84	0.89	5.00
39	4.94	32.94	220.08	665.23	698.17	8.84	0.89	5.00
40	4.94	32.25	225.02	665.99	698.25	8.84	0.89	5.00
41	4.94	31.56	229.96	666.76	698.32	8.84	0.89	5.00
42	4.94	30.87	234.90	667.53	698.40	8.84	0.89	5.00
43	4.94	30.18	239.84	668.30	698.48	8.84	0.89	5.00
44	4.94	29.49	244.78	669.07	698.55	8.84	0.89	5.00
45	4.94	28.80	249.72	669.84	698.63	8.84	0.89	5.00
46	4.94	28.10	254.65	670.60	698.71	8.84	0.89	5.00
47	4.94	27.41	259.59	671.37	698.78	8.84	0.89	5.00
48	4.94	26.72	264.53	672.14	698.86	8.84	0.89	5.00
49	5.55	26.92	269.77	672.96	699.88	8.84	19.36	5.62
50	5.55	28.01	275.33	673.82	701.82	8.84	19.36	5.62
51	2.32	28.37	279.26	674.43	702.80	8.84	0.00	2.35
52	2.75	27.97	281.80	674.83	702.80	8.84	0.00	2.78

53	2.75	27.55	284.55	675.25	702.80	8.84	0.00	2.78
54	1.34	26.58	286.60	676.22	702.80	48.14	0.00	2.01
55	0.83	25.37	287.69	677.43	702.80	48.14	0.00	1.24
56	0.25	24.77	288.23	678.03	702.80	48.14	0.00	0.38
57	2.79	23.07	289.75	679.73	702.80	48.14	0.00	4.18
58	2.79	19.95	292.54	682.85	702.80	48.14	0.00	4.18
59	2.88	14.47	295.37	688.33	702.80	69.90	0.00	8.37
60	1.25	8.83	297.44	693.97	702.80	69.90	0.00	3.63
61	2.24	3.56	299.18	699.24	702.80	72.53	0.00	7.47

Table 2 - Force Data On The 61 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1116.2	0.0	785.5	0.0	0.0	0.0
2	3709.0	0.0	2126.9	0.0	0.0	0.0
3	5582.0	0.0	3201.0	0.0	0.0	0.0
4	7036.2	0.0	4425.0	0.0	0.0	0.0
5	9220.8	0.0	5798.9	0.0	0.0	0.0
6	2851.9	0.0	1575.5	0.0	0.0	0.0
7	9699.5	0.0	5184.3	0.0	0.0	0.0
8	2413.9	0.0	1290.2	0.0	0.0	0.0
9	12726.1	0.0	6388.7	0.0	0.0	0.0
10	4327.6	0.0	2062.8	0.0	0.0	0.0
11	13666.7	0.0	6904.0	0.0	0.0	0.0
12	13793.2	0.0	6967.9	0.0	0.0	0.0
13	13194.8	0.0	6602.8	0.0	0.0	0.0
14	11446.6	0.0	5921.3	0.0	0.0	0.0
15	11405.1	0.0	5899.8	0.0	0.0	0.0
16	13721.5	0.0	7136.7	0.0	0.0	0.0
17	13602.5	0.0	7074.8	0.0	0.0	0.0
18	16457.9	0.0	8391.1	0.0	0.0	0.0
19	16546.7	0.0	8436.4	0.0	0.0	0.0
20	16635.5	0.0	8481.6	0.0	0.0	0.0
21	16724.3	0.0	8526.9	0.0	0.0	0.0
22	15979.0	0.0	8302.8	0.0	0.0	0.0
23	15853.4	0.0	8024.1	0.0	0.0	0.0
24	15727.7	0.0	7745.5	0.0	0.0	0.0
25	13396.3	0.0	6456.7	0.0	0.0	0.0
26	13166.9	0.0	6249.4	0.0	0.0	0.0
27	12785.3	0.0	5977.6	0.0	0.0	0.0
28	12535.3	0.0	5774.8	0.0	0.0	0.0
29	11000.9	0.0	4909.2	0.0	0.0	0.0
30	11182.2	0.0	4752.5	0.0	0.0	0.0
31	14467.1	0.0	5608.2	0.0	0.0	0.0
32	17280.5	0.0	5854.6	0.0	0.0	0.0
33	18813.4	0.0	5574.2	0.0	0.0	0.0
34	20741.1	0.0	5390.1	0.0	0.0	0.0
35	22331.9	0.0	5099.2	0.0	0.0	0.0
36	20751.6	0.0	4369.3	0.0	0.0	0.0
37	20342.0	0.0	4130.4	0.0	0.0	0.0
38	19932.3	0.0	3891.5	0.0	0.0	0.0
39	19522.6	0.0	3652.6	0.0	0.0	0.0
40	19112.9	0.0	3413.7	0.0	0.0	0.0
41	18703.2	0.0	3174.8	0.0	0.0	0.0
42	18293.5	0.0	2935.9	0.0	0.0	0.0
43	17883.9	0.0	2696.9	0.0	0.0	0.0
44	17474.2	0.0	2458.0	0.0	0.0	0.0
45	17064.5	0.0	2219.1	0.0	0.0	0.0
46	16654.8	0.0	1980.2	0.0	0.0	0.0
47	16245.1	0.0	1741.3	0.0	0.0	0.0
48	15835.4	0.0	1502.4	0.0	0.0	0.0
49	17928.0	0.0	1403.3	0.0	0.0	0.0
50	18651.7	0.0	1101.6	0.0	0.0	0.0
51	7914.2	0.0	371.8	0.0	0.0	0.0
52	9236.0	0.0	371.6	0.0	0.0	0.0
53	9094.7	0.0	297.4	0.0	0.0	0.0

54	4284.4	0.0	94.1	0.0	0.0	0.0
55	2524.1	0.0	0.0	0.0	0.0	0.0
56	746.8	0.0	0.0	0.0	0.0	62.8
57	7729.4	0.0	0.0	0.0	0.0	698.1
58	6685.3	0.0	0.0	0.0	0.0	698.1
59	4991.9	0.0	0.0	0.0	0.0	719.0
60	1323.0	0.0	0.0	0.0	0.0	312.1
61	958.8	0.0	0.0	0.0	0.0	560.7

TOTAL WEIGHT OF SLIDING MASS = 761023.50(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 526251.42(lbs)

TOTAL AREA OF SLIDING MASS = 6341.86(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 61 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	32.00	
2	3	400.00	32.00	
3	3	400.00	32.00	
4	3	400.00	32.00	
5	3	400.00	32.00	
6	3	400.00	32.00	
7	3	400.00	32.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	4	0.00	10.00	
40	4	0.00	10.00	
41	4	0.00	10.00	
42	4	0.00	10.00	
43	4	0.00	10.00	
44	4	0.00	10.00	
45	4	0.00	10.00	
46	4	0.00	10.00	
47	4	0.00	10.00	
48	4	0.00	10.00	
49	4	0.00	10.00	
50	4	0.00	10.00	
51	4	0.00	10.00	
52	4	0.00	10.00	

53	4	0.00	10.00
54	4	0.00	10.00
55	4	0.00	10.00
56	4	0.00	10.00
57	3	400.00	32.00
58	3	400.00	32.00
59	3	400.00	32.00
60	1	150.00	32.00
61	1	150.00	32.00

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 61 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-42.57	45.54	5.93	667.27	816.95	568.64
1	-42.57	45.54	5.93	667.27	816.95	568.64
2	-25.33	50.43	6.00	594.29	771.35	536.90
2	-25.33	50.43	6.00	594.29	771.35	536.90
3	-25.33	55.85	6.00	806.10	903.71	629.02
3	-25.33	55.85	6.00	806.10	903.71	629.02
4	-34.50	61.04	6.00	1284.93	1202.91	837.28
4	-34.50	61.04	6.00	1284.93	1202.91	837.28
5	-34.50	65.98	6.00	1593.99	1396.04	971.70
5	-34.50	65.98	6.00	1593.99	1396.04	971.70
6	-20.25	69.13	1.43	1354.68	1246.50	867.62
6	-20.25	69.13	1.43	1354.68	1246.50	867.62
7	-20.25	71.91	4.50	1503.28	1339.35	932.25
7	-20.25	71.91	4.50	1503.28	1339.35	932.25
8	-20.25	74.51	1.04	1293.27	228.04	158.72
8	-20.25	74.51	1.04	1293.27	228.04	158.72
9	-20.25	77.36	5.02	1499.12	264.34	183.99
9	-20.25	77.36	5.02	1499.12	264.34	183.99
10	8.84	80.46	1.50	1509.70	266.20	185.29
10	8.84	80.46	1.50	1509.70	266.20	185.29
11	8.84	83.52	4.71	1443.29	254.49	177.14
11	8.84	83.52	4.71	1443.29	254.49	177.14
12	8.84	88.17	4.71	1456.64	256.85	178.78
12	8.84	88.17	4.71	1456.64	256.85	178.78
13	8.84	92.70	4.45	1486.45	262.10	182.43
13	8.84	92.70	4.45	1486.45	262.10	182.43
14	8.84	96.80	3.85	1443.83	254.59	177.20
14	8.84	96.80	3.85	1443.83	254.59	177.20
15	8.84	100.60	3.85	1438.59	253.66	176.56
15	8.84	100.60	3.85	1438.59	253.66	176.56
16	8.84	104.80	4.66	1421.64	250.67	174.48
16	8.84	104.80	4.66	1421.64	250.67	174.48
17	8.84	109.40	4.66	1409.31	248.50	172.97
17	8.84	109.40	4.66	1409.31	248.50	172.97
18	8.84	114.49	5.64	1436.29	253.26	176.28
18	8.84	114.49	5.64	1436.29	253.26	176.28
19	8.84	120.06	5.64	1444.04	254.62	177.23
19	8.84	120.06	5.64	1444.04	254.62	177.23
20	8.84	125.64	5.64	1451.79	255.99	178.18
20	8.84	125.64	5.64	1451.79	255.99	178.18
21	8.84	131.21	5.64	1459.54	257.36	179.13
21	8.84	131.21	5.64	1459.54	257.36	179.13
22	8.84	136.67	5.40	1429.36	252.04	175.43
22	8.84	136.67	5.40	1429.36	252.04	175.43
23	8.84	142.00	5.40	1456.88	256.89	178.81
23	8.84	142.00	5.40	1456.88	256.89	178.81
24	8.84	147.33	5.40	1484.40	261.74	182.18
24	8.84	147.33	5.40	1484.40	261.74	182.18

25	8.84	152.30	4.66	1495.54	263.70	183.55
25	8.84	152.30	4.66	1495.54	263.70	183.55
26	8.84	156.90	4.66	1490.30	262.78	182.91
26	8.84	156.90	4.66	1490.30	262.78	182.91
27	8.84	161.47	4.60	1482.33	261.38	181.93
27	8.84	161.47	4.60	1482.33	261.38	181.93
28	8.84	166.03	4.60	1471.65	259.49	180.62
28	8.84	166.03	4.60	1471.65	259.49	180.62
29	8.84	170.30	4.05	1507.51	265.82	185.02
29	8.84	170.30	4.05	1507.51	265.82	185.02
30	8.84	174.30	4.05	1589.92	280.35	195.13
30	8.84	174.30	4.05	1589.92	280.35	195.13
31	8.84	178.75	4.96	1786.03	314.92	219.20
31	8.84	178.75	4.96	1786.03	314.92	219.20
32	8.84	183.88	5.41	2106.78	371.48	258.57
32	8.84	183.88	5.41	2106.78	371.48	258.57
33	8.84	189.23	5.41	2438.48	429.97	299.28
33	8.84	189.23	5.41	2438.48	429.97	299.28
34	8.84	194.62	5.52	2773.29	489.01	340.37
34	8.84	194.62	5.52	2773.29	489.01	340.37
35	8.84	200.08	5.52	3111.19	548.59	381.84
35	8.84	200.08	5.52	3111.19	548.59	381.84
36	8.84	205.27	5.00	3262.91	575.34	400.46
36	8.84	205.27	5.00	3262.91	575.34	400.46
37	8.84	210.21	5.00	3228.44	569.26	396.23
37	8.84	210.21	5.00	3228.44	569.26	396.23
38	8.84	215.15	5.00	3193.97	563.18	392.00
38	8.84	215.15	5.00	3193.97	563.18	392.00
39	8.84	220.08	5.00	3159.50	557.10	387.77
39	8.84	220.08	5.00	3159.50	557.10	387.77
40	8.84	225.02	5.00	3125.03	551.03	383.54
40	8.84	225.02	5.00	3125.03	551.03	383.54
41	8.84	229.96	5.00	3090.56	544.95	379.31
41	8.84	229.96	5.00	3090.56	544.95	379.31
42	8.84	234.90	5.00	3056.09	538.87	375.08
42	8.84	234.90	5.00	3056.09	538.87	375.08
43	8.84	239.84	5.00	3021.62	532.79	370.85
43	8.84	239.84	5.00	3021.62	532.79	370.85
44	8.84	244.78	5.00	2987.15	526.71	366.62
44	8.84	244.78	5.00	2987.15	526.71	366.62
45	8.84	249.72	5.00	2952.68	520.64	362.39
45	8.84	249.72	5.00	2952.68	520.64	362.39
46	8.84	254.65	5.00	2918.20	514.56	358.16
46	8.84	254.65	5.00	2918.20	514.56	358.16
47	8.84	259.59	5.00	2883.73	508.48	353.92
47	8.84	259.59	5.00	2883.73	508.48	353.92
48	8.84	264.53	5.00	2849.26	502.40	349.69
48	8.84	264.53	5.00	2849.26	502.40	349.69
49	8.84	269.77	5.62	2922.29	515.28	358.66
49	8.84	269.77	5.62	2922.29	515.28	358.66
50	8.84	275.33	5.62	3102.82	547.11	380.81
50	8.84	275.33	5.62	3102.82	547.11	380.81
51	8.84	279.26	2.35	3182.84	561.22	390.63
51	8.84	279.26	2.35	3182.84	561.22	390.63
52	8.84	281.80	2.78	3160.47	557.28	387.89
52	8.84	281.80	2.78	3160.47	557.28	387.89
53	8.84	284.55	2.78	3136.22	553.00	384.91
53	8.84	284.55	2.78	3136.22	553.00	384.91
54	48.14	286.60	2.01	2750.52	484.99	337.58
54	48.14	286.60	2.01	2750.52	484.99	337.58
55	48.14	287.69	1.24	2664.14	469.76	326.97
55	48.14	287.69	1.24	2664.14	469.76	326.97
56	48.14	288.23	0.38	2819.61	497.17	346.05
56	48.14	288.23	0.38	2819.61	497.17	346.05
57	48.14	289.75	4.18	1789.46	1518.18	1056.72
57	48.14	289.75	4.18	1789.46	1518.18	1056.72
58	48.14	292.54	4.18	1541.12	1363.00	948.71
58	48.14	292.54	4.18	1541.12	1363.00	948.71
59	69.90	295.37	8.37	533.12	733.13	510.29
59	69.90	295.37	8.37	533.12	733.13	510.29
60	69.90	297.44	3.63	452.36	432.66	301.15
60	69.90	297.44	3.63	452.36	432.66	301.15

61	72.53	299.18	7.47	136.05	235.01	163.58
61	72.53	299.18	7.47	136.05	235.01	163.58

Table 4 - Base Force Data on the 61 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-42.57	45.54	5.93	3955.95	4843.39	3371.21
1	-42.57	45.54	5.93	3955.95	4843.39	3371.21
2	-25.33	50.43	6.00	3565.74	4628.12	3221.38
2	-25.33	50.43	6.00	3565.74	4628.12	3221.38
3	-25.33	55.85	6.00	4836.61	5422.25	3774.13
3	-25.33	55.85	6.00	4836.61	5422.25	3774.13
4	-34.50	61.04	6.00	7709.57	7217.47	5023.68
4	-34.50	61.04	6.00	7709.57	7217.47	5023.68
5	-34.50	65.98	6.00	9563.94	8376.21	5830.22
5	-34.50	65.98	6.00	9563.94	8376.21	5830.22
6	-20.25	69.13	1.43	1942.43	1787.31	1244.05
6	-20.25	69.13	1.43	1942.43	1787.31	1244.05
7	-20.25	71.91	4.50	6767.15	6029.22	4196.61
7	-20.25	71.91	4.50	6767.15	6029.22	4196.61
8	-20.25	74.51	1.04	1346.21	237.37	165.22
8	-20.25	74.51	1.04	1346.21	237.37	165.22
9	-20.25	77.36	5.02	7530.98	1327.92	924.29
9	-20.25	77.36	5.02	7530.98	1327.92	924.29
10	8.84	80.46	1.50	2271.72	400.57	278.81
10	8.84	80.46	1.50	2271.72	400.57	278.81
11	8.84	83.52	4.71	6792.00	1197.61	833.59
11	8.84	83.52	4.71	6792.00	1197.61	833.59
12	8.84	88.17	4.71	6854.84	1208.69	841.30
12	8.84	88.17	4.71	6854.84	1208.69	841.30
13	8.84	92.70	4.45	6619.05	1167.12	812.36
13	8.84	92.70	4.45	6619.05	1167.12	812.36
14	8.84	96.80	3.85	5552.54	979.06	681.47
14	8.84	96.80	3.85	5552.54	979.06	681.47
15	8.84	100.60	3.85	5532.38	975.51	679.00
15	8.84	100.60	3.85	5532.38	975.51	679.00
16	8.84	104.80	4.66	6618.20	1166.97	812.26
16	8.84	104.80	4.66	6618.20	1166.97	812.26
17	8.84	109.40	4.66	6560.81	1156.85	805.22
17	8.84	109.40	4.66	6560.81	1156.85	805.22
18	8.84	114.49	5.64	8103.60	1428.88	994.57
18	8.84	114.49	5.64	8103.60	1428.88	994.57
19	8.84	120.06	5.64	8147.32	1436.59	999.93
19	8.84	120.06	5.64	8147.32	1436.59	999.93
20	8.84	125.64	5.64	8191.05	1444.30	1005.30
20	8.84	125.64	5.64	8191.05	1444.30	1005.30
21	8.84	131.21	5.64	8234.77	1452.01	1010.67
21	8.84	131.21	5.64	8234.77	1452.01	1010.67
22	8.84	136.67	5.40	7714.97	1360.36	946.87
22	8.84	136.67	5.40	7714.97	1360.36	946.87
23	8.84	142.00	5.40	7863.49	1386.54	965.10
23	8.84	142.00	5.40	7863.49	1386.54	965.10
24	8.84	147.33	5.40	8012.01	1412.73	983.32
24	8.84	147.33	5.40	8012.01	1412.73	983.32
25	8.84	152.30	4.66	6962.21	1227.63	854.48
25	8.84	152.30	4.66	6962.21	1227.63	854.48
26	8.84	156.90	4.66	6937.81	1223.32	851.49
26	8.84	156.90	4.66	6937.81	1223.32	851.49
27	8.84	161.47	4.60	6825.74	1203.56	837.73
27	8.84	161.47	4.60	6825.74	1203.56	837.73
28	8.84	166.03	4.60	6776.55	1194.89	831.70
28	8.84	166.03	4.60	6776.55	1194.89	831.70
29	8.84	170.30	4.05	6102.58	1076.05	748.98
29	8.84	170.30	4.05	6102.58	1076.05	748.98
30	8.84	174.30	4.05	6436.18	1134.87	789.92
30	8.84	174.30	4.05	6436.18	1134.87	789.92
31	8.84	178.75	4.96	8856.78	1561.69	1087.01

31	8.84	178.75	4.96	8856.78	1561.69	1087.01
32	8.84	183.88	5.41	11406.82	2011.33	1399.97
32	8.84	183.88	5.41	11406.82	2011.33	1399.97
33	8.84	189.23	5.41	13202.78	2328.01	1620.40
33	8.84	189.23	5.41	13202.78	2328.01	1620.40
34	8.84	194.62	5.52	15296.20	2697.13	1877.32
34	8.84	194.62	5.52	15296.20	2697.13	1877.32
35	8.84	200.08	5.52	17159.93	3025.76	2106.06
35	8.84	200.08	5.52	17159.93	3025.76	2106.06
36	8.84	205.27	5.00	16307.55	2875.46	2001.45
36	8.84	205.27	5.00	16307.55	2875.46	2001.45
37	8.84	210.21	5.00	16135.28	2845.08	1980.30
37	8.84	210.21	5.00	16135.28	2845.08	1980.30
38	8.84	215.15	5.00	15963.00	2814.71	1959.16
38	8.84	215.15	5.00	15963.00	2814.71	1959.16
39	8.84	220.08	5.00	15790.72	2784.33	1938.02
39	8.84	220.08	5.00	15790.72	2784.33	1938.02
40	8.84	225.02	5.00	15618.44	2753.95	1916.87
40	8.84	225.02	5.00	15618.44	2753.95	1916.87
41	8.84	229.96	5.00	15446.16	2723.58	1895.73
41	8.84	229.96	5.00	15446.16	2723.58	1895.73
42	8.84	234.90	5.00	15273.89	2693.20	1874.58
42	8.84	234.90	5.00	15273.89	2693.20	1874.58
43	8.84	239.84	5.00	15101.61	2662.82	1853.44
43	8.84	239.84	5.00	15101.61	2662.82	1853.44
44	8.84	244.78	5.00	14929.33	2632.44	1832.30
44	8.84	244.78	5.00	14929.33	2632.44	1832.30
45	8.84	249.72	5.00	14757.05	2602.07	1811.15
45	8.84	249.72	5.00	14757.05	2602.07	1811.15
46	8.84	254.65	5.00	14584.77	2571.69	1790.01
46	8.84	254.65	5.00	14584.77	2571.69	1790.01
47	8.84	259.59	5.00	14412.50	2541.31	1768.87
47	8.84	259.59	5.00	14412.50	2541.31	1768.87
48	8.84	264.53	5.00	14240.22	2510.93	1747.72
48	8.84	264.53	5.00	14240.22	2510.93	1747.72
49	8.84	269.77	5.62	16413.79	2894.19	2014.49
49	8.84	269.77	5.62	16413.79	2894.19	2014.49
50	8.84	275.33	5.62	17427.76	3072.98	2138.93
50	8.84	275.33	5.62	17427.76	3072.98	2138.93
51	8.84	279.26	2.35	7488.62	1320.45	919.09
51	8.84	279.26	2.35	7488.62	1320.45	919.09
52	8.84	281.80	2.78	8800.43	1551.75	1080.09
52	8.84	281.80	2.78	8800.43	1551.75	1080.09
53	8.84	284.55	2.78	8732.91	1539.85	1071.80
53	8.84	284.55	2.78	8732.91	1539.85	1071.80
54	48.14	286.60	2.01	5536.07	976.16	679.45
54	48.14	286.60	2.01	5536.07	976.16	679.45
55	48.14	287.69	1.24	3310.00	583.64	406.24
55	48.14	287.69	1.24	3310.00	583.64	406.24
56	48.14	288.23	0.38	1061.72	187.21	130.31
56	48.14	288.23	0.38	1061.72	187.21	130.31
57	48.14	289.75	4.18	7487.38	6352.29	4421.47
57	48.14	289.75	4.18	7487.38	6352.29	4421.47
58	48.14	292.54	4.18	6448.26	5702.98	3969.53
58	48.14	292.54	4.18	6448.26	5702.98	3969.53
59	69.90	295.37	8.37	4460.85	6134.41	4269.82
59	69.90	295.37	8.37	4460.85	6134.41	4269.82
60	69.90	297.44	3.63	1643.23	1571.69	1093.97
60	69.90	297.44	3.63	1643.23	1571.69	1093.97
61	72.53	299.18	7.47	1016.22	1755.46	1221.88
61	72.53	299.18	7.47	1016.22	1755.46	1221.88

Sum of the Resisting Forces = 127962.09 (lbs)

Average Available Shear Strength = 453.62(psf)

Sum of the Driving Forces = 92744.35 (lbs)

Average Mobilized Shear Stress = 328.77(psf)

Total length of the failure surface = 282.09(ft)

```
Factor of Safety Balance Check: FS =  1.37973

Janbu's Correction Factor (fo) =  1.0452

Janub's FS Corrected =  1.44206

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

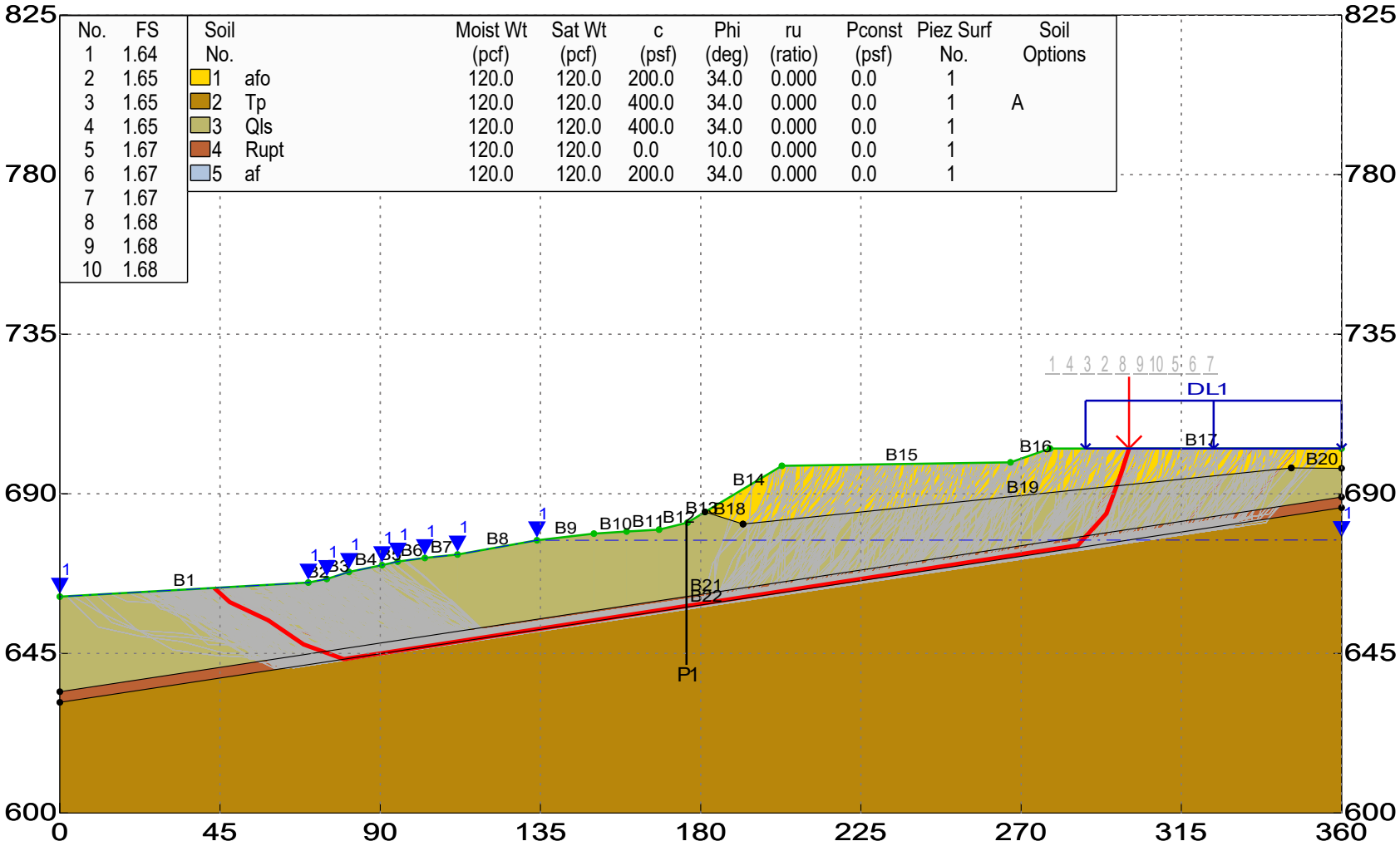
Royal Vista - Cross Section 7
Stage 2 (Existing Condition - Shear Pins)

LGC Geotechnical / BPP

\Sec 7 - Stage 2 (Existing Condition - Shear Pins).gsd

No.	FS
1	1.64
2	1.65
3	1.65
4	1.65
5	1.67
6	1.67
7	1.67
8	1.68
9	1.68
10	1.68

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.64

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 2 (Existing Condition - Shear Pins).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 2 (Existing Condition - Shear Pins).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 2 (Existing Condition - Shear Pins)

BOUNDARY DATA

17 Surface Boundaries
22 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	661.000	69.800	665.000	3
2	69.800	665.000	75.000	666.000	3
3	75.000	666.000	81.200	668.000	3
4	81.200	668.000	90.500	669.900	3
5	90.500	669.900	94.900	670.900	3
6	94.900	670.900	102.500	671.900	3
7	102.500	671.900	111.700	672.900	3
8	111.700	672.900	134.000	676.900	3
9	134.000	676.900	150.000	678.800	3
10	150.000	678.800	159.200	679.400	3
11	159.200	679.400	168.300	679.900	3
12	168.300	679.900	176.300	681.900	3
13	176.300	681.900	181.200	684.900	3
14	181.200	684.900	202.800	697.900	1
15	202.800	697.900	267.000	698.900	1
16	267.000	698.900	278.100	702.800	1
17	278.100	702.800	360.000	702.800	1
18	181.200	684.900	191.900	681.500	3
19	191.900	681.500	345.900	697.300	3
20	345.900	697.300	360.000	697.200	3
21	0.000	634.200	360.000	689.100	4
22	0.000	631.200	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 10 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	661.00
2	69.80	665.00
3	75.00	666.00
4	81.20	668.00
5	90.50	669.90
6	94.90	670.90
7	102.50	671.90
8	111.70	672.90
9	134.00	676.90
10	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	17	288.100	702.800	250.000	360.000	702.800	250.000	0.00

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 12.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	60.00	641.50	120.00	650.50	3.00
2	180.00	659.50	340.00	683.50	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 = 31

Number of Trial Surfaces With Valid FS = 969

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 3.1 %

Statistical Data On All Valid FS Values:
FS Max = 3.303 FS Min = 1.641 FS Ave = 2.065
Standard Deviation = 0.300 Coefficient of Variation = 14.55 %

Critical Surface is Sequence Number 48 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	176.00	658.37

Factor Of Safety For The Critical or Specified Surface = 1.641

Table 1 - Geometry Data on the 61 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.37	2.13	45.54	661.48	663.61	-42.57	3.28	5.93
2	5.42	5.70	50.43	658.19	663.89	-25.33	3.28	6.00
3	5.42	8.58	55.85	655.62	664.20	-25.33	3.28	6.00
4	4.94	11.86	61.04	652.64	664.50	-34.50	3.28	6.00
5	4.94	15.54	65.98	649.24	664.78	-34.50	3.28	6.00
6	1.35	17.67	69.13	647.29	664.96	-20.25	3.28	1.43
7	4.22	19.14	71.91	646.27	665.41	-20.25	10.89	4.50
8	0.98	20.60	74.51	645.31	665.91	-20.25	10.89	1.04
9	4.71	22.50	77.36	644.26	666.76	-20.25	17.88	5.02
10	1.49	24.25	80.46	643.51	667.76	8.84	17.88	1.50
11	4.65	24.49	83.52	643.98	668.47	8.84	11.55	4.71
12	4.65	24.72	88.17	644.71	669.42	8.84	11.55	4.71
13	4.40	24.99	92.70	645.41	670.40	8.84	12.80	4.45
14	3.80	25.10	96.80	646.05	671.15	8.84	7.50	3.85
15	3.80	25.01	100.60	646.64	671.65	8.84	7.50	3.85
16	4.60	24.86	104.80	647.29	672.15	8.84	6.20	4.66
17	4.60	24.64	109.40	648.01	672.65	8.84	6.20	4.66
18	5.57	24.60	114.49	648.80	673.40	8.84	10.17	5.64
19	5.57	24.73	120.06	649.67	674.40	8.84	10.17	5.64
20	5.57	24.87	125.64	650.53	675.40	8.84	10.17	5.64
21	5.58	25.00	131.21	651.40	676.40	8.84	10.17	5.64
22	5.33	24.97	136.67	652.25	677.22	8.84	6.77	5.40
23	5.33	24.77	142.00	653.08	677.85	8.84	6.77	5.40
24	5.33	24.57	147.33	653.91	678.48	8.84	6.77	5.40
25	4.60	24.27	152.30	654.68	678.95	8.84	3.73	4.66
26	4.60	23.85	156.90	655.40	679.25	8.84	3.73	4.66
27	4.55	23.42	161.47	656.11	679.52	8.84	3.14	4.60
28	4.55	22.96	166.03	656.82	679.77	8.84	3.14	4.60
29	4.00	22.92	170.30	657.48	680.40	8.84	14.04	4.05
30	4.00	23.30	174.30	658.10	681.40	8.84	14.04	4.05
31	4.90	24.60	178.75	658.80	683.40	8.84	31.48	4.96
32	5.35	26.92	183.88	659.59	686.51	8.84	31.04	5.41
33	5.35	29.30	189.23	660.43	689.73	8.84	31.04	5.41
34	5.45	31.71	194.62	661.27	692.98	8.84	31.04	5.52
35	5.45	34.15	200.08	662.11	696.26	8.84	31.04	5.52
36	4.94	35.02	205.27	662.92	697.94	8.84	0.89	5.00
37	4.94	34.33	210.21	663.69	698.02	8.84	0.89	5.00
38	4.94	33.63	215.15	664.46	698.09	8.84	0.89	5.00
39	4.94	32.94	220.08	665.23	698.17	8.84	0.89	5.00
40	4.94	32.25	225.02	665.99	698.25	8.84	0.89	5.00
41	4.94	31.56	229.96	666.76	698.32	8.84	0.89	5.00
42	4.94	30.87	234.90	667.53	698.40	8.84	0.89	5.00
43	4.94	30.18	239.84	668.30	698.48	8.84	0.89	5.00
44	4.94	29.49	244.78	669.07	698.55	8.84	0.89	5.00
45	4.94	28.80	249.72	669.84	698.63	8.84	0.89	5.00
46	4.94	28.10	254.65	670.60	698.71	8.84	0.89	5.00
47	4.94	27.41	259.59	671.37	698.78	8.84	0.89	5.00
48	4.94	26.72	264.53	672.14	698.86	8.84	0.89	5.00
49	5.55	26.92	269.77	672.96	699.88	8.84	19.36	5.62

50	5.55	28.01	275.33	673.82	701.82	8.84	19.36	5.62
51	2.32	28.37	279.26	674.43	702.80	8.84	0.00	2.35
52	2.75	27.97	281.80	674.83	702.80	8.84	0.00	2.78
53	2.75	27.55	284.55	675.25	702.80	8.84	0.00	2.78
54	1.34	26.58	286.60	676.22	702.80	48.14	0.00	2.01
55	0.83	25.37	287.69	677.43	702.80	48.14	0.00	1.24
56	0.25	24.77	288.23	678.03	702.80	48.14	0.00	0.38
57	2.79	23.07	289.75	679.73	702.80	48.14	0.00	4.18
58	2.79	19.95	292.54	682.85	702.80	48.14	0.00	4.18
59	2.88	14.47	295.37	688.33	702.80	69.90	0.00	8.37
60	1.25	8.83	297.44	693.97	702.80	69.90	0.00	3.63
61	2.24	3.56	299.18	699.24	702.80	72.53	0.00	7.47

Table 2 - Force Data On The 61 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1116.2	0.0	785.5	0.0	0.0	0.0
2	3709.0	0.0	2126.9	0.0	0.0	0.0
3	5582.0	0.0	3201.0	0.0	0.0	0.0
4	7036.2	0.0	4425.0	0.0	0.0	0.0
5	9220.8	0.0	5798.9	0.0	0.0	0.0
6	2851.9	0.0	1575.5	0.0	0.0	0.0
7	9699.5	0.0	5184.3	0.0	0.0	0.0
8	2413.9	0.0	1290.2	0.0	0.0	0.0
9	12726.1	0.0	6388.7	0.0	0.0	0.0
10	4327.6	0.0	2062.8	0.0	0.0	0.0
11	13666.7	0.0	6904.0	0.0	0.0	0.0
12	13793.2	0.0	6967.9	0.0	0.0	0.0
13	13194.8	0.0	6602.8	0.0	0.0	0.0
14	11446.6	0.0	5921.3	0.0	0.0	0.0
15	11405.1	0.0	5899.8	0.0	0.0	0.0
16	13721.5	0.0	7136.7	0.0	0.0	0.0
17	13602.5	0.0	7074.8	0.0	0.0	0.0
18	16457.9	0.0	8391.1	0.0	0.0	0.0
19	16546.7	0.0	8436.4	0.0	0.0	0.0
20	16635.5	0.0	8481.6	0.0	0.0	0.0
21	16724.3	0.0	8526.9	0.0	0.0	0.0
22	15979.0	0.0	8302.8	0.0	0.0	0.0
23	15853.4	0.0	8024.1	0.0	0.0	0.0
24	15727.7	0.0	7745.5	0.0	0.0	0.0
25	13396.3	0.0	6456.7	0.0	0.0	0.0
26	13166.9	0.0	6249.4	0.0	0.0	0.0
27	12785.3	0.0	5977.6	0.0	0.0	0.0
28	12535.3	0.0	5774.8	0.0	0.0	0.0
29	11000.9	0.0	4909.2	0.0	0.0	0.0
30	11182.2	0.0	4752.5	0.0	0.0	0.0
31	14467.1	0.0	5608.2	0.0	0.0	0.0
32	17280.5	0.0	5854.6	0.0	0.0	0.0
33	18813.4	0.0	5574.2	0.0	0.0	0.0
34	20741.1	0.0	5390.1	0.0	0.0	0.0
35	22331.9	0.0	5099.2	0.0	0.0	0.0
36	20751.6	0.0	4369.3	0.0	0.0	0.0
37	20342.0	0.0	4130.4	0.0	0.0	0.0
38	19932.3	0.0	3891.5	0.0	0.0	0.0
39	19522.6	0.0	3652.6	0.0	0.0	0.0
40	19112.9	0.0	3413.7	0.0	0.0	0.0
41	18703.2	0.0	3174.8	0.0	0.0	0.0
42	18293.5	0.0	2935.9	0.0	0.0	0.0
43	17883.9	0.0	2696.9	0.0	0.0	0.0
44	17474.2	0.0	2458.0	0.0	0.0	0.0
45	17064.5	0.0	2219.1	0.0	0.0	0.0
46	16654.8	0.0	1980.2	0.0	0.0	0.0
47	16245.1	0.0	1741.3	0.0	0.0	0.0
48	15835.4	0.0	1502.4	0.0	0.0	0.0
49	17928.0	0.0	1403.3	0.0	0.0	0.0
50	18651.7	0.0	1101.6	0.0	0.0	0.0

51	7914.2	0.0	371.8	0.0	0.0	0.0
52	9236.0	0.0	371.6	0.0	0.0	0.0
53	9094.7	0.0	297.4	0.0	0.0	0.0
54	4284.4	0.0	94.1	0.0	0.0	0.0
55	2524.1	0.0	0.0	0.0	0.0	0.0
56	746.8	0.0	0.0	0.0	0.0	62.8
57	7729.4	0.0	0.0	0.0	0.0	698.1
58	6685.3	0.0	0.0	0.0	0.0	698.1
59	4991.9	0.0	0.0	0.0	0.0	719.0
60	1323.0	0.0	0.0	0.0	0.0	312.1
61	958.8	0.0	0.0	0.0	0.0	560.7

TOTAL WEIGHT OF SLIDING MASS = 761023.50(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 526251.42(lbs)

TOTAL AREA OF SLIDING MASS = 6341.86(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 61 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	
3	3	400.00	34.00	
4	3	400.00	34.00	
5	3	400.00	34.00	
6	3	400.00	34.00	
7	3	400.00	34.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	4	0.00	10.00	
40	4	0.00	10.00	
41	4	0.00	10.00	
42	4	0.00	10.00	
43	4	0.00	10.00	
44	4	0.00	10.00	
45	4	0.00	10.00	
46	4	0.00	10.00	
47	4	0.00	10.00	
48	4	0.00	10.00	
49	4	0.00	10.00	

50	4	0.00	10.00
51	4	0.00	10.00
52	4	0.00	10.00
53	4	0.00	10.00
54	4	0.00	10.00
55	4	0.00	10.00
56	4	0.00	10.00
57	3	400.00	34.00
58	3	400.00	34.00
59	3	400.00	34.00
60	1	200.00	34.00
61	1	200.00	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 61 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-42.57	45.54	5.93	589.59	797.69	487.93
1	-42.57	45.54	5.93	589.59	797.69	487.93
2	-25.33	50.43	6.00	564.88	781.02	477.73
2	-25.33	50.43	6.00	564.88	781.02	477.73
3	-25.33	55.85	6.00	773.71	921.88	563.89
3	-25.33	55.85	6.00	773.71	921.88	563.89
4	-34.50	61.04	6.00	1220.72	1223.39	748.32
4	-34.50	61.04	6.00	1220.72	1223.39	748.32
5	-34.50	65.98	6.00	1522.65	1427.04	872.89
5	-34.50	65.98	6.00	1522.65	1427.04	872.89
6	-20.25	69.13	1.43	1325.09	1293.79	791.38
6	-20.25	69.13	1.43	1325.09	1293.79	791.38
7	-20.25	71.91	4.50	1472.15	1392.97	852.05
7	-20.25	71.91	4.50	1472.15	1392.97	852.05
8	-20.25	74.51	1.04	1285.50	226.67	138.65
8	-20.25	74.51	1.04	1285.50	226.67	138.65
9	-20.25	77.36	5.02	1490.12	262.75	160.72
9	-20.25	77.36	5.02	1490.12	262.75	160.72
10	8.84	80.46	1.50	1513.30	266.84	163.22
10	8.84	80.46	1.50	1513.30	266.84	163.22
11	8.84	83.52	4.71	1446.73	255.10	156.04
11	8.84	83.52	4.71	1446.73	255.10	156.04
12	8.84	88.17	4.71	1460.12	257.46	157.48
12	8.84	88.17	4.71	1460.12	257.46	157.48
13	8.84	92.70	4.45	1490.00	262.73	160.70
13	8.84	92.70	4.45	1490.00	262.73	160.70
14	8.84	96.80	3.85	1447.27	255.19	156.10
14	8.84	96.80	3.85	1447.27	255.19	156.10
15	8.84	100.60	3.85	1442.02	254.27	155.53
15	8.84	100.60	3.85	1442.02	254.27	155.53
16	8.84	104.80	4.66	1425.03	251.27	153.70
16	8.84	104.80	4.66	1425.03	251.27	153.70
17	8.84	109.40	4.66	1412.67	249.09	152.36
17	8.84	109.40	4.66	1412.67	249.09	152.36
18	8.84	114.49	5.64	1439.71	253.86	155.28
18	8.84	114.49	5.64	1439.71	253.86	155.28
19	8.84	120.06	5.64	1447.48	255.23	156.12
19	8.84	120.06	5.64	1447.48	255.23	156.12
20	8.84	125.64	5.64	1455.25	256.60	156.96
20	8.84	125.64	5.64	1455.25	256.60	156.96
21	8.84	131.21	5.64	1463.02	257.97	157.79
21	8.84	131.21	5.64	1463.02	257.97	157.79
22	8.84	136.67	5.40	1432.78	252.64	154.53
22	8.84	136.67	5.40	1432.78	252.64	154.53
23	8.84	142.00	5.40	1460.36	257.50	157.51

23	8.84	142.00	5.40	1460.36	257.50	157.51
24	8.84	147.33	5.40	1487.94	262.36	160.48
24	8.84	147.33	5.40	1487.94	262.36	160.48
25	8.84	152.30	4.66	1499.10	264.33	161.69
25	8.84	152.30	4.66	1499.10	264.33	161.69
26	8.84	156.90	4.66	1493.85	263.41	161.12
26	8.84	156.90	4.66	1493.85	263.41	161.12
27	8.84	161.47	4.60	1485.87	262.00	160.26
27	8.84	161.47	4.60	1485.87	262.00	160.26
28	8.84	166.03	4.60	1475.16	260.11	159.10
28	8.84	166.03	4.60	1475.16	260.11	159.10
29	8.84	170.30	4.05	1511.11	266.45	162.98
29	8.84	170.30	4.05	1511.11	266.45	162.98
30	8.84	174.30	4.05	1593.72	281.02	171.89
30	8.84	174.30	4.05	1593.72	281.02	171.89
31	8.84	178.75	4.96	1790.29	315.68	193.09
31	8.84	178.75	4.96	1790.29	315.68	193.09
32	8.84	183.88	5.41	2111.80	372.37	227.77
32	8.84	183.88	5.41	2111.80	372.37	227.77
33	8.84	189.23	5.41	2444.30	431.00	263.63
33	8.84	189.23	5.41	2444.30	431.00	263.63
34	8.84	194.62	5.52	2779.90	490.17	299.83
34	8.84	194.62	5.52	2779.90	490.17	299.83
35	8.84	200.08	5.52	3118.61	549.90	336.36
35	8.84	200.08	5.52	3118.61	549.90	336.36
36	8.84	205.27	5.00	3270.69	576.71	352.76
36	8.84	205.27	5.00	3270.69	576.71	352.76
37	8.84	210.21	5.00	3236.14	570.62	349.04
37	8.84	210.21	5.00	3236.14	570.62	349.04
38	8.84	215.15	5.00	3201.59	564.53	345.31
38	8.84	215.15	5.00	3201.59	564.53	345.31
39	8.84	220.08	5.00	3167.04	558.43	341.58
39	8.84	220.08	5.00	3167.04	558.43	341.58
40	8.84	225.02	5.00	3132.48	552.34	337.86
40	8.84	225.02	5.00	3132.48	552.34	337.86
41	8.84	229.96	5.00	3097.93	546.25	334.13
41	8.84	229.96	5.00	3097.93	546.25	334.13
42	8.84	234.90	5.00	3063.38	540.16	330.40
42	8.84	234.90	5.00	3063.38	540.16	330.40
43	8.84	239.84	5.00	3028.83	534.06	326.68
43	8.84	239.84	5.00	3028.83	534.06	326.68
44	8.84	244.78	5.00	2994.27	527.97	322.95
44	8.84	244.78	5.00	2994.27	527.97	322.95
45	8.84	249.72	5.00	2959.72	521.88	319.22
45	8.84	249.72	5.00	2959.72	521.88	319.22
46	8.84	254.65	5.00	2925.17	515.79	315.50
46	8.84	254.65	5.00	2925.17	515.79	315.50
47	8.84	259.59	5.00	2890.61	509.69	311.77
47	8.84	259.59	5.00	2890.61	509.69	311.77
48	8.84	264.53	5.00	2856.06	503.60	308.04
48	8.84	264.53	5.00	2856.06	503.60	308.04
49	8.84	269.77	5.62	2929.26	516.51	315.94
49	8.84	269.77	5.62	2929.26	516.51	315.94
50	8.84	275.33	5.62	3110.22	548.42	335.45
50	8.84	275.33	5.62	3110.22	548.42	335.45
51	8.84	279.26	2.35	3190.43	562.56	344.11
51	8.84	279.26	2.35	3190.43	562.56	344.11
52	8.84	281.80	2.78	3168.01	558.61	341.69
52	8.84	281.80	2.78	3168.01	558.61	341.69
53	8.84	284.55	2.78	3143.70	554.32	339.07
53	8.84	284.55	2.78	3143.70	554.32	339.07
54	48.14	286.60	2.01	2793.09	492.50	301.25
54	48.14	286.60	2.01	2793.09	492.50	301.25
55	48.14	287.69	1.24	2705.38	477.03	291.79
55	48.14	287.69	1.24	2705.38	477.03	291.79
56	48.14	288.23	0.38	2863.25	504.87	308.82
56	48.14	288.23	0.38	2863.25	504.87	308.82
57	48.14	289.75	4.18	1848.16	1646.60	1007.19
57	48.14	289.75	4.18	1848.16	1646.60	1007.19
58	48.14	292.54	4.18	1595.38	1476.10	902.90
58	48.14	292.54	4.18	1595.38	1476.10	902.90
59	69.90	295.37	8.37	593.51	800.33	489.54

59	69.90	295.37	8.37	593.51	800.33	489.54
60	69.90	297.44	3.63	442.50	498.47	304.90
60	69.90	297.44	3.63	442.50	498.47	304.90
61	72.53	299.18	7.47	115.44	277.87	169.96
61	72.53	299.18	7.47	115.44	277.87	169.96

Table 4 - Base Force Data on the 61 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-42.57	45.54	5.93	3495.46	4729.16	2892.72
1	-42.57	45.54	5.93	3495.46	4729.16	2892.72
2	-25.33	50.43	6.00	3389.31	4686.12	2866.40
2	-25.33	50.43	6.00	3389.31	4686.12	2866.40
3	-25.33	55.85	6.00	4642.28	5531.26	3383.35
3	-25.33	55.85	6.00	4642.28	5531.26	3383.35
4	-34.50	61.04	6.00	7324.35	7340.33	4489.93
4	-34.50	61.04	6.00	7324.35	7340.33	4489.93
5	-34.50	65.98	6.00	9135.88	8562.23	5237.34
5	-34.50	65.98	6.00	9135.88	8562.23	5237.34
6	-20.25	69.13	1.43	1900.00	1855.11	1134.73
6	-20.25	69.13	1.43	1900.00	1855.11	1134.73
7	-20.25	71.91	4.50	6627.00	6270.61	3835.60
7	-20.25	71.91	4.50	6627.00	6270.61	3835.60
8	-20.25	74.51	1.04	1338.13	235.95	144.32
8	-20.25	74.51	1.04	1338.13	235.95	144.32
9	-20.25	77.36	5.02	7485.75	1319.94	807.38
9	-20.25	77.36	5.02	7485.75	1319.94	807.38
10	8.84	80.46	1.50	2277.14	401.52	245.60
10	8.84	80.46	1.50	2277.14	401.52	245.60
11	8.84	83.52	4.71	6808.20	1200.47	734.30
11	8.84	83.52	4.71	6808.20	1200.47	734.30
12	8.84	88.17	4.71	6871.20	1211.58	741.10
12	8.84	88.17	4.71	6871.20	1211.58	741.10
13	8.84	92.70	4.45	6634.84	1169.90	715.60
13	8.84	92.70	4.45	6634.84	1169.90	715.60
14	8.84	96.80	3.85	5565.78	981.40	600.30
14	8.84	96.80	3.85	5565.78	981.40	600.30
15	8.84	100.60	3.85	5545.58	977.83	598.12
15	8.84	100.60	3.85	5545.58	977.83	598.12
16	8.84	104.80	4.66	6633.99	1169.75	715.51
16	8.84	104.80	4.66	6633.99	1169.75	715.51
17	8.84	109.40	4.66	6576.46	1159.61	709.31
17	8.84	109.40	4.66	6576.46	1159.61	709.31
18	8.84	114.49	5.64	8122.93	1432.29	876.10
18	8.84	114.49	5.64	8122.93	1432.29	876.10
19	8.84	120.06	5.64	8166.76	1440.02	880.83
19	8.84	120.06	5.64	8166.76	1440.02	880.83
20	8.84	125.64	5.64	8210.59	1447.75	885.56
20	8.84	125.64	5.64	8210.59	1447.75	885.56
21	8.84	131.21	5.64	8254.42	1455.48	890.28
21	8.84	131.21	5.64	8254.42	1455.48	890.28
22	8.84	136.67	5.40	7733.37	1363.60	834.09
22	8.84	136.67	5.40	7733.37	1363.60	834.09
23	8.84	142.00	5.40	7882.25	1389.85	850.14
23	8.84	142.00	5.40	7882.25	1389.85	850.14
24	8.84	147.33	5.40	8031.12	1416.10	866.20
24	8.84	147.33	5.40	8031.12	1416.10	866.20
25	8.84	152.30	4.66	6978.82	1230.55	752.70
25	8.84	152.30	4.66	6978.82	1230.55	752.70
26	8.84	156.90	4.66	6954.37	1226.24	750.07
26	8.84	156.90	4.66	6954.37	1226.24	750.07
27	8.84	161.47	4.60	6842.03	1206.43	737.95
27	8.84	161.47	4.60	6842.03	1206.43	737.95
28	8.84	166.03	4.60	6792.72	1197.74	732.63
28	8.84	166.03	4.60	6792.72	1197.74	732.63
29	8.84	170.30	4.05	6117.14	1078.62	659.77
29	8.84	170.30	4.05	6117.14	1078.62	659.77

30	8.84	174.30	4.05	6451.54	1137.58	695.83
30	8.84	174.30	4.05	6451.54	1137.58	695.83
31	8.84	178.75	4.96	8877.92	1565.42	957.53
31	8.84	178.75	4.96	8877.92	1565.42	957.53
32	8.84	183.88	5.41	11434.03	2016.13	1233.22
32	8.84	183.88	5.41	11434.03	2016.13	1233.22
33	8.84	189.23	5.41	13234.28	2333.56	1427.39
33	8.84	189.23	5.41	13234.28	2333.56	1427.39
34	8.84	194.62	5.52	15332.69	2703.57	1653.72
34	8.84	194.62	5.52	15332.69	2703.57	1653.72
35	8.84	200.08	5.52	17200.87	3032.98	1855.21
35	8.84	200.08	5.52	17200.87	3032.98	1855.21
36	8.84	205.27	5.00	16346.46	2882.32	1763.06
36	8.84	205.27	5.00	16346.46	2882.32	1763.06
37	8.84	210.21	5.00	16173.77	2851.87	1744.43
37	8.84	210.21	5.00	16173.77	2851.87	1744.43
38	8.84	215.15	5.00	16001.08	2821.42	1725.80
38	8.84	215.15	5.00	16001.08	2821.42	1725.80
39	8.84	220.08	5.00	15828.40	2790.97	1707.18
39	8.84	220.08	5.00	15828.40	2790.97	1707.18
40	8.84	225.02	5.00	15655.71	2760.52	1688.55
40	8.84	225.02	5.00	15655.71	2760.52	1688.55
41	8.84	229.96	5.00	15483.02	2730.07	1669.93
41	8.84	229.96	5.00	15483.02	2730.07	1669.93
42	8.84	234.90	5.00	15310.33	2699.62	1651.30
42	8.84	234.90	5.00	15310.33	2699.62	1651.30
43	8.84	239.84	5.00	15137.64	2669.17	1632.68
43	8.84	239.84	5.00	15137.64	2669.17	1632.68
44	8.84	244.78	5.00	14964.95	2638.72	1614.05
44	8.84	244.78	5.00	14964.95	2638.72	1614.05
45	8.84	249.72	5.00	14792.26	2608.27	1595.43
45	8.84	249.72	5.00	14792.26	2608.27	1595.43
46	8.84	254.65	5.00	14619.57	2577.83	1576.80
46	8.84	254.65	5.00	14619.57	2577.83	1576.80
47	8.84	259.59	5.00	14446.88	2547.38	1558.18
47	8.84	259.59	5.00	14446.88	2547.38	1558.18
48	8.84	264.53	5.00	14274.19	2516.93	1539.55
48	8.84	264.53	5.00	14274.19	2516.93	1539.55
49	8.84	269.77	5.62	16452.95	2901.10	1774.54
49	8.84	269.77	5.62	16452.95	2901.10	1774.54
50	8.84	275.33	5.62	17469.34	3080.32	1884.16
50	8.84	275.33	5.62	17469.34	3080.32	1884.16
51	8.84	279.26	2.35	7506.49	1323.60	809.62
51	8.84	279.26	2.35	7506.49	1323.60	809.62
52	8.84	281.80	2.78	8821.43	1555.46	951.44
52	8.84	281.80	2.78	8821.43	1555.46	951.44
53	8.84	284.55	2.78	8753.75	1543.52	944.14
53	8.84	284.55	2.78	8753.75	1543.52	944.14
54	48.14	286.60	2.01	5621.76	991.27	606.34
54	48.14	286.60	2.01	5621.76	991.27	606.34
55	48.14	287.69	1.24	3361.23	592.68	362.53
55	48.14	287.69	1.24	3361.23	592.68	362.53
56	48.14	288.23	0.38	1078.16	190.11	116.29
56	48.14	288.23	0.38	1078.16	190.11	116.29
57	48.14	289.75	4.18	7732.99	6889.62	4214.24
57	48.14	289.75	4.18	7732.99	6889.62	4214.24
58	48.14	292.54	4.18	6675.29	6176.20	3777.85
58	48.14	292.54	4.18	6675.29	6176.20	3777.85
59	69.90	295.37	8.37	4966.14	6696.67	4096.21
59	69.90	295.37	8.37	4966.14	6696.67	4096.21
60	69.90	297.44	3.63	1607.43	1810.74	1107.59
60	69.90	297.44	3.63	1607.43	1810.74	1107.59
61	72.53	299.18	7.47	862.30	2075.57	1269.58
61	72.53	299.18	7.47	862.30	2075.57	1269.58

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 61 Slices (Only Applicable Slices Listed)
***

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

No.	(lbs)	(lbs)	(lbs)		(ft/lbs)
30	12000.0	0.0	12000.0	90.00	-0.317347E+04

Sum of the Resisting Forces = 129822.55 (lbs)

Average Available Shear Strength = 460.21(psf)

Sum of the Driving Forces = 82688.10 (lbs)

Average Mobilized Shear Stress = 293.12(psf)

Total length of the failure surface = 282.09(ft)

Factor of Safety Balance Check: FS = 1.57003

Janbu's Correction Factor (fo) = 1.0452

Janub's FS Corrected = 1.64095

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

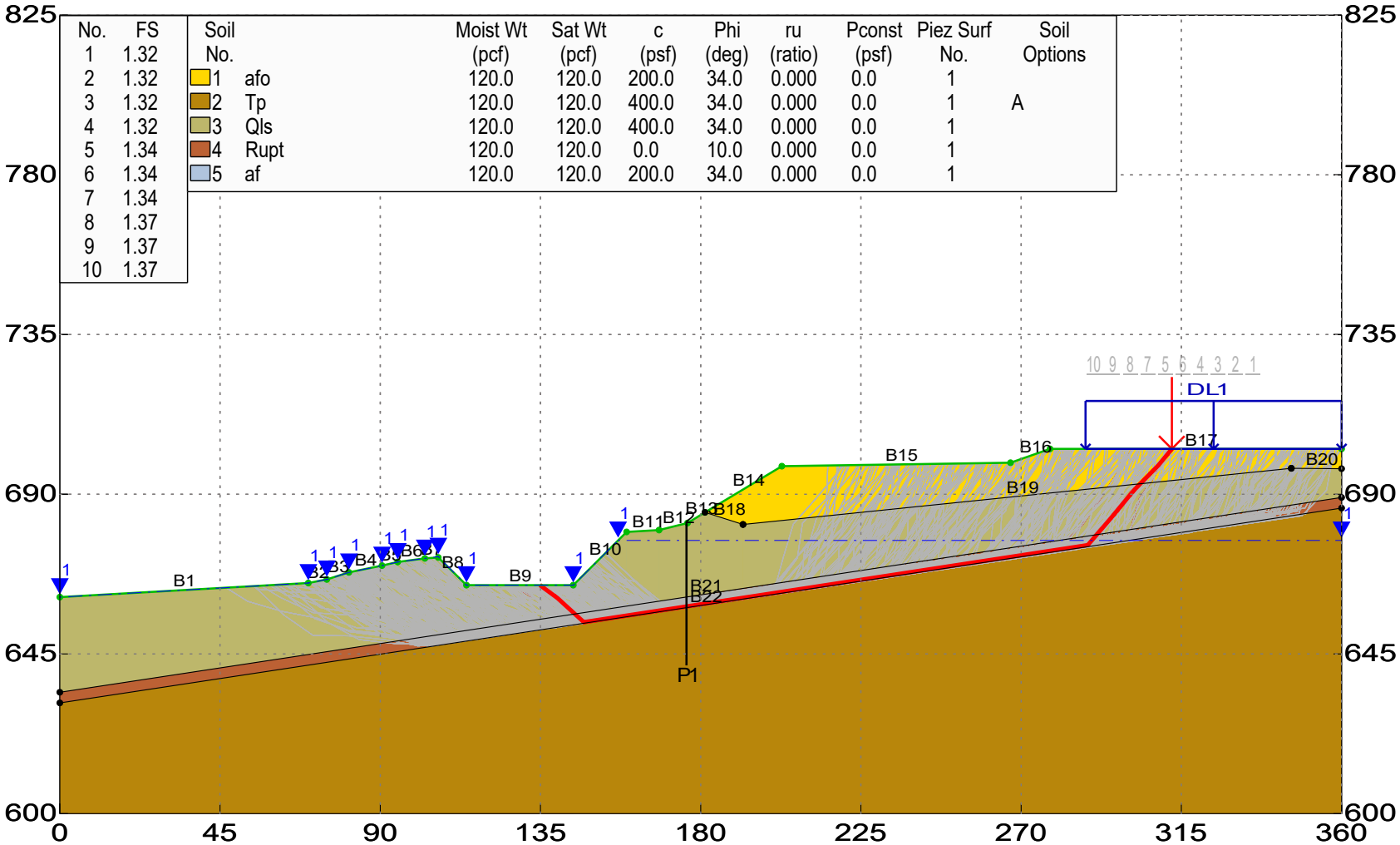
Royal Vista - Cross Section 7
Stage 3 (Temporary Staging Pad)

LGC Geotechnical / BPP

\Sec 7 - Stage 3 (Temporary Staging Pad).gsd

No.	FS
1	1.32
2	1.32
3	1.32
4	1.32
5	1.34
6	1.34
7	1.34
8	1.37
9	1.37
10	1.37

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.32

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 3 (Temporary Staging Pad).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 3 (Temporary Staging Pad).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 3 (Temporary Staging Pad)

BOUNDARY DATA

17 Surface Boundaries
22 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	661.000	69.800	665.000	3
2	69.800	665.000	75.000	666.000	3
3	75.000	666.000	81.200	668.000	3
4	81.200	668.000	90.500	669.900	3
5	90.500	669.900	94.900	670.900	3
6	94.900	670.900	102.500	671.900	3
7	102.500	671.900	106.300	672.200	3
8	106.300	672.200	114.200	664.400	3
9	114.200	664.400	144.200	664.400	3
10	144.200	664.400	159.200	679.400	3
11	159.200	679.400	168.300	679.900	3
12	168.300	679.900	176.300	681.900	3
13	176.300	681.900	181.200	684.900	3
14	181.200	684.900	202.800	697.900	1
15	202.800	697.900	267.000	698.900	1
16	267.000	698.900	278.100	702.800	1
17	278.100	702.800	360.000	702.800	1
18	181.200	684.900	191.900	681.500	3
19	191.900	681.500	345.900	697.300	3
20	345.900	697.300	360.000	697.200	3
21	0.000	634.200	360.000	689.100	4
22	0.000	631.200	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 12 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	661.00
2	69.80	665.00
3	75.00	666.00
4	81.20	668.00
5	90.50	669.90
6	94.90	670.90
7	102.50	671.90
8	106.30	672.40
9	114.20	664.40
10	144.20	664.40
11	156.80	677.00
12	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	17	288.100	702.800	250.000	360.000	702.800	250.000	0.00

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 10.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	100.00	648.02	170.00	658.49	3.00
2	200.00	663.00	350.00	685.50	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 = 32

Number of Trial Surfaces With Valid FS = 968

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 3.2 %

Statistical Data On All Valid FS Values:
FS Max = 2.883 FS Min = 1.324 FS Ave = 1.871

Standard Deviation = 0.343 Coefficient of Variation = 18.33 %

Critical Surface is Sequence Number 30 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	176.00	658.38

Factor Of Safety For The Critical or Specified Surface = 1.324

Table 1 - Geometry Data on the 44 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.95	1.85	137.32	662.55	664.40	-36.73	0.00	6.18
2	4.40	5.71	142.00	658.69	664.40	-42.42	0.00	5.96
3	0.46	8.16	144.43	656.47	664.63	-42.42	45.00	0.63
4	2.52	11.01	145.92	655.11	666.12	-42.42	45.00	3.41
5	4.81	15.46	149.59	654.33	669.79	8.72	45.00	4.87
6	4.81	19.53	154.40	655.07	674.60	8.72	45.00	4.87
7	2.40	22.58	158.00	655.62	678.20	8.72	45.00	2.43
8	4.55	23.37	161.47	656.15	679.52	8.72	3.14	4.60
9	4.55	22.92	166.03	656.85	679.77	8.72	3.14	4.60
10	4.00	22.89	170.30	657.51	680.40	8.72	14.04	4.05
11	4.00	23.28	174.30	658.12	681.40	8.72	14.04	4.05
12	4.90	24.60	178.75	658.80	683.40	8.72	31.48	4.96
13	5.35	26.92	183.88	659.59	686.51	8.72	31.04	5.41
14	5.35	29.32	189.23	660.41	689.73	8.72	31.04	5.41
15	5.45	31.74	194.62	661.24	692.98	8.72	31.04	5.51
16	5.45	34.19	200.08	662.07	696.26	8.72	31.04	5.51
17	4.94	35.07	205.27	662.87	697.94	8.72	0.89	5.00
18	4.94	34.39	210.21	663.63	698.02	8.72	0.89	5.00
19	4.94	33.71	215.15	664.39	698.09	8.72	0.89	5.00
20	4.94	33.02	220.08	665.14	698.17	8.72	0.89	5.00
21	4.94	32.34	225.02	665.90	698.25	8.72	0.89	5.00
22	4.94	31.66	229.96	666.66	698.32	8.72	0.89	5.00
23	4.94	30.98	234.90	667.42	698.40	8.72	0.89	5.00
24	4.94	30.30	239.84	668.18	698.48	8.72	0.89	5.00
25	4.94	29.62	244.78	668.93	698.55	8.72	0.89	5.00
26	4.94	28.94	249.72	669.69	698.63	8.72	0.89	5.00
27	4.94	28.26	254.65	670.45	698.71	8.72	0.89	5.00
28	4.94	27.58	259.59	671.21	698.78	8.72	0.89	5.00
29	4.94	26.90	264.53	671.96	698.86	8.72	0.89	5.00
30	5.55	27.11	269.77	672.77	699.88	8.72	19.36	5.61
31	5.55	28.21	275.33	673.62	701.82	8.72	19.36	5.61
32	2.56	28.56	279.38	674.24	702.80	8.72	0.00	2.59
33	3.72	28.08	282.52	674.72	702.80	8.72	0.00	3.77
34	3.72	27.51	286.24	675.29	702.80	8.72	0.00	3.77
35	0.62	27.17	288.41	675.63	702.80	8.72	0.00	0.63
36	1.13	26.46	289.29	676.34	702.80	49.59	0.00	1.74
37	1.37	24.99	290.54	677.81	702.80	49.59	0.00	2.12
38	3.98	21.85	293.22	680.95	702.80	49.59	0.00	6.14
39	3.18	17.58	296.79	685.22	702.80	50.57	0.00	5.00
40	3.18	13.72	299.97	689.08	702.80	50.57	0.00	5.00
41	1.88	10.82	302.50	691.98	702.80	45.71	0.00	2.70
42	2.55	8.55	304.72	694.25	702.80	45.71	0.00	3.65
43	2.55	5.94	307.27	696.86	702.80	45.71	0.00	3.65
44	3.78	2.31	310.43	700.49	702.80	50.80	0.00	5.97

Table 2 - Force Data On The 44 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1097.9	0.0	712.4	0.0	0.0	0.0
2	3013.9	0.0	2123.0	0.0	0.0	0.0
3	452.0	0.0	159.2	0.0	0.0	0.0
4	3328.6	0.0	1172.3	0.0	0.0	0.0
5	8921.4	0.0	2346.7	0.0	0.0	0.0
6	11271.4	0.0	2964.8	0.0	0.0	0.0
7	6503.3	0.0	3239.5	0.0	0.0	0.0
8	12761.6	0.0	5988.4	0.0	0.0	0.0
9	12516.9	0.0	5787.9	0.0	0.0	0.0
10	10989.0	0.0	4922.6	0.0	0.0	0.0
11	11174.5	0.0	4767.6	0.0	0.0	0.0
12	14463.3	0.0	5629.1	0.0	0.0	0.0
13	17283.3	0.0	5880.5	0.0	0.0	0.0
14	18823.5	0.0	5603.3	0.0	0.0	0.0
15	20759.0	0.0	5423.0	0.0	0.0	0.0
16	22357.3	0.0	5135.3	0.0	0.0	0.0
17	20781.3	0.0	4404.8	0.0	0.0	0.0
18	20377.9	0.0	4168.6	0.0	0.0	0.0
19	19974.4	0.0	3932.4	0.0	0.0	0.0
20	19571.0	0.0	3696.2	0.0	0.0	0.0
21	19167.6	0.0	3459.9	0.0	0.0	0.0
22	18764.1	0.0	3223.7	0.0	0.0	0.0
23	18360.7	0.0	2987.5	0.0	0.0	0.0
24	17957.2	0.0	2751.3	0.0	0.0	0.0
25	17553.8	0.0	2515.0	0.0	0.0	0.0
26	17150.4	0.0	2278.8	0.0	0.0	0.0
27	16746.9	0.0	2042.6	0.0	0.0	0.0
28	16343.5	0.0	1806.4	0.0	0.0	0.0
29	15940.1	0.0	1570.1	0.0	0.0	0.0
30	18053.1	0.0	1482.7	0.0	0.0	0.0
31	18784.6	0.0	1184.3	0.0	0.0	0.0
32	8758.5	0.0	445.0	0.0	0.0	0.0
33	12540.6	0.0	535.0	0.0	0.0	0.0
34	12285.6	0.0	400.8	0.0	0.0	0.0
35	2033.9	0.0	54.0	0.0	0.0	155.9
36	3581.0	0.0	71.9	0.0	0.0	281.9
37	4115.7	0.0	0.0	0.0	0.0	343.1
38	10443.2	0.0	0.0	0.0	0.0	995.8
39	6699.6	0.0	0.0	0.0	0.0	794.0
40	5227.8	0.0	0.0	0.0	0.0	794.0
41	2445.9	0.0	0.0	0.0	0.0	470.9
42	2615.9	0.0	0.0	0.0	0.0	637.5
43	1816.2	0.0	0.0	0.0	0.0	637.5
44	1048.5	0.0	0.0	0.0	0.0	943.8

TOTAL WEIGHT OF SLIDING MASS = 524855.73(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 422224.07(lbs)

TOTAL AREA OF SLIDING MASS = 4373.80(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 44 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	
3	3	400.00	34.00	
4	4	0.00	10.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	

10	4	0.00	10.00
11	4	0.00	10.00
12	4	0.00	10.00
13	4	0.00	10.00
14	4	0.00	10.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	4	0.00	10.00
28	4	0.00	10.00
29	4	0.00	10.00
30	4	0.00	10.00
31	4	0.00	10.00
32	4	0.00	10.00
33	4	0.00	10.00
34	4	0.00	10.00
35	4	0.00	10.00
36	4	0.00	10.00
37	4	0.00	10.00
38	3	400.00	34.00
39	3	400.00	34.00
40	3	400.00	34.00
41	3	400.00	34.00
42	1	200.00	34.00
43	1	200.00	34.00
44	1	200.00	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 44 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-36.73	137.32	6.18	572.52	786.17	594.07
1	-36.73	137.32	6.18	572.52	786.17	594.07
2	-42.42	142.00	5.96	1212.97	1218.16	920.50
2	-42.42	142.00	5.96	1212.97	1218.16	920.50
3	-42.42	144.43	0.63	1988.58	1741.31	1315.81
3	-42.42	144.43	0.63	1988.58	1741.31	1315.81
4	-42.42	145.92	3.41	1121.33	197.72	149.41
4	-42.42	145.92	3.41	1121.33	197.72	149.41
5	8.72	149.59	4.87	1343.75	236.94	179.04
5	8.72	149.59	4.87	1343.75	236.94	179.04
6	8.72	154.40	4.87	1697.71	299.35	226.20
6	8.72	154.40	4.87	1697.71	299.35	226.20
7	8.72	158.00	2.43	1346.60	237.44	179.42
7	8.72	158.00	2.43	1346.60	237.44	179.42
8	8.72	161.47	4.60	1472.20	259.59	196.16
8	8.72	161.47	4.60	1472.20	259.59	196.16
9	8.72	166.03	4.60	1462.20	257.83	194.82
9	8.72	166.03	4.60	1462.20	257.83	194.82
10	8.72	170.30	4.05	1498.64	264.25	199.68
10	8.72	170.30	4.05	1498.64	264.25	199.68
11	8.72	174.30	4.05	1581.51	278.86	210.72
11	8.72	174.30	4.05	1581.51	278.86	210.72

12	8.72	178.75	4.96	1777.96	313.50	236.90
12	8.72	178.75	4.96	1777.96	313.50	236.90
13	8.72	183.88	5.41	2098.96	370.10	279.67
13	8.72	183.88	5.41	2098.96	370.10	279.67
14	8.72	189.23	5.41	2430.94	428.64	323.90
14	8.72	189.23	5.41	2430.94	428.64	323.90
15	8.72	194.62	5.51	2766.01	487.72	368.55
15	8.72	194.62	5.51	2766.01	487.72	368.55
16	8.72	200.08	5.51	3104.19	547.35	413.60
16	8.72	200.08	5.51	3104.19	547.35	413.60
17	8.72	205.27	5.00	3256.44	574.20	433.89
17	8.72	205.27	5.00	3256.44	574.20	433.89
18	8.72	210.21	5.00	3222.75	568.26	429.40
18	8.72	210.21	5.00	3222.75	568.26	429.40
19	8.72	215.15	5.00	3189.06	562.32	424.91
19	8.72	215.15	5.00	3189.06	562.32	424.91
20	8.72	220.08	5.00	3155.37	556.38	420.42
20	8.72	220.08	5.00	3155.37	556.38	420.42
21	8.72	225.02	5.00	3121.68	550.44	415.94
21	8.72	225.02	5.00	3121.68	550.44	415.94
22	8.72	229.96	5.00	3087.99	544.50	411.45
22	8.72	229.96	5.00	3087.99	544.50	411.45
23	8.72	234.90	5.00	3054.31	538.56	406.96
23	8.72	234.90	5.00	3054.31	538.56	406.96
24	8.72	239.84	5.00	3020.62	532.62	402.47
24	8.72	239.84	5.00	3020.62	532.62	402.47
25	8.72	244.78	5.00	2986.93	526.68	397.98
25	8.72	244.78	5.00	2986.93	526.68	397.98
26	8.72	249.72	5.00	2953.24	520.74	393.49
26	8.72	249.72	5.00	2953.24	520.74	393.49
27	8.72	254.65	5.00	2919.55	514.80	389.00
27	8.72	254.65	5.00	2919.55	514.80	389.00
28	8.72	259.59	5.00	2885.86	508.86	384.51
28	8.72	259.59	5.00	2885.86	508.86	384.51
29	8.72	264.53	5.00	2852.18	502.92	380.03
29	8.72	264.53	5.00	2852.18	502.92	380.03
30	8.72	269.77	5.61	2925.86	515.91	389.84
30	8.72	269.77	5.61	2925.86	515.91	389.84
31	8.72	275.33	5.61	3106.92	547.83	413.97
31	8.72	275.33	5.61	3106.92	547.83	413.97
32	8.72	279.38	2.59	3186.40	561.85	424.56
32	8.72	279.38	2.59	3186.40	561.85	424.56
33	8.72	282.52	3.77	3159.24	557.06	420.94
33	8.72	282.52	3.77	3159.24	557.06	420.94
34	8.72	286.24	3.77	3127.04	551.38	416.65
34	8.72	286.24	3.77	3127.04	551.38	416.65
35	8.72	288.41	0.63	3352.98	591.22	446.75
35	8.72	288.41	0.63	3352.98	591.22	446.75
36	49.59	289.29	1.74	2906.05	512.41	387.20
36	49.59	289.29	1.74	2906.05	512.41	387.20
37	49.59	290.54	2.12	2790.26	492.00	371.78
37	49.59	290.54	2.12	2790.26	492.00	371.78
38	49.59	293.22	6.14	1533.59	1434.42	1083.91
38	49.59	293.22	6.14	1533.59	1434.42	1083.91
39	50.57	296.79	5.00	1194.68	1205.82	911.17
39	50.57	296.79	5.00	1194.68	1205.82	911.17
40	50.57	299.97	5.00	914.09	1016.56	768.16
40	50.57	299.97	5.00	914.09	1016.56	768.16
41	45.71	302.50	2.70	789.31	932.40	704.56
41	45.71	302.50	2.70	789.31	932.40	704.56
42	45.71	304.72	3.65	718.44	684.60	517.31
42	45.71	304.72	3.65	718.44	684.60	517.31
43	45.71	307.27	3.65	516.00	548.05	414.13
43	45.71	307.27	3.65	516.00	548.05	414.13
44	50.80	310.43	5.97	200.92	335.53	253.54
44	50.80	310.43	5.97	200.92	335.53	253.54

Table 4 - Base Force Data on the 44 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available	Mobilized

No. *	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Force (lbs)	Shear Force (lbs)	Shear Force (lbs)
1	-36.73	137.32	6.18	3537.37	4857.41	3670.48
1	-36.73	137.32	6.18	3537.37	4857.41	3670.48
2	-42.42	142.00	5.96	7231.97	7262.90	5488.18
2	-42.42	142.00	5.96	7231.97	7262.90	5488.18
3	-42.42	144.43	0.63	1243.68	1089.03	822.92
3	-42.42	144.43	0.63	1243.68	1089.03	822.92
4	-42.42	145.92	3.41	3826.42	674.70	509.84
4	-42.42	145.92	3.41	3826.42	674.70	509.84
5	8.72	149.59	4.87	6538.55	1152.92	871.20
5	8.72	149.59	4.87	6538.55	1152.92	871.20
6	8.72	154.40	4.87	8260.87	1456.62	1100.68
6	8.72	154.40	4.87	8260.87	1456.62	1100.68
7	8.72	158.00	2.43	3269.67	576.53	435.65
7	8.72	158.00	2.43	3269.67	576.53	435.65
8	8.72	161.47	4.60	6776.87	1194.95	902.95
8	8.72	161.47	4.60	6776.87	1194.95	902.95
9	8.72	166.03	4.60	6730.86	1186.83	896.82
9	8.72	166.03	4.60	6730.86	1186.83	896.82
10	8.72	170.30	4.05	6064.69	1069.37	808.06
10	8.72	170.30	4.05	6064.69	1069.37	808.06
11	8.72	174.30	4.05	6400.05	1128.50	852.75
11	8.72	174.30	4.05	6400.05	1128.50	852.75
12	8.72	178.75	4.96	8813.94	1554.13	1174.37
12	8.72	178.75	4.96	8813.94	1554.13	1174.37
13	8.72	183.88	5.41	11360.85	2003.22	1513.73
13	8.72	183.88	5.41	11360.85	2003.22	1513.73
14	8.72	189.23	5.41	13157.69	2320.06	1753.14
14	8.72	189.23	5.41	13157.69	2320.06	1753.14
15	8.72	194.62	5.51	15251.16	2689.19	2032.07
15	8.72	194.62	5.51	15251.16	2689.19	2032.07
16	8.72	200.08	5.51	17115.81	3017.98	2280.52
16	8.72	200.08	5.51	17115.81	3017.98	2280.52
17	8.72	205.27	5.00	16269.97	2868.83	2167.82
17	8.72	205.27	5.00	16269.97	2868.83	2167.82
18	8.72	210.21	5.00	16101.65	2839.16	2145.39
18	8.72	210.21	5.00	16101.65	2839.16	2145.39
19	8.72	215.15	5.00	15933.34	2809.48	2122.97
19	8.72	215.15	5.00	15933.34	2809.48	2122.97
20	8.72	220.08	5.00	15765.02	2779.80	2100.54
20	8.72	220.08	5.00	15765.02	2779.80	2100.54
21	8.72	225.02	5.00	15596.71	2750.12	2078.12
21	8.72	225.02	5.00	15596.71	2750.12	2078.12
22	8.72	229.96	5.00	15428.39	2720.44	2055.69
22	8.72	229.96	5.00	15428.39	2720.44	2055.69
23	8.72	234.90	5.00	15260.08	2690.76	2033.26
23	8.72	234.90	5.00	15260.08	2690.76	2033.26
24	8.72	239.84	5.00	15091.76	2661.08	2010.84
24	8.72	239.84	5.00	15091.76	2661.08	2010.84
25	8.72	244.78	5.00	14923.44	2631.41	1988.41
25	8.72	244.78	5.00	14923.44	2631.41	1988.41
26	8.72	249.72	5.00	14755.13	2601.73	1965.98
26	8.72	249.72	5.00	14755.13	2601.73	1965.98
27	8.72	254.65	5.00	14586.81	2572.05	1943.56
27	8.72	254.65	5.00	14586.81	2572.05	1943.56
28	8.72	259.59	5.00	14418.50	2542.37	1921.13
28	8.72	259.59	5.00	14418.50	2542.37	1921.13
29	8.72	264.53	5.00	14250.18	2512.69	1898.70
29	8.72	264.53	5.00	14250.18	2512.69	1898.70
30	8.72	269.77	5.61	16428.55	2896.80	2188.95
30	8.72	269.77	5.61	16428.55	2896.80	2188.95
31	8.72	275.33	5.61	17445.20	3076.06	2324.41
31	8.72	275.33	5.61	17445.20	3076.06	2324.41
32	8.72	279.38	2.59	8238.89	1452.74	1097.76
32	8.72	279.38	2.59	8238.89	1452.74	1097.76
33	8.72	282.52	3.77	11896.71	2097.71	1585.13
33	8.72	282.52	3.77	11896.71	2097.71	1585.13
34	8.72	286.24	3.77	11775.45	2076.33	1568.97
34	8.72	286.24	3.77	11775.45	2076.33	1568.97
35	8.72	288.41	0.63	2115.91	373.09	281.93

35	8.72	288.41	0.63	2115.91	373.09	281.93
36	49.59	289.29	1.74	5055.03	891.34	673.54
36	49.59	289.29	1.74	5055.03	891.34	673.54
37	49.59	290.54	2.12	5906.02	1041.39	786.92
37	49.59	290.54	2.12	5906.02	1041.39	786.92
38	49.59	293.22	6.14	9422.14	8812.86	6659.39
38	49.59	293.22	6.14	9422.14	8812.86	6659.39
39	50.57	296.79	5.00	5973.39	6029.11	4555.86
39	50.57	296.79	5.00	5973.39	6029.11	4555.86
40	50.57	299.97	5.00	4570.44	5082.80	3840.79
40	50.57	299.97	5.00	4570.44	5082.80	3840.79
41	45.71	302.50	2.70	2128.97	2514.91	1900.38
41	45.71	302.50	2.70	2128.97	2514.91	1900.38
42	45.71	304.72	3.65	2623.31	2499.72	1888.90
42	45.71	304.72	3.65	2623.31	2499.72	1888.90
43	45.71	307.27	3.65	1884.12	2001.13	1512.14
43	45.71	307.27	3.65	1884.12	2001.13	1512.14
44	50.80	310.43	5.97	1200.17	2004.18	1514.45
44	50.80	310.43	5.97	1200.17	2004.18	1514.45

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 44 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
11	12000.0	0.0	12000.0	90.00	-0.312991E+04

Sum of the Resisting Forces = 96282.71 (lbs)

Average Available Shear Strength = 492.87(psf)

Sum of the Driving Forces = 76513.22 (lbs)

Average Mobilized Shear Stress = 391.67(psf)

Total length of the failure surface = 195.35(ft)

Factor of Safety Balance Check: FS = 1.25838

Janbu's Correction Factor (fo) = 1.0519

Janub's FS Corrected = 1.32371

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

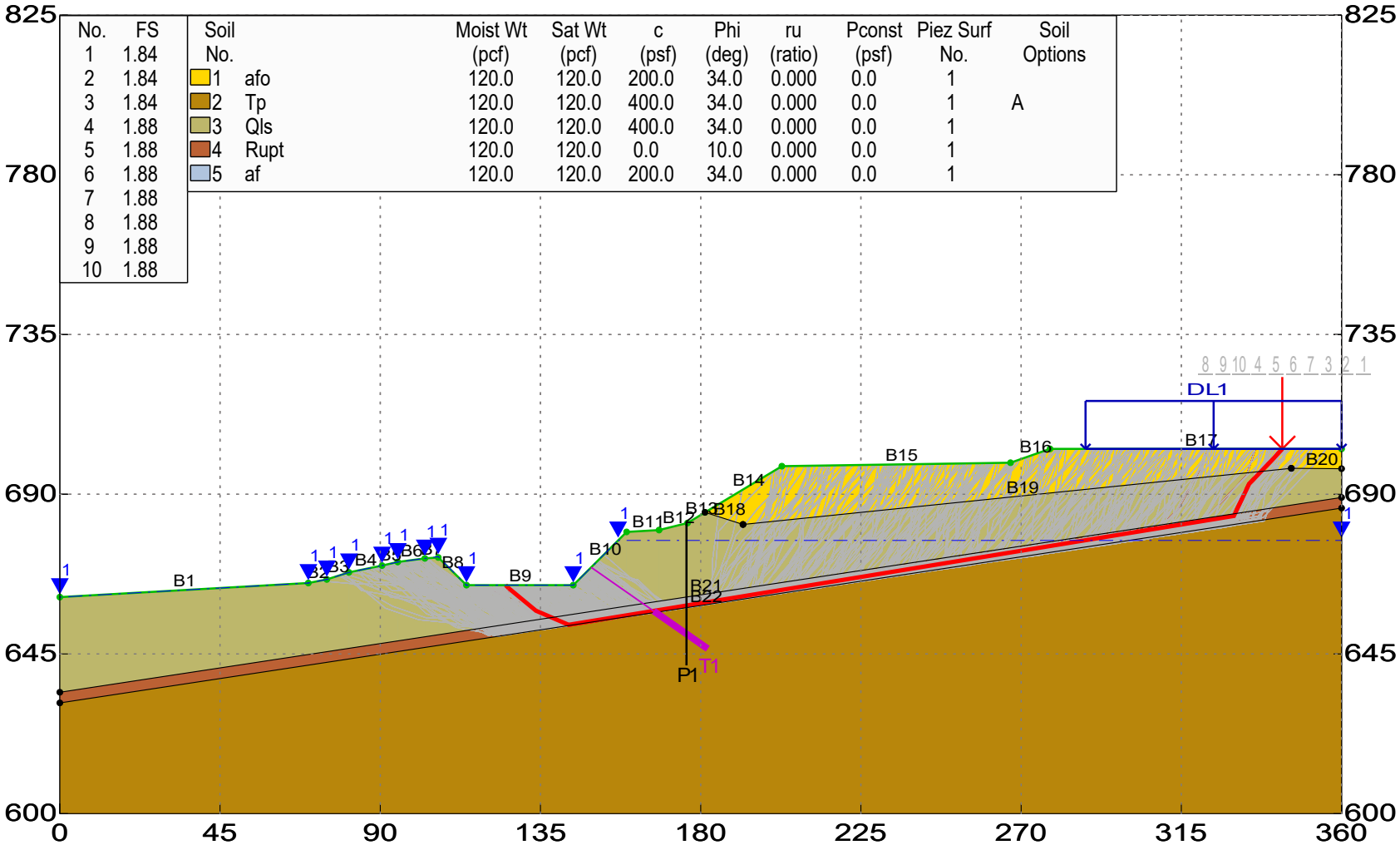
Royal Vista - Cross Section 7
Stage 4 (Temporary Staging Pad - Tieback)

LGC Geotechnical / BPP

\Sec 7 - Stage 4 (Temporary Staging Pad - Tieback).gsd

No.	FS
1	1.84
2	1.84
3	1.84
4	1.88
5	1.88
6	1.88
7	1.88
8	1.88
9	1.88
10	1.88

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.84

Simplified Janbu (Corrected) Method

GEOSTASE
Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 4 (Temporary Staging Pad - Tieback).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 4 (Temporary Staging Pad - Tieback).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 4 (Temporary Staging Pad - Tieback)

BOUNDARY DATA

17 Surface Boundaries
22 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	661.000	69.800	665.000	3
2	69.800	665.000	75.000	666.000	3
3	75.000	666.000	81.200	668.000	3
4	81.200	668.000	90.500	669.900	3
5	90.500	669.900	94.900	670.900	3
6	94.900	670.900	102.500	671.900	3
7	102.500	671.900	106.300	672.200	3
8	106.300	672.200	114.200	664.400	3
9	114.200	664.400	144.200	664.400	3
10	144.200	664.400	159.200	679.400	3
11	159.200	679.400	168.300	679.900	3
12	168.300	679.900	176.300	681.900	3
13	176.300	681.900	181.200	684.900	3
14	181.200	684.900	202.800	697.900	1
15	202.800	697.900	267.000	698.900	1
16	267.000	698.900	278.100	702.800	1
17	278.100	702.800	360.000	702.800	1
18	181.200	684.900	191.900	681.500	3
19	191.900	681.500	345.900	697.300	3
20	345.900	697.300	360.000	697.200	3
21	0.000	634.200	360.000	689.100	4
22	0.000	631.200	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 12 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	661.00
2	69.80	665.00
3	75.00	666.00
4	81.20	668.00
5	90.50	669.90
6	94.90	670.90
7	102.50	671.90
8	106.30	672.40
9	114.20	664.40
10	144.20	664.40
11	156.80	677.00
12	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	17	288.100	702.800	250.000	360.000	702.800	250.000	0.00

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	149.20	669.40	167300.0	5.0	35.00	21.5	18.5

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 10.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)

1	120.00	651.00	170.00	658.49	3.00
2	180.00	660.00	340.00	684.00	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 = 146

Number of Trial Surfaces With Valid FS = 854

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 14.6 %

Statistical Data On All Valid FS Values:
FS Max = 10.799 FS Min = 1.843 FS Ave = 2.842
Standard Deviation = 1.034 Coefficient of Variation = 36.39 %

Critical Surface is Sequence Number 230 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	166.74	657.12

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	176.00	658.64

Factor Of Safety For The Critical or Specified Surface = 1.843

Table 1 - Geometry Data on the 51 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.83	0.41	125.61	663.99	664.40	-44.79	0.00	1.17
2	3.85	2.42	127.95	661.98	664.40	-39.65	0.00	5.00
3	3.85	5.61	131.80	658.79	664.40	-39.65	0.00	5.00
4	4.43	8.17	135.94	656.23	664.40	-23.49	0.00	4.83
5	4.74	10.16	140.52	654.24	664.40	-23.49	0.00	5.17
6	1.30	11.09	143.55	653.31	664.40	9.33	0.00	1.32
7	4.20	12.74	146.30	653.76	666.50	9.33	45.00	4.26
8	4.20	16.25	150.50	654.45	670.70	9.33	45.00	4.26
9	4.20	19.76	154.70	655.14	674.90	9.33	45.00	4.26
10	2.40	22.51	158.00	655.69	678.20	9.33	45.00	2.43
11	4.55	23.27	161.47	656.26	679.52	9.33	3.14	4.61
12	4.55	22.77	166.03	657.00	679.77	9.33	3.14	4.61
13	4.00	22.69	170.30	657.71	680.40	9.33	14.04	4.05
14	4.00	23.04	174.30	658.36	681.40	9.33	14.04	4.05
15	4.90	24.31	178.75	659.09	683.40	9.33	31.48	4.97
16	5.35	26.57	183.88	659.94	686.51	9.33	31.04	5.42
17	5.35	28.91	189.23	660.82	689.73	9.33	31.04	5.42
18	5.45	31.28	194.62	661.70	692.98	9.33	31.04	5.52

19	5.45	33.66	200.08	662.60	696.26	9.33	31.04	5.52
20	4.94	34.49	205.27	663.45	697.94	9.33	0.89	5.00
21	4.94	33.75	210.21	664.26	698.02	9.33	0.89	5.00
22	4.94	33.02	215.15	665.07	698.09	9.33	0.89	5.00
23	4.94	32.29	220.08	665.88	698.17	9.33	0.89	5.00
24	4.94	31.55	225.02	666.70	698.25	9.33	0.89	5.00
25	4.94	30.82	229.96	667.51	698.32	9.33	0.89	5.00
26	4.94	30.08	234.90	668.32	698.40	9.33	0.89	5.00
27	4.94	29.35	239.84	669.13	698.48	9.33	0.89	5.00
28	4.94	28.61	244.78	669.94	698.55	9.33	0.89	5.00
29	4.94	27.88	249.72	670.75	698.63	9.33	0.89	5.00
30	4.94	27.15	254.65	671.56	698.71	9.33	0.89	5.00
31	4.94	26.41	259.59	672.37	698.78	9.33	0.89	5.00
32	4.94	25.68	264.53	673.18	698.86	9.33	0.89	5.00
33	5.55	25.83	269.77	674.05	699.88	9.33	19.36	5.62
34	5.55	26.87	275.33	674.96	701.82	9.33	19.36	5.62
35	2.56	27.18	279.38	675.62	702.80	9.33	0.00	2.59
36	3.55	26.68	282.43	676.12	702.80	9.33	0.00	3.60
37	3.55	26.09	285.98	676.71	702.80	9.33	0.00	3.60
38	0.34	25.77	287.93	677.03	702.80	9.33	0.00	0.34
39	5.21	25.32	290.70	677.48	702.80	9.33	0.00	5.28
40	5.21	24.46	295.91	678.34	702.80	9.33	0.00	5.28
41	5.21	23.61	301.12	679.19	702.80	9.33	0.00	5.28
42	5.21	22.75	306.32	680.05	702.80	9.33	0.00	5.28
43	5.21	21.90	311.53	680.90	702.80	9.33	0.00	5.28
44	5.21	21.04	316.74	681.76	702.80	9.33	0.00	5.28
45	5.21	20.18	321.95	682.62	702.80	9.33	0.00	5.28
46	5.21	19.33	327.15	683.47	702.80	9.33	0.00	5.28
47	0.30	18.58	329.91	684.22	702.80	64.65	0.00	0.70
48	3.98	14.07	332.05	688.73	702.80	64.65	0.00	9.30
49	3.36	8.12	335.72	694.68	702.80	46.14	0.00	4.84
50	3.57	4.51	339.18	698.29	702.80	46.14	0.00	5.16
51	2.38	1.33	342.16	701.47	702.80	48.12	0.00	3.57

Table 2 - Force Data On The 51 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	41.4	0.0	30.3	0.0	0.0	0.0
2	1119.2	0.0	755.8	0.0	0.0	0.0
3	2593.1	0.0	1751.2	0.0	0.0	0.0
4	4339.5	0.0	2460.5	0.0	0.0	0.0
5	5786.5	0.0	3280.9	0.0	0.0	0.0
6	1733.1	0.0	913.3	0.0	0.0	0.0
7	6418.5	0.0	1691.2	0.0	0.0	0.0
8	8187.6	0.0	2157.3	0.0	0.0	0.0
9	9956.7	0.0	2623.4	0.0	0.0	0.0
10	6483.9	0.0	3234.7	0.0	0.0	0.0
11	12704.1	0.0	5968.2	0.0	0.0	0.0
12	12432.6	0.0	5753.1	0.0	0.0	0.0
13	10892.7	0.0	4880.1	0.0	0.0	0.0
14	11057.3	0.0	4713.9	0.0	0.0	0.0
15	14291.4	0.0	5548.0	0.0	0.0	0.0
16	17060.1	0.0	5772.8	0.0	0.0	0.0
17	18563.1	0.0	5475.5	0.0	0.0	0.0
18	20455.5	0.0	5272.1	0.0	0.0	0.0
19	22015.2	0.0	4963.6	0.0	0.0	0.0
20	20438.0	0.0	4231.3	0.0	0.0	0.0
21	20002.8	0.0	3978.0	0.0	0.0	0.0
22	19567.7	0.0	3724.7	0.0	0.0	0.0
23	19132.6	0.0	3471.3	0.0	0.0	0.0
24	18697.5	0.0	3218.0	0.0	0.0	0.0
25	18262.4	0.0	2964.7	0.0	0.0	0.0
26	17827.3	0.0	2711.4	0.0	0.0	0.0
27	17392.1	0.0	2458.1	0.0	0.0	0.0
28	16957.0	0.0	2204.8	0.0	0.0	0.0
29	16521.9	0.0	1951.5	0.0	0.0	0.0

30	16086.8	0.0	1698.1	0.0	0.0	0.0
31	15651.7	0.0	1444.8	0.0	0.0	0.0
32	15216.5	0.0	1191.5	0.0	0.0	0.0
33	17202.1	0.0	1036.7	0.0	0.0	0.0
34	17893.7	0.0	716.8	0.0	0.0	0.0
35	8334.8	0.0	222.5	0.0	0.0	0.0
36	11369.7	0.0	196.6	0.0	0.0	0.0
37	11121.1	0.0	65.5	0.0	0.0	0.0
38	1052.8	0.0	0.0	0.0	0.0	0.0
39	15818.7	0.0	0.0	0.0	0.0	1301.7
40	15284.3	0.0	0.0	0.0	0.0	1301.7
41	14749.9	0.0	0.0	0.0	0.0	1301.7
42	14215.5	0.0	0.0	0.0	0.0	1301.7
43	13681.1	0.0	0.0	0.0	0.0	1301.7
44	13146.7	0.0	0.0	0.0	0.0	1301.7
45	12612.3	0.0	0.0	0.0	0.0	1301.7
46	12077.9	0.0	0.0	0.0	0.0	1301.7
47	671.6	0.0	0.0	0.0	0.0	75.3
48	6717.9	0.0	0.0	0.0	0.0	995.0
49	3269.4	0.0	0.0	0.0	0.0	839.0
50	1935.4	0.0	0.0	0.0	0.0	893.3
51	379.1	0.0	0.0	0.0	0.0	595.1

TOTAL WEIGHT OF SLIDING MASS = 609419.59(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 507024.10(lbs)

TOTAL AREA OF SLIDING MASS = 5078.50(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 51 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	
3	3	400.00	34.00	
4	3	400.00	34.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	

39	4	0.00	10.00
40	4	0.00	10.00
41	4	0.00	10.00
42	4	0.00	10.00
43	4	0.00	10.00
44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	4	0.00	10.00
48	3	400.00	34.00
49	3	400.00	34.00
50	1	200.00	34.00
51	1	200.00	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 51 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-44.79	125.61	1.17	396.55	667.47	347.28
1	-44.79	125.61	1.17	396.55	667.47	347.28
2	-39.65	127.95	5.00	475.42	720.68	374.96
2	-39.65	127.95	5.00	475.42	720.68	374.96
3	-39.65	131.80	5.00	743.44	901.45	469.02
3	-39.65	131.80	5.00	743.44	901.45	469.02
4	-23.49	135.94	4.83	680.59	859.07	446.97
4	-23.49	135.94	4.83	680.59	859.07	446.97
5	-23.49	140.52	5.17	611.75	107.87	56.12
5	-23.49	140.52	5.17	611.75	107.87	56.12
6	9.33	143.55	1.32	628.38	110.80	57.65
6	9.33	143.55	1.32	628.38	110.80	57.65
7	9.33	146.30	4.26	1112.75	196.21	102.09
7	9.33	146.30	4.26	1112.75	196.21	102.09
8	9.33	150.50	4.26	1419.46	250.29	130.22
8	9.33	150.50	4.26	1419.46	250.29	130.22
9	9.33	154.70	4.26	1726.16	304.37	158.36
9	9.33	154.70	4.26	1726.16	304.37	158.36
10	9.33	158.00	2.43	1349.67	237.98	123.82
10	9.33	158.00	2.43	1349.67	237.98	123.82
11	9.33	161.47	4.61	1473.77	259.86	135.21
11	9.33	161.47	4.61	1473.77	259.86	135.21
12	9.33	166.03	4.61	5611.31	989.43	514.79
12	9.33	166.03	4.61	5611.31	989.43	514.79
13	9.33	170.30	4.05	1494.93	263.60	137.15
13	9.33	170.30	4.05	1494.93	263.60	137.15
14	9.33	174.30	4.05	1575.77	277.85	144.56
14	9.33	174.30	4.05	1575.77	277.85	144.56
15	9.33	178.75	4.97	1770.49	312.19	162.43
15	9.33	178.75	4.97	1770.49	312.19	162.43
16	9.33	183.88	5.42	2090.00	368.52	191.74
16	9.33	183.88	5.42	2090.00	368.52	191.74
17	9.33	189.23	5.42	2420.39	426.78	222.05
17	9.33	189.23	5.42	2420.39	426.78	222.05
18	9.33	194.62	5.52	2753.87	485.58	252.65
18	9.33	194.62	5.52	2753.87	485.58	252.65
19	9.33	200.08	5.52	3090.43	544.93	283.52
19	9.33	200.08	5.52	3090.43	544.93	283.52
20	9.33	205.27	5.00	3240.27	571.35	297.27
20	9.33	205.27	5.00	3240.27	571.35	297.27
21	9.33	210.21	5.00	3203.38	564.84	293.88
21	9.33	210.21	5.00	3203.38	564.84	293.88
22	9.33	215.15	5.00	3166.49	558.34	290.50
22	9.33	215.15	5.00	3166.49	558.34	290.50

23	9.33	220.08	5.00	3129.60	551.83	287.12
23	9.33	220.08	5.00	3129.60	551.83	287.12
24	9.33	225.02	5.00	3092.71	545.33	283.73
24	9.33	225.02	5.00	3092.71	545.33	283.73
25	9.33	229.96	5.00	3055.82	538.82	280.35
25	9.33	229.96	5.00	3055.82	538.82	280.35
26	9.33	234.90	5.00	3018.92	532.32	276.96
26	9.33	234.90	5.00	3018.92	532.32	276.96
27	9.33	239.84	5.00	2982.03	525.81	273.58
27	9.33	239.84	5.00	2982.03	525.81	273.58
28	9.33	244.78	5.00	2945.14	519.31	270.19
28	9.33	244.78	5.00	2945.14	519.31	270.19
29	9.33	249.72	5.00	2908.25	512.80	266.81
29	9.33	249.72	5.00	2908.25	512.80	266.81
30	9.33	254.65	5.00	2871.36	506.30	263.42
30	9.33	254.65	5.00	2871.36	506.30	263.42
31	9.33	259.59	5.00	2834.47	499.79	260.04
31	9.33	259.59	5.00	2834.47	499.79	260.04
32	9.33	264.53	5.00	2797.58	493.29	256.66
32	9.33	264.53	5.00	2797.58	493.29	256.66
33	9.33	269.77	5.62	2868.43	505.78	263.15
33	9.33	269.77	5.62	2868.43	505.78	263.15
34	9.33	275.33	5.62	3047.01	537.27	279.54
34	9.33	275.33	5.62	3047.01	537.27	279.54
35	9.33	279.38	2.59	3124.40	550.92	286.64
35	9.33	279.38	2.59	3124.40	550.92	286.64
36	9.33	282.43	3.60	3095.97	545.90	284.03
36	9.33	282.43	3.60	3095.97	545.90	284.03
37	9.33	285.98	3.60	3062.91	540.07	281.00
37	9.33	285.98	3.60	3062.91	540.07	281.00
38	9.33	287.93	0.34	3043.07	536.58	279.18
38	9.33	287.93	0.34	3043.07	536.58	279.18
39	9.33	290.70	5.28	3235.27	570.47	296.81
39	9.33	290.70	5.28	3235.27	570.47	296.81
40	9.33	295.91	5.28	3134.29	552.66	287.55
40	9.33	295.91	5.28	3134.29	552.66	287.55
41	9.33	301.12	5.28	3033.30	534.85	278.28
41	9.33	301.12	5.28	3033.30	534.85	278.28
42	9.33	306.32	5.28	2932.31	517.05	269.02
42	9.33	306.32	5.28	2932.31	517.05	269.02
43	9.33	311.53	5.28	2831.33	499.24	259.75
43	9.33	311.53	5.28	2831.33	499.24	259.75
44	9.33	316.74	5.28	2730.34	481.43	250.49
44	9.33	316.74	5.28	2730.34	481.43	250.49
45	9.33	321.95	5.28	2629.35	463.63	241.22
45	9.33	321.95	5.28	2629.35	463.63	241.22
46	9.33	327.15	5.28	2528.37	445.82	231.96
46	9.33	327.15	5.28	2528.37	445.82	231.96
47	64.65	329.91	0.70	2050.78	361.61	188.14
47	64.65	329.91	0.70	2050.78	361.61	188.14
48	64.65	332.05	9.30	812.39	947.96	493.22
48	64.65	332.05	9.30	812.39	947.96	493.22
49	46.14	335.72	4.84	709.90	878.83	457.25
49	46.14	335.72	4.84	709.90	878.83	457.25
50	46.14	339.18	5.16	483.65	526.23	273.79
50	46.14	339.18	5.16	483.65	526.23	273.79
51	48.12	342.16	3.57	199.44	334.52	174.05
51	48.12	342.16	3.57	199.44	334.52	174.05

Table 4 - Base Force Data on the 51 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-44.79	125.61	1.17	465.65	783.80	407.81
1	-44.79	125.61	1.17	465.65	783.80	407.81
2	-39.65	127.95	5.00	2377.10	3603.38	1874.82
2	-39.65	127.95	5.00	2377.10	3603.38	1874.82
3	-39.65	131.80	5.00	3717.18	4507.27	2345.11

3	-39.65	131.80	5.00	3717.18	4507.27	2345.11
4	-23.49	135.94	4.83	3284.80	4146.18	2157.24
4	-23.49	135.94	4.83	3284.80	4146.18	2157.24
5	-23.49	140.52	5.17	3164.97	558.07	290.36
5	-23.49	140.52	5.17	3164.97	558.07	290.36
6	9.33	143.55	1.32	829.53	146.27	76.10
6	9.33	143.55	1.32	829.53	146.27	76.10
7	9.33	146.30	4.26	4736.19	835.12	434.51
7	9.33	146.30	4.26	4736.19	835.12	434.51
8	9.33	150.50	4.26	6041.61	1065.30	554.27
8	9.33	150.50	4.26	6041.61	1065.30	554.27
9	9.33	154.70	4.26	7347.03	1295.48	674.03
9	9.33	154.70	4.26	7347.03	1295.48	674.03
10	9.33	158.00	2.43	3282.60	578.81	301.15
10	9.33	158.00	2.43	3282.60	578.81	301.15
11	9.33	161.47	4.61	6795.49	1198.23	623.43
11	9.33	161.47	4.61	6795.49	1198.23	623.43
12	9.33	166.03	4.61	25873.58	4562.21	2373.69
12	9.33	166.03	4.61	25873.58	4562.21	2373.69
13	9.33	170.30	4.05	6059.84	1068.51	555.94
13	9.33	170.30	4.05	6059.84	1068.51	555.94
14	9.33	174.30	4.05	6387.53	1126.29	586.00
14	9.33	174.30	4.05	6387.53	1126.29	586.00
15	9.33	178.75	4.97	8791.67	1550.21	806.57
15	9.33	178.75	4.97	8791.67	1550.21	806.57
16	9.33	183.88	5.42	11331.31	1998.02	1039.56
16	9.33	183.88	5.42	11331.31	1998.02	1039.56
17	9.33	189.23	5.42	13122.59	2313.87	1203.89
17	9.33	189.23	5.42	13122.59	2313.87	1203.89
18	9.33	194.62	5.52	15209.68	2681.88	1395.37
18	9.33	194.62	5.52	15209.68	2681.88	1395.37
19	9.33	200.08	5.52	17068.55	3009.65	1565.90
19	9.33	200.08	5.52	17068.55	3009.65	1565.90
20	9.33	205.27	5.00	16216.37	2859.38	1487.72
20	9.33	205.27	5.00	16216.37	2859.38	1487.72
21	9.33	210.21	5.00	16031.75	2826.83	1470.78
21	9.33	210.21	5.00	16031.75	2826.83	1470.78
22	9.33	215.15	5.00	15847.12	2794.27	1453.85
22	9.33	215.15	5.00	15847.12	2794.27	1453.85
23	9.33	220.08	5.00	15662.50	2761.72	1436.91
23	9.33	220.08	5.00	15662.50	2761.72	1436.91
24	9.33	225.02	5.00	15477.87	2729.17	1419.97
24	9.33	225.02	5.00	15477.87	2729.17	1419.97
25	9.33	229.96	5.00	15293.24	2696.61	1403.03
25	9.33	229.96	5.00	15293.24	2696.61	1403.03
26	9.33	234.90	5.00	15108.62	2664.06	1386.09
26	9.33	234.90	5.00	15108.62	2664.06	1386.09
27	9.33	239.84	5.00	14923.99	2631.50	1369.16
27	9.33	239.84	5.00	14923.99	2631.50	1369.16
28	9.33	244.78	5.00	14739.37	2598.95	1352.22
28	9.33	244.78	5.00	14739.37	2598.95	1352.22
29	9.33	249.72	5.00	14554.74	2566.39	1335.28
29	9.33	249.72	5.00	14554.74	2566.39	1335.28
30	9.33	254.65	5.00	14370.12	2533.84	1318.34
30	9.33	254.65	5.00	14370.12	2533.84	1318.34
31	9.33	259.59	5.00	14185.49	2501.28	1301.40
31	9.33	259.59	5.00	14185.49	2501.28	1301.40
32	9.33	264.53	5.00	14000.87	2468.73	1284.47
32	9.33	264.53	5.00	14000.87	2468.73	1284.47
33	9.33	269.77	5.62	16133.08	2844.70	1480.08
33	9.33	269.77	5.62	16133.08	2844.70	1480.08
34	9.33	275.33	5.62	17137.49	3021.80	1572.23
34	9.33	275.33	5.62	17137.49	3021.80	1572.23
35	9.33	279.38	2.59	8092.15	1426.86	742.39
35	9.33	279.38	2.59	8092.15	1426.86	742.39
36	9.33	282.43	3.60	11144.00	1964.99	1022.37
36	9.33	282.43	3.60	11144.00	1964.99	1022.37
37	9.33	285.98	3.60	11024.98	1944.00	1011.45
37	9.33	285.98	3.60	11024.98	1944.00	1011.45
38	9.33	287.93	0.34	1049.82	185.11	96.31
38	9.33	287.93	0.34	1049.82	185.11	96.31
39	9.33	290.70	5.28	17071.74	3010.21	1566.19

39	9.33	290.70	5.28	17071.74	3010.21	1566.19
40	9.33	295.91	5.28	16538.86	2916.25	1517.31
40	9.33	295.91	5.28	16538.86	2916.25	1517.31
41	9.33	301.12	5.28	16005.98	2822.29	1468.42
41	9.33	301.12	5.28	16005.98	2822.29	1468.42
42	9.33	306.32	5.28	15473.10	2728.32	1419.53
42	9.33	306.32	5.28	15473.10	2728.32	1419.53
43	9.33	311.53	5.28	14940.22	2634.36	1370.64
43	9.33	311.53	5.28	14940.22	2634.36	1370.64
44	9.33	316.74	5.28	14407.34	2540.40	1321.76
44	9.33	316.74	5.28	14407.34	2540.40	1321.76
45	9.33	321.95	5.28	13874.46	2446.44	1272.87
45	9.33	321.95	5.28	13874.46	2446.44	1272.87
46	9.33	327.15	5.28	13341.58	2352.48	1223.98
46	9.33	327.15	5.28	13341.58	2352.48	1223.98
47	64.65	329.91	0.70	1442.54	254.36	132.34
47	64.65	329.91	0.70	1442.54	254.36	132.34
48	64.65	332.05	9.30	7552.46	8812.84	4585.27
48	64.65	332.05	9.30	7552.46	8812.84	4585.27
49	46.14	335.72	4.84	3438.10	4256.27	2214.51
49	46.14	335.72	4.84	3438.10	4256.27	2214.51
50	46.14	339.18	5.16	2494.14	2713.70	1411.92
50	46.14	339.18	5.16	2494.14	2713.70	1411.92
51	48.12	342.16	3.57	711.06	1192.69	620.55
51	48.12	342.16	3.57	711.06	1192.69	620.55

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 51 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
12	27408.8	19191.9	33460.0	35.00	-0.168362E+05

***Pier/Pile Slice Force Data on the 51 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
14	12000.0	0.0	12000.0	90.00	-0.335076E+04

Sum of the Resisting Forces = 110322.26 (lbs)

Average Available Shear Strength = 471.26(psf)

Sum of the Driving Forces = 62019.67 (lbs)

Average Mobilized Shear Stress = 264.93(psf)

Total length of the failure surface = 234.10(ft)

Factor of Safety Balance Check: FS = 1.77883

Janbu's Correction Factor (fo) = 1.0363

Janub's FS Corrected = 1.84336

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

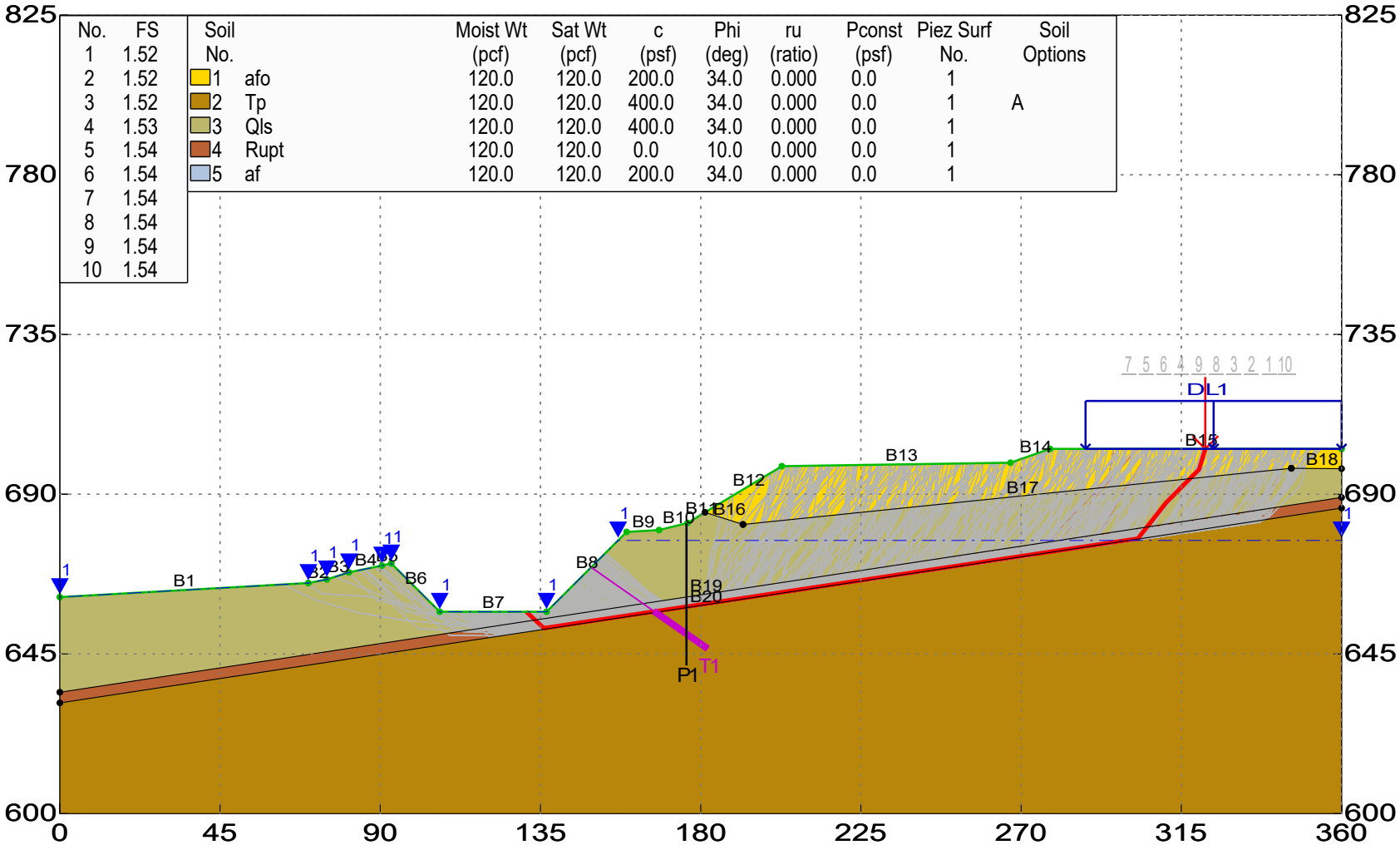
Royal Vista - Cross Section 7
Stage 5 (2nd Temporary Staging Pad)

LGC Geotechnical / BPP

\Sec 7 - Stage 5 (2nd Temporary Staging Pad).gsd

No.	FS
1	1.52
2	1.52
3	1.52
4	1.53
5	1.54
6	1.54
7	1.54
8	1.54
9	1.54
10	1.54

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.52

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 5 (2nd Temporary Staging Pad).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 5 (2nd Temporary Staging Pad).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 5 (2nd Temporary Staging Pad)

BOUNDARY DATA

15 Surface Boundaries
20 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	661.000	69.800	665.000	3
2	69.800	665.000	75.000	666.000	3
3	75.000	666.000	81.200	668.000	3
4	81.200	668.000	90.500	669.900	3
5	90.500	669.900	93.100	670.500	3
6	93.100	670.500	106.700	656.900	3
7	106.700	656.900	136.700	656.900	3
8	136.700	656.900	159.200	679.400	3
9	159.200	679.400	168.300	679.900	3
10	168.300	679.900	176.300	681.900	3
11	176.300	681.900	181.200	684.900	3
12	181.200	684.900	202.800	697.900	1
13	202.800	697.900	267.000	698.900	1
14	267.000	698.900	278.100	702.800	1
15	278.100	702.800	360.000	702.800	1
16	181.200	684.900	191.900	681.500	3
17	191.900	681.500	345.900	697.300	3
18	345.900	697.300	360.000	697.200	3
19	0.000	634.200	360.000	689.100	4
20	0.000	631.200	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 10 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	661.00
2	69.80	665.00
3	75.00	666.00
4	81.20	668.00
5	90.50	669.90
6	93.10	670.50
7	106.70	656.90
8	136.70	656.90
9	156.80	677.00
10	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load	BND No.	X - 1	Y - 1	Stress	X - 2	Y - 2

Stress (psf)	Deflection (deg from Vert)	No.	(ft)	(ft)	(psf)	(ft)	(ft)
		1	15	288.100	702.800	250.000	360.000	702.800
250.000	0.00						

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	149.20	669.40	167300.0	5.0	35.00	21.5	18.5

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 13.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	120.00	651.00	170.00	658.49	3.00
2	180.00	660.00	340.00	684.00	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 = 117

Number of Trial Surfaces With Valid FS = 883

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 11.7 %

Statistical Data On All Valid FS Values:
FS Max = 11.116 FS Min = 1.517 FS Ave = 2.341
Standard Deviation = 1.036 Coefficient of Variation = 44.26 %

Critical Surface is Sequence Number 157 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	166.72	657.13

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	176.00	658.34

Factor Of Safety For The Critical or Specified Surface = 1.517

Table 1 - Geometry Data on the 45 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.49	1.17	132.26	655.73	656.90	-43.26	0.00	3.42
2	2.42	3.48	134.72	653.42	656.90	-43.26	0.00	3.33
3	0.77	4.56	136.31	652.34	656.90	8.60	0.00	0.78
4	5.02	6.64	139.21	652.78	659.41	8.60	45.00	5.08
5	5.03	10.90	144.24	653.54	664.44	8.60	45.00	5.08
6	5.03	15.17	149.26	654.30	669.46	8.60	45.00	5.08
7	5.03	19.43	154.29	655.06	674.49	8.60	45.00	5.08
8	2.40	22.58	158.00	655.62	678.20	8.60	45.00	2.43
9	4.55	23.38	161.47	656.14	679.52	8.60	3.14	4.60
10	4.55	22.94	166.03	656.83	679.77	8.60	3.14	4.60
11	4.00	22.92	170.30	657.48	680.40	8.60	14.04	4.05
12	4.00	23.32	174.30	658.08	681.40	8.60	14.04	4.05
13	4.90	24.64	178.75	658.76	683.40	8.60	31.48	4.96
14	5.35	26.98	183.88	659.53	686.51	8.60	31.04	5.41
15	5.35	29.39	189.23	660.34	689.73	8.60	31.04	5.41
16	5.45	31.82	194.62	661.16	692.98	8.60	31.04	5.51
17	5.45	34.28	200.08	661.98	696.26	8.60	31.04	5.51
18	4.94	35.17	205.27	662.77	697.94	8.60	0.89	4.99
19	4.94	34.50	210.21	663.51	698.02	8.60	0.89	4.99
20	4.94	33.83	215.15	664.26	698.09	8.60	0.89	4.99
21	4.94	33.16	220.08	665.01	698.17	8.60	0.89	4.99
22	4.94	32.49	225.02	665.75	698.25	8.60	0.89	4.99

23	4.94	31.82	229.96	666.50	698.32	8.60	0.89	4.99
24	4.94	31.15	234.90	667.25	698.40	8.60	0.89	4.99
25	4.94	30.48	239.84	668.00	698.48	8.60	0.89	4.99
26	4.94	29.81	244.78	668.74	698.55	8.60	0.89	4.99
27	4.94	29.14	249.72	669.49	698.63	8.60	0.89	4.99
28	4.94	28.47	254.65	670.24	698.71	8.60	0.89	4.99
29	4.94	27.80	259.59	670.98	698.78	8.60	0.89	4.99
30	4.94	27.13	264.53	671.73	698.86	8.60	0.89	4.99
31	5.55	27.35	269.77	672.52	699.88	8.60	19.36	5.61
32	5.55	28.46	275.33	673.36	701.82	8.60	19.36	5.61
33	2.56	28.82	279.38	673.98	702.80	8.60	0.00	2.58
34	3.72	28.35	282.52	674.45	702.80	8.60	0.00	3.76
35	3.72	27.79	286.24	675.01	702.80	8.60	0.00	3.76
36	5.64	27.08	290.92	675.72	702.80	8.60	0.00	5.70
37	5.64	26.23	296.56	676.57	702.80	8.60	0.00	5.70
38	3.39	25.54	301.07	677.26	702.80	8.60	0.00	3.42
39	2.56	23.66	304.04	679.14	702.80	51.78	0.00	4.14
40	2.74	20.30	306.69	682.50	702.80	51.78	0.00	4.43
41	2.74	16.82	309.44	685.98	702.80	51.78	0.00	4.43
42	3.30	13.41	312.45	689.39	702.80	45.25	0.00	4.68
43	3.30	10.09	315.75	692.71	702.80	45.25	0.00	4.68
44	2.56	7.13	318.68	695.67	702.80	45.25	0.00	3.64
45	1.76	2.92	320.84	699.88	702.80	73.22	0.00	6.10

Table 2 - Force Data On The 45 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	349.2	0.0	249.4	0.0	0.0	0.0
2	1011.7	0.0	722.4	0.0	0.0	0.0
3	423.1	0.0	222.5	0.0	0.0	0.0
4	4001.4	0.0	1052.2	0.0	0.0	0.0
5	6573.2	0.0	1728.5	0.0	0.0	0.0
6	9145.1	0.0	2404.8	0.0	0.0	0.0
7	11716.9	0.0	3081.0	0.0	0.0	0.0
8	6503.6	0.0	3238.6	0.0	0.0	0.0
9	12766.2	0.0	5988.9	0.0	0.0	0.0
10	12527.0	0.0	5791.3	0.0	0.0	0.0
11	11002.4	0.0	4928.0	0.0	0.0	0.0
12	11192.0	0.0	4775.3	0.0	0.0	0.0
13	14490.5	0.0	5641.6	0.0	0.0	0.0
14	17320.3	0.0	5898.1	0.0	0.0	0.0
15	18868.0	0.0	5624.9	0.0	0.0	0.0
16	20812.0	0.0	5449.1	0.0	0.0	0.0
17	22418.1	0.0	5165.6	0.0	0.0	0.0
18	20843.1	0.0	4435.9	0.0	0.0	0.0
19	20446.1	0.0	4203.1	0.0	0.0	0.0
20	20049.1	0.0	3970.4	0.0	0.0	0.0
21	19652.0	0.0	3737.6	0.0	0.0	0.0
22	19255.0	0.0	3504.8	0.0	0.0	0.0
23	18858.0	0.0	3272.0	0.0	0.0	0.0
24	18460.9	0.0	3039.2	0.0	0.0	0.0
25	18063.9	0.0	2806.5	0.0	0.0	0.0
26	17666.9	0.0	2573.7	0.0	0.0	0.0
27	17269.8	0.0	2340.9	0.0	0.0	0.0
28	16872.8	0.0	2108.1	0.0	0.0	0.0
29	16475.8	0.0	1875.3	0.0	0.0	0.0
30	16078.7	0.0	1642.6	0.0	0.0	0.0
31	18216.5	0.0	1568.2	0.0	0.0	0.0
32	18956.2	0.0	1274.2	0.0	0.0	0.0
33	8840.2	0.0	487.9	0.0	0.0	0.0
34	12662.7	0.0	599.0	0.0	0.0	0.0
35	12411.3	0.0	466.8	0.0	0.0	0.0
36	18324.3	0.0	455.3	0.0	0.0	1409.8
37	17747.1	0.0	151.8	0.0	0.0	1409.8
38	10377.6	0.0	0.0	0.0	0.0	846.4
39	7267.1	0.0	0.0	0.0	0.0	639.8

40	6678.5	0.0	0.0	0.0	0.0	685.5
41	5532.9	0.0	0.0	0.0	0.0	685.5
42	5305.1	0.0	0.0	0.0	0.0	824.0
43	3989.7	0.0	0.0	0.0	0.0	824.0
44	2190.8	0.0	0.0	0.0	0.0	639.9
45	617.4	0.0	0.0	0.0	0.0	440.3

TOTAL WEIGHT OF SLIDING MASS = 570230.68(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 465205.79(lbs)

TOTAL AREA OF SLIDING MASS = 4751.92(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 45 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	4	0.00	10.00	
3	4	0.00	10.00	
4	4	0.00	10.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	4	0.00	10.00	
40	3	400.00	34.00	
41	3	400.00	34.00	
42	3	400.00	34.00	
43	3	400.00	34.00	
44	1	200.00	34.00	
45	1	200.00	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 45 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-43.26	132.26	3.42	582.61	792.97	501.65
1	-43.26	132.26	3.42	582.61	792.97	501.65
2	-43.26	134.72	3.33	226.41	39.92	25.26
2	-43.26	134.72	3.33	226.41	39.92	25.26
3	8.60	136.31	0.78	258.01	45.49	28.78
3	8.60	136.31	0.78	258.01	45.49	28.78
4	8.60	139.21	5.08	578.61	102.03	64.54
4	8.60	139.21	5.08	578.61	102.03	64.54
5	8.60	144.24	5.08	950.50	167.60	106.03
5	8.60	144.24	5.08	950.50	167.60	106.03
6	8.60	149.26	5.08	1322.39	233.17	147.51
6	8.60	149.26	5.08	1322.39	233.17	147.51
7	8.60	154.29	5.08	1694.28	298.75	188.99
7	8.60	154.29	5.08	1694.28	298.75	188.99
8	8.60	158.00	2.43	1350.73	238.17	150.67
8	8.60	158.00	2.43	1350.73	238.17	150.67
9	8.60	161.47	4.60	1477.14	260.46	164.77
9	8.60	161.47	4.60	1477.14	260.46	164.77
10	8.60	166.03	4.60	5609.42	989.09	625.72
10	8.60	166.03	4.60	5609.42	989.09	625.72
11	8.60	170.30	4.05	1504.75	265.33	167.85
11	8.60	170.30	4.05	1504.75	265.33	167.85
12	8.60	174.30	4.05	1588.36	280.07	177.18
12	8.60	174.30	4.05	1588.36	280.07	177.18
13	8.60	178.75	4.96	1785.96	314.91	199.22
13	8.60	178.75	4.96	1785.96	314.91	199.22
14	8.60	183.88	5.41	2108.57	371.80	235.21
14	8.60	183.88	5.41	2108.57	371.80	235.21
15	8.60	189.23	5.41	2442.21	430.63	272.42
15	8.60	189.23	5.41	2442.21	430.63	272.42
16	8.60	194.62	5.51	2778.97	490.01	309.99
16	8.60	194.62	5.51	2778.97	490.01	309.99
17	8.60	200.08	5.51	3118.85	549.94	347.90
17	8.60	200.08	5.51	3118.85	549.94	347.90
18	8.60	205.27	4.99	3272.19	576.98	365.00
18	8.60	205.27	4.99	3272.19	576.98	365.00
19	8.60	210.21	4.99	3239.02	571.13	361.30
19	8.60	210.21	4.99	3239.02	571.13	361.30
20	8.60	215.15	4.99	3205.84	565.28	357.60
20	8.60	215.15	4.99	3205.84	565.28	357.60
21	8.60	220.08	4.99	3172.66	559.43	353.90
21	8.60	220.08	4.99	3172.66	559.43	353.90
22	8.60	225.02	4.99	3139.48	553.57	350.20
22	8.60	225.02	4.99	3139.48	553.57	350.20
23	8.60	229.96	4.99	3106.30	547.72	346.50
23	8.60	229.96	4.99	3106.30	547.72	346.50
24	8.60	234.90	4.99	3073.12	541.87	342.80
24	8.60	234.90	4.99	3073.12	541.87	342.80
25	8.60	239.84	4.99	3039.94	536.02	339.10
25	8.60	239.84	4.99	3039.94	536.02	339.10
26	8.60	244.78	4.99	3006.76	530.17	335.40
26	8.60	244.78	4.99	3006.76	530.17	335.40
27	8.60	249.72	4.99	2973.58	524.32	331.70
27	8.60	249.72	4.99	2973.58	524.32	331.70
28	8.60	254.65	4.99	2940.40	518.47	327.99
28	8.60	254.65	4.99	2940.40	518.47	327.99
29	8.60	259.59	4.99	2907.22	512.62	324.29
29	8.60	259.59	4.99	2907.22	512.62	324.29
30	8.60	264.53	4.99	2874.04	506.77	320.59
30	8.60	264.53	4.99	2874.04	506.77	320.59
31	8.60	269.77	5.61	2948.60	519.92	328.91
31	8.60	269.77	5.61	2948.60	519.92	328.91
32	8.60	275.33	5.61	3130.90	552.06	349.24
32	8.60	275.33	5.61	3130.90	552.06	349.24
33	8.60	279.38	2.58	3211.11	566.21	358.19
33	8.60	279.38	2.58	3211.11	566.21	358.19

34	8.60	282.52	3.76	3184.26	561.47	355.20
34	8.60	282.52	3.76	3184.26	561.47	355.20
35	8.60	286.24	3.76	3152.43	555.86	351.64
35	8.60	286.24	3.76	3152.43	555.86	351.64
36	8.60	290.92	5.70	3357.87	592.08	374.56
36	8.60	290.92	5.70	3357.87	592.08	374.56
37	8.60	296.56	5.70	3309.63	583.58	369.18
37	8.60	296.56	5.70	3309.63	583.58	369.18
38	8.60	301.07	3.42	3255.35	574.01	363.13
38	8.60	301.07	3.42	3255.35	574.01	363.13
39	51.78	304.04	4.14	2675.95	471.84	298.50
39	51.78	304.04	4.14	2675.95	471.84	298.50
40	51.78	306.69	4.43	1467.40	1389.78	879.20
40	51.78	306.69	4.43	1467.40	1389.78	879.20
41	51.78	309.44	4.43	1204.84	1212.68	767.16
41	51.78	309.44	4.43	1204.84	1212.68	767.16
42	45.25	312.45	4.68	1075.60	1125.50	712.01
42	45.25	312.45	4.68	1075.60	1125.50	712.01
43	45.25	315.75	4.68	804.10	942.37	596.16
43	45.25	315.75	4.68	804.10	942.37	596.16
44	45.25	318.68	3.64	657.71	643.63	407.17
44	45.25	318.68	3.64	657.71	643.63	407.17
45	73.22	320.84	6.10	56.04	237.80	150.43
45	73.22	320.84	6.10	56.04	237.80	150.43

Table 4 - Base Force Data on the 45 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-43.26	132.26	3.42	1989.65	2708.07	1713.17
1	-43.26	132.26	3.42	1989.65	2708.07	1713.17
2	-43.26	134.72	3.33	753.12	132.80	84.01
2	-43.26	134.72	3.33	753.12	132.80	84.01
3	8.60	136.31	0.78	201.68	35.56	22.50
3	8.60	136.31	0.78	201.68	35.56	22.50
4	8.60	139.21	5.08	2940.60	518.51	328.02
4	8.60	139.21	5.08	2940.60	518.51	328.02
5	8.60	144.24	5.08	4830.58	851.76	538.84
5	8.60	144.24	5.08	4830.58	851.76	538.84
6	8.60	149.26	5.08	6720.57	1185.02	749.66
6	8.60	149.26	5.08	6720.57	1185.02	749.66
7	8.60	154.29	5.08	8610.56	1518.27	960.49
7	8.60	154.29	5.08	8610.56	1518.27	960.49
8	8.60	158.00	2.43	3278.63	578.11	365.72
8	8.60	158.00	2.43	3278.63	578.11	365.72
9	8.60	161.47	4.60	6797.40	1198.56	758.23
9	8.60	161.47	4.60	6797.40	1198.56	758.23
10	8.60	166.03	4.60	25813.09	4551.54	2879.38
10	8.60	166.03	4.60	25813.09	4551.54	2879.38
11	8.60	170.30	4.05	6087.44	1073.38	679.04
11	8.60	170.30	4.05	6087.44	1073.38	679.04
12	8.60	174.30	4.05	6425.71	1133.03	716.77
12	8.60	174.30	4.05	6425.71	1133.03	716.77
13	8.60	178.75	4.96	8850.73	1560.62	987.28
13	8.60	178.75	4.96	8850.73	1560.62	987.28
14	8.60	183.88	5.41	11409.13	2011.74	1272.66
14	8.60	183.88	5.41	11409.13	2011.74	1272.66
15	8.60	189.23	5.41	13214.41	2330.06	1474.03
15	8.60	189.23	5.41	13214.41	2330.06	1474.03
16	8.60	194.62	5.51	15317.62	2700.91	1708.64
16	8.60	194.62	5.51	15317.62	2700.91	1708.64
17	8.60	200.08	5.51	17191.01	3031.24	1917.61
17	8.60	200.08	5.51	17191.01	3031.24	1917.61
18	8.60	205.27	4.99	16343.38	2881.78	1823.06
18	8.60	205.27	4.99	16343.38	2881.78	1823.06
19	8.60	210.21	4.99	16177.66	2852.56	1804.58
19	8.60	210.21	4.99	16177.66	2852.56	1804.58
20	8.60	215.15	4.99	16011.94	2823.34	1786.09

20	8.60	215.15	4.99	16011.94	2823.34	1786.09
21	8.60	220.08	4.99	15846.22	2794.12	1767.60
21	8.60	220.08	4.99	15846.22	2794.12	1767.60
22	8.60	225.02	4.99	15680.50	2764.90	1749.12
22	8.60	225.02	4.99	15680.50	2764.90	1749.12
23	8.60	229.96	4.99	15514.79	2735.68	1730.63
23	8.60	229.96	4.99	15514.79	2735.68	1730.63
24	8.60	234.90	4.99	15349.07	2706.45	1712.15
24	8.60	234.90	4.99	15349.07	2706.45	1712.15
25	8.60	239.84	4.99	15183.35	2677.23	1693.66
25	8.60	239.84	4.99	15183.35	2677.23	1693.66
26	8.60	244.78	4.99	15017.63	2648.01	1675.18
26	8.60	244.78	4.99	15017.63	2648.01	1675.18
27	8.60	249.72	4.99	14851.91	2618.79	1656.69
27	8.60	249.72	4.99	14851.91	2618.79	1656.69
28	8.60	254.65	4.99	14686.20	2589.57	1638.21
28	8.60	254.65	4.99	14686.20	2589.57	1638.21
29	8.60	259.59	4.99	14520.48	2560.35	1619.72
29	8.60	259.59	4.99	14520.48	2560.35	1619.72
30	8.60	264.53	4.99	14354.76	2531.13	1601.24
30	8.60	264.53	4.99	14354.76	2531.13	1601.24
31	8.60	269.77	5.61	16550.84	2918.36	1846.20
31	8.60	269.77	5.61	16550.84	2918.36	1846.20
32	8.60	275.33	5.61	17574.09	3098.79	1960.34
32	8.60	275.33	5.61	17574.09	3098.79	1960.34
33	8.60	279.38	2.58	8300.09	1463.53	925.85
33	8.60	279.38	2.58	8300.09	1463.53	925.85
34	8.60	282.52	3.76	11987.03	2113.64	1337.12
34	8.60	282.52	3.76	11987.03	2113.64	1337.12
35	8.60	286.24	3.76	11867.18	2092.50	1323.75
35	8.60	286.24	3.76	11867.18	2092.50	1323.75
36	8.60	290.92	5.70	19150.61	3376.77	2136.20
36	8.60	290.92	5.70	19150.61	3376.77	2136.20
37	8.60	296.56	5.70	18875.51	3328.26	2105.51
37	8.60	296.56	5.70	18875.51	3328.26	2105.51
38	8.60	301.07	3.42	11146.37	1965.41	1243.35
38	8.60	301.07	3.42	11146.37	1965.41	1243.35
39	51.78	304.04	4.14	11068.98	1951.76	1234.72
39	51.78	304.04	4.14	11068.98	1951.76	1234.72
40	51.78	306.69	4.43	6503.20	6159.17	3896.39
40	51.78	306.69	4.43	6503.20	6159.17	3896.39
41	51.78	309.44	4.43	5339.59	5374.31	3399.88
41	51.78	309.44	4.43	5339.59	5374.31	3399.88
42	45.25	312.45	4.68	5036.14	5269.79	3333.76
42	45.25	312.45	4.68	5036.14	5269.79	3333.76
43	45.25	315.75	4.68	3764.92	4412.34	2791.32
43	45.25	315.75	4.68	3764.92	4412.34	2791.32
44	45.25	318.68	3.64	2391.20	2340.01	1480.33
44	45.25	318.68	3.64	2391.20	2340.01	1480.33
45	73.22	320.84	6.10	341.92	1450.98	917.92
45	73.22	320.84	6.10	341.92	1450.98	917.92

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 45 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 45 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
12	12000.0	0.0	12000.0	90.00	-0.308529E+04

Sum of the Resisting Forces = 98216.31 (lbs)

Average Available Shear Strength = 473.16(psf)

Sum of the Driving Forces = 67791.78 (lbs)

Average Mobilized Shear Stress = 326.59(psf)

Total length of the failure surface = 207.58(ft)

Factor of Safety Balance Check: FS = 1.44879

Janbu's Correction Factor (fo) = 1.0469

Janub's FS Corrected = 1.51676

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

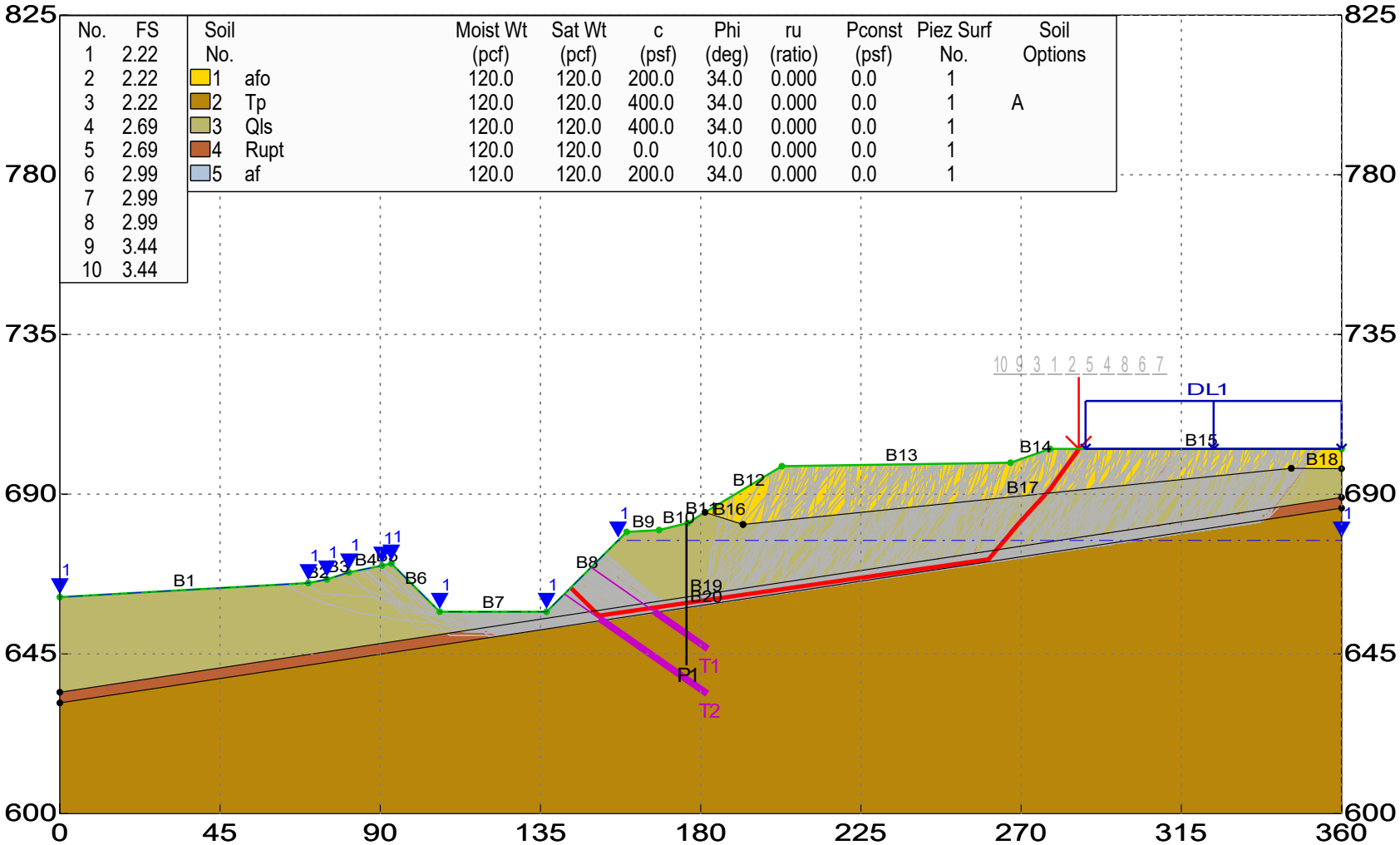
Royal Vista - Cross Section 7
Stage 6 (2nd Temporary Staging Pad - Tieback)

LGC Geotechnical / BPP

\Sec 7 - Stage 6 (2nd Temporary Staging Pad - Tieback).gsd

No.	FS
1	2.22
2	2.22
3	2.22
4	2.69
5	2.69
6	2.99
7	2.99
8	2.99
9	3.44
10	3.44

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 2.22

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** GEOSTASE(R) ***

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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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 6 (2nd Temporary Staging Pad - Tieback).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 6 (2nd Temporary Staging Pad - Tieback).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 6 (2nd Temporary Staging Pad - Tieback)

BOUNDARY DATA

15 Surface Boundaries
20 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	661.000	69.800	665.000	3
2	69.800	665.000	75.000	666.000	3
3	75.000	666.000	81.200	668.000	3
4	81.200	668.000	90.500	669.900	3
5	90.500	669.900	93.100	670.500	3
6	93.100	670.500	106.700	656.900	3
7	106.700	656.900	136.700	656.900	3
8	136.700	656.900	159.200	679.400	3
9	159.200	679.400	168.300	679.900	3
10	168.300	679.900	176.300	681.900	3
11	176.300	681.900	181.200	684.900	3
12	181.200	684.900	202.800	697.900	1
13	202.800	697.900	267.000	698.900	1
14	267.000	698.900	278.100	702.800	1
15	278.100	702.800	360.000	702.800	1
16	181.200	684.900	191.900	681.500	3
17	191.900	681.500	345.900	697.300	3
18	345.900	697.300	360.000	697.200	3
19	0.000	634.200	360.000	689.100	4
20	0.000	631.200	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 10 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	661.00
2	69.80	665.00
3	75.00	666.00
4	81.20	668.00
5	90.50	669.90
6	93.10	670.50
7	106.70	656.90
8	136.70	656.90
9	156.80	677.00
10	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load	BND No.	X - 1	Y - 1	Stress	X - 2	Y - 2

Stress (psf)	Deflection (deg from Vert)	No.	(ft)	(ft)	(psf)	(ft)	(ft)
		1	15	288.100	702.800	250.000	360.000	702.800
250.000	0.00						

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

TIEBACK LOAD(S)

2 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	149.20	669.40	167300.0	5.0	35.00	21.5	18.5
2	141.70	661.90	334600.0	5.0	35.00	12.0	37.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 13.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	120.00	651.00	170.00	658.49	3.00
2	180.00	660.00	340.00	684.00	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 = 551

Number of Trial Surfaces With Valid FS = 449

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 55.1 %

Statistical Data On All Valid FS Values:
FS Max = 79.250 FS Min = 2.221 FS Ave = 8.498
Standard Deviation = 8.327 Coefficient of Variation = 97.99 %

Critical Surface is Sequence Number 113 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	165.67	657.87
2	150.82	655.51

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	176.00	659.37

Factor of Safety for the Preceding Surface is Between -5.430 and -5.429

Factor of Safety For The Preceding Specified Surface = 900.0

Table 1 - Geometry Data on the 38 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.33	3.31	145.13	662.02	665.33	-44.58	45.00	4.68
2	3.33	9.93	148.47	658.74	668.67	-44.58	45.00	4.68
3	1.31	14.54	150.79	656.45	670.99	-44.58	45.00	1.84
4	2.68	16.98	152.78	656.00	672.98	8.25	45.00	2.71
5	2.68	19.27	155.46	656.39	675.66	8.25	45.00	2.71
6	2.40	21.44	158.00	656.76	678.20	8.25	45.00	2.43
7	4.55	22.26	161.47	657.26	679.52	8.25	3.14	4.60
8	4.55	21.85	166.03	657.92	679.77	8.25	3.14	4.60
9	4.00	21.86	170.30	658.54	680.40	8.25	14.04	4.04
10	4.00	22.28	174.30	659.12	681.40	8.25	14.04	4.04
11	4.90	23.63	178.75	659.77	683.40	8.25	31.48	4.95
12	5.35	26.00	183.88	660.51	686.51	8.25	31.04	5.41
13	5.35	28.44	189.23	661.29	689.73	8.25	31.04	5.41
14	5.45	30.91	194.62	662.07	692.98	8.25	31.04	5.51
15	5.45	33.40	200.08	662.86	696.26	8.25	31.04	5.51

16	4.84	34.33	205.22	663.61	697.94	8.25	0.89	4.89
17	4.84	33.71	210.06	664.31	698.01	8.25	0.89	4.89
18	4.84	33.08	214.89	665.01	698.09	8.25	0.89	4.89
19	4.84	32.45	219.73	665.71	698.16	8.25	0.89	4.89
20	4.84	31.83	224.57	666.41	698.24	8.25	0.89	4.89
21	4.84	31.20	229.41	667.11	698.31	8.25	0.89	4.89
22	4.84	30.58	234.24	667.81	698.39	8.25	0.89	4.89
23	4.84	29.95	239.08	668.52	698.47	8.25	0.89	4.89
24	4.84	29.32	243.92	669.22	698.54	8.25	0.89	4.89
25	4.84	28.70	248.76	669.92	698.62	8.25	0.89	4.89
26	4.84	28.07	253.59	670.62	698.69	8.25	0.89	4.89
27	4.84	27.44	258.43	671.32	698.77	8.25	0.89	4.89
28	2.22	25.83	261.96	673.00	698.82	49.97	0.89	3.46
29	2.25	23.20	264.20	675.66	698.86	49.97	0.89	3.50
30	1.67	20.89	266.16	678.00	698.89	49.97	0.89	2.60
31	2.21	18.98	268.11	680.31	699.29	49.97	19.36	3.44
32	3.91	16.59	271.17	683.78	700.36	47.73	19.36	5.82
33	3.91	13.66	275.08	688.08	701.74	47.73	19.36	5.82
34	0.92	11.85	277.50	690.74	702.59	47.73	19.36	1.37
35	0.15	11.43	278.03	691.35	702.77	54.23	19.36	0.25
36	3.73	8.77	279.96	694.03	702.80	54.23	0.00	6.38
37	3.73	3.59	283.69	699.21	702.80	54.23	0.00	6.38
38	0.62	0.50	285.86	702.30	702.80	58.55	0.00	1.18

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

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1324.2	0.0	483.4	0.0	0.0	0.0
2	3972.7	0.0	1450.2	0.0	0.0	0.0
3	2280.6	0.0	832.5	0.0	0.0	0.0
4	5458.5	0.0	1434.1	0.0	0.0	0.0
5	6194.8	0.0	1627.5	0.0	0.0	0.0
6	6175.2	0.0	3063.1	0.0	0.0	0.0
7	12155.5	0.0	5662.6	0.0	0.0	0.0
8	11931.8	0.0	5473.3	0.0	0.0	0.0
9	10491.9	0.0	4655.3	0.0	0.0	0.0
10	10693.5	0.0	4509.1	0.0	0.0	0.0
11	13896.1	0.0	5324.2	0.0	0.0	0.0
12	16691.7	0.0	5562.5	0.0	0.0	0.0
13	18260.9	0.0	5300.8	0.0	0.0	0.0
14	20215.6	0.0	5130.8	0.0	0.0	0.0
15	21843.9	0.0	4859.2	0.0	0.0	0.0
16	19929.8	0.0	4085.6	0.0	0.0	0.0
17	19566.3	0.0	3871.6	0.0	0.0	0.0
18	19202.8	0.0	3657.6	0.0	0.0	0.0
19	18839.4	0.0	3443.7	0.0	0.0	0.0
20	18475.9	0.0	3229.7	0.0	0.0	0.0
21	18112.4	0.0	3015.7	0.0	0.0	0.0
22	17749.0	0.0	2801.8	0.0	0.0	0.0
23	17385.5	0.0	2587.8	0.0	0.0	0.0
24	17022.0	0.0	2373.9	0.0	0.0	0.0
25	16658.6	0.0	2159.9	0.0	0.0	0.0
26	16295.1	0.0	1945.9	0.0	0.0	0.0
27	15931.6	0.0	1732.0	0.0	0.0	0.0
28	6889.4	0.0	863.6	0.0	0.0	0.0
29	6270.6	0.0	293.0	0.0	0.0	0.0
30	4198.2	0.0	0.0	0.0	0.0	0.0
31	5037.0	0.0	0.0	0.0	0.0	0.0
32	7785.8	0.0	0.0	0.0	0.0	0.0
33	6410.5	0.0	0.0	0.0	0.0	0.0
34	1307.5	0.0	0.0	0.0	0.0	0.0
35	198.8	0.0	0.0	0.0	0.0	0.0
36	3920.6	0.0	0.0	0.0	0.0	0.0
37	1606.8	0.0	0.0	0.0	0.0	0.0
38	37.1	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 420417.52(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 331101.61(lbs)

TOTAL AREA OF SLIDING MASS = 3503.48(ft2)

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

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	
3	4	0.00	10.00	
4	4	0.00	10.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	3	400.00	34.00	
30	3	400.00	34.00	
31	3	400.00	34.00	
32	3	400.00	34.00	
33	3	400.00	34.00	
34	1	200.00	34.00	
35	1	200.00	34.00	
36	1	200.00	34.00	
37	1	200.00	34.00	
38	1	200.00	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 38 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-44.58	145.13	4.68	197.17	532.99	0.54
1	-44.58	145.13	4.68	197.17	532.99	0.54
2	-44.58	148.47	4.68	720.88	886.24	0.90
2	-44.58	148.47	4.68	720.88	886.24	0.90
3	-44.58	150.79	1.84	29700.76	5237.05	5.33
3	-44.58	150.79	1.84	29700.76	5237.05	5.33
4	8.25	152.78	2.71	1514.98	267.13	0.27
4	8.25	152.78	2.71	1514.98	267.13	0.27

5	8.25	155.46	2.71	1719.33	303.16	0.31
5	8.25	155.46	2.71	1719.33	303.16	0.31
6	8.25	158.00	2.43	1316.13	232.07	0.24
6	8.25	158.00	2.43	1316.13	232.07	0.24
7	8.25	161.47	4.60	1446.72	255.09	0.26
7	8.25	161.47	4.60	1446.72	255.09	0.26
8	8.25	166.03	4.60	5676.62	1000.94	1.02
8	8.25	166.03	4.60	5676.62	1000.94	1.02
9	8.25	170.30	4.04	1478.15	260.64	0.27
9	8.25	170.30	4.04	1478.15	260.64	0.27
10	8.25	174.30	4.04	1565.15	275.98	0.28
10	8.25	174.30	4.04	1565.15	275.98	0.28
11	8.25	178.75	4.95	1768.94	311.91	0.32
11	8.25	178.75	4.95	1768.94	311.91	0.32
12	8.25	183.88	5.41	2100.89	370.44	0.38
12	8.25	183.88	5.41	2100.89	370.44	0.38
13	8.25	189.23	5.41	2444.21	430.98	0.44
13	8.25	189.23	5.41	2444.21	430.98	0.44
14	8.25	194.62	5.51	2790.74	492.08	0.50
14	8.25	194.62	5.51	2790.74	492.08	0.50
15	8.25	200.08	5.51	3140.48	553.75	0.56
15	8.25	200.08	5.51	3140.48	553.75	0.56
16	8.25	205.22	4.89	3299.59	581.81	0.59
16	8.25	205.22	4.89	3299.59	581.81	0.59
17	8.25	210.06	4.89	3268.08	576.25	0.59
17	8.25	210.06	4.89	3268.08	576.25	0.59
18	8.25	214.89	4.89	3236.57	570.69	0.58
18	8.25	214.89	4.89	3236.57	570.69	0.58
19	8.25	219.73	4.89	3205.05	565.14	0.58
19	8.25	219.73	4.89	3205.05	565.14	0.58
20	8.25	224.57	4.89	3173.54	559.58	0.57
20	8.25	224.57	4.89	3173.54	559.58	0.57
21	8.25	229.41	4.89	3142.03	554.02	0.56
21	8.25	229.41	4.89	3142.03	554.02	0.56
22	8.25	234.24	4.89	3110.52	548.47	0.56
22	8.25	234.24	4.89	3110.52	548.47	0.56
23	8.25	239.08	4.89	3079.01	542.91	0.55
23	8.25	239.08	4.89	3079.01	542.91	0.55
24	8.25	243.92	4.89	3047.50	537.36	0.55
24	8.25	243.92	4.89	3047.50	537.36	0.55
25	8.25	248.76	4.89	3015.98	531.80	0.54
25	8.25	248.76	4.89	3015.98	531.80	0.54
26	8.25	253.59	4.89	2984.47	526.24	0.54
26	8.25	253.59	4.89	2984.47	526.24	0.54
27	8.25	258.43	4.89	2952.96	520.69	0.53
27	8.25	258.43	4.89	2952.96	520.69	0.53
28	49.97	261.96	3.46	2963.82	522.60	0.53
28	49.97	261.96	3.46	2963.82	522.60	0.53
29	49.97	264.20	3.50	3271.50	2606.65	2.65
29	49.97	264.20	3.50	3271.50	2606.65	2.65
30	49.97	266.16	2.60	3044.81	2453.75	2.50
30	49.97	266.16	2.60	3044.81	2453.75	2.50
31	49.97	268.11	3.44	2775.63	2272.18	2.31
31	49.97	268.11	3.44	2775.63	2272.18	2.31
32	47.73	271.17	5.82	2399.40	2018.41	2.06
32	47.73	271.17	5.82	2399.40	2018.41	2.06
33	47.73	275.08	5.82	1992.14	1743.72	1.78
33	47.73	275.08	5.82	1992.14	1743.72	1.78
34	47.73	277.50	1.37	1693.69	1342.41	1.37
34	47.73	277.50	1.37	1693.69	1342.41	1.37
35	54.23	278.03	0.25	1718.77	1359.33	1.38
35	54.23	278.03	0.25	1718.77	1359.33	1.38
36	54.23	279.96	6.38	1332.82	1099.00	1.12
36	54.23	279.96	6.38	1332.82	1099.00	1.12
37	54.23	283.69	6.38	582.71	593.04	0.60
37	54.23	283.69	6.38	582.71	593.04	0.60
38	58.55	285.86	1.18	75.74	51.09	0.05
38	58.55	285.86	1.18	75.74	51.09	0.05

Table 4 - Base Force Data on the 38 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-44.58	145.13	4.68	922.94	2494.91	2.54
1	-44.58	145.13	4.68	922.94	2494.91	2.54
2	-44.58	148.47	4.68	3374.40	4148.44	4.22
2	-44.58	148.47	4.68	3374.40	4148.44	4.22
3	-44.58	150.79	1.84	54513.79	9612.25	9.79
3	-44.58	150.79	1.84	54513.79	9612.25	9.79
4	8.25	152.78	2.71	4100.87	723.09	0.74
4	8.25	152.78	2.71	4100.87	723.09	0.74
5	8.25	155.46	2.71	4654.02	820.63	0.84
5	8.25	155.46	2.71	4654.02	820.63	0.84
6	8.25	158.00	2.43	3191.74	562.79	0.57
6	8.25	158.00	2.43	3191.74	562.79	0.57
7	8.25	161.47	4.60	6651.40	1172.82	1.19
7	8.25	161.47	4.60	6651.40	1172.82	1.19
8	8.25	166.03	4.60	26098.79	4601.92	4.69
8	8.25	166.03	4.60	26098.79	4601.92	4.69
9	8.25	170.30	4.04	5974.45	1053.46	1.07
9	8.25	170.30	4.04	5974.45	1053.46	1.07
10	8.25	174.30	4.04	6326.09	1115.46	1.14
10	8.25	174.30	4.04	6326.09	1115.46	1.14
11	8.25	178.75	4.95	8758.47	1544.36	1.57
11	8.25	178.75	4.95	8758.47	1544.36	1.57
12	8.25	183.88	5.41	11357.34	2002.60	2.04
12	8.25	183.88	5.41	11357.34	2002.60	2.04
13	8.25	189.23	5.41	13213.31	2329.86	2.37
13	8.25	189.23	5.41	13213.31	2329.86	2.37
14	8.25	194.62	5.51	15368.62	2709.90	2.76
14	8.25	194.62	5.51	15368.62	2709.90	2.76
15	8.25	200.08	5.51	17294.62	3049.51	3.11
15	8.25	200.08	5.51	17294.62	3049.51	3.11
16	8.25	205.22	4.89	16128.61	2843.91	2.90
16	8.25	205.22	4.89	16128.61	2843.91	2.90
17	8.25	210.06	4.89	15974.57	2816.75	2.87
17	8.25	210.06	4.89	15974.57	2816.75	2.87
18	8.25	214.89	4.89	15820.54	2789.59	2.84
18	8.25	214.89	4.89	15820.54	2789.59	2.84
19	8.25	219.73	4.89	15666.51	2762.43	2.81
19	8.25	219.73	4.89	15666.51	2762.43	2.81
20	8.25	224.57	4.89	15512.48	2735.27	2.79
20	8.25	224.57	4.89	15512.48	2735.27	2.79
21	8.25	229.41	4.89	15358.45	2708.11	2.76
21	8.25	229.41	4.89	15358.45	2708.11	2.76
22	8.25	234.24	4.89	15204.42	2680.95	2.73
22	8.25	234.24	4.89	15204.42	2680.95	2.73
23	8.25	239.08	4.89	15050.39	2653.79	2.70
23	8.25	239.08	4.89	15050.39	2653.79	2.70
24	8.25	243.92	4.89	14896.36	2626.63	2.67
24	8.25	243.92	4.89	14896.36	2626.63	2.67
25	8.25	248.76	4.89	14742.32	2599.47	2.65
25	8.25	248.76	4.89	14742.32	2599.47	2.65
26	8.25	253.59	4.89	14588.29	2572.31	2.62
26	8.25	253.59	4.89	14588.29	2572.31	2.62
27	8.25	258.43	4.89	14434.26	2545.15	2.59
27	8.25	258.43	4.89	14434.26	2545.15	2.59
28	49.97	261.96	3.46	10242.98	1806.11	1.84
28	49.97	261.96	3.46	10242.98	1806.11	1.84
29	49.97	264.20	3.50	11457.01	9128.68	9.30
29	49.97	264.20	3.50	11457.01	9128.68	9.30
30	49.97	266.16	2.60	7927.39	6388.52	6.51
30	49.97	266.16	2.60	7927.39	6388.52	6.51
31	49.97	268.11	3.44	9543.59	7812.57	7.96
31	49.97	268.11	3.44	9543.59	7812.57	7.96
32	47.73	271.17	5.82	13955.56	11739.65	11.96
32	47.73	271.17	5.82	13955.56	11739.65	11.96
33	47.73	275.08	5.82	11586.85	10141.94	10.33
33	47.73	275.08	5.82	11586.85	10141.94	10.33
34	47.73	277.50	1.37	2316.02	1835.67	1.87

34	47.73	277.50	1.37	2316.02	1835.67	1.87
35	54.23	278.03	0.25	426.33	337.17	0.34
35	54.23	278.03	0.25	426.33	337.17	0.34
36	54.23	279.96	6.38	8498.03	7007.19	7.14
36	54.23	279.96	6.38	8498.03	7007.19	7.14
37	54.23	283.69	6.38	3715.32	3781.21	3.85
37	54.23	283.69	6.38	3715.32	3781.21	3.85
38	58.55	285.86	1.18	89.32	60.24	0.06
38	58.55	285.86	1.18	89.32	60.24	0.06

****SLICE REINFORCEMENT DATA****

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

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
8	27408.8	19191.9	33460.0	35.00	0.830246E+04

***Pier/Pile Slice Force Data on the 38 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
10	12000.0	0.0	12000.0	90.00	-0.295820E+04

Sum of the Resisting Forces = 103694.81 (lbs)

Average Available Shear Strength = 640.38(psf)

Sum of the Driving Forces = -19098.09 (lbs)

Average Mobilized Shear Stress = -117.94(psf)

Total length of the failure surface = 161.93(ft)

Factor of Safety Balance Check: FS = -5.42959

Janbu's Correction Factor (fo) = -0.4090

Janub's FS Corrected = 2.22091

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

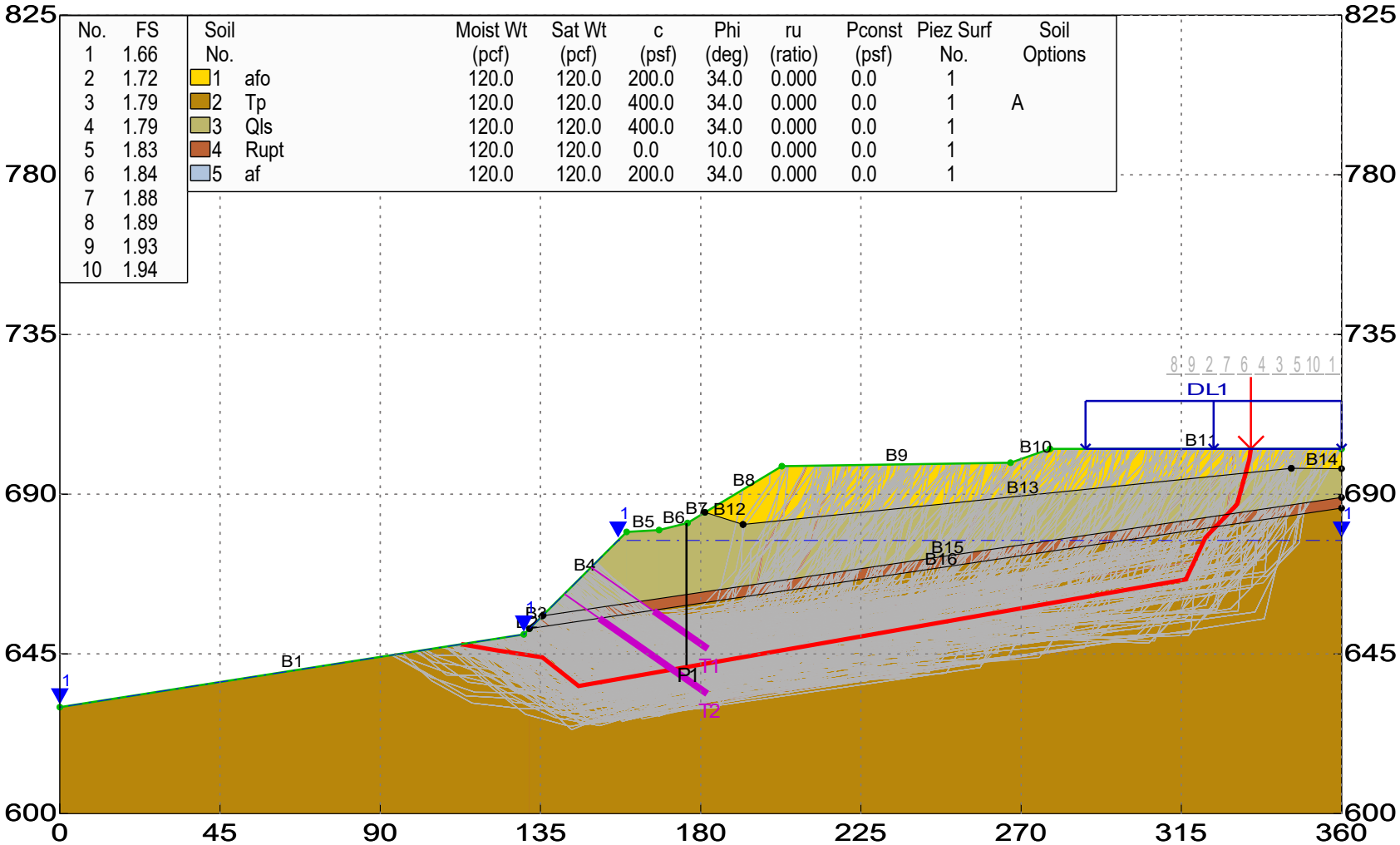
Royal Vista - Cross Section 7
Stage 7 (Temporary Cut - Along Bedding)

LGC Geotechnical / BPP

\Sec 7 - Stage 7 (Temporary Cut - Along Bedding).gsd

No.	FS
1	1.66
2	1.72
3	1.79
4	1.79
5	1.83
6	1.84
7	1.88
8	1.89
9	1.93
10	1.94

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.66

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 7 (Temporary Cut - Along Bedding).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 7 (Temporary Cut - Along Bedding).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 7 (Temporary Cut - Along Bedding)

BOUNDARY DATA

11 Surface Boundaries
16 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	630.000	130.300	650.500	2
2	130.300	650.500	131.900	652.100	2
3	131.900	652.100	135.500	655.700	4
4	135.500	655.700	159.200	679.400	3
5	159.200	679.400	168.300	679.900	3
6	168.300	679.900	176.300	681.900	3
7	176.300	681.900	181.200	684.900	3
8	181.200	684.900	202.800	697.900	1
9	202.800	697.900	267.000	698.900	1
10	267.000	698.900	278.100	702.800	1
11	278.100	702.800	360.000	702.800	1
12	181.200	684.900	191.900	681.500	3
13	191.900	681.500	345.900	697.300	3
14	345.900	697.300	360.000	697.200	3
15	135.500	655.700	360.000	689.100	4
16	131.900	652.100	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	630.00
2	130.30	650.50
3	156.80	677.00
4	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	11	288.100	702.800	250.000	360.000	702.800	250.000	0.00

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

TIEBACK LOAD(S)

2 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	149.20	669.40	167300.0	5.0	35.00	21.5	18.5
2	141.70	661.90	334600.0	5.0	35.00	12.0	37.0

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.

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 13.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	140.00	638.00	170.00	642.49	30.00
2	180.00	644.00	340.00	668.00	30.00

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 = 229

Number of Trial Surfaces With Valid FS = 771

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 22.9 %

Statistical Data On All Valid FS Values:
FS Max = 168.845 FS Min = 1.661 FS Ave = 10.758
Standard Deviation = 18.369 Coefficient of Variation = 170.75 %

Critical Surface is Sequence Number 10 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	166.71	657.14
2	142.30	661.48

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.

Factor Of Safety For The Critical or Specified Surface = 1.661

Table 1 - Geometry Data on the 53 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.95	0.83	115.22	647.30	648.13	-10.01	8.94	5.03
2	4.95	2.48	120.17	646.43	648.91	-10.01	8.94	5.03
3	3.83	3.90	124.56	645.70	649.60	-8.62	8.94	3.87
4	3.83	5.08	128.39	645.12	650.20	-8.62	8.94	3.87
5	1.60	6.59	131.10	644.71	651.30	-8.62	45.00	1.62
6	3.60	9.59	133.70	644.31	653.90	-8.62	45.00	3.64
7	0.00	11.66	135.50	644.04	655.70	-8.62	45.00	0.00
8	5.10	16.23	138.05	642.02	658.25	-38.36	45.00	6.50
9	5.10	25.36	143.15	637.99	663.35	-38.36	45.00	6.50
10	5.55	32.21	148.47	636.46	668.67	9.98	45.00	5.64
11	5.55	36.79	154.02	637.44	674.22	9.98	45.00	5.64
12	2.40	40.06	158.00	638.14	678.20	9.98	45.00	2.44
13	4.55	40.78	161.47	638.75	679.52	9.98	3.14	4.62
14	4.55	40.22	166.03	639.55	679.77	9.98	3.14	4.62
15	4.00	40.10	170.30	640.30	680.40	9.98	14.04	4.06
16	4.00	40.39	174.30	641.01	681.40	9.98	14.04	4.06
17	4.90	41.61	178.75	641.79	683.40	9.98	31.48	4.98
18	5.35	43.82	183.88	642.69	686.51	9.98	31.04	5.43
19	5.35	46.09	189.23	643.63	689.73	9.98	31.04	5.43
20	5.45	48.39	194.62	644.59	692.98	9.98	31.04	5.53
21	5.45	50.72	200.08	645.54	696.26	9.98	31.04	5.53
22	4.94	51.48	205.27	646.46	697.94	9.98	0.89	5.01
23	4.94	50.69	210.21	647.33	698.02	9.98	0.89	5.01
24	4.94	49.89	215.15	648.20	698.09	9.98	0.89	5.01
25	4.94	49.10	220.08	649.07	698.17	9.98	0.89	5.01
26	4.94	48.31	225.02	649.94	698.25	9.98	0.89	5.01
27	4.94	47.52	229.96	650.81	698.32	9.98	0.89	5.01
28	4.94	46.72	234.90	651.68	698.40	9.98	0.89	5.01
29	4.94	45.93	239.84	652.54	698.48	9.98	0.89	5.01
30	4.94	45.14	244.78	653.41	698.55	9.98	0.89	5.01
31	4.94	44.35	249.72	654.28	698.63	9.98	0.89	5.01

32	4.94	43.55	254.65	655.15	698.71	9.98	0.89	5.01
33	4.94	42.76	259.59	656.02	698.78	9.98	0.89	5.01
34	4.94	41.97	264.53	656.89	698.86	9.98	0.89	5.01
35	5.55	42.06	269.77	657.81	699.88	9.98	19.36	5.64
36	5.55	43.03	275.33	658.79	701.82	9.98	19.36	5.64
37	0.57	43.47	278.38	659.33	702.80	9.98	0.00	0.58
38	4.72	43.00	281.03	659.80	702.80	9.98	0.00	4.79
39	4.72	42.17	285.74	660.63	702.80	9.98	0.00	4.79
40	5.42	41.28	290.81	661.52	702.80	9.98	0.00	5.51
41	5.42	40.33	296.24	662.47	702.80	9.98	0.00	5.51
42	5.76	39.34	301.83	663.46	702.80	9.98	0.00	5.85
43	5.76	38.33	307.59	664.47	702.80	9.98	0.00	5.85
44	5.76	37.31	313.36	665.49	702.80	9.98	0.00	5.85
45	2.58	34.05	317.53	668.75	702.80	64.85	0.00	6.08
46	2.58	28.55	320.11	674.25	702.80	64.85	0.00	6.08
47	0.36	25.42	321.59	677.38	702.80	64.85	0.00	0.84
48	2.91	23.50	323.22	679.30	702.80	46.59	0.00	4.23
49	3.31	20.21	326.33	682.59	702.80	46.59	0.00	4.82
50	2.71	17.03	329.34	685.77	702.80	46.59	0.00	3.95
51	2.36	11.21	331.88	691.59	702.80	74.97	0.00	9.09
52	1.01	4.93	333.56	697.87	702.80	74.97	0.00	3.91
53	0.47	1.52	334.31	701.28	702.80	81.16	0.00	3.08

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

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	491.6	0.0	253.3	0.0	0.0	0.0
2	1474.8	0.0	759.9	0.0	0.0	0.0
3	1789.7	0.0	918.5	0.0	0.0	0.0
4	2332.2	0.0	1197.0	0.0	0.0	0.0
5	1265.8	0.0	332.9	0.0	0.0	0.0
6	4141.6	0.0	1089.1	0.0	0.0	0.0
7	3.3	0.0	0.9	0.0	0.0	0.0
8	9925.8	0.0	3291.1	0.0	0.0	0.0
9	15510.5	0.0	5142.8	0.0	0.0	0.0
10	21459.7	0.0	5665.3	0.0	0.0	0.0
11	24507.3	0.0	6469.9	0.0	0.0	0.0
12	11537.8	0.0	5909.4	0.0	0.0	0.0
13	22263.2	0.0	11026.9	0.0	0.0	0.0
14	21962.4	0.0	10796.0	0.0	0.0	0.0
15	19246.3	0.0	9300.3	0.0	0.0	0.0
16	19388.4	0.0	9121.8	0.0	0.0	0.0
17	24466.1	0.0	10931.1	0.0	0.0	0.0
18	28130.4	0.0	11629.1	0.0	0.0	0.0
19	29592.9	0.0	11309.9	0.0	0.0	0.0
20	31649.9	0.0	11193.0	0.0	0.0	0.0
21	33167.6	0.0	10861.7	0.0	0.0	0.0
22	30507.3	0.0	9556.1	0.0	0.0	0.0
23	30037.7	0.0	9284.1	0.0	0.0	0.0
24	29568.1	0.0	9012.1	0.0	0.0	0.0
25	29098.5	0.0	8740.1	0.0	0.0	0.0
26	28628.9	0.0	8468.1	0.0	0.0	0.0
27	28159.3	0.0	8196.0	0.0	0.0	0.0
28	27689.7	0.0	7924.0	0.0	0.0	0.0
29	27220.1	0.0	7652.0	0.0	0.0	0.0
30	26750.5	0.0	7380.0	0.0	0.0	0.0
31	26280.9	0.0	7108.0	0.0	0.0	0.0
32	25811.3	0.0	6836.0	0.0	0.0	0.0
33	25341.7	0.0	6563.9	0.0	0.0	0.0
34	24872.1	0.0	6291.9	0.0	0.0	0.0
35	28012.2	0.0	6746.4	0.0	0.0	0.0
36	28660.2	0.0	6402.9	0.0	0.0	0.0
37	2969.0	0.0	637.2	0.0	0.0	0.0
38	24334.2	0.0	5140.2	0.0	0.0	0.0
39	23864.4	0.0	4892.1	0.0	0.0	0.0
40	26873.8	0.0	5321.4	0.0	0.0	1356.2

41	26252.2	0.0	4993.2	0.0	0.0	1356.2
42	27209.9	0.0	4945.2	0.0	0.0	1440.9
43	26508.2	0.0	4574.7	0.0	0.0	1440.9
44	25806.5	0.0	4204.2	0.0	0.0	1440.9
45	10555.5	0.0	3131.1	0.0	0.0	645.8
46	8849.8	0.0	1043.7	0.0	0.0	645.8
47	1091.5	0.0	0.0	0.0	0.0	89.5
48	8194.5	0.0	0.0	0.0	0.0	726.4
49	8038.7	0.0	0.0	0.0	0.0	828.5
50	5546.8	0.0	0.0	0.0	0.0	678.6
51	3168.5	0.0	0.0	0.0	0.0	589.1
52	600.1	0.0	0.0	0.0	0.0	253.7
53	86.1	0.0	0.0	0.0	0.0	118.1

TOTAL WEIGHT OF SLIDING MASS = 970895.60(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 696941.91(lbs)

TOTAL AREA OF SLIDING MASS = 8090.80(ft2)

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

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	400.00	34.00	A
2	2	400.00	34.00	A
3	2	400.00	34.00	A
4	2	400.00	34.00	A
5	2	400.00	34.00	A
6	2	400.00	34.00	A
7	2	400.00	34.00	A
8	2	400.00	34.00	A
9	2	400.00	34.00	A
10	2	300.00	12.00	A
11	2	300.00	12.00	A
12	2	300.00	12.00	A
13	2	300.00	12.00	A
14	2	300.00	12.00	A
15	2	300.00	12.00	A
16	2	300.00	12.00	A
17	2	300.00	12.00	A
18	2	300.00	12.00	A
19	2	300.00	12.00	A
20	2	300.00	12.00	A
21	2	300.00	12.00	A
22	2	300.00	12.00	A
23	2	300.00	12.00	A
24	2	300.00	12.00	A
25	2	300.00	12.00	A
26	2	300.00	12.00	A
27	2	300.00	12.00	A
28	2	300.00	12.00	A
29	2	300.00	12.00	A
30	2	300.00	12.00	A
31	2	300.00	12.00	A
32	2	300.00	12.00	A
33	2	300.00	12.00	A
34	2	300.00	12.00	A
35	2	300.00	12.00	A
36	2	300.00	12.00	A
37	2	300.00	12.00	A
38	2	300.00	12.00	A
39	2	300.00	12.00	A
40	2	300.00	12.00	A
41	2	300.00	12.00	A
42	2	300.00	12.00	A
43	2	300.00	12.00	A
44	2	300.00	12.00	A
45	2	400.00	34.00	A
46	2	400.00	34.00	A
47	2	400.00	34.00	A

48	2	400.00	34.00	A
49	4	0.00	10.00	
50	3	400.00	34.00	
51	3	400.00	34.00	
52	1	200.00	34.00	
53	1	200.00	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 53 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-10.01	115.22	5.03	68.53	446.23	103.86
1	-10.01	115.22	5.03	68.53	446.23	103.86
2	-10.01	120.17	5.03	169.28	514.18	119.67
2	-10.01	120.17	5.03	169.28	514.18	119.67
3	-8.62	124.56	3.87	252.01	569.98	132.66
3	-8.62	124.56	3.87	252.01	569.98	132.66
4	-8.62	128.39	3.87	323.70	618.34	143.92
4	-8.62	128.39	3.87	323.70	618.34	143.92
5	-8.62	131.10	1.62	616.31	815.71	189.85
5	-8.62	131.10	1.62	616.31	815.71	189.85
6	-8.62	133.70	3.64	889.16	999.75	232.69
6	-8.62	133.70	3.64	889.16	999.75	232.69
7	-8.62	135.50	0.00	1078.18	1127.24	262.36
7	-8.62	135.50	0.00	1078.18	1127.24	262.36
8	-38.36	138.05	6.50	1753.60	1582.82	368.39
8	-38.36	138.05	6.50	1753.60	1582.82	368.39
9	-38.36	143.15	6.50	11376.69	8073.67	1879.12
9	-38.36	143.15	6.50	11376.69	8073.67	1879.12
10	9.98	148.47	5.64	2820.85	899.59	209.38
10	9.98	148.47	5.64	2820.85	899.59	209.38
11	9.98	154.02	5.64	3223.31	985.14	229.29
11	9.98	154.02	5.64	3223.31	985.14	229.29
12	9.98	158.00	2.44	2347.35	798.94	185.95
12	9.98	158.00	2.44	2347.35	798.94	185.95
13	9.98	161.47	4.62	2469.97	825.01	192.02
13	9.98	161.47	4.62	2469.97	825.01	192.02
14	9.98	166.03	4.62	6632.96	1709.88	397.97
14	9.98	166.03	4.62	6632.96	1709.88	397.97
15	9.98	170.30	4.06	2485.34	828.28	192.78
15	9.98	170.30	4.06	2485.34	828.28	192.78
16	9.98	174.30	4.06	2564.05	845.00	196.67
16	9.98	174.30	4.06	2564.05	845.00	196.67
17	9.98	178.75	4.98	2757.12	886.04	206.22
17	9.98	178.75	4.98	2757.12	886.04	206.22
18	9.98	183.88	5.43	3075.38	953.69	221.97
18	9.98	183.88	5.43	3075.38	953.69	221.97
19	9.98	189.23	5.43	3404.45	1023.64	238.25
19	9.98	189.23	5.43	3404.45	1023.64	238.25
20	9.98	194.62	5.53	3736.59	1094.24	254.68
20	9.98	194.62	5.53	3736.59	1094.24	254.68
21	9.98	200.08	5.53	4071.81	1165.49	271.26
21	9.98	200.08	5.53	4071.81	1165.49	271.26
22	9.98	205.27	5.01	4219.19	1196.82	278.55
22	9.98	205.27	5.01	4219.19	1196.82	278.55
23	9.98	210.21	5.01	4178.72	1188.22	276.55
23	9.98	210.21	5.01	4178.72	1188.22	276.55
24	9.98	215.15	5.01	4138.26	1179.61	274.55
24	9.98	215.15	5.01	4138.26	1179.61	274.55
25	9.98	220.08	5.01	4097.79	1171.01	272.55
25	9.98	220.08	5.01	4097.79	1171.01	272.55
26	9.98	225.02	5.01	4057.33	1162.41	270.55

26	9.98	225.02	5.01	4057.33	1162.41	270.55
27	9.98	229.96	5.01	4016.86	1153.81	268.54
27	9.98	229.96	5.01	4016.86	1153.81	268.54
28	9.98	234.90	5.01	3976.39	1145.21	266.54
28	9.98	234.90	5.01	3976.39	1145.21	266.54
29	9.98	239.84	5.01	3935.93	1136.61	264.54
29	9.98	239.84	5.01	3935.93	1136.61	264.54
30	9.98	244.78	5.01	3895.46	1128.01	262.54
30	9.98	244.78	5.01	3895.46	1128.01	262.54
31	9.98	249.72	5.01	3855.00	1119.40	260.54
31	9.98	249.72	5.01	3855.00	1119.40	260.54
32	9.98	254.65	5.01	3814.53	1110.80	258.54
32	9.98	254.65	5.01	3814.53	1110.80	258.54
33	9.98	259.59	5.01	3774.06	1102.20	256.53
33	9.98	259.59	5.01	3774.06	1102.20	256.53
34	9.98	264.53	5.01	3733.60	1093.60	254.53
34	9.98	264.53	5.01	3733.60	1093.60	254.53
35	9.98	269.77	5.64	3801.41	1108.01	257.89
35	9.98	269.77	5.64	3801.41	1108.01	257.89
36	9.98	275.33	5.64	3977.49	1145.44	266.60
36	9.98	275.33	5.64	3977.49	1145.44	266.60
37	9.98	278.38	0.58	4062.67	1163.55	270.81
37	9.98	278.38	0.58	4062.67	1163.55	270.81
38	9.98	281.03	4.79	4036.12	1157.90	269.50
38	9.98	281.03	4.79	4036.12	1157.90	269.50
39	9.98	285.74	4.79	3988.75	1147.84	267.15
39	9.98	285.74	4.79	3988.75	1147.84	267.15
40	9.98	290.81	5.51	4185.51	1189.66	276.89
40	9.98	290.81	5.51	4185.51	1189.66	276.89
41	9.98	296.24	5.51	4131.01	1178.07	274.19
41	9.98	296.24	5.51	4131.01	1178.07	274.19
42	9.98	301.83	5.85	4074.81	1166.13	271.41
42	9.98	301.83	5.85	4074.81	1166.13	271.41
43	9.98	307.59	5.85	4016.91	1153.82	268.55
43	9.98	307.59	5.85	4016.91	1153.82	268.55
44	9.98	313.36	5.85	3959.01	1141.51	265.68
44	9.98	313.36	5.85	3959.01	1141.51	265.68
45	64.85	317.53	6.08	2656.37	2191.74	510.12
45	64.85	317.53	6.08	2656.37	2191.74	510.12
46	64.85	320.11	6.08	2423.06	2034.37	473.49
46	64.85	320.11	6.08	2423.06	2034.37	473.49
47	64.85	321.59	0.84	2272.74	1932.98	449.89
47	64.85	321.59	0.84	2272.74	1932.98	449.89
48	46.59	323.22	4.23	2516.95	2097.70	488.23
48	46.59	323.22	4.23	2516.95	2097.70	488.23
49	46.59	326.33	4.82	2556.86	450.84	104.93
49	46.59	326.33	4.82	2556.86	450.84	104.93
50	46.59	329.34	3.95	1857.47	1652.88	384.70
50	46.59	329.34	3.95	1857.47	1652.88	384.70
51	74.97	331.88	9.09	751.75	907.06	211.12
51	74.97	331.88	9.09	751.75	907.06	211.12
52	74.97	333.56	3.91	402.94	471.79	109.81
52	74.97	333.56	3.91	402.94	471.79	109.81
53	81.16	334.31	3.08	207.62	140.04	32.59
53	81.16	334.31	3.08	207.62	140.04	32.59

Table 4 - Base Force Data on the 53 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-10.01	115.22	5.03	344.76	2244.73	522.45
1	-10.01	115.22	5.03	344.76	2244.73	522.45
2	-10.01	120.17	5.03	851.58	2586.59	602.02
2	-10.01	120.17	5.03	851.58	2586.59	602.02
3	-8.62	124.56	3.87	975.05	2205.32	513.28
3	-8.62	124.56	3.87	975.05	2205.32	513.28
4	-8.62	128.39	3.87	1252.41	2392.40	556.82
4	-8.62	128.39	3.87	1252.41	2392.40	556.82

5	-8.62	131.10	1.62	997.37	1320.05	307.24
5	-8.62	131.10	1.62	997.37	1320.05	307.24
6	-8.62	133.70	3.64	3237.57	3640.23	847.25
6	-8.62	133.70	3.64	3237.57	3640.23	847.25
7	-8.62	135.50	0.00	2.55	2.67	0.62
7	-8.62	135.50	0.00	2.55	2.67	0.62
8	-38.36	138.05	6.50	11398.39	10288.31	2394.57
8	-38.36	138.05	6.50	11398.39	10288.31	2394.57
9	-38.36	143.15	6.50	73948.47	52478.87	12214.26
9	-38.36	143.15	6.50	73948.47	52478.87	12214.26
10	9.98	148.47	5.64	15901.60	5071.14	1180.29
10	9.98	148.47	5.64	15901.60	5071.14	1180.29
11	9.98	154.02	5.64	18170.31	5553.37	1292.53
11	9.98	154.02	5.64	18170.31	5553.37	1292.53
12	9.98	158.00	2.44	5720.26	1946.95	453.15
12	9.98	158.00	2.44	5720.26	1946.95	453.15
13	9.98	161.47	4.62	11411.15	3811.50	887.11
13	9.98	161.47	4.62	11411.15	3811.50	887.11
14	9.98	166.03	4.62	30644.01	7899.57	1838.60
14	9.98	166.03	4.62	30644.01	7899.57	1838.60
15	9.98	170.30	4.06	10094.22	3364.04	782.97
15	9.98	170.30	4.06	10094.22	3364.04	782.97
16	9.98	174.30	4.06	10413.89	3431.99	798.78
16	9.98	174.30	4.06	10413.89	3431.99	798.78
17	9.98	178.75	4.98	13717.63	4408.38	1026.03
17	9.98	178.75	4.98	13717.63	4408.38	1026.03
18	9.98	183.88	5.43	16706.27	5180.71	1205.79
18	9.98	183.88	5.43	16706.27	5180.71	1205.79
19	9.98	189.23	5.43	18493.86	5560.67	1294.22
19	9.98	189.23	5.43	18493.86	5560.67	1294.22
20	9.98	194.62	5.53	20677.56	6055.29	1409.35
20	9.98	194.62	5.53	20677.56	6055.29	1409.35
21	9.98	200.08	5.53	22532.60	6449.59	1501.12
21	9.98	200.08	5.53	22532.60	6449.59	1501.12
22	9.98	205.27	5.01	21156.69	6001.31	1396.78
22	9.98	205.27	5.01	21156.69	6001.31	1396.78
23	9.98	210.21	5.01	20953.78	5958.18	1386.74
23	9.98	210.21	5.01	20953.78	5958.18	1386.74
24	9.98	215.15	5.01	20750.87	5915.05	1376.71
24	9.98	215.15	5.01	20750.87	5915.05	1376.71
25	9.98	220.08	5.01	20547.95	5871.92	1366.67
25	9.98	220.08	5.01	20547.95	5871.92	1366.67
26	9.98	225.02	5.01	20345.04	5828.79	1356.63
26	9.98	225.02	5.01	20345.04	5828.79	1356.63
27	9.98	229.96	5.01	20142.13	5785.66	1346.59
27	9.98	229.96	5.01	20142.13	5785.66	1346.59
28	9.98	234.90	5.01	19939.22	5742.53	1336.55
28	9.98	234.90	5.01	19939.22	5742.53	1336.55
29	9.98	239.84	5.01	19736.30	5699.40	1326.51
29	9.98	239.84	5.01	19736.30	5699.40	1326.51
30	9.98	244.78	5.01	19533.39	5656.27	1316.48
30	9.98	244.78	5.01	19533.39	5656.27	1316.48
31	9.98	249.72	5.01	19330.48	5613.14	1306.44
31	9.98	249.72	5.01	19330.48	5613.14	1306.44
32	9.98	254.65	5.01	19127.57	5570.01	1296.40
32	9.98	254.65	5.01	19127.57	5570.01	1296.40
33	9.98	259.59	5.01	18924.65	5526.88	1286.36
33	9.98	259.59	5.01	18924.65	5526.88	1286.36
34	9.98	264.53	5.01	18721.74	5483.75	1276.32
34	9.98	264.53	5.01	18721.74	5483.75	1276.32
35	9.98	269.77	5.64	21422.21	6244.03	1453.27
35	9.98	269.77	5.64	21422.21	6244.03	1453.27
36	9.98	275.33	5.64	22414.48	6454.95	1502.36
36	9.98	275.33	5.64	22414.48	6454.95	1502.36
37	9.98	278.38	0.58	2347.87	672.43	156.51
37	9.98	278.38	0.58	2347.87	672.43	156.51
38	9.98	281.03	4.79	19324.66	5543.96	1290.34
38	9.98	281.03	4.79	19324.66	5543.96	1290.34
39	9.98	285.74	4.79	19097.85	5495.75	1279.12
39	9.98	285.74	4.79	19097.85	5495.75	1279.12
40	9.98	290.81	5.51	23054.88	6552.95	1525.17
40	9.98	290.81	5.51	23054.88	6552.95	1525.17

41	9.98	296.24	5.51	22754.70	6489.14	1510.32
41	9.98	296.24	5.51	22754.70	6489.14	1510.32
42	9.98	301.83	5.85	23846.32	6824.33	1588.34
42	9.98	301.83	5.85	23846.32	6824.33	1588.34
43	9.98	307.59	5.85	23507.48	6752.31	1571.57
43	9.98	307.59	5.85	23507.48	6752.31	1571.57
44	9.98	313.36	5.85	23168.65	6680.29	1554.81
44	9.98	313.36	5.85	23168.65	6680.29	1554.81
45	64.85	317.53	6.08	16147.91	13323.48	3100.99
45	64.85	317.53	6.08	16147.91	13323.48	3100.99
46	64.85	320.11	6.08	14729.62	12366.83	2878.33
46	64.85	320.11	6.08	14729.62	12366.83	2878.33
47	64.85	321.59	0.84	1913.93	1627.81	378.87
47	64.85	321.59	0.84	1913.93	1627.81	378.87
48	46.59	323.22	4.23	10641.72	8869.14	2064.26
48	46.59	323.22	4.23	10641.72	8869.14	2064.26
49	46.59	326.33	4.82	12329.43	2174.01	505.99
49	46.59	326.33	4.82	12329.43	2174.01	505.99
50	46.59	329.34	3.95	7336.76	6528.66	1519.52
50	46.59	329.34	3.95	7336.76	6528.66	1519.52
51	74.97	331.88	9.09	6830.99	8242.27	1918.36
51	74.97	331.88	9.09	6830.99	8242.27	1918.36
52	74.97	333.56	3.91	1576.82	1846.22	429.70
52	74.97	333.56	3.91	1576.82	1846.22	429.70
53	81.16	334.31	3.08	638.44	430.63	100.23
53	81.16	334.31	3.08	638.44	430.63	100.23

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 53 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 53 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
10	12000.0	0.0	12000.0	90.00	-0.163211E+04

Sum of the Resisting Forces = 277997.96 (lbs)

Average Available Shear Strength = 1106.23(psf)

Sum of the Driving Forces = 69376.47 (lbs)

Average Mobilized Shear Stress = 276.07(psf)

Total length of the failure surface = 251.30(ft)

Factor of Safety Balance Check: FS = 4.00709

Janbu's Correction Factor (fo) = 0.4146

Janub's FS Corrected = 1.66119

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

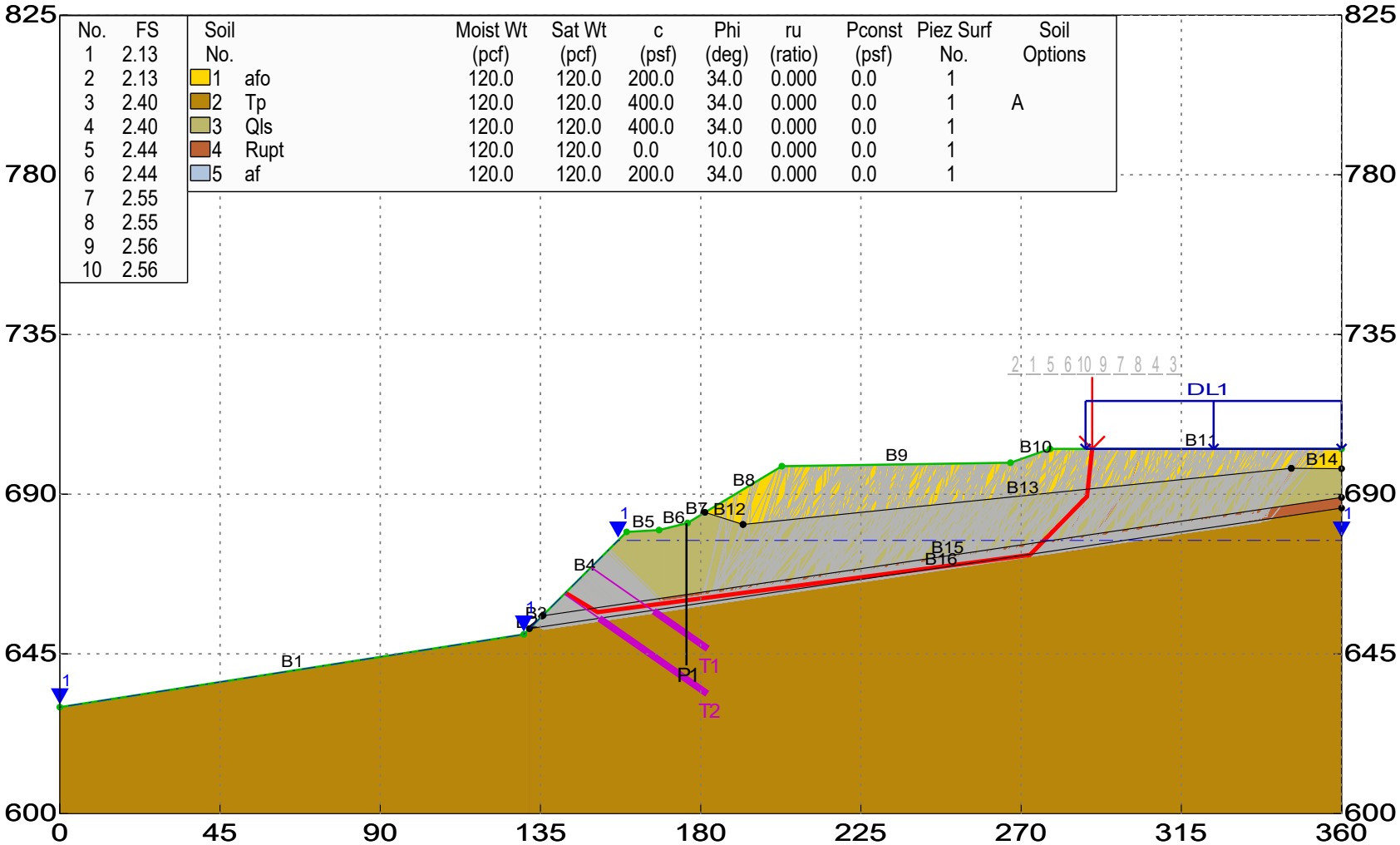
Royal Vista - Cross Section 7
Stage 7 (Temporary Cut - Rupture Surface)

LGC Geotechnical / BPP

\Sec 7 - Stage 7 (Temporary Cut - Rupture Surface).gsd

No.	FS
1	2.13
2	2.13
3	2.40
4	2.40
5	2.44
6	2.44
7	2.55
8	2.55
9	2.56
10	2.56

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 2.13

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 7 (Temporary Cut - Rupture Surface).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 7 (Temporary Cut - Rupture Surface).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 7 (Temporary Cut - Rupture Surface)

BOUNDARY DATA

11 Surface Boundaries
16 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	630.000	130.300	650.500	2
2	130.300	650.500	131.900	652.100	2
3	131.900	652.100	135.500	655.700	4
4	135.500	655.700	159.200	679.400	3
5	159.200	679.400	168.300	679.900	3
6	168.300	679.900	176.300	681.900	3
7	176.300	681.900	181.200	684.900	3
8	181.200	684.900	202.800	697.900	1
9	202.800	697.900	267.000	698.900	1
10	267.000	698.900	278.100	702.800	1
11	278.100	702.800	360.000	702.800	1
12	181.200	684.900	191.900	681.500	3
13	191.900	681.500	345.900	697.300	3
14	345.900	697.300	360.000	697.200	3
15	135.500	655.700	360.000	689.100	4
16	131.900	652.100	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	630.00
2	130.30	650.50
3	156.80	677.00
4	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	11	288.100	702.800	250.000	360.000	702.800	250.000	0.00

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

TIEBACK LOAD(S)

2 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	149.20	669.40	167300.0	5.0	35.00	21.5	18.5
2	141.70	661.90	334600.0	5.0	35.00	12.0	37.0

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.

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 23.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	135.00	653.25	170.00	658.49	3.00
2	180.00	660.00	340.00	684.00	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 = 590

Number of Trial Surfaces With Valid FS = 410

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 59.0 %

Statistical Data On All Valid FS Values:
FS Max = 146.195 FS Min = 2.134 FS Ave = 12.760
Standard Deviation = 20.364 Coefficient of Variation = 159.60 %

Critical Surface is Sequence Number 343 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	164.66	658.57
2	151.16	655.27

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	176.00	660.08

Factor Of Safety For The Critical or Specified Surface = 2.134

Table 1 - Geometry Data on the 39 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.67	2.95	143.84	661.10	664.04	-31.19	45.00	4.29
2	3.67	8.84	147.51	658.87	667.71	-31.19	45.00	4.29
3	1.65	13.12	150.18	657.26	670.38	-31.19	45.00	1.93
4	2.90	15.70	152.45	656.95	672.65	7.56	45.00	2.92
5	2.90	18.21	155.35	657.34	675.55	7.56	45.00	2.92
6	2.40	20.51	158.00	657.69	678.20	7.56	45.00	2.42
7	4.55	21.37	161.47	658.15	679.52	7.56	3.14	4.59
8	4.55	21.02	166.03	658.76	679.77	7.56	3.14	4.59
9	4.00	21.08	170.30	659.32	680.40	7.56	14.04	4.04
10	4.00	21.55	174.30	659.85	681.40	7.56	14.04	4.04
11	4.90	22.95	178.75	660.45	683.40	7.56	31.48	4.94
12	5.35	25.38	183.88	661.13	686.51	7.56	31.04	5.40
13	5.35	27.89	189.23	661.84	689.73	7.56	31.04	5.40
14	5.45	30.43	194.62	662.55	692.98	7.56	31.04	5.50
15	5.45	32.98	200.08	663.28	696.26	7.56	31.04	5.50
16	4.98	33.97	205.29	663.97	697.94	7.56	0.89	5.02
17	4.98	33.39	210.27	664.63	698.02	7.56	0.89	5.02
18	4.98	32.80	215.24	665.29	698.09	7.56	0.89	5.02
19	4.98	32.22	220.22	665.95	698.17	7.56	0.89	5.02
20	4.98	31.63	225.20	666.61	698.25	7.56	0.89	5.02
21	4.98	31.05	230.18	667.27	698.33	7.56	0.89	5.02
22	4.98	30.47	235.16	667.94	698.40	7.56	0.89	5.02
23	4.98	29.88	240.13	668.60	698.48	7.56	0.89	5.02
24	4.98	29.30	245.11	669.26	698.56	7.56	0.89	5.02
25	4.98	28.72	250.09	669.92	698.64	7.56	0.89	5.02
26	4.98	28.13	255.07	670.58	698.71	7.56	0.89	5.02
27	4.98	27.55	260.04	671.24	698.79	7.56	0.89	5.02
28	4.47	27.00	264.77	671.87	698.87	7.56	0.89	4.51
29	2.73	27.03	268.36	672.35	699.38	7.56	19.36	2.75
30	2.73	27.63	271.09	672.71	700.34	7.56	19.36	2.75

31	0.18	27.86	272.54	672.98	700.85	45.71	19.36	0.26
32	3.45	26.64	274.36	674.85	701.49	45.71	19.36	4.94
33	0.37	25.35	276.27	676.81	702.16	45.71	19.36	0.54
34	1.64	24.67	277.28	677.84	702.51	45.71	19.36	2.35
35	5.00	21.56	280.60	681.24	702.80	45.71	0.00	7.16
36	5.00	16.43	285.60	686.37	702.80	45.71	0.00	7.16
37	0.41	13.66	288.31	689.14	702.80	45.71	0.00	0.59
38	0.22	12.41	288.62	690.39	702.80	83.93	0.00	2.10
39	1.21	5.68	289.34	697.12	702.80	83.93	0.00	11.43

Table 2 - Force Data On The 39 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1298.7	0.0	394.7	0.0	0.0	0.0
2	3896.1	0.0	1184.2	0.0	0.0	0.0
3	2600.1	0.0	790.3	0.0	0.0	0.0
4	5460.9	0.0	1432.3	0.0	0.0	0.0
5	6335.3	0.0	1661.6	0.0	0.0	0.0
6	5907.0	0.0	2917.3	0.0	0.0	0.0
7	11670.1	0.0	5398.6	0.0	0.0	0.0
8	11476.7	0.0	5225.5	0.0	0.0	0.0
9	10116.9	0.0	4450.9	0.0	0.0	0.0
10	10341.9	0.0	4317.1	0.0	0.0	0.0
11	13497.4	0.0	5106.2	0.0	0.0	0.0
12	16296.6	0.0	5345.9	0.0	0.0	0.0
13	17907.6	0.0	5106.7	0.0	0.0	0.0
14	19898.8	0.0	4956.1	0.0	0.0	0.0
15	21570.7	0.0	4707.8	0.0	0.0	0.0
16	20290.9	0.0	4082.9	0.0	0.0	0.0
17	19942.3	0.0	3875.8	0.0	0.0	0.0
18	19593.7	0.0	3668.6	0.0	0.0	0.0
19	19245.2	0.0	3461.5	0.0	0.0	0.0
20	18896.6	0.0	3254.4	0.0	0.0	0.0
21	18548.1	0.0	3047.2	0.0	0.0	0.0
22	18199.5	0.0	2840.1	0.0	0.0	0.0
23	17851.0	0.0	2633.0	0.0	0.0	0.0
24	17502.4	0.0	2425.8	0.0	0.0	0.0
25	17153.8	0.0	2218.7	0.0	0.0	0.0
26	16805.3	0.0	2011.6	0.0	0.0	0.0
27	16456.7	0.0	1804.4	0.0	0.0	0.0
28	14470.2	0.0	1442.8	0.0	0.0	0.0
29	8841.6	0.0	798.5	0.0	0.0	0.0
30	9036.4	0.0	736.4	0.0	0.0	0.0
31	615.5	0.0	66.1	0.0	0.0	0.0
32	11036.0	0.0	664.2	0.0	0.0	0.0
33	1140.0	0.0	6.4	0.0	0.0	0.0
34	4849.1	0.0	0.0	0.0	0.0	0.0
35	12935.5	0.0	0.0	0.0	0.0	0.0
36	9860.7	0.0	0.0	0.0	0.0	0.0
37	677.4	0.0	0.0	0.0	0.0	103.3
38	329.9	0.0	0.0	0.0	0.0	55.4
39	824.1	0.0	0.0	0.0	0.0	302.1

TOTAL WEIGHT OF SLIDING MASS = 453376.64(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 362681.71(lbs)

TOTAL AREA OF SLIDING MASS = 3778.14(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 39 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	

3	4	0.00	10.00	
4	4	0.00	10.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	2	300.00	12.00	A
29	2	300.00	12.00	A
30	2	300.00	12.00	A
31	2	400.00	34.00	A
32	4	0.00	10.00	
33	3	400.00	34.00	
34	3	400.00	34.00	
35	3	400.00	34.00	
36	3	400.00	34.00	
37	3	400.00	34.00	
38	3	400.00	34.00	
39	1	200.00	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 39 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-31.19	143.84	4.29	298.09	601.06	55.74
1	-31.19	143.84	4.29	298.09	601.06	55.74
2	-31.19	147.51	4.29	843.82	969.17	89.87
2	-31.19	147.51	4.29	843.82	969.17	89.87
3	-31.19	150.18	1.93	1177.26	207.58	19.25
3	-31.19	150.18	1.93	1177.26	207.58	19.25
4	7.56	152.45	2.92	14601.40	2574.62	238.74
4	7.56	152.45	2.92	14601.40	2574.62	238.74
5	7.56	155.35	2.92	1613.52	284.51	26.38
5	7.56	155.35	2.92	1613.52	284.51	26.38
6	7.56	158.00	2.42	1253.34	221.00	20.49
6	7.56	158.00	2.42	1253.34	221.00	20.49
7	7.56	161.47	4.59	1385.45	244.29	22.65
7	7.56	161.47	4.59	1385.45	244.29	22.65
8	7.56	166.03	4.59	5588.81	985.46	91.38
8	7.56	166.03	4.59	5588.81	985.46	91.38
9	7.56	170.30	4.04	1422.86	250.89	23.26
9	7.56	170.30	4.04	1422.86	250.89	23.26
10	7.56	174.30	4.04	1512.05	266.62	24.72
10	7.56	174.30	4.04	1512.05	266.62	24.72

11	7.56	178.75	4.94	1717.53	302.85	28.08
11	7.56	178.75	4.94	1717.53	302.85	28.08
12	7.56	183.88	5.40	2050.75	361.60	33.53
12	7.56	183.88	5.40	2050.75	361.60	33.53
13	7.56	189.23	5.40	2395.40	422.37	39.17
13	7.56	189.23	5.40	2395.40	422.37	39.17
14	7.56	194.62	5.50	2743.28	483.71	44.85
14	7.56	194.62	5.50	2743.28	483.71	44.85
15	7.56	200.08	5.50	3094.38	545.62	50.59
15	7.56	200.08	5.50	3094.38	545.62	50.59
16	7.56	205.29	5.02	3255.58	574.05	53.23
16	7.56	205.29	5.02	3255.58	574.05	53.23
17	7.56	210.27	5.02	3226.88	568.99	52.76
17	7.56	210.27	5.02	3226.88	568.99	52.76
18	7.56	215.24	5.02	3198.17	563.92	52.29
18	7.56	215.24	5.02	3198.17	563.92	52.29
19	7.56	220.22	5.02	3169.47	558.86	51.82
19	7.56	220.22	5.02	3169.47	558.86	51.82
20	7.56	225.20	5.02	3140.76	553.80	51.35
20	7.56	225.20	5.02	3140.76	553.80	51.35
21	7.56	230.18	5.02	3112.05	548.74	50.88
21	7.56	230.18	5.02	3112.05	548.74	50.88
22	7.56	235.16	5.02	3083.35	543.68	50.41
22	7.56	235.16	5.02	3083.35	543.68	50.41
23	7.56	240.13	5.02	3054.64	538.62	49.94
23	7.56	240.13	5.02	3054.64	538.62	49.94
24	7.56	245.11	5.02	3025.94	533.55	49.48
24	7.56	245.11	5.02	3025.94	533.55	49.48
25	7.56	250.09	5.02	2997.23	528.49	49.01
25	7.56	250.09	5.02	2997.23	528.49	49.01
26	7.56	255.07	5.02	2968.53	523.43	48.54
26	7.56	255.07	5.02	2968.53	523.43	48.54
27	7.56	260.04	5.02	2939.82	518.37	48.07
27	7.56	260.04	5.02	2939.82	518.37	48.07
28	7.56	264.77	4.51	2907.23	917.95	85.12
28	7.56	264.77	4.51	2907.23	917.95	85.12
29	7.56	268.36	2.75	2941.25	925.18	85.79
29	7.56	268.36	2.75	2941.25	925.18	85.79
30	7.56	271.09	2.75	3035.06	945.12	87.64
30	7.56	271.09	2.75	3035.06	945.12	87.64
31	45.71	272.54	0.26	2854.97	2325.70	215.66
31	45.71	272.54	0.26	2854.97	2325.70	215.66
32	45.71	274.36	4.94	3008.09	530.41	49.18
32	45.71	274.36	4.94	3008.09	530.41	49.18
33	45.71	276.27	0.54	2796.08	2285.98	211.97
33	45.71	276.27	0.54	2796.08	2285.98	211.97
34	45.71	277.28	2.35	2731.20	2242.22	207.92
34	45.71	277.28	2.35	2731.20	2242.22	207.92
35	45.71	280.60	7.16	2381.67	2006.46	186.05
35	45.71	280.60	7.16	2381.67	2006.46	186.05
36	45.71	285.60	7.16	1806.44	1618.46	150.08
36	45.71	285.60	7.16	1806.44	1618.46	150.08
37	45.71	288.31	0.59	1728.91	1566.16	145.23
37	45.71	288.31	0.59	1728.91	1566.16	145.23
38	83.93	288.62	2.10	1064.41	717.95	66.57
38	83.93	288.62	2.10	1064.41	717.95	66.57
39	83.93	289.34	11.43	570.46	384.78	35.68
39	83.93	289.34	11.43	570.46	384.78	35.68

Table 4 - Base Force Data on the 39 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-31.19	143.84	4.29	1279.51	2579.99	239.24
1	-31.19	143.84	4.29	1279.51	2579.99	239.24
2	-31.19	147.51	4.29	3622.00	4160.02	385.75
2	-31.19	147.51	4.29	3622.00	4160.02	385.75
3	-31.19	150.18	1.93	2273.52	400.88	37.17

3	-31.19	150.18	1.93	2273.52	400.88	37.17
4	7.56	152.45	2.92	42697.41	7528.70	698.12
4	7.56	152.45	2.92	42697.41	7528.70	698.12
5	7.56	155.35	2.92	4718.27	831.96	77.15
5	7.56	155.35	2.92	4718.27	831.96	77.15
6	7.56	158.00	2.42	3034.44	535.05	49.61
6	7.56	158.00	2.42	3034.44	535.05	49.61
7	7.56	161.47	4.59	6359.16	1121.29	103.97
7	7.56	161.47	4.59	6359.16	1121.29	103.97
8	7.56	166.03	4.59	25652.34	4523.20	419.42
8	7.56	166.03	4.59	25652.34	4523.20	419.42
9	7.56	170.30	4.04	5741.41	1012.37	93.87
9	7.56	170.30	4.04	5741.41	1012.37	93.87
10	7.56	174.30	4.04	6101.32	1075.83	99.76
10	7.56	174.30	4.04	6101.32	1075.83	99.76
11	7.56	178.75	4.94	8489.81	1496.98	138.81
11	7.56	178.75	4.94	8489.81	1496.98	138.81
12	7.56	183.88	5.40	11067.82	1951.55	180.96
12	7.56	183.88	5.40	11067.82	1951.55	180.96
13	7.56	189.23	5.40	12927.93	2279.54	211.38
13	7.56	189.23	5.40	12927.93	2279.54	211.38
14	7.56	194.62	5.50	15082.16	2659.39	246.60
14	7.56	194.62	5.50	15082.16	2659.39	246.60
15	7.56	200.08	5.50	17012.46	2999.76	278.16
15	7.56	200.08	5.50	17012.46	2999.76	278.16
16	7.56	205.29	5.02	16347.85	2882.57	267.29
16	7.56	205.29	5.02	16347.85	2882.57	267.29
17	7.56	210.27	5.02	16203.71	2857.15	264.94
17	7.56	210.27	5.02	16203.71	2857.15	264.94
18	7.56	215.24	5.02	16059.56	2831.73	262.58
18	7.56	215.24	5.02	16059.56	2831.73	262.58
19	7.56	220.22	5.02	15915.42	2806.32	260.22
19	7.56	220.22	5.02	15915.42	2806.32	260.22
20	7.56	225.20	5.02	15771.27	2780.90	257.87
20	7.56	225.20	5.02	15771.27	2780.90	257.87
21	7.56	230.18	5.02	15627.13	2755.48	255.51
21	7.56	230.18	5.02	15627.13	2755.48	255.51
22	7.56	235.16	5.02	15482.99	2730.07	253.15
22	7.56	235.16	5.02	15482.99	2730.07	253.15
23	7.56	240.13	5.02	15338.84	2704.65	250.80
23	7.56	240.13	5.02	15338.84	2704.65	250.80
24	7.56	245.11	5.02	15194.70	2679.23	248.44
24	7.56	245.11	5.02	15194.70	2679.23	248.44
25	7.56	250.09	5.02	15050.55	2653.82	246.08
25	7.56	250.09	5.02	15050.55	2653.82	246.08
26	7.56	255.07	5.02	14906.41	2628.40	243.72
26	7.56	255.07	5.02	14906.41	2628.40	243.72
27	7.56	260.04	5.02	14762.26	2602.99	241.37
27	7.56	260.04	5.02	14762.26	2602.99	241.37
28	7.56	264.77	4.51	13099.53	4136.15	383.53
28	7.56	264.77	4.51	13099.53	4136.15	383.53
29	7.56	268.36	2.75	8087.02	2543.80	235.88
29	7.56	268.36	2.75	8087.02	2543.80	235.88
30	7.56	271.09	2.75	8344.94	2598.63	240.96
30	7.56	271.09	2.75	8344.94	2598.63	240.96
31	45.71	272.54	0.26	752.50	613.00	56.84
31	45.71	272.54	0.26	752.50	613.00	56.84
32	45.71	274.36	4.94	14870.25	2622.03	243.13
32	45.71	274.36	4.94	14870.25	2622.03	243.13
33	45.71	276.27	0.54	1500.44	1226.71	113.75
33	45.71	276.27	0.54	1500.44	1226.71	113.75
34	45.71	277.28	2.35	6405.23	5258.47	487.60
34	45.71	277.28	2.35	6405.23	5258.47	487.60
35	45.71	280.60	7.16	17052.14	14365.70	1332.09
35	45.71	280.60	7.16	17052.14	14365.70	1332.09
36	45.71	285.60	7.16	12933.64	11587.74	1074.50
36	45.71	285.60	7.16	12933.64	11587.74	1074.50
37	45.71	288.31	0.59	1023.04	926.74	85.93
37	45.71	288.31	0.59	1023.04	926.74	85.93
38	83.93	288.62	2.10	2230.34	1504.38	139.50
38	83.93	288.62	2.10	2230.34	1504.38	139.50
39	83.93	289.34	11.43	6519.80	4397.66	407.78

39	83.93	289.34	11.43	6519.80	4397.66	407.78

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 39 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
8	27408.8	19191.9	33460.0	35.00	0.311467E+05

***Pier/Pile Slice Force Data on the 39 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
10	12000.0	0.0	12000.0	90.00	-0.270916E+04

Sum of the Resisting Forces = 101888.92 (lbs)

Average Available Shear Strength = 600.92(psf)

Sum of the Driving Forces = 10178.29 (lbs)

Average Mobilized Shear Stress = 60.03(psf)

Total length of the failure surface = 169.56(ft)

Factor of Safety Balance Check: FS = 10.01042

Janbu's Correction Factor (fo) = 0.2132

Janub's FS Corrected = 2.13393

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

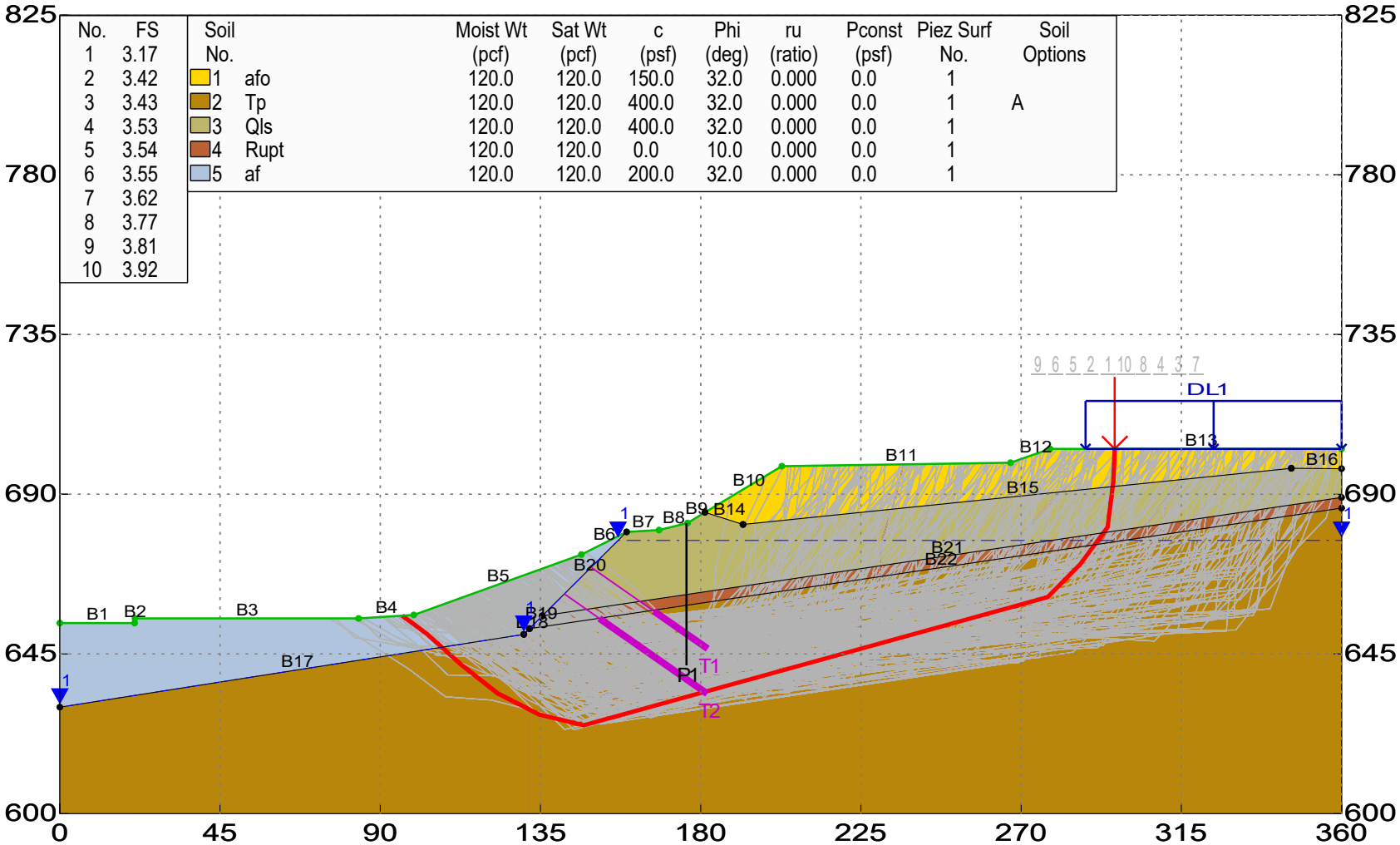
Royal Vista - Cross Section 7
Stage 8 (Final Condition - Along Bedding)

LGC Geotechnical / BPP

\Sec 7 - Stage 8 (Final Condition - Along Bedding).gsd

No.	FS
1	3.17
2	3.42
3	3.43
4	3.53
5	3.54
6	3.55
7	3.62
8	3.77
9	3.81
10	3.92

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 3.17

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 8 (Final Condition - Along Bedding).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 8 (Final Condition - Along Bedding).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 8 (Final Condition - Along Bedding)

BOUNDARY DATA

13 Surface Boundaries
22 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	653.700	21.000	653.700	5
2	21.000	653.700	21.100	655.000	5
3	21.100	655.000	83.900	655.000	5
4	83.900	655.000	99.400	656.000	5
5	99.400	656.000	146.500	673.000	5
6	146.500	673.000	159.200	679.400	5
7	159.200	679.400	168.300	679.900	3
8	168.300	679.900	176.300	681.900	3
9	176.300	681.900	181.200	684.900	3
10	181.200	684.900	202.800	697.900	1
11	202.800	697.900	267.000	698.900	1
12	267.000	698.900	278.100	702.800	1
13	278.100	702.800	360.000	702.800	1
14	181.200	684.900	191.900	681.500	3
15	191.900	681.500	345.900	697.300	3
16	345.900	697.300	360.000	697.200	3
17	0.000	630.000	130.300	650.500	2
18	130.300	650.500	131.900	652.100	2
19	131.900	652.100	135.500	655.700	4
20	135.500	655.700	159.200	679.400	3
21	135.500	655.700	360.000	689.100	4
22	131.900	652.100	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	32.00
2	10.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	630.00
2	130.30	650.50
3	156.80	677.00
4	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)

1 13 288.100 702.800 250.000 360.000 702.800
250.000 0.00

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

TIEBACK LOAD(S)

2 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	149.20	669.40	167300.0	5.0	35.00	21.5	18.5
2	141.70	661.90	334600.0	5.0	35.00	12.0	37.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 13.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	140.00	638.00	170.00	642.49	30.00
2	180.00	644.00	340.00	668.00	30.00

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 = 388

Number of Trial Surfaces With Valid FS = 612

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 38.8 %

Statistical Data On All Valid FS Values:
FS Max = 159.703 FS Min = 3.165 FS Ave = 15.260
Standard Deviation = 16.654 Coefficient of Variation = 109.13 %

Critical Surface is Sequence Number 2 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	150.35	668.59
2	143.25	660.82

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.

Factor Of Safety For The Critical or Specified Surface = 3.165

Table 1 - Geometry Data on the 54 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.24	1.31	97.78	654.58	655.90	-36.73	3.69	4.04
2	3.67	4.66	101.23	652.01	656.66	-36.73	19.85	4.58
3	4.21	9.33	105.17	648.76	658.08	-41.80	19.85	5.64
4	2.74	13.69	108.65	645.65	659.34	-41.80	19.85	3.68
5	2.74	17.13	111.39	643.20	660.33	-41.80	19.85	3.68
6	5.10	21.79	115.31	639.96	661.74	-38.31	19.85	6.50
7	5.10	27.66	120.41	635.93	663.58	-38.31	19.85	6.50
8	3.67	32.20	124.80	632.97	665.17	-27.23	19.85	4.13
9	3.67	35.41	128.47	631.08	666.49	-27.23	19.85	4.13
10	1.60	37.72	131.10	629.72	667.44	-27.23	19.85	1.80
11	2.62	39.57	133.21	628.64	668.20	-27.23	19.85	2.95
12	0.98	41.01	135.01	627.85	668.85	-13.61	19.85	1.01
13	5.50	42.96	138.25	627.06	670.02	-13.61	19.85	5.66
14	5.50	46.28	143.75	625.73	672.01	-13.61	19.85	5.66
15	0.65	48.18	146.83	624.98	673.16	-13.61	26.75	0.67
16	4.82	48.97	149.57	625.57	674.54	15.49	26.75	5.00
17	4.82	50.07	154.39	626.91	676.98	15.49	26.75	5.00
18	2.40	50.89	158.00	627.91	678.80	15.49	26.75	2.49
19	4.55	50.65	161.47	628.87	679.52	15.49	3.14	4.72
20	4.55	49.64	166.03	630.13	679.77	15.49	3.14	4.72
21	4.00	49.08	170.30	631.32	680.40	15.49	14.04	4.15
22	4.00	48.97	174.30	632.43	681.40	15.49	14.04	4.15
23	4.90	49.74	178.75	633.66	683.40	15.49	31.48	5.08
24	5.35	51.43	183.88	635.08	686.51	15.49	31.04	5.55
25	5.35	53.17	189.23	636.56	689.73	15.49	31.04	5.55

26	5.45	54.92	194.62	638.06	692.98	15.49	31.04	5.66
27	5.45	56.69	200.08	639.57	696.26	15.49	31.04	5.66
28	4.94	56.93	205.27	641.01	697.94	15.49	0.89	5.12
29	4.94	55.64	210.21	642.38	698.02	15.49	0.89	5.12
30	4.94	54.34	215.15	643.75	698.09	15.49	0.89	5.12
31	4.94	53.05	220.08	645.12	698.17	15.49	0.89	5.12
32	4.94	51.76	225.02	646.49	698.25	15.49	0.89	5.12
33	4.94	50.47	229.96	647.86	698.32	15.49	0.89	5.12
34	4.94	49.18	234.90	649.22	698.40	15.49	0.89	5.12
35	4.94	47.88	239.84	650.59	698.48	15.49	0.89	5.12
36	4.94	46.59	244.78	651.96	698.55	15.49	0.89	5.12
37	4.94	45.30	249.72	653.33	698.63	15.49	0.89	5.12
38	4.94	44.01	254.65	654.70	698.71	15.49	0.89	5.12
39	4.94	42.72	259.59	656.07	698.78	15.49	0.89	5.12
40	4.94	41.42	264.53	657.44	698.86	15.49	0.89	5.12
41	5.23	40.97	269.61	658.85	699.82	15.49	19.36	5.42
42	5.23	41.36	274.84	660.29	701.65	15.49	19.36	5.42
43	0.65	41.34	277.78	661.35	702.69	45.32	19.36	0.92
44	0.57	40.84	278.38	661.96	702.80	45.32	0.00	0.81
45	3.96	38.55	280.65	664.25	702.80	45.32	0.00	5.63
46	3.96	34.54	284.61	668.26	702.80	45.32	0.00	5.63
47	1.51	31.52	287.35	671.28	702.80	53.61	0.00	2.54
48	2.55	28.77	289.37	674.03	702.80	53.61	0.00	4.29
49	0.91	26.42	291.10	676.38	702.80	53.61	0.00	1.54
50	1.59	24.72	292.35	678.08	702.80	53.61	0.00	2.68
51	1.16	22.86	293.73	679.94	702.80	53.61	0.00	1.95
52	1.40	16.36	295.01	686.44	702.80	83.02	0.00	11.51
53	0.18	9.91	295.80	692.89	702.80	83.02	0.00	1.49
54	0.39	4.59	296.08	698.21	702.80	87.57	0.00	9.18

Table 2 - Force Data On The 54 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	509.7	0.0	0.0	0.0	0.0	0.0
2	2049.9	0.0	0.0	0.0	0.0	0.0
3	4706.1	0.0	0.0	0.0	0.0	0.0
4	4504.4	0.0	323.1	0.0	0.0	0.0
5	5637.5	0.0	969.2	0.0	0.0	0.0
6	13332.5	0.0	3239.3	0.0	0.0	0.0
7	16925.3	0.0	5152.0	0.0	0.0	0.0
8	14179.6	0.0	4188.6	0.0	0.0	0.0
9	15594.7	0.0	4808.4	0.0	0.0	0.0
10	7241.9	0.0	1211.4	0.0	0.0	0.0
11	12435.5	0.0	2276.7	0.0	0.0	0.0
12	4826.5	0.0	861.6	0.0	0.0	0.0
13	28355.0	0.0	5542.2	0.0	0.0	0.0
14	30544.3	0.0	6748.5	0.0	0.0	0.0
15	3780.9	0.0	882.6	0.0	0.0	0.0
16	28343.6	0.0	6900.9	0.0	0.0	0.0
17	28976.6	0.0	7445.2	0.0	0.0	0.0
18	14655.0	0.0	7628.9	0.0	0.0	0.0
19	27655.9	0.0	14179.3	0.0	0.0	0.0
20	27103.8	0.0	13807.8	0.0	0.0	0.0
21	23558.8	0.0	11831.8	0.0	0.0	0.0
22	23506.6	0.0	11544.6	0.0	0.0	0.0
23	29246.4	0.0	13750.8	0.0	0.0	0.0
24	33016.9	0.0	14521.6	0.0	0.0	0.0
25	34132.1	0.0	14007.9	0.0	0.0	0.0
26	35916.7	0.0	13741.5	0.0	0.0	0.0
27	37074.0	0.0	13208.4	0.0	0.0	0.0
28	33735.7	0.0	11508.3	0.0	0.0	0.0
29	32970.2	0.0	11070.6	0.0	0.0	0.0
30	32204.6	0.0	10632.9	0.0	0.0	0.0
31	31439.0	0.0	10195.2	0.0	0.0	0.0
32	30673.4	0.0	9757.5	0.0	0.0	0.0
33	29907.8	0.0	9319.8	0.0	0.0	0.0

34	29142.3	0.0	8882.0	0.0	0.0	0.0
35	28376.7	0.0	8444.3	0.0	0.0	0.0
36	27611.1	0.0	8006.6	0.0	0.0	0.0
37	26845.5	0.0	7568.9	0.0	0.0	0.0
38	26079.9	0.0	7131.2	0.0	0.0	0.0
39	25314.4	0.0	6693.5	0.0	0.0	0.0
40	24548.8	0.0	6255.8	0.0	0.0	0.0
41	25692.6	0.0	6142.9	0.0	0.0	0.0
42	25935.6	0.0	5652.8	0.0	0.0	0.0
43	3218.7	0.0	901.3	0.0	0.0	0.0
44	2789.2	0.0	759.5	0.0	0.0	0.0
45	18326.4	0.0	4481.5	0.0	0.0	0.0
46	16422.0	0.0	3073.3	0.0	0.0	0.0
47	5699.9	0.0	906.2	0.0	0.0	0.0
48	8793.0	0.0	794.6	0.0	0.0	636.8
49	2891.4	0.0	59.4	0.0	0.0	228.0
50	4709.3	0.0	0.0	0.0	0.0	396.8
51	3178.4	0.0	0.0	0.0	0.0	289.7
52	2747.8	0.0	0.0	0.0	0.0	349.9
53	215.5	0.0	0.0	0.0	0.0	45.3
54	214.5	0.0	0.0	0.0	0.0	97.5

TOTAL WEIGHT OF SLIDING MASS = 1007493.54(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 707652.19(lbs)

TOTAL AREA OF SLIDING MASS = 8395.78(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 54 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	2	400.00	32.00	A
5	2	400.00	32.00	A
6	2	400.00	32.00	A
7	2	400.00	32.00	A
8	2	400.00	32.00	A
9	2	400.00	32.00	A
10	2	400.00	32.00	A
11	2	400.00	32.00	A
12	2	400.00	32.00	A
13	2	400.00	32.00	A
14	2	400.00	32.00	A
15	2	400.00	32.00	A
16	2	400.00	32.00	A
17	2	400.00	32.00	A
18	2	400.00	32.00	A
19	2	400.00	32.00	A
20	2	400.00	32.00	A
21	2	400.00	32.00	A
22	2	400.00	32.00	A
23	2	400.00	32.00	A
24	2	400.00	32.00	A
25	2	400.00	32.00	A
26	2	400.00	32.00	A
27	2	400.00	32.00	A
28	2	400.00	32.00	A
29	2	400.00	32.00	A
30	2	400.00	32.00	A
31	2	400.00	32.00	A
32	2	400.00	32.00	A
33	2	400.00	32.00	A
34	2	400.00	32.00	A
35	2	400.00	32.00	A
36	2	400.00	32.00	A
37	2	400.00	32.00	A
38	2	400.00	32.00	A
39	2	400.00	32.00	A

40	2	400.00	32.00	A
41	2	400.00	32.00	A
42	2	400.00	32.00	A
43	2	400.00	32.00	A
44	2	400.00	32.00	A
45	2	400.00	32.00	A
46	2	400.00	32.00	A
47	2	400.00	32.00	A
48	2	400.00	32.00	A
49	4	0.00	10.00	
50	4	0.00	10.00	
51	3	400.00	32.00	
52	3	400.00	32.00	
53	1	150.00	32.00	
54	1	150.00	32.00	

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 54 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-36.73	97.78	4.04	204.21	327.61	59.24
1	-36.73	97.78	4.04	204.21	327.61	59.24
2	-36.73	101.23	4.58	644.69	602.85	109.02
2	-36.73	101.23	4.58	644.69	602.85	109.02
3	-41.80	105.17	5.64	1291.31	1006.90	182.08
3	-41.80	105.17	5.64	1291.31	1006.90	182.08
4	-41.80	108.65	3.68	1817.15	1535.48	277.67
4	-41.80	108.65	3.68	1817.15	1535.48	277.67
5	-41.80	111.39	3.68	2083.05	1701.64	307.71
5	-41.80	111.39	3.68	2083.05	1701.64	307.71
6	-38.31	115.31	6.50	2403.29	1901.74	343.90
6	-38.31	115.31	6.50	2403.29	1901.74	343.90
7	-38.31	120.41	6.50	2856.30	2184.82	395.09
7	-38.31	120.41	6.50	2856.30	2184.82	395.09
8	-27.23	124.80	4.13	3077.60	2323.10	420.10
8	-27.23	124.80	4.13	3077.60	2323.10	420.10
9	-27.23	128.47	4.13	3328.46	2479.85	448.44
9	-27.23	128.47	4.13	3328.46	2479.85	448.44
10	-27.23	131.10	1.80	4147.50	2991.64	540.99
10	-27.23	131.10	1.80	4147.50	2991.64	540.99
11	-27.23	133.21	2.95	4277.45	3072.85	555.68
11	-27.23	133.21	2.95	4277.45	3072.85	555.68
12	-13.61	135.01	1.01	4207.48	3029.12	547.77
12	-13.61	135.01	1.01	4207.48	3029.12	547.77
13	-13.61	138.25	5.66	4319.66	3099.22	560.45
13	-13.61	138.25	5.66	4319.66	3099.22	560.45
14	-13.61	143.75	5.66	11696.98	7709.08	1394.07
14	-13.61	143.75	5.66	11696.98	7709.08	1394.07
15	-13.61	146.83	0.67	4622.38	3288.38	594.65
15	-13.61	146.83	0.67	4622.38	3288.38	594.65
16	15.49	149.57	5.00	8184.73	5514.39	997.19
16	15.49	149.57	5.00	8184.73	5514.39	997.19
17	15.49	154.39	5.00	4354.87	3121.23	564.43
17	15.49	154.39	5.00	4354.87	3121.23	564.43
18	15.49	158.00	2.49	2924.91	2227.69	402.84
18	15.49	158.00	2.49	2924.91	2227.69	402.84
19	15.49	161.47	4.72	2955.97	2247.09	406.35
19	15.49	161.47	4.72	2955.97	2247.09	406.35
20	15.49	166.03	4.72	2914.70	2221.30	401.69
20	15.49	166.03	4.72	2914.70	2221.30	401.69
21	15.49	170.30	4.15	2921.23	2225.39	402.43
21	15.49	170.30	4.15	2921.23	2225.39	402.43

22	15.49	174.30	4.15	2975.57	2259.34	408.57
22	15.49	174.30	4.15	2975.57	2259.34	408.57
23	15.49	178.75	5.08	3139.11	2361.53	427.05
23	15.49	178.75	5.08	3139.11	2361.53	427.05
24	15.49	183.88	5.55	3421.14	2537.76	458.92
24	15.49	183.88	5.55	3421.14	2537.76	458.92
25	15.49	189.23	5.55	3712.46	2719.80	491.83
25	15.49	189.23	5.55	3712.46	2719.80	491.83
26	15.49	194.62	5.66	4006.51	2903.55	525.06
26	15.49	194.62	5.66	4006.51	2903.55	525.06
27	15.49	200.08	5.66	4303.28	3088.99	558.60
27	15.49	200.08	5.66	4303.28	3088.99	558.60
28	15.49	205.27	5.12	4417.98	3160.66	571.56
28	15.49	205.27	5.12	4417.98	3160.66	571.56
29	15.49	210.21	5.12	4350.60	3118.55	563.94
29	15.49	210.21	5.12	4350.60	3118.55	563.94
30	15.49	215.15	5.12	4283.22	3076.45	556.33
30	15.49	215.15	5.12	4283.22	3076.45	556.33
31	15.49	220.08	5.12	4215.84	3034.35	548.71
31	15.49	220.08	5.12	4215.84	3034.35	548.71
32	15.49	225.02	5.12	4148.46	2992.25	541.10
32	15.49	225.02	5.12	4148.46	2992.25	541.10
33	15.49	229.96	5.12	4081.08	2950.14	533.49
33	15.49	229.96	5.12	4081.08	2950.14	533.49
34	15.49	234.90	5.12	4013.70	2908.04	525.87
34	15.49	234.90	5.12	4013.70	2908.04	525.87
35	15.49	239.84	5.12	3946.32	2865.94	518.26
35	15.49	239.84	5.12	3946.32	2865.94	518.26
36	15.49	244.78	5.12	3878.94	2823.83	510.65
36	15.49	244.78	5.12	3878.94	2823.83	510.65
37	15.49	249.72	5.12	3811.56	2781.73	503.03
37	15.49	249.72	5.12	3811.56	2781.73	503.03
38	15.49	254.65	5.12	3744.18	2739.63	495.42
38	15.49	254.65	5.12	3744.18	2739.63	495.42
39	15.49	259.59	5.12	3676.81	2697.52	487.80
39	15.49	259.59	5.12	3676.81	2697.52	487.80
40	15.49	264.53	5.12	3609.43	2655.42	480.19
40	15.49	264.53	5.12	3609.43	2655.42	480.19
41	15.49	269.61	5.42	3641.99	2675.77	483.87
41	15.49	269.61	5.42	3641.99	2675.77	483.87
42	15.49	274.84	5.42	3774.50	2758.57	498.84
42	15.49	274.84	5.42	3774.50	2758.57	498.84
43	45.32	277.78	0.92	3485.41	2577.93	466.18
43	45.32	277.78	0.92	3485.41	2577.93	466.18
44	45.32	278.38	0.81	3465.97	2565.78	463.98
44	45.32	278.38	0.81	3465.97	2565.78	463.98
45	45.32	280.65	5.63	3348.26	2492.23	450.68
45	45.32	280.65	5.63	3348.26	2492.23	450.68
46	45.32	284.61	5.63	3142.41	2363.60	427.42
46	45.32	284.61	5.63	3142.41	2363.60	427.42
47	53.61	287.35	2.54	2857.93	2185.83	395.27
47	53.61	287.35	2.54	2857.93	2185.83	395.27
48	53.61	289.37	4.29	2936.71	2235.06	404.18
48	53.61	289.37	4.29	2936.71	2235.06	404.18
49	53.61	291.10	1.54	3233.65	570.18	103.11
49	53.61	291.10	1.54	3233.65	570.18	103.11
50	53.61	292.35	2.68	3075.99	542.38	98.08
50	53.61	292.35	2.68	3075.99	542.38	98.08
51	53.61	293.73	1.95	2486.16	1953.52	353.26
51	53.61	293.73	1.95	2486.16	1953.52	353.26
52	83.02	295.01	11.51	804.19	902.52	163.21
52	83.02	295.01	11.51	804.19	902.52	163.21
53	83.02	295.80	1.49	609.91	531.11	96.04
53	83.02	295.80	1.49	609.91	531.11	96.04
54	87.57	296.08	9.18	209.95	131.19	23.72
54	87.57	296.08	9.18	209.95	131.19	23.72

Table 4 - Base Force Data on the 54 Slices

Slice	Alpha	X-Coord.	Base	Effective	Available	Mobilized

No. *	(deg)	Slice Cntr (ft)	Leng. (ft)	Normal Force (lbs)	Shear Force (lbs)	Shear Force (lbs)
1	-36.73	97.78	4.04	824.77	1323.14	239.27
1	-36.73	97.78	4.04	824.77	1323.14	239.27
2	-36.73	101.23	4.58	2951.62	2760.04	499.11
2	-36.73	101.23	4.58	2951.62	2760.04	499.11
3	-41.80	105.17	5.64	7284.72	5680.26	1027.19
3	-41.80	105.17	5.64	7284.72	5680.26	1027.19
4	-41.80	108.65	3.68	6685.91	5649.55	1021.63
4	-41.80	108.65	3.68	6685.91	5649.55	1021.63
5	-41.80	111.39	3.68	7664.24	6260.88	1132.18
5	-41.80	111.39	3.68	7664.24	6260.88	1132.18
6	-38.31	115.31	6.50	15621.39	12361.33	2235.35
6	-38.31	115.31	6.50	15621.39	12361.33	2235.35
7	-38.31	120.41	6.50	18565.98	14201.31	2568.09
7	-38.31	120.41	6.50	18565.98	14201.31	2568.09
8	-27.23	124.80	4.13	12702.56	9588.41	1733.91
8	-27.23	124.80	4.13	12702.56	9588.41	1733.91
9	-27.23	128.47	4.13	13737.97	10235.40	1850.91
9	-27.23	128.47	4.13	13737.97	10235.40	1850.91
10	-27.23	131.10	1.80	7463.25	5383.34	973.49
10	-27.23	131.10	1.80	7463.25	5383.34	973.49
11	-27.23	133.21	2.95	12600.09	9051.69	1636.86
11	-27.23	133.21	2.95	12600.09	9051.69	1636.86
12	-13.61	135.01	1.01	4246.05	3056.89	552.79
12	-13.61	135.01	1.01	4246.05	3056.89	552.79
13	-13.61	138.25	5.66	24444.96	17538.50	3171.57
13	-13.61	138.25	5.66	24444.96	17538.50	3171.57
14	-13.61	143.75	5.66	66193.18	43625.69	7889.03
14	-13.61	143.75	5.66	66193.18	43625.69	7889.03
15	-13.61	146.83	0.67	3110.10	2212.54	400.10
15	-13.61	146.83	0.67	3110.10	2212.54	400.10
16	15.49	149.57	5.00	40963.47	27598.76	4990.81
16	15.49	149.57	5.00	40963.47	27598.76	4990.81
17	15.49	154.39	5.00	21795.56	15621.32	2824.87
17	15.49	154.39	5.00	21795.56	15621.32	2824.87
18	15.49	158.00	2.49	7284.43	5548.01	1003.27
18	15.49	158.00	2.49	7284.43	5548.01	1003.27
19	15.49	161.47	4.72	13956.72	10609.74	1918.61
19	15.49	161.47	4.72	13956.72	10609.74	1918.61
20	15.49	166.03	4.72	13761.84	10487.97	1896.59
20	15.49	166.03	4.72	13761.84	10487.97	1896.59
21	15.49	170.30	4.15	12125.44	9237.14	1670.39
21	15.49	170.30	4.15	12125.44	9237.14	1670.39
22	15.49	174.30	4.15	12351.00	9378.08	1695.88
22	15.49	174.30	4.15	12351.00	9378.08	1695.88
23	15.49	178.75	5.08	15961.52	12007.76	2171.42
23	15.49	178.75	5.08	15961.52	12007.76	2171.42
24	15.49	183.88	5.55	18993.12	14088.90	2547.76
24	15.49	183.88	5.55	18993.12	14088.90	2547.76
25	15.49	189.23	5.55	20610.47	15099.53	2730.52
25	15.49	189.23	5.55	20610.47	15099.53	2730.52
26	15.49	194.62	5.66	22658.69	16420.91	2969.47
26	15.49	194.62	5.66	22658.69	16420.91	2969.47
27	15.49	200.08	5.66	24337.07	17469.68	3159.12
27	15.49	200.08	5.66	24337.07	17469.68	3159.12
28	15.49	205.27	5.12	22640.56	16197.25	2929.02
28	15.49	205.27	5.12	22640.56	16197.25	2929.02
29	15.49	210.21	5.12	22295.27	15981.49	2890.00
29	15.49	210.21	5.12	22295.27	15981.49	2890.00
30	15.49	215.15	5.12	21949.97	15765.72	2850.99
30	15.49	215.15	5.12	21949.97	15765.72	2850.99
31	15.49	220.08	5.12	21604.68	15549.96	2811.97
31	15.49	220.08	5.12	21604.68	15549.96	2811.97
32	15.49	225.02	5.12	21259.38	15334.19	2772.95
32	15.49	225.02	5.12	21259.38	15334.19	2772.95
33	15.49	229.96	5.12	20914.09	15118.43	2733.93
33	15.49	229.96	5.12	20914.09	15118.43	2733.93
34	15.49	234.90	5.12	20568.79	14902.67	2694.91
34	15.49	234.90	5.12	20568.79	14902.67	2694.91
35	15.49	239.84	5.12	20223.50	14686.90	2655.90

35	15.49	239.84	5.12	20223.50	14686.90	2655.90
36	15.49	244.78	5.12	19878.20	14471.14	2616.88
36	15.49	244.78	5.12	19878.20	14471.14	2616.88
37	15.49	249.72	5.12	19532.91	14255.37	2577.86
37	15.49	249.72	5.12	19532.91	14255.37	2577.86
38	15.49	254.65	5.12	19187.61	14039.61	2538.84
38	15.49	254.65	5.12	19187.61	14039.61	2538.84
39	15.49	259.59	5.12	18842.32	13823.85	2499.83
39	15.49	259.59	5.12	18842.32	13823.85	2499.83
40	15.49	264.53	5.12	18497.03	13608.08	2460.81
40	15.49	264.53	5.12	18497.03	13608.08	2460.81
41	15.49	269.61	5.42	19749.03	14509.60	2623.84
41	15.49	269.61	5.42	19749.03	14509.60	2623.84
42	15.49	274.84	5.42	20467.56	14958.59	2705.03
42	15.49	274.84	5.42	20467.56	14958.59	2705.03
43	45.32	277.78	0.92	3215.89	2378.58	430.13
43	45.32	277.78	0.92	3215.89	2378.58	430.13
44	45.32	278.38	0.81	2805.29	2076.69	375.54
44	45.32	278.38	0.81	2805.29	2076.69	375.54
45	45.32	280.65	5.63	18864.03	14041.15	2539.12
45	45.32	280.65	5.63	18864.03	14041.15	2539.12
46	45.32	284.61	5.63	17704.28	13316.45	2408.07
46	45.32	284.61	5.63	17704.28	13316.45	2408.07
47	53.61	287.35	2.54	7260.28	5552.88	1004.15
47	53.61	287.35	2.54	7260.28	5552.88	1004.15
48	53.61	289.37	4.29	12609.28	9596.62	1735.40
48	53.61	289.37	4.29	12609.28	9596.62	1735.40
49	53.61	291.10	1.54	4971.09	876.54	158.51
49	53.61	291.10	1.54	4971.09	876.54	158.51
50	53.61	292.35	2.68	8230.19	1451.20	262.43
50	53.61	292.35	2.68	8230.19	1451.20	262.43
51	53.61	293.73	1.95	4855.48	3815.24	689.93
51	53.61	293.73	1.95	4855.48	3815.24	689.93
52	83.02	295.01	11.51	9255.82	10387.45	1878.41
52	83.02	295.01	11.51	9255.82	10387.45	1878.41
53	83.02	295.80	1.49	909.11	791.66	143.16
53	83.02	295.80	1.49	909.11	791.66	143.16
54	87.57	296.08	9.18	1927.10	1204.19	217.76
54	87.57	296.08	9.18	1927.10	1204.19	217.76

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 54 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 54 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
15	12000.0	0.0	12000.0	90.00	-0.145013E+04

Sum of the Resisting Forces = 541387.92 (lbs)

Average Available Shear Strength = 2218.75(psf)

Sum of the Driving Forces = 103544.84 (lbs)

Average Mobilized Shear Stress = 424.35(psf)

Total length of the failure surface = 244.01(ft)

Factor of Safety Balance Check: FS = 5.22854

Janbu's Correction Factor (fo) = 0.6054

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Janub's FS Corrected =  3.16546

                    **** END OF GEOSTASE OUTPUT ****
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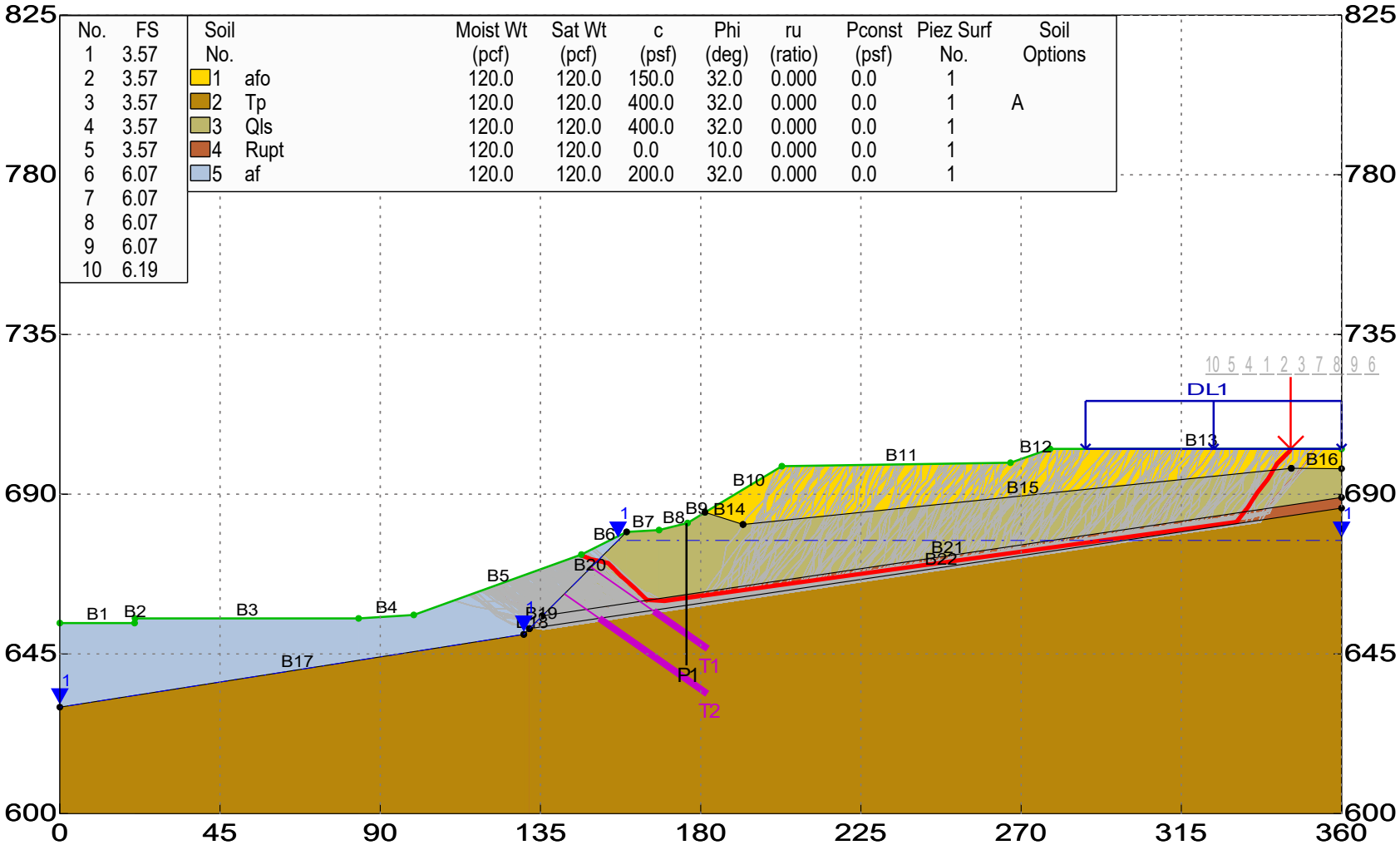
Royal Vista - Cross Section 7
Stage 8 (Final Condition - Rupture Surface)

LGC Geotechnical / BPP

\Sec 7 - Stage 8 (Final Condition - Rupture Surface).gsd

No.	FS
1	3.57
2	3.57
3	3.57
4	3.57
5	3.57
6	6.07
7	6.07
8	6.07
9	6.07
10	6.19

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 3.57

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 8 (Final Condition - Rupture Surface).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 8 (Final Condition - Rupture Surface).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 8 (Final Condition - Rupture Surface)

BOUNDARY DATA

13 Surface Boundaries
22 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	653.700	21.000	653.700	5
2	21.000	653.700	21.100	655.000	5
3	21.100	655.000	83.900	655.000	5
4	83.900	655.000	99.400	656.000	5
5	99.400	656.000	146.500	673.000	5
6	146.500	673.000	159.200	679.400	5
7	159.200	679.400	168.300	679.900	3
8	168.300	679.900	176.300	681.900	3
9	176.300	681.900	181.200	684.900	3
10	181.200	684.900	202.800	697.900	1
11	202.800	697.900	267.000	698.900	1
12	267.000	698.900	278.100	702.800	1
13	278.100	702.800	360.000	702.800	1
14	181.200	684.900	191.900	681.500	3
15	191.900	681.500	345.900	697.300	3
16	345.900	697.300	360.000	697.200	3
17	0.000	630.000	130.300	650.500	2
18	130.300	650.500	131.900	652.100	2
19	131.900	652.100	135.500	655.700	4
20	135.500	655.700	159.200	679.400	3
21	135.500	655.700	360.000	689.100	4
22	131.900	652.100	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	32.00
2	10.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	630.00
2	130.30	650.50
3	156.80	677.00
4	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)

1 13 288.100 702.800 250.000 360.000 702.800
250.000 0.00

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

TIEBACK LOAD(S)

2 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	149.20	669.40	167300.0	5.0	35.00	21.5	18.5
2	141.70	661.90	334600.0	5.0	35.00	12.0	37.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 5.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	135.00	653.25	170.00	658.49	3.00
2	180.00	660.00	340.00	684.00	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 = 789

Number of Trial Surfaces With Valid FS = 211

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 78.9 %

Statistical Data On All Valid FS Values:
FS Max = 49.306 FS Min = 3.573 FS Ave = 11.071
Standard Deviation = 7.812 Coefficient of Variation = 70.56 %

Critical Surface is Sequence Number 55 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	165.02	658.32
2	151.01	655.38

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	176.00	660.77

Factor of Safety for the Preceding Surface is Between -10.615 and -10.615

Factor of Safety For The Preceding Specified Surface = 900.0

Table 1 - Geometry Data on the 53 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.30	0.11	146.35	672.83	672.95	-22.01	19.85	0.32
2	2.65	1.43	147.82	672.23	673.67	-22.01	26.75	2.86
3	1.91	3.34	150.11	671.48	674.82	-12.84	26.75	1.96
4	2.96	5.12	152.54	670.93	676.05	-12.84	26.75	3.04
5	2.78	8.29	155.41	669.20	677.49	-44.98	26.75	3.92
6	0.76	10.95	157.18	667.43	678.38	-44.98	26.75	1.08
7	1.64	12.66	158.38	666.32	678.99	-41.68	26.75	2.19
8	2.10	14.80	160.25	664.66	679.46	-41.68	3.14	2.81
9	3.57	17.64	163.08	661.98	679.61	-44.49	3.14	5.00
10	0.74	19.53	165.23	660.20	679.73	-3.56	3.14	0.75
11	2.69	19.73	166.95	660.10	679.83	-3.56	3.14	2.70
12	1.55	20.13	169.08	659.96	680.09	-3.56	14.04	1.56
13	3.22	20.55	171.46	660.14	680.69	7.90	14.04	3.25
14	3.22	20.91	174.69	660.59	681.50	7.90	14.04	3.25
15	4.90	22.25	178.75	661.15	683.40	7.90	31.48	4.95
16	5.35	24.65	183.88	661.86	686.51	7.90	31.04	5.40
17	5.35	27.13	189.23	662.60	689.73	7.90	31.04	5.40
18	5.45	29.63	194.62	663.35	692.98	7.90	31.04	5.50
19	5.45	32.15	200.08	664.11	696.26	7.90	31.04	5.50

20	4.94	33.11	205.27	664.83	697.94	7.90	0.89	4.99
21	4.94	32.50	210.21	665.51	698.02	7.90	0.89	4.99
22	4.94	31.89	215.15	666.20	698.09	7.90	0.89	4.99
23	4.94	31.29	220.08	666.88	698.17	7.90	0.89	4.99
24	4.94	30.68	225.02	667.57	698.25	7.90	0.89	4.99
25	4.94	30.07	229.96	668.25	698.32	7.90	0.89	4.99
26	4.94	29.46	234.90	668.94	698.40	7.90	0.89	4.99
27	4.94	28.85	239.84	669.62	698.48	7.90	0.89	4.99
28	4.94	28.25	244.78	670.31	698.55	7.90	0.89	4.99
29	4.94	27.64	249.72	670.99	698.63	7.90	0.89	4.99
30	4.94	27.03	254.65	671.68	698.71	7.90	0.89	4.99
31	4.94	26.42	259.59	672.36	698.78	7.90	0.89	4.99
32	4.94	25.81	264.53	673.05	698.86	7.90	0.89	4.99
33	5.55	26.10	269.77	673.78	699.88	7.90	19.36	5.60
34	5.55	27.28	275.33	674.55	701.82	7.90	19.36	5.60
35	0.57	27.83	278.38	674.97	702.80	7.90	0.00	0.57
36	4.72	27.46	281.03	675.34	702.80	7.90	0.00	4.76
37	4.72	26.81	285.74	675.99	702.80	7.90	0.00	4.76
38	4.92	26.14	290.56	676.66	702.80	7.90	0.00	4.97
39	5.35	25.43	295.70	677.37	702.80	7.90	0.00	5.40
40	5.35	24.69	301.05	678.11	702.80	7.90	0.00	5.40
41	5.35	23.94	306.41	678.86	702.80	7.90	0.00	5.40
42	5.35	23.20	311.76	679.60	702.80	7.90	0.00	5.40
43	5.35	22.46	317.11	680.34	702.80	7.90	0.00	5.40
44	5.35	21.72	322.47	681.08	702.80	7.90	0.00	5.40
45	5.35	20.97	327.82	681.83	702.80	7.90	0.00	5.40
46	2.20	19.18	331.60	683.62	702.80	52.19	0.00	3.60
47	0.86	17.21	333.13	685.59	702.80	52.19	0.00	1.40
48	2.68	14.54	334.90	688.26	702.80	57.58	0.00	5.00
49	3.06	10.45	337.77	692.35	702.80	52.31	0.00	5.00
50	1.47	7.25	340.04	695.55	702.80	58.99	0.00	2.86
51	1.10	5.11	341.33	697.69	702.80	58.99	0.00	2.14
52	3.52	2.41	343.64	700.39	702.80	45.25	0.00	5.00
53	0.32	0.32	345.55	702.48	702.80	63.72	0.00	0.71

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

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	4.1	0.0	0.0	0.0	0.0	0.0
2	455.5	0.0	0.0	0.0	0.0	0.0
3	766.2	0.0	0.0	0.0	0.0	0.0
4	1819.3	0.0	172.3	0.0	0.0	0.0
5	2761.4	0.0	784.9	0.0	0.0	0.0
6	999.8	0.0	642.2	0.0	0.0	0.0
7	2490.5	0.0	1461.8	0.0	0.0	0.0
8	3720.3	0.0	2160.0	0.0	0.0	0.0
9	7548.5	0.0	4687.1	0.0	0.0	0.0
10	1743.3	0.0	781.2	0.0	0.0	0.0
11	6378.3	0.0	2847.2	0.0	0.0	0.0
12	3750.6	0.0	1653.7	0.0	0.0	0.0
13	7950.6	0.0	3424.3	0.0	0.0	0.0
14	8089.4	0.0	3333.5	0.0	0.0	0.0
15	13083.5	0.0	4893.0	0.0	0.0	0.0
16	15825.2	0.0	5102.7	0.0	0.0	0.0
17	17416.0	0.0	4852.6	0.0	0.0	0.0
18	19377.2	0.0	4686.1	0.0	0.0	0.0
19	21027.9	0.0	4426.6	0.0	0.0	0.0
20	19622.0	0.0	3786.9	0.0	0.0	0.0
21	19261.6	0.0	3573.8	0.0	0.0	0.0
22	18901.3	0.0	3360.7	0.0	0.0	0.0
23	18540.9	0.0	3147.6	0.0	0.0	0.0
24	18180.5	0.0	2934.5	0.0	0.0	0.0
25	17820.2	0.0	2721.4	0.0	0.0	0.0
26	17459.8	0.0	2508.3	0.0	0.0	0.0
27	17099.4	0.0	2295.1	0.0	0.0	0.0
28	16739.1	0.0	2082.0	0.0	0.0	0.0

29	16378.7	0.0	1868.9	0.0	0.0	0.0
30	16018.4	0.0	1655.8	0.0	0.0	0.0
31	15658.0	0.0	1442.7	0.0	0.0	0.0
32	15297.6	0.0	1229.6	0.0	0.0	0.0
33	17382.5	0.0	1127.5	0.0	0.0	0.0
34	18168.5	0.0	858.3	0.0	0.0	0.0
35	1900.8	0.0	72.8	0.0	0.0	0.0
36	15540.5	0.0	494.3	0.0	0.0	0.0
37	15170.4	0.0	300.0	0.0	0.0	0.0
38	15445.3	0.0	105.9	0.0	0.0	1230.9
39	16335.9	0.0	0.0	0.0	0.0	1338.4
40	15858.8	0.0	0.0	0.0	0.0	1338.4
41	15381.8	0.0	0.0	0.0	0.0	1338.4
42	14904.7	0.0	0.0	0.0	0.0	1338.4
43	14427.7	0.0	0.0	0.0	0.0	1338.4
44	13950.6	0.0	0.0	0.0	0.0	1338.4
45	13473.6	0.0	0.0	0.0	0.0	1338.4
46	5074.7	0.0	0.0	0.0	0.0	551.2
47	1777.5	0.0	0.0	0.0	0.0	215.2
48	4677.5	0.0	0.0	0.0	0.0	670.1
49	3834.6	0.0	0.0	0.0	0.0	764.3
50	1280.6	0.0	0.0	0.0	0.0	368.0
51	676.7	0.0	0.0	0.0	0.0	276.0
52	1019.6	0.0	0.0	0.0	0.0	880.0
53	12.1	0.0	0.0	0.0	0.0	78.8

TOTAL WEIGHT OF SLIDING MASS = 568479.55(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 490325.04(lbs)

TOTAL AREA OF SLIDING MASS = 4737.33(ft2)

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

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	3	400.00	32.00	
5	3	400.00	32.00	
6	3	400.00	32.00	
7	3	400.00	32.00	
8	3	400.00	32.00	
9	3	400.00	32.00	
10	3	400.00	32.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	

36	4	0.00	10.00
37	4	0.00	10.00
38	4	0.00	10.00
39	4	0.00	10.00
40	4	0.00	10.00
41	4	0.00	10.00
42	4	0.00	10.00
43	4	0.00	10.00
44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	3	400.00	32.00
48	3	400.00	32.00
49	3	400.00	32.00
50	3	400.00	32.00
51	1	150.00	32.00
52	1	150.00	32.00
53	1	150.00	32.00

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

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

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-22.01	146.35	0.32	13.48	8.42	0.01
1	-22.01	146.35	0.32	13.48	8.42	0.01
2	-22.01	147.82	2.86	160.51	300.30	0.31
2	-22.01	147.82	2.86	160.51	300.30	0.31
3	-12.84	150.11	1.96	20180.19	12809.98	13.06
3	-12.84	150.11	1.96	20180.19	12809.98	13.06
4	-12.84	152.54	3.04	541.82	738.56	0.75
4	-12.84	152.54	3.04	541.82	738.56	0.75
5	-44.98	155.41	3.92	715.04	846.81	0.86
5	-44.98	155.41	3.92	715.04	846.81	0.86
6	-44.98	157.18	1.08	641.47	800.84	0.82
6	-44.98	157.18	1.08	641.47	800.84	0.82
7	-41.68	158.38	2.19	778.98	886.76	0.90
7	-41.68	158.38	2.19	778.98	886.76	0.90
8	-41.68	160.25	2.81	923.62	977.14	1.00
8	-41.68	160.25	2.81	923.62	977.14	1.00
9	-44.49	163.08	5.00	1079.44	1074.51	1.10
9	-44.49	163.08	5.00	1079.44	1074.51	1.10
10	-3.56	165.23	0.75	26994.36	17267.95	17.60
10	-3.56	165.23	0.75	26994.36	17267.95	17.60
11	-3.56	166.95	2.70	1311.48	231.25	0.24
11	-3.56	166.95	2.70	1311.48	231.25	0.24
12	-3.56	169.08	1.56	1351.21	238.25	0.24
12	-3.56	169.08	1.56	1351.21	238.25	0.24
13	7.90	171.46	3.25	1417.42	249.93	0.25
13	7.90	171.46	3.25	1417.42	249.93	0.25
14	7.90	174.69	3.25	1488.54	262.47	0.27
14	7.90	174.69	3.25	1488.54	262.47	0.27
15	7.90	178.75	4.95	1684.89	297.09	0.30
15	7.90	178.75	4.95	1684.89	297.09	0.30
16	7.90	183.88	5.40	2017.90	355.81	0.36
16	7.90	183.88	5.40	2017.90	355.81	0.36
17	7.90	189.23	5.40	2362.34	416.54	0.42
17	7.90	189.23	5.40	2362.34	416.54	0.42
18	7.90	194.62	5.50	2710.00	477.85	0.49
18	7.90	194.62	5.50	2710.00	477.85	0.49
19	7.90	200.08	5.50	3060.88	539.71	0.55
19	7.90	200.08	5.50	3060.88	539.71	0.55
20	7.90	205.27	4.99	3221.17	567.98	0.58

20	7.90	205.27	4.99	3221.17	567.98	0.58
21	7.90	210.21	4.99	3190.87	562.64	0.57
21	7.90	210.21	4.99	3190.87	562.64	0.57
22	7.90	215.15	4.99	3160.57	557.29	0.57
22	7.90	215.15	4.99	3160.57	557.29	0.57
23	7.90	220.08	4.99	3130.28	551.95	0.56
23	7.90	220.08	4.99	3130.28	551.95	0.56
24	7.90	225.02	4.99	3099.98	546.61	0.56
24	7.90	225.02	4.99	3099.98	546.61	0.56
25	7.90	229.96	4.99	3069.69	541.27	0.55
25	7.90	229.96	4.99	3069.69	541.27	0.55
26	7.90	234.90	4.99	3039.39	535.93	0.55
26	7.90	234.90	4.99	3039.39	535.93	0.55
27	7.90	239.84	4.99	3009.10	530.58	0.54
27	7.90	239.84	4.99	3009.10	530.58	0.54
28	7.90	244.78	4.99	2978.80	525.24	0.54
28	7.90	244.78	4.99	2978.80	525.24	0.54
29	7.90	249.72	4.99	2948.50	519.90	0.53
29	7.90	249.72	4.99	2948.50	519.90	0.53
30	7.90	254.65	4.99	2918.21	514.56	0.52
30	7.90	254.65	4.99	2918.21	514.56	0.52
31	7.90	259.59	4.99	2887.91	509.22	0.52
31	7.90	259.59	4.99	2887.91	509.22	0.52
32	7.90	264.53	4.99	2857.62	503.88	0.51
32	7.90	264.53	4.99	2857.62	503.88	0.51
33	7.90	269.77	5.60	2937.52	517.96	0.53
33	7.90	269.77	5.60	2937.52	517.96	0.53
34	7.90	275.33	5.60	3127.61	551.48	0.56
34	7.90	275.33	5.60	3127.61	551.48	0.56
35	7.90	278.38	0.57	3220.38	567.84	0.58
35	7.90	278.38	0.57	3220.38	567.84	0.58
36	7.90	281.03	4.76	3199.22	564.11	0.58
36	7.90	281.03	4.76	3199.22	564.11	0.58
37	7.90	285.74	4.76	3161.46	557.45	0.57
37	7.90	285.74	4.76	3161.46	557.45	0.57
38	7.90	290.56	4.97	3373.44	594.83	0.61
38	7.90	290.56	4.97	3373.44	594.83	0.61
39	7.90	295.70	5.40	3309.07	583.48	0.59
39	7.90	295.70	5.40	3309.07	583.48	0.59
40	7.90	301.05	5.40	3219.75	567.73	0.58
40	7.90	301.05	5.40	3219.75	567.73	0.58
41	7.90	306.41	5.40	3130.44	551.98	0.56
41	7.90	306.41	5.40	3130.44	551.98	0.56
42	7.90	311.76	5.40	3041.12	536.23	0.55
42	7.90	311.76	5.40	3041.12	536.23	0.55
43	7.90	317.11	5.40	2951.81	520.48	0.53
43	7.90	317.11	5.40	2951.81	520.48	0.53
44	7.90	322.47	5.40	2862.49	504.73	0.51
44	7.90	322.47	5.40	2862.49	504.73	0.51
45	7.90	327.82	5.40	2773.18	488.99	0.50
45	7.90	327.82	5.40	2773.18	488.99	0.50
46	52.19	331.60	3.60	2607.60	459.79	0.47
46	52.19	331.60	3.60	2607.60	459.79	0.47
47	52.19	333.13	1.40	2557.32	1997.99	2.04
47	52.19	333.13	1.40	2557.32	1997.99	2.04
48	57.58	334.90	5.00	2264.20	1814.83	1.85
48	57.58	334.90	5.00	2264.20	1814.83	1.85
49	52.31	337.77	5.00	1681.21	1450.54	1.48
49	52.31	337.77	5.00	1681.21	1450.54	1.48
50	58.99	340.04	2.86	1311.12	1219.28	1.24
50	58.99	340.04	2.86	1311.12	1219.28	1.24
51	58.99	341.33	2.14	982.66	764.03	0.78
51	58.99	341.33	2.14	982.66	764.03	0.78
52	45.25	343.64	5.00	588.88	517.97	0.53
52	45.25	343.64	5.00	588.88	517.97	0.53
53	63.72	345.55	0.71	359.81	374.84	0.38
53	63.72	345.55	0.71	359.81	374.84	0.38

Table 4 - Base Force Data on the 53 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-22.01	146.35	0.32	4.37	2.73	0.00
1	-22.01	146.35	0.32	4.37	2.73	0.00
2	-22.01	147.82	2.86	458.62	858.05	0.87
2	-22.01	147.82	2.86	458.62	858.05	0.87
3	-12.84	150.11	1.96	39613.89	25146.11	25.63
3	-12.84	150.11	1.96	39613.89	25146.11	25.63
4	-12.84	152.54	3.04	1645.49	2243.01	2.29
4	-12.84	152.54	3.04	1645.49	2243.01	2.29
5	-44.98	155.41	3.92	2805.97	3323.04	3.39
5	-44.98	155.41	3.92	2805.97	3323.04	3.39
6	-44.98	157.18	1.08	690.10	861.55	0.88
6	-44.98	157.18	1.08	690.10	861.55	0.88
7	-41.68	158.38	2.19	1709.44	1945.96	1.98
7	-41.68	158.38	2.19	1709.44	1945.96	1.98
8	-41.68	160.25	2.81	2591.25	2741.41	2.79
8	-41.68	160.25	2.81	2591.25	2741.41	2.79
9	-44.49	163.08	5.00	5397.20	5372.54	5.48
9	-44.49	163.08	5.00	5397.20	5372.54	5.48
10	-3.56	165.23	0.75	20118.96	12869.84	13.12
10	-3.56	165.23	0.75	20118.96	12869.84	13.12
11	-3.56	166.95	2.70	3539.80	624.16	0.64
11	-3.56	166.95	2.70	3539.80	624.16	0.64
12	-3.56	169.08	1.56	2101.94	370.63	0.38
12	-3.56	169.08	1.56	2101.94	370.63	0.38
13	7.90	171.46	3.25	4613.07	813.41	0.83
13	7.90	171.46	3.25	4613.07	813.41	0.83
14	7.90	174.69	3.25	4844.53	854.22	0.87
14	7.90	174.69	3.25	4844.53	854.22	0.87
15	7.90	178.75	4.95	8335.01	1469.69	1.50
15	7.90	178.75	4.95	8335.01	1469.69	1.50
16	7.90	183.88	5.40	10899.15	1921.81	1.96
16	7.90	183.88	5.40	10899.15	1921.81	1.96
17	7.90	189.23	5.40	12759.54	2249.85	2.29
17	7.90	189.23	5.40	12759.54	2249.85	2.29
18	7.90	194.62	5.50	14910.91	2629.19	2.68
18	7.90	194.62	5.50	14910.91	2629.19	2.68
19	7.90	200.08	5.50	16841.49	2969.61	3.03
19	7.90	200.08	5.50	16841.49	2969.61	3.03
20	7.90	205.27	4.99	16059.91	2831.79	2.89
20	7.90	205.27	4.99	16059.91	2831.79	2.89
21	7.90	210.21	4.99	15908.86	2805.16	2.86
21	7.90	210.21	4.99	15908.86	2805.16	2.86
22	7.90	215.15	4.99	15757.81	2778.53	2.83
22	7.90	215.15	4.99	15757.81	2778.53	2.83
23	7.90	220.08	4.99	15606.77	2751.89	2.81
23	7.90	220.08	4.99	15606.77	2751.89	2.81
24	7.90	225.02	4.99	15455.72	2725.26	2.78
24	7.90	225.02	4.99	15455.72	2725.26	2.78
25	7.90	229.96	4.99	15304.67	2698.63	2.75
25	7.90	229.96	4.99	15304.67	2698.63	2.75
26	7.90	234.90	4.99	15153.63	2671.99	2.72
26	7.90	234.90	4.99	15153.63	2671.99	2.72
27	7.90	239.84	4.99	15002.58	2645.36	2.70
27	7.90	239.84	4.99	15002.58	2645.36	2.70
28	7.90	244.78	4.99	14851.53	2618.73	2.67
28	7.90	244.78	4.99	14851.53	2618.73	2.67
29	7.90	249.72	4.99	14700.49	2592.09	2.64
29	7.90	249.72	4.99	14700.49	2592.09	2.64
30	7.90	254.65	4.99	14549.44	2565.46	2.62
30	7.90	254.65	4.99	14549.44	2565.46	2.62
31	7.90	259.59	4.99	14398.39	2538.83	2.59
31	7.90	259.59	4.99	14398.39	2538.83	2.59
32	7.90	264.53	4.99	14247.35	2512.19	2.56
32	7.90	264.53	4.99	14247.35	2512.19	2.56
33	7.90	269.77	5.60	16459.31	2902.22	2.96
33	7.90	269.77	5.60	16459.31	2902.22	2.96
34	7.90	275.33	5.60	17524.44	3090.03	3.15
34	7.90	275.33	5.60	17524.44	3090.03	3.15

35	7.90	278.38	0.57	1850.47	326.29	0.33
35	7.90	278.38	0.57	1850.47	326.29	0.33
36	7.90	281.03	4.76	15230.11	2685.48	2.74
36	7.90	281.03	4.76	15230.11	2685.48	2.74
37	7.90	285.74	4.76	15050.34	2653.78	2.71
37	7.90	285.74	4.76	15050.34	2653.78	2.71
38	7.90	290.56	4.97	16768.54	2956.75	3.01
38	7.90	290.56	4.97	16768.54	2956.75	3.01
39	7.90	295.70	5.40	17884.69	3153.55	3.21
39	7.90	295.70	5.40	17884.69	3153.55	3.21
40	7.90	301.05	5.40	17401.96	3068.43	3.13
40	7.90	301.05	5.40	17401.96	3068.43	3.13
41	7.90	306.41	5.40	16919.23	2983.32	3.04
41	7.90	306.41	5.40	16919.23	2983.32	3.04
42	7.90	311.76	5.40	16436.50	2898.20	2.95
42	7.90	311.76	5.40	16436.50	2898.20	2.95
43	7.90	317.11	5.40	15953.78	2813.08	2.87
43	7.90	317.11	5.40	15953.78	2813.08	2.87
44	7.90	322.47	5.40	15471.05	2727.96	2.78
44	7.90	322.47	5.40	15471.05	2727.96	2.78
45	7.90	327.82	5.40	14988.32	2642.85	2.69
45	7.90	327.82	5.40	14988.32	2642.85	2.69
46	52.19	331.60	3.60	9376.76	1653.38	1.69
46	52.19	331.60	3.60	9376.76	1653.38	1.69
47	52.19	333.13	1.40	3590.64	2805.31	2.86
47	52.19	333.13	1.40	3590.64	2805.31	2.86
48	57.58	334.90	5.00	11320.99	9074.14	9.25
48	57.58	334.90	5.00	11320.99	9074.14	9.25
49	52.31	337.77	5.00	8406.07	7252.69	7.39
49	52.31	337.77	5.00	8406.07	7252.69	7.39
50	58.99	340.04	2.86	3745.80	3483.41	3.55
50	58.99	340.04	2.86	3745.80	3483.41	3.55
51	58.99	341.33	2.14	2105.90	1637.37	1.67
51	58.99	341.33	2.14	2105.90	1637.37	1.67
52	45.25	343.64	5.00	2944.41	2589.87	2.64
52	45.25	343.64	5.00	2944.41	2589.87	2.64
53	63.72	345.55	0.71	256.18	266.88	0.27
53	63.72	345.55	0.71	256.18	266.88	0.27

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 53 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 53 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
14	12000.0	0.0	12000.0	90.00	-0.218359E+04

Sum of the Resisting Forces = 150009.18 (lbs)

Average Available Shear Strength = 694.24(psf)

Sum of the Driving Forces = -14132.11 (lbs)

Average Mobilized Shear Stress = -65.40(psf)

Total length of the failure surface = 216.08(ft)

Factor of Safety Balance Check: FS = ********

Janbu's Correction Factor (fo) = -0.3366

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Janub's FS Corrected =  3.57296

                    **** END OF GEOSTASE OUTPUT ****
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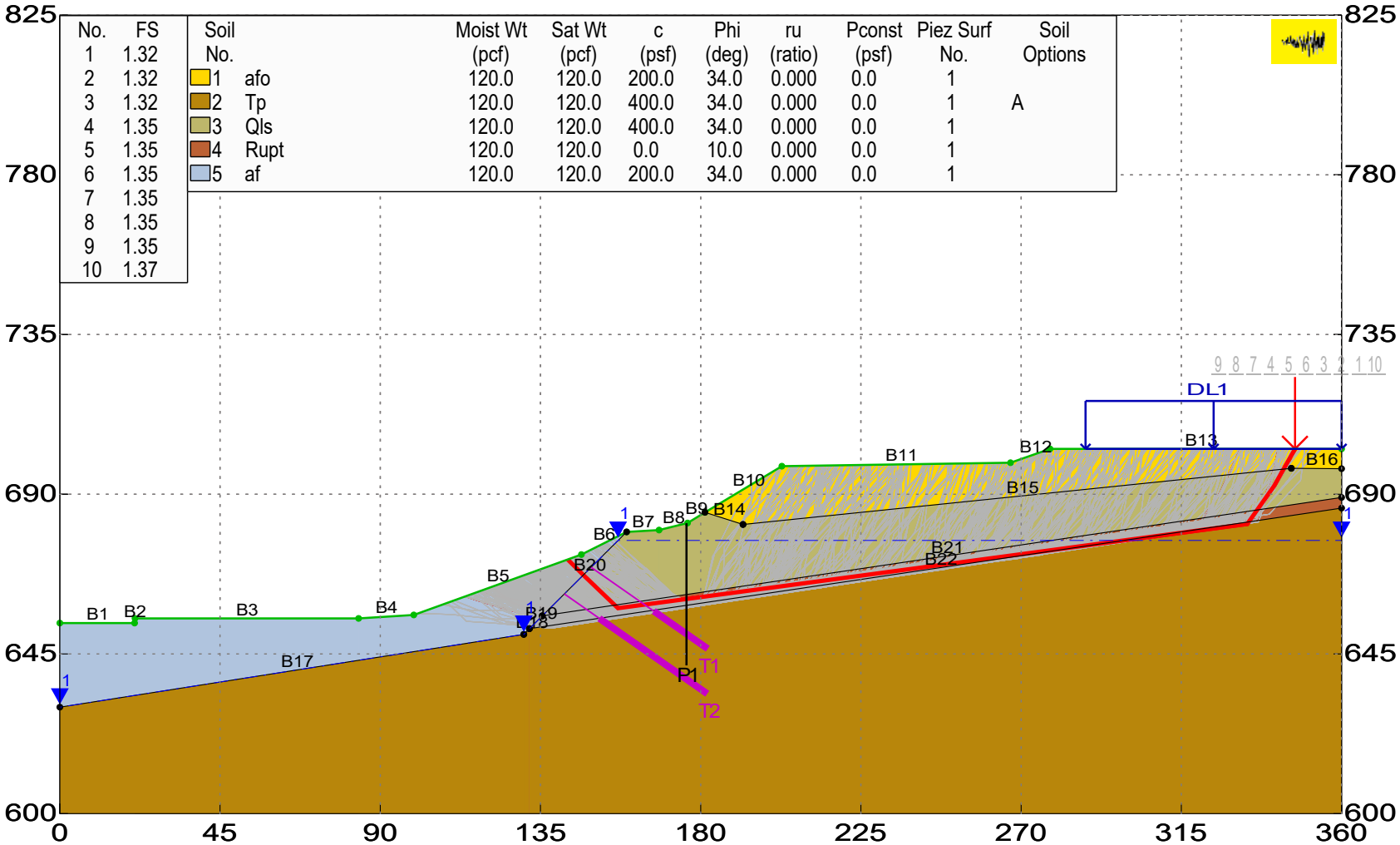
Royal Vista - Cross Section 7
Stage 8 (Final Condition - Rupture Surface (Seismic))

LGC Geotechnical / BPP

\Sec 7 - Stage 8 (Final Condition - Rupture Surface (Seismic)) - 2 Tiebacks.gsd

No.	FS
1	1.32
2	1.32
3	1.32
4	1.35
5	1.35
6	1.35
7	1.35
8	1.35
9	1.35
10	1.37

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.32

Simplified Janbu (Corrected) Method

kh = 0.15000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 8 (Final Condition - Rupture Surface (Seismic)) - 2 Tiebacks.gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\7-7'\Sec 7 - Stage 8 (Final Condition - Rupture Surface (Seismic)) - 2 Tiebacks.OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 7

DESCRIPTION: Stage 8 (Final Condition - Rupture Surface (Seismic))

BOUNDARY DATA

13 Surface Boundaries
22 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	653.700	21.000	653.700	5
2	21.000	653.700	21.100	655.000	5
3	21.100	655.000	83.900	655.000	5
4	83.900	655.000	99.400	656.000	5
5	99.400	656.000	146.500	673.000	5
6	146.500	673.000	159.200	679.400	5
7	159.200	679.400	168.300	679.900	3
8	168.300	679.900	176.300	681.900	3
9	176.300	681.900	181.200	684.900	3
10	181.200	684.900	202.800	697.900	1
11	202.800	697.900	267.000	698.900	1
12	267.000	698.900	278.100	702.800	1
13	278.100	702.800	360.000	702.800	1
14	181.200	684.900	191.900	681.500	3
15	191.900	681.500	345.900	697.300	3
16	345.900	697.300	360.000	697.200	3
17	0.000	630.000	130.300	650.500	2
18	130.300	650.500	131.900	652.100	2
19	131.900	652.100	135.500	655.700	4
20	135.500	655.700	159.200	679.400	3
21	135.500	655.700	360.000	689.100	4
22	131.900	652.100	360.000	686.100	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 600.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	6.0	400.00	34.00
2	10.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	630.00
2	130.30	650.50
3	156.80	677.00
4	360.00	677.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)

1 13 288.100 702.800 250.000 360.000 702.800
250.000 0.00

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

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.15000(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)

2 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	149.20	669.40	167300.0	5.0	35.00	21.5	18.5
2	141.70	661.90	334600.0	5.0	35.00	12.0	37.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	176.00	681.82	12000.0	1.0	90.00	40.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 13.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	135.00	653.25	175.00	659.24	3.00
2	180.00	660.00	340.00	684.00	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 = 313

Number of Trial Surfaces With Valid FS = 687

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 31.3 %

Statistical Data On All Valid FS Values:
FS Max = 44.656 FS Min = 1.317 FS Ave = 4.395
Standard Deviation = 5.450 Coefficient of Variation = 123.99 %

Critical Surface is Sequence Number 116 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	164.21	658.89
2	151.51	655.03

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	176.00	660.47

Factor Of Safety For The Critical or Specified Surface = 1.317

Table 1 - Geometry Data on the 51 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.86	2.60	144.57	669.70	672.30	-44.66	19.85	5.42
2	0.55	5.62	146.78	667.52	673.14	-44.66	26.75	0.77
3	0.35	6.28	147.22	667.08	673.36	-44.66	26.75	0.49
4	4.24	9.66	149.52	664.86	674.52	-43.96	26.75	5.89
5	4.24	15.88	153.76	660.78	676.66	-43.96	26.75	5.89
6	0.88	19.64	156.32	658.31	677.95	-43.96	26.75	1.22
7	0.04	20.29	156.78	657.89	678.18	7.65	26.75	0.05
8	2.40	20.74	158.00	658.05	678.80	7.65	26.75	2.42
9	4.55	21.01	161.47	658.52	679.52	7.65	3.14	4.59
10	4.55	20.64	166.03	659.13	679.77	7.65	3.14	4.59
11	4.00	20.70	170.30	659.70	680.40	7.65	14.04	4.04
12	4.00	21.16	174.30	660.24	681.40	7.65	14.04	4.04
13	4.90	22.56	178.75	660.84	683.40	7.65	31.48	4.94

14	5.35	24.98	183.88	661.53	686.51	7.65	31.04	5.40
15	5.35	27.48	189.23	662.25	689.73	7.65	31.04	5.40
16	5.45	30.01	194.62	662.97	692.98	7.65	31.04	5.50
17	5.45	32.56	200.08	663.70	696.26	7.65	31.04	5.50
18	4.94	33.54	205.27	664.40	697.94	7.65	0.89	4.98
19	4.94	32.95	210.21	665.06	698.02	7.65	0.89	4.98
20	4.94	32.36	215.15	665.73	698.09	7.65	0.89	4.98
21	4.94	31.78	220.08	666.39	698.17	7.65	0.89	4.98
22	4.94	31.19	225.02	667.05	698.25	7.65	0.89	4.98
23	4.94	30.61	229.96	667.72	698.32	7.65	0.89	4.98
24	4.94	30.02	234.90	668.38	698.40	7.65	0.89	4.98
25	4.94	29.43	239.84	669.04	698.48	7.65	0.89	4.98
26	4.94	28.85	244.78	669.71	698.55	7.65	0.89	4.98
27	4.94	28.26	249.72	670.37	698.63	7.65	0.89	4.98
28	4.94	27.67	254.65	671.03	698.71	7.65	0.89	4.98
29	4.94	27.09	259.59	671.70	698.78	7.65	0.89	4.98
30	4.94	26.50	264.53	672.36	698.86	7.65	0.89	4.98
31	5.55	26.81	269.77	673.06	699.88	7.65	19.36	5.60
32	5.55	28.01	275.33	673.81	701.82	7.65	19.36	5.60
33	0.57	28.58	278.38	674.22	702.80	7.65	0.00	0.57
34	4.72	28.22	281.03	674.58	702.80	7.65	0.00	4.76
35	4.72	27.59	285.74	675.21	702.80	7.65	0.00	4.76
36	4.86	26.95	290.53	675.85	702.80	7.65	0.00	4.90
37	4.86	26.29	295.39	676.51	702.80	7.65	0.00	4.90
38	1.13	25.89	298.39	676.91	702.80	7.65	0.00	1.14
39	0.12	25.81	299.01	676.99	702.80	7.65	0.00	0.12
40	4.92	25.47	301.53	677.33	702.80	7.65	0.00	4.96
41	4.92	24.81	306.45	677.99	702.80	7.65	0.00	4.96
42	4.92	24.15	311.37	678.65	702.80	7.65	0.00	4.96
43	4.92	23.49	316.29	679.31	702.80	7.65	0.00	4.96
44	4.92	22.83	321.21	679.97	702.80	7.65	0.00	4.96
45	4.92	22.17	326.13	680.63	702.80	7.65	0.00	4.96
46	4.92	21.51	331.05	681.29	702.80	7.65	0.00	4.96
47	0.42	20.88	333.71	681.92	702.80	54.78	0.00	0.72
48	2.37	18.91	335.11	683.89	702.80	54.78	0.00	4.11
49	4.71	13.89	338.65	688.91	702.80	54.78	0.00	8.17
50	2.71	8.14	342.36	694.66	702.80	60.69	0.00	5.54
51	3.21	2.86	345.32	699.94	702.80	60.69	0.00	6.56

Table 2 - Force Data On The 51 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1204.8	0.0	0.0	180.7	0.0	0.0
2	371.2	0.0	0.0	55.7	0.0	0.0
3	261.1	0.0	5.2	39.2	0.0	0.0
4	4913.3	0.0	891.8	737.0	0.0	0.0
5	8081.0	0.0	2422.5	1212.1	0.0	0.0
6	2068.4	0.0	692.7	310.3	0.0	0.0
7	108.7	0.0	26.8	16.3	0.0	0.0
8	5973.9	0.0	2863.1	896.1	0.0	0.0
9	11469.1	0.0	5294.2	1720.4	0.0	0.0
10	11272.0	0.0	5119.1	1690.8	0.0	0.0
11	9933.8	0.0	4355.7	1490.1	0.0	0.0
12	10155.9	0.0	4220.4	1523.4	0.0	0.0
13	13265.6	0.0	4985.6	1989.8	0.0	0.0
14	16038.6	0.0	5211.6	2405.8	0.0	0.0
15	17644.4	0.0	4969.6	2646.7	0.0	0.0
16	19625.4	0.0	4813.6	2943.8	0.0	0.0
17	21291.9	0.0	4562.4	3193.8	0.0	0.0
18	19874.7	0.0	3917.3	2981.2	0.0	0.0
19	19527.2	0.0	3711.1	2929.1	0.0	0.0
20	19179.7	0.0	3504.8	2877.0	0.0	0.0
21	18832.2	0.0	3298.6	2824.8	0.0	0.0
22	18484.7	0.0	3092.4	2772.7	0.0	0.0
23	18137.3	0.0	2886.1	2720.6	0.0	0.0
24	17789.8	0.0	2679.9	2668.5	0.0	0.0

25	17442.3	0.0	2473.7	2616.3	0.0	0.0
26	17094.8	0.0	2267.4	2564.2	0.0	0.0
27	16747.3	0.0	2061.2	2512.1	0.0	0.0
28	16399.8	0.0	1855.0	2460.0	0.0	0.0
29	16052.4	0.0	1648.8	2407.9	0.0	0.0
30	15704.9	0.0	1442.5	2355.7	0.0	0.0
31	17855.5	0.0	1375.0	2678.3	0.0	0.0
32	18657.8	0.0	1114.6	2798.7	0.0	0.0
33	1951.9	0.0	99.6	292.8	0.0	0.0
34	15970.5	0.0	719.6	2395.6	0.0	0.0
35	15612.1	0.0	531.6	2341.8	0.0	0.0
36	15718.7	0.0	351.2	2357.8	0.0	1215.2
37	15337.9	0.0	151.4	2300.7	0.0	1215.2
38	3504.4	0.0	6.6	525.7	0.0	282.0
39	383.6	0.0	0.1	57.5	0.0	31.0
40	15033.9	0.0	0.0	2255.1	0.0	1229.7
41	14644.0	0.0	0.0	2196.6	0.0	1229.7
42	14254.0	0.0	0.0	2138.1	0.0	1229.7
43	13864.0	0.0	0.0	2079.6	0.0	1229.7
44	13474.1	0.0	0.0	2021.1	0.0	1229.7
45	13084.1	0.0	0.0	1962.6	0.0	1229.7
46	12694.2	0.0	0.0	1904.1	0.0	1229.7
47	1040.3	0.0	0.0	156.0	0.0	103.8
48	5381.6	0.0	0.0	807.2	0.0	593.0
49	7850.8	0.0	0.0	1177.6	0.0	1177.4
50	2648.7	0.0	0.0	397.3	0.0	677.9
51	1103.6	0.0	0.0	165.5	0.0	803.3

TOTAL WEIGHT OF SLIDING MASS = 605011.77(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 517274.98(lbs)

TOTAL AREA OF SLIDING MASS = 5041.76(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 51 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	34.00	
2	5	200.00	34.00	
3	3	400.00	34.00	
4	3	400.00	34.00	
5	3	400.00	34.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	

34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	2	300.00	12.00	A
39	2	300.00	12.00	A
40	2	300.00	12.00	A
41	2	300.00	12.00	A
42	2	300.00	12.00	A
43	2	300.00	12.00	A
44	2	300.00	12.00	A
45	2	300.00	12.00	A
46	2	300.00	12.00	A
47	2	400.00	34.00	A
48	4	0.00	10.00	
49	3	400.00	34.00	
50	3	400.00	34.00	
51	1	200.00	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 51 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-44.66	144.57	5.42	425.78	487.19	108.14
1	-44.66	144.57	5.42	425.78	487.19	108.14
2	-44.66	146.78	0.77	854.79	776.57	172.38
2	-44.66	146.78	0.77	854.79	776.57	172.38
3	-44.66	147.22	0.49	992.62	1069.53	237.41
3	-44.66	147.22	0.49	992.62	1069.53	237.41
4	-43.96	149.52	5.89	11988.58	8486.40	1883.78
4	-43.96	149.52	5.89	11988.58	8486.40	1883.78
5	-43.96	153.76	5.89	1872.54	1663.04	369.16
5	-43.96	153.76	5.89	1872.54	1663.04	369.16
6	-43.96	156.32	1.22	1863.20	328.53	72.93
6	-43.96	156.32	1.22	1863.20	328.53	72.93
7	7.65	156.78	0.05	1829.11	322.52	71.59
7	7.65	156.78	0.05	1829.11	322.52	71.59
8	7.65	158.00	2.42	1299.55	229.15	50.86
8	7.65	158.00	2.42	1299.55	229.15	50.86
9	7.65	161.47	4.59	1359.90	239.79	53.23
9	7.65	161.47	4.59	1359.90	239.79	53.23
10	7.65	166.03	4.59	5549.30	978.49	217.20
10	7.65	166.03	4.59	5549.30	978.49	217.20
11	7.65	170.30	4.04	1396.42	246.23	54.66
11	7.65	170.30	4.04	1396.42	246.23	54.66
12	7.65	174.30	4.04	1484.98	261.84	58.12
12	7.65	174.30	4.04	1484.98	261.84	58.12
13	7.65	178.75	4.94	1689.42	297.89	66.12
13	7.65	178.75	4.94	1689.42	297.89	66.12
14	7.65	183.88	5.40	2021.11	356.38	79.11
14	7.65	183.88	5.40	2021.11	356.38	79.11
15	7.65	189.23	5.40	2364.19	416.87	92.54
15	7.65	189.23	5.40	2364.19	416.87	92.54
16	7.65	194.62	5.50	2710.49	477.93	106.09
16	7.65	194.62	5.50	2710.49	477.93	106.09
17	7.65	200.08	5.50	3059.98	539.56	119.77
17	7.65	200.08	5.50	3059.98	539.56	119.77
18	7.65	205.27	4.98	3220.33	567.83	126.04
18	7.65	205.27	4.98	3220.33	567.83	126.04
19	7.65	210.21	4.98	3191.51	562.75	124.92
19	7.65	210.21	4.98	3191.51	562.75	124.92
20	7.65	215.15	4.98	3162.70	557.67	123.79

20	7.65	215.15	4.98	3162.70	557.67	123.79
21	7.65	220.08	4.98	3133.89	552.59	122.66
21	7.65	220.08	4.98	3133.89	552.59	122.66
22	7.65	225.02	4.98	3105.07	547.51	121.53
22	7.65	225.02	4.98	3105.07	547.51	121.53
23	7.65	229.96	4.98	3076.26	542.43	120.41
23	7.65	229.96	4.98	3076.26	542.43	120.41
24	7.65	234.90	4.98	3047.45	537.35	119.28
24	7.65	234.90	4.98	3047.45	537.35	119.28
25	7.65	239.84	4.98	3018.63	532.27	118.15
25	7.65	239.84	4.98	3018.63	532.27	118.15
26	7.65	244.78	4.98	2989.82	527.19	117.02
26	7.65	244.78	4.98	2989.82	527.19	117.02
27	7.65	249.72	4.98	2961.01	522.11	115.89
27	7.65	249.72	4.98	2961.01	522.11	115.89
28	7.65	254.65	4.98	2932.19	517.02	114.77
28	7.65	254.65	4.98	2932.19	517.02	114.77
29	7.65	259.59	4.98	2903.38	511.94	113.64
29	7.65	259.59	4.98	2903.38	511.94	113.64
30	7.65	264.53	4.98	2874.57	506.86	112.51
30	7.65	264.53	4.98	2874.57	506.86	112.51
31	7.65	269.77	5.60	2955.16	521.07	115.67
31	7.65	269.77	5.60	2955.16	521.07	115.67
32	7.65	275.33	5.60	3145.16	554.58	123.10
32	7.65	275.33	5.60	3145.16	554.58	123.10
33	7.65	278.38	0.57	3237.98	570.94	126.74
33	7.65	278.38	0.57	3237.98	570.94	126.74
34	7.65	281.03	4.76	3217.65	567.36	125.94
34	7.65	281.03	4.76	3217.65	567.36	125.94
35	7.65	285.74	4.76	3181.37	560.96	124.52
35	7.65	285.74	4.76	3181.37	560.96	124.52
36	7.65	290.53	4.90	3393.15	598.30	132.81
36	7.65	290.53	4.90	3393.15	598.30	132.81
37	7.65	295.39	4.90	3355.75	591.71	131.35
37	7.65	295.39	4.90	3355.75	591.71	131.35
38	7.65	298.39	1.14	3319.48	1005.58	223.21
38	7.65	298.39	1.14	3319.48	1005.58	223.21
39	7.65	299.01	0.12	3314.67	1004.56	222.99
39	7.65	299.01	0.12	3314.67	1004.56	222.99
40	7.65	301.53	4.96	3274.82	996.08	221.11
40	7.65	301.53	4.96	3274.82	996.08	221.11
41	7.65	306.45	4.96	3196.07	979.35	217.39
41	7.65	306.45	4.96	3196.07	979.35	217.39
42	7.65	311.37	4.96	3117.32	962.61	213.68
42	7.65	311.37	4.96	3117.32	962.61	213.68
43	7.65	316.29	4.96	3038.58	945.87	209.96
43	7.65	316.29	4.96	3038.58	945.87	209.96
44	7.65	321.21	4.96	2959.83	929.13	206.24
44	7.65	321.21	4.96	2959.83	929.13	206.24
45	7.65	326.13	4.96	2881.08	912.39	202.53
45	7.65	326.13	4.96	2881.08	912.39	202.53
46	7.65	331.05	4.96	2802.33	895.65	198.81
46	7.65	331.05	4.96	2802.33	895.65	198.81
47	54.78	333.71	0.72	2140.07	1843.49	409.21
47	54.78	333.71	0.72	2140.07	1843.49	409.21
48	54.78	335.11	4.11	2378.77	419.44	93.11
48	54.78	335.11	4.11	2378.77	419.44	93.11
49	54.78	338.65	8.17	1455.45	1381.71	306.71
49	54.78	338.65	8.17	1455.45	1381.71	306.71
50	60.69	342.36	5.54	825.05	956.50	212.32
50	60.69	342.36	5.54	825.05	956.50	212.32
51	60.69	345.32	6.56	397.00	467.78	103.84
51	60.69	345.32	6.56	397.00	467.78	103.84

Table 4 - Base Force Data on the 51 Slices

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

1	-44.66	144.57	5.42	2309.32	2642.40	586.55
1	-44.66	144.57	5.42	2309.32	2642.40	586.55
2	-44.66	146.78	0.77	662.03	601.45	133.51
2	-44.66	146.78	0.77	662.03	601.45	133.51
3	-44.66	147.22	0.49	483.10	520.53	115.55
3	-44.66	147.22	0.49	483.10	520.53	115.55
4	-43.96	149.52	5.89	70617.05	49987.94	11096.14
4	-43.96	149.52	5.89	70617.05	49987.94	11096.14
5	-43.96	153.76	5.89	11029.91	9795.91	2174.46
5	-43.96	153.76	5.89	11029.91	9795.91	2174.46
6	-43.96	156.32	1.22	2271.76	400.57	88.92
6	-43.96	156.32	1.22	2271.76	400.57	88.92
7	7.65	156.78	0.05	82.36	14.52	3.22
7	7.65	156.78	0.05	82.36	14.52	3.22
8	7.65	158.00	2.42	3146.93	554.89	123.17
8	7.65	158.00	2.42	3146.93	554.89	123.17
9	7.65	161.47	4.59	6243.10	1100.83	244.36
9	7.65	161.47	4.59	6243.10	1100.83	244.36
10	7.65	166.03	4.59	25476.04	4492.11	997.14
10	7.65	166.03	4.59	25476.04	4492.11	997.14
11	7.65	170.30	4.04	5635.84	993.75	220.59
11	7.65	170.30	4.04	5635.84	993.75	220.59
12	7.65	174.30	4.04	5993.27	1056.77	234.58
12	7.65	174.30	4.04	5993.27	1056.77	234.58
13	7.65	178.75	4.94	8352.47	1472.77	326.92
13	7.65	178.75	4.94	8352.47	1472.77	326.92
14	7.65	183.88	5.40	10910.03	1923.73	427.02
14	7.65	183.88	5.40	10910.03	1923.73	427.02
15	7.65	189.23	5.40	12762.01	2250.29	499.51
15	7.65	189.23	5.40	12762.01	2250.29	499.51
16	7.65	194.62	5.50	14904.79	2628.12	583.38
16	7.65	194.62	5.50	14904.79	2628.12	583.38
17	7.65	200.08	5.50	16826.65	2966.99	658.60
17	7.65	200.08	5.50	16826.65	2966.99	658.60
18	7.65	205.27	4.98	16046.25	2829.39	628.06
18	7.65	205.27	4.98	16046.25	2829.39	628.06
19	7.65	210.21	4.98	15902.68	2804.07	622.44
19	7.65	210.21	4.98	15902.68	2804.07	622.44
20	7.65	215.15	4.98	15759.11	2778.76	616.82
20	7.65	215.15	4.98	15759.11	2778.76	616.82
21	7.65	220.08	4.98	15615.54	2753.44	611.20
21	7.65	220.08	4.98	15615.54	2753.44	611.20
22	7.65	225.02	4.98	15471.97	2728.13	605.58
22	7.65	225.02	4.98	15471.97	2728.13	605.58
23	7.65	229.96	4.98	15328.40	2702.81	599.96
23	7.65	229.96	4.98	15328.40	2702.81	599.96
24	7.65	234.90	4.98	15184.83	2677.49	594.34
24	7.65	234.90	4.98	15184.83	2677.49	594.34
25	7.65	239.84	4.98	15041.25	2652.18	588.72
25	7.65	239.84	4.98	15041.25	2652.18	588.72
26	7.65	244.78	4.98	14897.68	2626.86	583.10
26	7.65	244.78	4.98	14897.68	2626.86	583.10
27	7.65	249.72	4.98	14754.11	2601.55	577.48
27	7.65	249.72	4.98	14754.11	2601.55	577.48
28	7.65	254.65	4.98	14610.54	2576.23	571.86
28	7.65	254.65	4.98	14610.54	2576.23	571.86
29	7.65	259.59	4.98	14466.97	2550.92	566.24
29	7.65	259.59	4.98	14466.97	2550.92	566.24
30	7.65	264.53	4.98	14323.40	2525.60	560.62
30	7.65	264.53	4.98	14323.40	2525.60	560.62
31	7.65	269.77	5.60	16548.41	2917.93	647.71
31	7.65	269.77	5.60	16548.41	2917.93	647.71
32	7.65	275.33	5.60	17612.40	3105.54	689.36
32	7.65	275.33	5.60	17612.40	3105.54	689.36
33	7.65	278.38	0.57	1859.48	327.88	72.78
33	7.65	278.38	0.57	1859.48	327.88	72.78
34	7.65	281.03	4.76	15308.80	2699.35	599.19
34	7.65	281.03	4.76	15308.80	2699.35	599.19
35	7.65	285.74	4.76	15136.20	2668.92	592.44
35	7.65	285.74	4.76	15136.20	2668.92	592.44
36	7.65	290.53	4.90	16641.93	2934.42	651.37
36	7.65	290.53	4.90	16641.93	2934.42	651.37

37	7.65	295.39	4.90	16458.52	2902.08	644.19
37	7.65	295.39	4.90	16458.52	2902.08	644.19
38	7.65	298.39	1.14	3777.52	1144.33	254.01
38	7.65	298.39	1.14	3777.52	1144.33	254.01
39	7.65	299.01	0.12	414.20	125.53	27.86
39	7.65	299.01	0.12	414.20	125.53	27.86
40	7.65	301.53	4.96	16253.16	4943.64	1097.37
40	7.65	301.53	4.96	16253.16	4943.64	1097.37
41	7.65	306.45	4.96	15862.33	4860.56	1078.93
41	7.65	306.45	4.96	15862.33	4860.56	1078.93
42	7.65	311.37	4.96	15471.49	4777.49	1060.49
42	7.65	311.37	4.96	15471.49	4777.49	1060.49
43	7.65	316.29	4.96	15080.66	4694.41	1042.05
43	7.65	316.29	4.96	15080.66	4694.41	1042.05
44	7.65	321.21	4.96	14689.83	4611.34	1023.61
44	7.65	321.21	4.96	14689.83	4611.34	1023.61
45	7.65	326.13	4.96	14298.99	4528.27	1005.17
45	7.65	326.13	4.96	14298.99	4528.27	1005.17
46	7.65	331.05	4.96	13908.16	4445.19	986.73
46	7.65	331.05	4.96	13908.16	4445.19	986.73
47	54.78	333.71	0.72	1540.71	1327.20	294.61
47	54.78	333.71	0.72	1540.71	1327.20	294.61
48	54.78	335.11	4.11	9784.06	1725.19	382.95
48	54.78	335.11	4.11	9784.06	1725.19	382.95
49	54.78	338.65	8.17	11886.62	11284.42	2504.87
49	54.78	338.65	8.17	11886.62	11284.42	2504.87
50	60.69	342.36	5.54	4570.52	5298.73	1176.19
50	60.69	342.36	5.54	4570.52	5298.73	1176.19
51	60.69	345.32	6.56	2606.12	3070.75	681.63
51	60.69	345.32	6.56	2606.12	3070.75	681.63

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 51 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
10	27408.8	19191.9	33460.0	35.00	0.414245E+05

***Pier/Pile Slice Force Data on the 51 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
12	12000.0	0.0	12000.0	90.00	-0.273991E+04

Sum of the Resisting Forces = 163373.37 (lbs)

Average Available Shear Strength = 732.20(psf)

Sum of the Driving Forces = 38507.87 (lbs)

Average Mobilized Shear Stress = 172.58(psf)

Total length of the failure surface = 223.13(ft)

Factor of Safety Balance Check: FS = 4.24260

Janbu's Correction Factor (fo) = 0.3104

Janub's FS Corrected = 1.31676

The FS Calculation To Determine The Seismic Yield Coefficient (ky) Did Not Converge in 30 Iterations.

**** END OF GEOSTASE OUTPUT ***

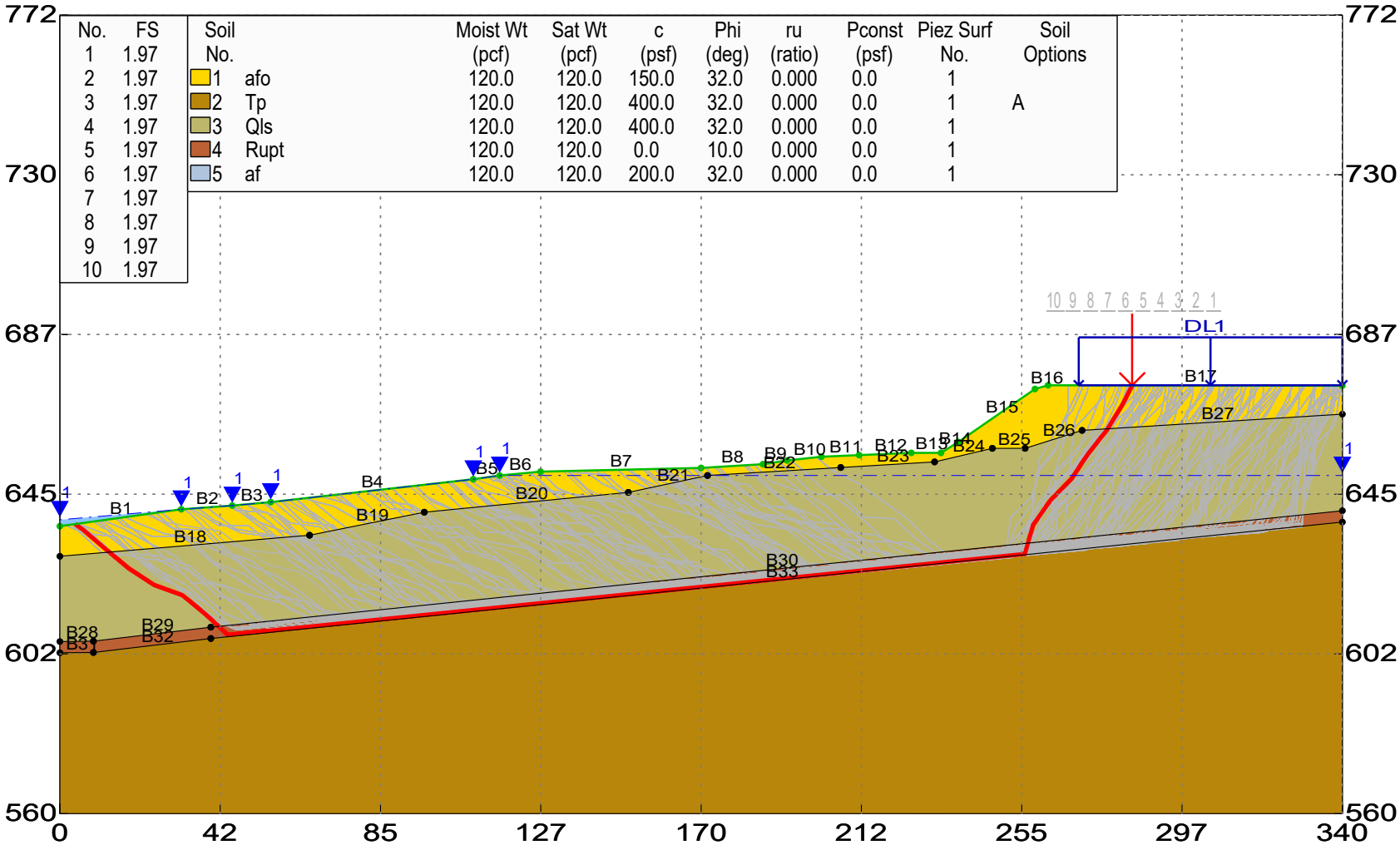
Royal Vista - Section 8
Stage 1 (Existing Condition)

LGC Geotechnical / BPP

\Sec 8 - Stage 1 (Existing Condition).gsd

No.	FS
1	1.97
2	1.97
3	1.97
4	1.97
5	1.97
6	1.97
7	1.97
8	1.97
9	1.97
10	1.97

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 1.97

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 1 (Existing Condition).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 1 (Existing Condition).OUT
Unit System: English

PROJECT: Royal Vista - Section 8

DESCRIPTION: Stage 1 (Existing Condition)

BOUNDARY DATA

17 Surface Boundaries
33 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	636.500	32.200	641.000	1
2	32.200	641.000	45.700	642.000	1
3	45.700	642.000	55.900	642.900	1
4	55.900	642.900	109.600	649.000	1
5	109.600	649.000	116.600	650.000	1
6	116.600	650.000	127.400	651.000	1
7	127.400	651.000	170.000	652.000	1
8	170.000	652.000	186.400	653.000	1
9	186.400	653.000	192.800	654.000	1
10	192.800	654.000	201.900	655.000	1
11	201.900	655.000	211.900	655.400	1
12	211.900	655.400	225.700	656.000	1
13	225.700	656.000	233.600	656.000	1
14	233.600	656.000	238.200	658.900	1
15	238.200	658.900	258.500	673.000	1
16	258.500	673.000	262.000	674.000	1
17	262.000	674.000	340.000	673.900	1
18	0.000	628.500	66.200	634.100	3
19	66.200	634.100	96.600	640.200	3
20	96.600	640.200	150.700	645.500	3
21	150.700	645.500	171.700	650.000	3
22	171.700	650.000	207.000	652.100	3
23	207.000	652.100	231.900	653.600	3
24	231.900	653.600	247.200	657.200	3
25	247.200	657.200	255.900	657.200	3
26	255.900	657.200	271.000	662.000	3

27	271.000	662.000	340.000	666.300	3
28	0.000	605.800	8.900	605.900	4
29	8.900	605.900	40.000	609.600	4
30	40.000	609.600	340.000	640.600	4
31	0.000	602.800	8.900	602.900	2
32	8.900	602.900	40.000	606.600	2
33	40.000	606.600	340.000	637.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	32.00
2	8.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 7 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	638.20
2	32.20	641.00
3	45.70	642.00
4	55.90	642.90
5	109.60	649.00
6	116.60	650.00

7 340.00 650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	17	270.100	674.000	250.000	340.000	674.000	250.000	0.00

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

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	230.00	656.00	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

PIER/PILE LOAD DATA HAS BEEN SUPPRESSED

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 = 8.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	40.00	608.40	240.00	628.40	3.00
2	250.00	629.40	330.00	637.40	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 = 113

Number of Trial Surfaces With Valid FS = 887

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 11.3 %

Statistical Data On All Valid FS Values:
FS Max = 4.368 FS Min = 1.966 FS Ave = 2.641
Standard Deviation = 0.430 Coefficient of Variation = 16.29 %

Critical Surface is Sequence Number 64 of Those Analyzed.

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

Factor Of Safety For The Critical or Specified Surface = 1.966

Table 1 - Geometry Data on the 80 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.06	0.89	5.06	636.31	637.21	-36.00	7.96	2.55
2	3.05	3.30	7.61	634.27	637.56	-40.39	7.96	4.00
3	3.05	6.31	10.66	631.68	637.99	-40.39	7.96	4.00
4	0.92	8.27	12.64	629.99	638.27	-40.03	7.96	1.20
5	2.60	10.00	14.40	628.52	638.51	-40.03	7.96	3.40
6	2.60	12.55	17.01	626.33	638.88	-40.03	7.96	3.40
7	3.35	15.15	19.98	624.14	639.29	-33.21	7.96	4.00
8	3.35	17.81	23.33	621.95	639.76	-33.21	7.96	4.00
9	3.60	20.05	26.80	620.20	640.25	-20.02	7.96	3.83
10	3.60	21.86	30.40	618.89	640.75	-20.02	7.96	3.83
11	0.32	22.84	32.36	618.17	641.01	-20.02	4.24	0.34
12	3.07	24.30	34.06	616.84	641.14	-39.78	4.24	4.00
13	3.07	27.09	37.13	614.28	641.37	-39.78	4.24	4.00
14	3.42	30.20	40.38	611.41	641.61	-42.90	4.24	4.67
15	2.44	33.14	43.31	608.68	641.82	-42.90	4.24	3.33
16	1.17	34.35	45.11	607.61	641.96	5.82	4.24	1.18
17	5.10	34.30	48.25	607.93	642.23	5.82	5.04	5.13
18	5.10	34.23	53.35	608.45	642.67	5.82	5.04	5.13
19	5.15	34.22	58.48	608.97	643.19	5.82	6.48	5.18
20	5.15	34.28	63.63	609.50	643.78	5.82	6.48	5.18
21	5.07	34.34	68.73	610.02	644.36	5.82	6.48	5.09
22	5.07	34.40	73.80	610.53	644.93	5.82	6.48	5.09
23	5.07	34.46	78.87	611.05	645.51	5.82	6.48	5.09
24	5.07	34.52	83.93	611.57	646.08	5.82	6.48	5.09
25	5.07	34.58	89.00	612.08	646.66	5.82	6.48	5.09
26	5.07	34.63	94.07	612.60	647.24	5.82	6.48	5.09
27	4.33	34.69	98.77	613.08	647.77	5.82	6.48	4.36
28	4.33	34.74	103.10	613.52	648.26	5.82	6.48	4.36
29	4.33	34.79	107.43	613.96	648.75	5.82	6.48	4.36
30	3.50	34.89	111.35	614.36	649.25	5.82	8.13	3.52
31	3.50	35.03	114.85	614.72	649.75	5.82	8.13	3.52
32	5.40	35.08	119.30	615.17	650.25	5.82	5.29	5.43
33	5.40	35.03	124.70	615.72	650.75	5.82	5.29	5.43
34	4.66	34.82	129.73	616.24	651.05	5.82	1.34	4.68
35	4.66	34.45	134.39	616.71	651.16	5.82	1.34	4.68
36	4.66	34.09	139.05	617.19	651.27	5.82	1.34	4.68
37	4.66	33.72	143.71	617.66	651.38	5.82	1.34	4.68
38	4.66	33.35	148.37	618.14	651.49	5.82	1.34	4.68
39	4.82	32.98	153.11	618.62	651.60	5.82	1.34	4.85
40	4.83	32.60	157.94	619.11	651.72	5.82	1.34	4.85
41	4.83	32.22	162.76	619.61	651.83	5.82	1.34	4.85
42	4.82	31.85	167.59	620.10	651.94	5.82	1.34	4.85
43	1.70	31.62	170.85	620.43	652.05	5.82	3.49	1.71
44	4.90	31.49	174.15	620.77	652.25	5.82	3.49	4.93

45	4.90	31.29	179.05	621.27	652.55	5.82	3.49	4.93
46	4.90	31.08	183.95	621.77	652.85	5.82	3.49	4.93
47	3.20	31.07	188.00	622.18	653.25	5.82	8.88	3.22
48	3.20	31.24	191.20	622.51	653.75	5.82	8.88	3.22
49	4.55	31.35	195.08	622.90	654.25	5.82	6.27	4.57
50	4.55	31.39	199.62	623.36	654.75	5.82	6.27	4.57
51	2.55	31.32	203.18	623.73	655.05	5.82	2.29	2.56
52	2.55	31.17	205.72	623.99	655.15	5.82	2.29	2.56
53	4.90	30.94	209.45	624.37	655.30	5.82	2.29	4.93
54	4.60	30.65	214.20	624.85	655.50	5.82	2.49	4.62
55	4.60	30.38	218.80	625.32	655.70	5.82	2.49	4.62
56	4.60	30.11	223.40	625.79	655.90	5.82	2.49	4.62
57	3.10	29.82	227.25	626.18	656.00	5.82	0.00	3.12
58	3.10	29.50	230.35	626.50	656.00	5.82	0.00	3.12
59	1.70	29.26	232.75	626.74	656.00	5.82	0.00	1.71
60	4.60	30.39	235.90	627.06	657.45	5.82	32.23	4.62
61	4.50	32.94	240.45	627.53	660.46	5.82	34.78	4.52
62	4.50	35.60	244.95	627.99	663.59	5.82	34.78	4.52
63	4.32	38.22	249.36	628.44	666.65	5.82	34.78	4.34
64	4.32	40.77	253.68	628.88	669.65	5.82	34.78	4.34
65	0.07	41.96	255.87	629.21	671.17	74.38	34.78	0.24
66	0.74	40.79	256.27	630.66	671.45	74.38	34.78	2.76
67	1.35	37.78	257.32	634.39	672.18	74.38	34.78	5.00
68	0.51	35.66	258.24	637.17	672.82	55.00	34.78	0.89
69	3.50	33.47	260.25	640.03	673.50	55.00	15.95	6.10
70	0.58	31.06	262.29	642.94	674.00	55.00	-0.07	1.01
71	2.79	29.21	263.97	644.79	674.00	45.80	-0.07	4.00
72	2.79	26.34	266.76	647.66	673.99	45.80	-0.07	4.00
73	0.61	24.45	268.46	649.54	673.99	56.35	-0.07	1.09
74	1.34	22.98	269.43	651.01	673.99	56.35	-0.07	2.42
75	0.90	21.30	270.55	652.69	673.99	56.35	-0.07	1.62
76	1.59	19.43	271.79	654.56	673.99	56.35	-0.07	2.87
77	4.93	15.09	275.05	658.90	673.98	51.95	-0.07	8.00
78	0.23	11.75	277.63	662.23	673.98	58.35	-0.07	0.44
79	3.97	8.34	279.73	665.64	673.98	58.35	-0.07	7.56
80	2.55	2.56	282.99	671.41	673.97	63.50	-0.07	5.71

Table 2 - Force Data On The 80 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	221.2	184.0	367.4	0.0	0.0	0.0
2	1204.9	242.5	1138.0	0.0	0.0	0.0
3	2308.2	207.5	1845.8	0.0	0.0	0.0
4	912.1	55.7	691.5	0.0	0.0	0.0
5	3123.7	140.7	2303.1	0.0	0.0	0.0
6	3920.6	115.1	2811.3	0.0	0.0	0.0
7	6085.6	111.0	3913.6	0.0	0.0	0.0
8	7153.3	69.8	4528.4	0.0	0.0	0.0
9	8656.3	30.0	4822.4	0.0	0.0	0.0
10	9439.5	0.0	5207.5	0.0	0.0	0.0
11	877.5	0.0	483.0	0.0	0.0	0.0
12	8964.5	0.0	6032.8	0.0	0.0	0.0
13	9992.6	0.0	6724.7	0.0	0.0	0.0
14	12402.6	0.0	8755.4	0.0	0.0	0.0
15	9696.9	0.0	6845.4	0.0	0.0	0.0
16	4827.2	0.0	2509.4	0.0	0.0	0.0
17	20988.6	0.0	10885.9	0.0	0.0	0.0
18	20945.8	0.0	10863.7	0.0	0.0	0.0
19	21148.0	0.0	10913.2	0.0	0.0	0.0
20	21185.0	0.0	10932.3	0.0	0.0	0.0
21	20878.4	0.0	10774.0	0.0	0.0	0.0
22	20914.2	0.0	10792.5	0.0	0.0	0.0
23	20950.0	0.0	10811.0	0.0	0.0	0.0
24	20985.9	0.0	10829.5	0.0	0.0	0.0
25	21021.7	0.0	10848.0	0.0	0.0	0.0
26	21057.5	0.0	10866.5	0.0	0.0	0.0

27	18038.2	0.0	9308.4	0.0	0.0	0.0
28	18064.4	0.0	9321.9	0.0	0.0	0.0
29	18090.6	0.0	9335.4	0.0	0.0	0.0
30	14652.3	0.0	7505.5	0.0	0.0	0.0
31	14712.4	0.0	7536.3	0.0	0.0	0.0
32	22729.1	0.0	11795.7	0.0	0.0	0.0
33	22696.3	0.0	11609.2	0.0	0.0	0.0
34	19469.7	0.0	9868.4	0.0	0.0	0.0
35	19265.1	0.0	9729.6	0.0	0.0	0.0
36	19060.6	0.0	9590.7	0.0	0.0	0.0
37	18856.1	0.0	9451.8	0.0	0.0	0.0
38	18651.5	0.0	9312.9	0.0	0.0	0.0
39	19096.4	0.0	9496.3	0.0	0.0	0.0
40	18877.2	0.0	9347.4	0.0	0.0	0.0
41	18657.9	0.0	9198.5	0.0	0.0	0.0
42	18438.6	0.0	9049.6	0.0	0.0	0.0
43	6450.8	0.0	3153.0	0.0	0.0	0.0
44	18513.9	0.0	8984.7	0.0	0.0	0.0
45	18395.8	0.0	8831.1	0.0	0.0	0.0
46	18277.7	0.0	8677.6	0.0	0.0	0.0
47	11931.2	0.0	5584.1	0.0	0.0	0.0
48	11998.0	0.0	5518.6	0.0	0.0	0.0
49	17116.9	0.0	7734.0	0.0	0.0	0.0
50	17136.6	0.0	7601.6	0.0	0.0	0.0
51	9585.4	0.0	4202.3	0.0	0.0	0.0
52	9537.0	0.0	4160.8	0.0	0.0	0.0
53	18190.3	0.0	7878.5	0.0	0.0	0.0
54	16918.6	0.0	7256.4	0.0	0.0	0.0
55	16770.1	0.0	7121.0	0.0	0.0	0.0
56	16621.6	0.0	6985.7	0.0	0.0	0.0
57	11092.7	0.0	4631.4	0.0	0.0	0.0
58	10975.1	0.0	4570.0	0.0	0.0	0.0
59	5968.7	0.0	2480.0	0.0	0.0	0.0
60	16773.6	0.0	6618.0	0.0	0.0	0.0
61	17785.4	0.0	6343.2	0.0	0.0	0.0
62	19225.4	0.0	6213.6	0.0	0.0	0.0
63	19799.3	0.0	5839.9	0.0	0.0	0.0
64	21124.9	0.0	5720.7	0.0	0.0	0.0
65	327.5	0.0	313.4	0.0	0.0	0.0
66	3637.6	0.0	3331.4	0.0	0.0	0.0
67	6101.3	0.0	4867.7	0.0	0.0	0.0
68	2187.7	0.0	713.9	0.0	0.0	0.0
69	14057.6	0.0	3796.3	0.0	0.0	0.0
70	2152.3	0.0	443.5	0.0	0.0	0.0
71	9774.0	0.0	1301.1	0.0	0.0	0.0
72	8813.2	0.0	585.3	0.0	0.0	0.0
73	1779.0	0.0	31.1	0.0	0.0	0.0
74	3693.8	0.0	0.0	0.0	0.0	0.0
75	2300.6	0.0	0.0	0.0	0.0	225.0
76	3702.2	0.0	0.0	0.0	0.0	396.9
77	8925.7	0.0	0.0	0.0	0.0	1232.7
78	323.6	0.0	0.0	0.0	0.0	57.4
79	3970.8	0.0	0.0	0.0	0.0	992.1
80	782.7	0.0	0.0	0.0	0.0	637.4

TOTAL WEIGHT OF SLIDING MASS = 1001936.20(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 554903.99(lbs)

TOTAL AREA OF SLIDING MASS = 8349.47(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 80 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	150.00	32.00	
2	1	150.00	32.00	
3	1	150.00	32.00	
4	1	150.00	32.00	
5	3	400.00	32.00	
6	3	400.00	32.00	

7	3	400.00	32.00
8	3	400.00	32.00
9	3	400.00	32.00
10	3	400.00	32.00
11	3	400.00	32.00
12	3	400.00	32.00
13	3	400.00	32.00
14	3	400.00	32.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	4	0.00	10.00
28	4	0.00	10.00
29	4	0.00	10.00
30	4	0.00	10.00
31	4	0.00	10.00
32	4	0.00	10.00
33	4	0.00	10.00
34	4	0.00	10.00
35	4	0.00	10.00
36	4	0.00	10.00
37	4	0.00	10.00
38	4	0.00	10.00
39	4	0.00	10.00
40	4	0.00	10.00
41	4	0.00	10.00
42	4	0.00	10.00
43	4	0.00	10.00
44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	4	0.00	10.00
48	4	0.00	10.00
49	4	0.00	10.00
50	4	0.00	10.00
51	4	0.00	10.00
52	4	0.00	10.00
53	4	0.00	10.00
54	4	0.00	10.00
55	4	0.00	10.00
56	4	0.00	10.00
57	4	0.00	10.00
58	4	0.00	10.00
59	4	0.00	10.00
60	4	0.00	10.00
61	4	0.00	10.00
62	4	0.00	10.00
63	4	0.00	10.00
64	4	0.00	10.00
65	4	0.00	10.00
66	4	0.00	10.00
67	3	400.00	32.00
68	3	400.00	32.00
69	3	400.00	32.00
70	3	400.00	32.00
71	3	400.00	32.00
72	3	400.00	32.00
73	3	400.00	32.00
74	3	400.00	32.00
75	3	400.00	32.00
76	3	400.00	32.00
77	3	400.00	32.00
78	3	400.00	32.00

79	1	150.00	32.00
80	1	150.00	32.00

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 80 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-36.00	5.06	2.55	145.81	241.11	123.81
1	-36.00	5.06	2.55	145.81	241.11	123.81
2	-40.39	7.61	4.00	362.30	376.39	193.28
2	-40.39	7.61	4.00	362.30	376.39	193.28
3	-40.39	10.66	4.00	605.86	528.58	271.43
3	-40.39	10.66	4.00	605.86	528.58	271.43
4	-40.03	12.64	1.20	758.81	624.16	320.51
4	-40.03	12.64	1.20	758.81	624.16	320.51
5	-40.03	14.40	3.40	1054.96	1059.21	543.91
5	-40.03	14.40	3.40	1054.96	1059.21	543.91
6	-40.03	17.01	3.40	1259.75	1187.18	609.62
6	-40.03	17.01	3.40	1259.75	1187.18	609.62
7	-33.21	19.98	4.00	1300.22	1212.47	622.61
7	-33.21	19.98	4.00	1300.22	1212.47	622.61
8	-33.21	23.33	4.00	1496.60	1335.18	685.62
8	-33.21	23.33	4.00	1496.60	1335.18	685.62
9	-20.02	26.80	3.83	1405.58	1278.30	656.41
9	-20.02	26.80	3.83	1405.58	1278.30	656.41
10	-20.02	30.40	3.83	1529.62	1355.81	696.22
10	-20.02	30.40	3.83	1529.62	1355.81	696.22
11	-20.02	32.36	0.34	1597.67	1398.34	718.05
11	-20.02	32.36	0.34	1597.67	1398.34	718.05
12	-39.78	34.06	4.00	2205.39	1778.08	913.05
12	-39.78	34.06	4.00	2205.39	1778.08	913.05
13	-39.78	37.13	4.00	2429.74	1918.27	985.04
13	-39.78	37.13	4.00	2429.74	1918.27	985.04
14	-42.90	40.38	4.67	2836.91	2172.70	1115.69
14	-42.90	40.38	4.67	2836.91	2172.70	1115.69
15	-42.90	43.31	3.33	2105.93	371.33	190.68
15	-42.90	43.31	3.33	2105.93	371.33	190.68
16	5.82	45.11	1.18	1970.97	347.54	178.46
16	5.82	45.11	1.18	1970.97	347.54	178.46
17	5.82	48.25	5.13	1972.83	347.86	178.63
17	5.82	48.25	5.13	1972.83	347.86	178.63
18	5.82	53.35	5.13	1968.80	347.15	178.27
18	5.82	53.35	5.13	1968.80	347.15	178.27
19	5.82	58.48	5.18	1979.12	348.97	179.20
19	5.82	58.48	5.18	1979.12	348.97	179.20
20	5.82	63.63	5.18	1982.58	349.58	179.51
20	5.82	63.63	5.18	1982.58	349.58	179.51
21	5.82	68.73	5.09	1986.02	350.19	179.82
21	5.82	68.73	5.09	1986.02	350.19	179.82
22	5.82	73.80	5.09	1989.43	350.79	180.13
22	5.82	73.80	5.09	1989.43	350.79	180.13
23	5.82	78.87	5.09	1992.84	351.39	180.44
23	5.82	78.87	5.09	1992.84	351.39	180.44
24	5.82	83.93	5.09	1996.24	351.99	180.75
24	5.82	83.93	5.09	1996.24	351.99	180.75
25	5.82	89.00	5.09	1999.65	352.59	181.06
25	5.82	89.00	5.09	1999.65	352.59	181.06
26	5.82	94.07	5.09	2003.06	353.19	181.37
26	5.82	94.07	5.09	2003.06	353.19	181.37
27	5.82	98.77	4.36	2006.22	353.75	181.65
27	5.82	98.77	4.36	2006.22	353.75	181.65
28	5.82	103.10	4.36	2009.14	354.27	181.92

28	5.82	103.10	4.36	2009.14	354.27	181.92
29	5.82	107.43	4.36	2012.05	354.78	182.18
29	5.82	107.43	4.36	2012.05	354.78	182.18
30	5.82	111.35	3.52	2033.30	358.53	184.11
30	5.82	111.35	3.52	2033.30	358.53	184.11
31	5.82	114.85	3.52	2041.65	360.00	184.86
31	5.82	114.85	3.52	2041.65	360.00	184.86
32	5.82	119.30	5.43	2016.44	355.55	182.58
32	5.82	119.30	5.43	2016.44	355.55	182.58
33	5.82	124.70	5.43	2044.45	360.49	185.11
33	5.82	124.70	5.43	2044.45	360.49	185.11
34	5.82	129.73	4.68	2051.41	361.72	185.74
34	5.82	129.73	4.68	2051.41	361.72	185.74
35	5.82	134.39	4.68	2037.30	359.23	184.47
35	5.82	134.39	4.68	2037.30	359.23	184.47
36	5.82	139.05	4.68	2023.20	356.74	183.19
36	5.82	139.05	4.68	2023.20	356.74	183.19
37	5.82	143.71	4.68	2009.09	354.26	181.91
37	5.82	143.71	4.68	2009.09	354.26	181.91
38	5.82	148.37	4.68	1994.99	351.77	180.64
38	5.82	148.37	4.68	1994.99	351.77	180.64
39	5.82	153.11	4.85	1980.64	349.24	179.34
39	5.82	153.11	4.85	1980.64	349.24	179.34
40	5.82	157.94	4.85	1966.03	346.66	178.01
40	5.82	157.94	4.85	1966.03	346.66	178.01
41	5.82	162.76	4.85	1951.43	344.09	176.69
41	5.82	162.76	4.85	1951.43	344.09	176.69
42	5.82	167.59	4.85	1936.82	341.51	175.37
42	5.82	167.59	4.85	1936.82	341.51	175.37
43	5.82	170.85	1.71	1930.74	340.44	174.82
43	5.82	170.85	1.71	1930.74	340.44	174.82
44	5.82	174.15	4.93	1935.46	341.27	175.25
44	5.82	174.15	4.93	1935.46	341.27	175.25
45	5.82	179.05	4.93	1942.46	342.51	175.88
45	5.82	179.05	4.93	1942.46	342.51	175.88
46	5.82	183.95	4.93	1949.47	343.74	176.51
46	5.82	183.95	4.93	1949.47	343.74	176.51
47	5.82	188.00	3.22	1973.38	347.96	178.68
47	5.82	188.00	3.22	1973.38	347.96	178.68
48	5.82	191.20	3.22	2014.19	355.16	182.37
48	5.82	191.20	3.22	2014.19	355.16	182.37
49	5.82	195.08	4.57	2051.08	361.66	185.71
49	5.82	195.08	4.57	2051.08	361.66	185.71
50	5.82	199.62	4.57	2084.04	367.47	188.70
50	5.82	199.62	4.57	2084.04	367.47	188.70
51	5.82	203.18	2.56	2099.16	370.14	190.07
51	5.82	203.18	2.56	2099.16	370.14	190.07
52	5.82	205.72	2.56	2096.45	369.66	189.82
52	5.82	205.72	2.56	2096.45	369.66	189.82
53	5.82	209.45	4.93	2092.49	368.96	189.46
53	5.82	209.45	4.93	2092.49	368.96	189.46
54	5.82	214.20	4.62	2088.40	368.24	189.09
54	5.82	214.20	4.62	2088.40	368.24	189.09
55	5.82	218.80	4.62	2085.41	367.71	188.82
55	5.82	218.80	4.62	2085.41	367.71	188.82
56	5.82	223.40	4.62	2082.42	367.19	188.55
56	5.82	223.40	4.62	2082.42	367.19	188.55
57	5.82	227.25	3.12	2071.91	365.33	187.60
57	5.82	227.25	3.12	2071.91	365.33	187.60
58	5.82	230.35	3.12	2053.88	362.15	185.97
58	5.82	230.35	3.12	2053.88	362.15	185.97
59	5.82	232.75	1.71	2039.92	359.69	184.70
59	5.82	232.75	1.71	2039.92	359.69	184.70
60	5.82	235.90	4.62	2193.93	386.85	198.65
60	5.82	235.90	4.62	2193.93	386.85	198.65
61	5.82	240.45	4.52	2525.53	445.32	228.67
61	5.82	240.45	4.52	2525.53	445.32	228.67
62	5.82	244.95	4.52	2870.84	506.21	259.94
62	5.82	244.95	4.52	2870.84	506.21	259.94
63	5.82	249.36	4.34	3209.14	565.86	290.57
63	5.82	249.36	4.34	3209.14	565.86	290.57
64	5.82	253.68	4.34	3540.43	624.27	320.57

64	5.82	253.68	4.34	3540.43	624.27	320.57
65	74.38	255.87	0.24	2790.19	491.99	252.64
65	74.38	255.87	0.24	2790.19	491.99	252.64
66	74.38	256.27	2.76	2753.18	485.46	249.29
66	74.38	256.27	2.76	2753.18	485.46	249.29
67	74.38	257.32	5.00	1265.86	1191.00	611.58
67	74.38	257.32	5.00	1265.86	1191.00	611.58
68	55.00	258.24	0.89	2141.32	1738.05	892.50
68	55.00	258.24	0.89	2141.32	1738.05	892.50
69	55.00	260.25	6.10	2084.81	1702.73	874.36
69	55.00	260.25	6.10	2084.81	1702.73	874.36
70	55.00	262.29	1.01	2012.04	1657.26	851.01
70	55.00	262.29	1.01	2012.04	1657.26	851.01
71	45.80	263.97	4.00	2197.77	1773.32	910.61
71	45.80	263.97	4.00	2197.77	1773.32	910.61
72	45.80	266.76	4.00	2074.73	1696.44	871.13
72	45.80	266.76	4.00	2074.73	1696.44	871.13
73	56.35	268.46	1.09	1714.89	1471.58	755.66
73	56.35	268.46	1.09	1714.89	1471.58	755.66
74	56.35	269.43	2.42	1617.19	1410.53	724.32
74	56.35	269.43	2.42	1617.19	1410.53	724.32
75	56.35	270.55	1.62	1649.08	1430.46	734.55
75	56.35	270.55	1.62	1649.08	1430.46	734.55
76	56.35	271.79	2.87	1500.03	1337.32	686.72
76	56.35	271.79	2.87	1500.03	1337.32	686.72
77	51.95	275.05	8.00	1248.29	1180.02	605.95
77	51.95	275.05	8.00	1248.29	1180.02	605.95
78	58.35	277.63	0.44	847.46	929.55	477.33
78	58.35	277.63	0.44	847.46	929.55	477.33
79	58.35	279.73	7.56	724.21	602.54	309.41
79	58.35	279.73	7.56	724.21	602.54	309.41
80	63.50	282.99	5.71	235.83	297.36	152.70
80	63.50	282.99	5.71	235.83	297.36	152.70

Table 4 - Base Force Data on the 80 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-36.00	5.06	2.55	371.79	614.78	315.69
1	-36.00	5.06	2.55	371.79	614.78	315.69
2	-40.39	7.61	4.00	1449.22	1505.57	773.12
2	-40.39	7.61	4.00	1449.22	1505.57	773.12
3	-40.39	10.66	4.00	2423.44	2114.34	1085.72
3	-40.39	10.66	4.00	2423.44	2114.34	1085.72
4	-40.03	12.64	1.20	910.48	748.91	384.57
4	-40.03	12.64	1.20	910.48	748.91	384.57
5	-40.03	14.40	3.40	3586.93	3601.39	1849.33
5	-40.03	14.40	3.40	3586.93	3601.39	1849.33
6	-40.03	17.01	3.40	4283.23	4036.48	2072.76
6	-40.03	17.01	3.40	4283.23	4036.48	2072.76
7	-33.21	19.98	4.00	5200.88	4849.87	2490.43
7	-33.21	19.98	4.00	5200.88	4849.87	2490.43
8	-33.21	23.33	4.00	5986.42	5340.73	2742.49
8	-33.21	23.33	4.00	5986.42	5340.73	2742.49
9	-20.02	26.80	3.83	5382.80	4895.39	2513.81
9	-20.02	26.80	3.83	5382.80	4895.39	2513.81
10	-20.02	30.40	3.83	5857.85	5192.23	2666.24
10	-20.02	30.40	3.83	5857.85	5192.23	2666.24
11	-20.02	32.36	0.34	544.47	476.54	244.70
11	-20.02	32.36	0.34	544.47	476.54	244.70
12	-39.78	34.06	4.00	8821.54	7112.31	3652.21
12	-39.78	34.06	4.00	8821.54	7112.31	3652.21
13	-39.78	37.13	4.00	9718.95	7673.07	3940.16
13	-39.78	37.13	4.00	9718.95	7673.07	3940.16
14	-42.90	40.38	4.67	13252.77	10149.87	5212.01
14	-42.90	40.38	4.67	13252.77	10149.87	5212.01
15	-42.90	43.31	3.33	7009.46	1235.96	634.67
15	-42.90	43.31	3.33	7009.46	1235.96	634.67

16	5.82	45.11	1.18	2320.35	409.14	210.10
16	5.82	45.11	1.18	2320.35	409.14	210.10
17	5.82	48.25	5.13	10113.60	1783.30	915.73
17	5.82	48.25	5.13	10113.60	1783.30	915.73
18	5.82	53.35	5.13	10092.96	1779.66	913.87
18	5.82	53.35	5.13	10092.96	1779.66	913.87
19	5.82	58.48	5.18	10245.30	1806.52	927.66
19	5.82	58.48	5.18	10245.30	1806.52	927.66
20	5.82	63.63	5.18	10263.23	1809.68	929.28
20	5.82	63.63	5.18	10263.23	1809.68	929.28
21	5.82	68.73	5.09	10114.66	1783.49	915.83
21	5.82	68.73	5.09	10114.66	1783.49	915.83
22	5.82	73.80	5.09	10132.02	1786.55	917.40
22	5.82	73.80	5.09	10132.02	1786.55	917.40
23	5.82	78.87	5.09	10149.38	1789.61	918.97
23	5.82	78.87	5.09	10149.38	1789.61	918.97
24	5.82	83.93	5.09	10166.74	1792.67	920.55
24	5.82	83.93	5.09	10166.74	1792.67	920.55
25	5.82	89.00	5.09	10184.10	1795.73	922.12
25	5.82	89.00	5.09	10184.10	1795.73	922.12
26	5.82	94.07	5.09	10201.46	1798.79	923.69
26	5.82	94.07	5.09	10201.46	1798.79	923.69
27	5.82	98.77	4.36	8738.71	1540.87	791.24
27	5.82	98.77	4.36	8738.71	1540.87	791.24
28	5.82	103.10	4.36	8751.41	1543.11	792.39
28	5.82	103.10	4.36	8751.41	1543.11	792.39
29	5.82	107.43	4.36	8764.10	1545.35	793.54
29	5.82	107.43	4.36	8764.10	1545.35	793.54
30	5.82	111.35	3.52	7153.46	1261.35	647.71
30	5.82	111.35	3.52	7153.46	1261.35	647.71
31	5.82	114.85	3.52	7182.81	1266.52	650.37
31	5.82	114.85	3.52	7182.81	1266.52	650.37
32	5.82	119.30	5.43	10945.23	1929.94	991.03
32	5.82	119.30	5.43	10945.23	1929.94	991.03
33	5.82	124.70	5.43	11097.29	1956.75	1004.80
33	5.82	124.70	5.43	11097.29	1956.75	1004.80
34	5.82	129.73	4.68	9609.13	1694.35	870.06
34	5.82	129.73	4.68	9609.13	1694.35	870.06
35	5.82	134.39	4.68	9543.06	1682.70	864.07
35	5.82	134.39	4.68	9543.06	1682.70	864.07
36	5.82	139.05	4.68	9476.99	1671.05	858.09
36	5.82	139.05	4.68	9476.99	1671.05	858.09
37	5.82	143.71	4.68	9410.92	1659.40	852.11
37	5.82	143.71	4.68	9410.92	1659.40	852.11
38	5.82	148.37	4.68	9344.85	1647.75	846.13
38	5.82	148.37	4.68	9344.85	1647.75	846.13
39	5.82	153.11	4.85	9606.11	1693.82	869.78
39	5.82	153.11	4.85	9606.11	1693.82	869.78
40	5.82	157.94	4.85	9535.28	1681.33	863.37
40	5.82	157.94	4.85	9535.28	1681.33	863.37
41	5.82	162.76	4.85	9464.45	1668.84	856.96
41	5.82	162.76	4.85	9464.45	1668.84	856.96
42	5.82	167.59	4.85	9393.62	1656.35	850.54
42	5.82	167.59	4.85	9393.62	1656.35	850.54
43	5.82	170.85	1.71	3299.27	581.75	298.73
43	5.82	170.85	1.71	3299.27	581.75	298.73
44	5.82	174.15	4.93	9532.90	1680.91	863.15
44	5.82	174.15	4.93	9532.90	1680.91	863.15
45	5.82	179.05	4.93	9567.42	1686.99	866.28
45	5.82	179.05	4.93	9567.42	1686.99	866.28
46	5.82	183.95	4.93	9601.94	1693.08	869.41
46	5.82	183.95	4.93	9601.94	1693.08	869.41
47	5.82	188.00	3.22	6347.56	1119.25	574.74
47	5.82	188.00	3.22	6347.56	1119.25	574.74
48	5.82	191.20	3.22	6478.83	1142.39	586.62
48	5.82	191.20	3.22	6478.83	1142.39	586.62
49	5.82	195.08	4.57	9380.79	1654.09	849.38
49	5.82	195.08	4.57	9380.79	1654.09	849.38
50	5.82	199.62	4.57	9531.53	1680.67	863.03
50	5.82	199.62	4.57	9531.53	1680.67	863.03
51	5.82	203.18	2.56	5380.61	948.75	487.19
51	5.82	203.18	2.56	5380.61	948.75	487.19

52	5.82	205.72	2.56	5373.67	947.52	486.56
52	5.82	205.72	2.56	5373.67	947.52	486.56
53	5.82	209.45	4.93	10306.37	1817.29	933.19
53	5.82	209.45	4.93	10306.37	1817.29	933.19
54	5.82	214.20	4.62	9656.42	1702.69	874.34
54	5.82	214.20	4.62	9656.42	1702.69	874.34
55	5.82	218.80	4.62	9642.61	1700.25	873.09
55	5.82	218.80	4.62	9642.61	1700.25	873.09
56	5.82	223.40	4.62	9628.80	1697.82	871.84
56	5.82	223.40	4.62	9628.80	1697.82	871.84
57	5.82	227.25	3.12	6456.23	1138.41	584.58
57	5.82	227.25	3.12	6456.23	1138.41	584.58
58	5.82	230.35	3.12	6400.04	1128.50	579.49
58	5.82	230.35	3.12	6400.04	1128.50	579.49
59	5.82	232.75	1.71	3485.84	614.65	315.63
59	5.82	232.75	1.71	3485.84	614.65	315.63
60	5.82	235.90	4.62	10144.40	1788.73	918.52
60	5.82	235.90	4.62	10144.40	1788.73	918.52
61	5.82	240.45	4.52	11423.82	2014.33	1034.37
61	5.82	240.45	4.52	11423.82	2014.33	1034.37
62	5.82	244.95	4.52	12985.74	2289.74	1175.79
62	5.82	244.95	4.52	12985.74	2289.74	1175.79
63	5.82	249.36	4.34	13927.21	2455.74	1261.04
63	5.82	249.36	4.34	13927.21	2455.74	1261.04
64	5.82	253.68	4.34	15365.00	2709.26	1391.22
64	5.82	253.68	4.34	15365.00	2709.26	1391.22
65	74.38	255.87	0.24	674.06	118.86	61.03
65	74.38	255.87	0.24	674.06	118.86	61.03
66	74.38	256.27	2.76	7598.99	1339.91	688.05
66	74.38	256.27	2.76	7598.99	1339.91	688.05
67	74.38	257.32	5.00	6327.21	5953.01	3056.90
67	74.38	257.32	5.00	6327.21	5953.01	3056.90
68	55.00	258.24	0.89	1908.67	1549.21	795.53
68	55.00	258.24	0.89	1908.67	1549.21	795.53
69	55.00	260.25	6.10	12721.24	10389.86	5335.25
69	55.00	260.25	6.10	12721.24	10389.86	5335.25
70	55.00	262.29	1.01	2025.68	1668.50	856.78
70	55.00	262.29	1.01	2025.68	1668.50	856.78
71	45.80	263.97	4.00	8791.08	7093.28	3642.43
71	45.80	263.97	4.00	8791.08	7093.28	3642.43
72	45.80	266.76	4.00	8298.93	6785.75	3484.52
72	45.80	266.76	4.00	8298.93	6785.75	3484.52
73	56.35	268.46	1.09	1876.59	1610.34	826.92
73	56.35	268.46	1.09	1876.59	1610.34	826.92
74	56.35	269.43	2.42	3908.19	3408.77	1750.42
74	56.35	269.43	2.42	3908.19	3408.77	1750.42
75	56.35	270.55	1.62	2678.19	2323.14	1192.94
75	56.35	270.55	1.62	2678.19	2323.14	1192.94
76	56.35	271.79	2.87	4297.59	3831.44	1967.46
76	56.35	271.79	2.87	4297.59	3831.44	1967.46
77	51.95	275.05	8.00	9986.36	9440.17	4847.58
77	51.95	275.05	8.00	9986.36	9440.17	4847.58
78	58.35	277.63	0.44	370.73	406.64	208.81
78	58.35	277.63	0.44	370.73	406.64	208.81
79	58.35	279.73	7.56	5476.85	4556.70	2339.89
79	58.35	279.73	7.56	5476.85	4556.70	2339.89
80	63.50	282.99	5.71	1347.45	1699.04	872.46
80	63.50	282.99	5.71	1347.45	1699.04	872.46

Sum of the Resisting Forces = 160903.11 (lbs)

Average Available Shear Strength = 508.12(psf)

Sum of the Driving Forces = 86684.11 (lbs)

Average Mobilized Shear Stress = 273.74(psf)

Total length of the failure surface = 316.67(ft)

Factor of Safety Balance Check: FS = 1.85620

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Janbu's Correction Factor (fo) =  1.0591

Janub's FS Corrected =  1.96593

                    **** END OF GEOSTASE OUTPUT ****
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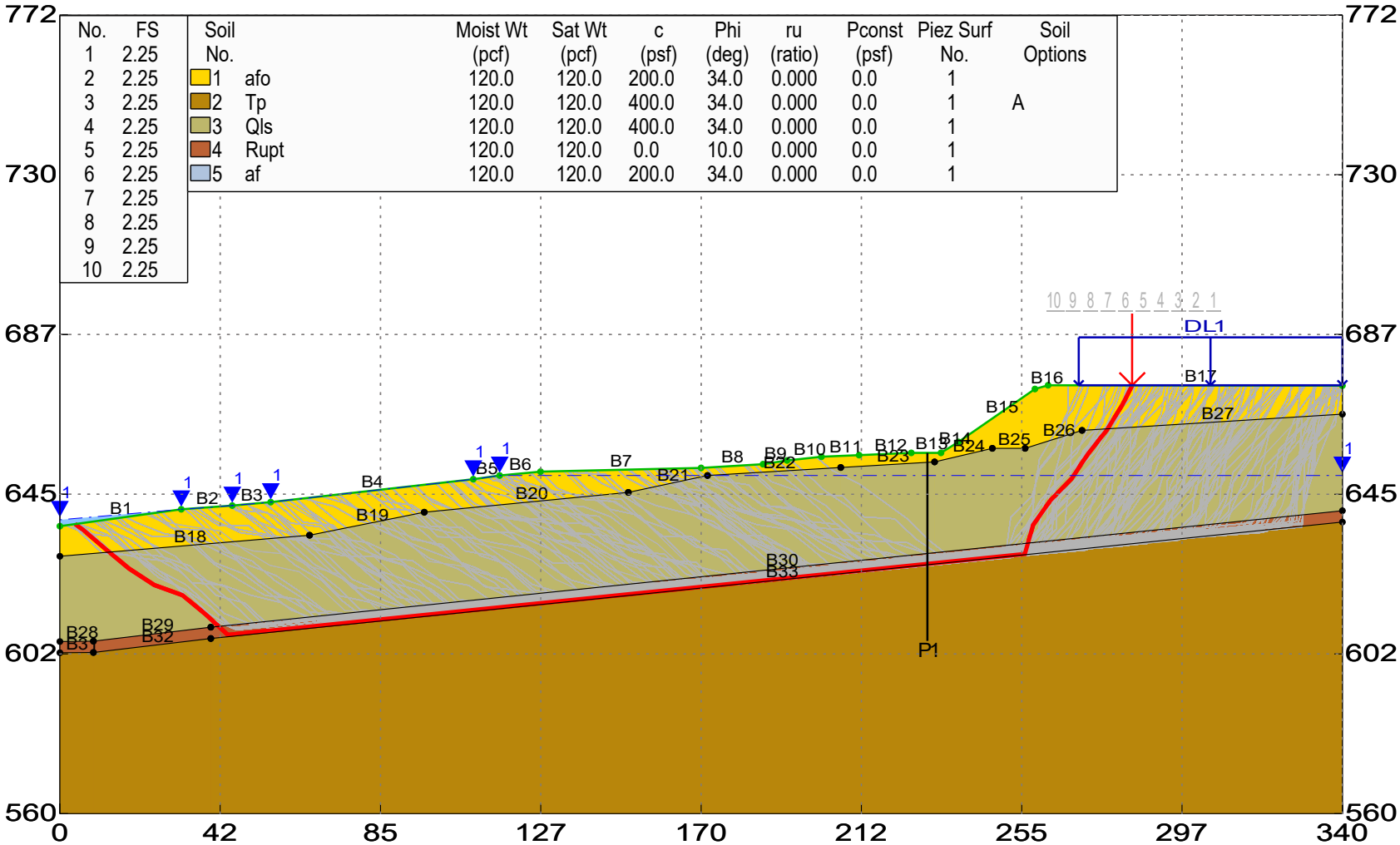
Royal Vista - Cross Section 8
Stage 2 (Existing Condition - Shear Pin)

LGC Geotechnical / BPP

\Sec 8 - Stage 2 (Existing Condition - Shear Pin).gsd

No.	FS
1	2.25
2	2.25
3	2.25
4	2.25
5	2.25
6	2.25
7	2.25
8	2.25
9	2.25
10	2.25

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 2.25

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 2 (Existing Condition - Shear Pin).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 2 (Existing Condition - Shear Pin).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 8

DESCRIPTION: Stage 2 (Existing Condition - Shear Pin)

BOUNDARY DATA

17 Surface Boundaries
33 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	636.500	32.200	641.000	1
2	32.200	641.000	45.700	642.000	1
3	45.700	642.000	55.900	642.900	1
4	55.900	642.900	109.600	649.000	1
5	109.600	649.000	116.600	650.000	1
6	116.600	650.000	127.400	651.000	1
7	127.400	651.000	170.000	652.000	1
8	170.000	652.000	186.400	653.000	1
9	186.400	653.000	192.800	654.000	1
10	192.800	654.000	201.900	655.000	1
11	201.900	655.000	211.900	655.400	1
12	211.900	655.400	225.700	656.000	1
13	225.700	656.000	233.600	656.000	1
14	233.600	656.000	238.200	658.900	1
15	238.200	658.900	258.500	673.000	1
16	258.500	673.000	262.000	674.000	1
17	262.000	674.000	340.000	673.900	1
18	0.000	628.500	66.200	634.100	3
19	66.200	634.100	96.600	640.200	3
20	96.600	640.200	150.700	645.500	3
21	150.700	645.500	171.700	650.000	3
22	171.700	650.000	207.000	652.100	3
23	207.000	652.100	231.900	653.600	3
24	231.900	653.600	247.200	657.200	3
25	247.200	657.200	255.900	657.200	3
26	255.900	657.200	271.000	662.000	3

27	271.000	662.000	340.000	666.300	3
28	0.000	605.800	8.900	605.900	4
29	8.900	605.900	40.000	609.600	4
30	40.000	609.600	340.000	640.600	4
31	0.000	602.800	8.900	602.900	2
32	8.900	602.900	40.000	606.600	2
33	40.000	606.600	340.000	637.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 7 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	638.20
2	32.20	641.00
3	45.70	642.00
4	55.90	642.90
5	109.60	649.00
6	116.60	650.00

7 340.00 650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	17	270.100	674.000	250.000	340.000	674.000	250.000	0.00

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

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	230.00	656.00	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 8.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	40.00	608.40	240.00	628.40	3.00
2	250.00	629.40	330.00	637.40	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 = 144

Number of Trial Surfaces With Valid FS = 856

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 14.4 %

Statistical Data On All Valid FS Values:
FS Max = 5.707 FS Min = 2.253 FS Ave = 3.148
Standard Deviation = 0.607 Coefficient of Variation = 19.28 %

Critical Surface is Sequence Number 64 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	230.00	626.46

Factor Of Safety For The Critical or Specified Surface = 2.253

Table 1 - Geometry Data on the 80 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.06	0.89	5.06	636.31	637.21	-36.00	7.96	2.55
2	3.05	3.30	7.61	634.27	637.56	-40.39	7.96	4.00
3	3.05	6.31	10.66	631.68	637.99	-40.39	7.96	4.00
4	0.92	8.27	12.64	629.99	638.27	-40.03	7.96	1.20
5	2.60	10.00	14.40	628.52	638.51	-40.03	7.96	3.40
6	2.60	12.55	17.01	626.33	638.88	-40.03	7.96	3.40
7	3.35	15.15	19.98	624.14	639.29	-33.21	7.96	4.00
8	3.35	17.81	23.33	621.95	639.76	-33.21	7.96	4.00
9	3.60	20.05	26.80	620.20	640.25	-20.02	7.96	3.83
10	3.60	21.86	30.40	618.89	640.75	-20.02	7.96	3.83
11	0.32	22.84	32.36	618.17	641.01	-20.02	4.24	0.34
12	3.07	24.30	34.06	616.84	641.14	-39.78	4.24	4.00
13	3.07	27.09	37.13	614.28	641.37	-39.78	4.24	4.00
14	3.42	30.20	40.38	611.41	641.61	-42.90	4.24	4.67
15	2.44	33.14	43.31	608.68	641.82	-42.90	4.24	3.33
16	1.17	34.35	45.11	607.61	641.96	5.82	4.24	1.18
17	5.10	34.30	48.25	607.93	642.23	5.82	5.04	5.13
18	5.10	34.23	53.35	608.45	642.67	5.82	5.04	5.13
19	5.15	34.22	58.48	608.97	643.19	5.82	6.48	5.18
20	5.15	34.28	63.63	609.50	643.78	5.82	6.48	5.18
21	5.07	34.34	68.73	610.02	644.36	5.82	6.48	5.09
22	5.07	34.40	73.80	610.53	644.93	5.82	6.48	5.09
23	5.07	34.46	78.87	611.05	645.51	5.82	6.48	5.09
24	5.07	34.52	83.93	611.57	646.08	5.82	6.48	5.09
25	5.07	34.58	89.00	612.08	646.66	5.82	6.48	5.09
26	5.07	34.63	94.07	612.60	647.24	5.82	6.48	5.09
27	4.33	34.69	98.77	613.08	647.77	5.82	6.48	4.36
28	4.33	34.74	103.10	613.52	648.26	5.82	6.48	4.36
29	4.33	34.79	107.43	613.96	648.75	5.82	6.48	4.36
30	3.50	34.89	111.35	614.36	649.25	5.82	8.13	3.52
31	3.50	35.03	114.85	614.72	649.75	5.82	8.13	3.52
32	5.40	35.08	119.30	615.17	650.25	5.82	5.29	5.43
33	5.40	35.03	124.70	615.72	650.75	5.82	5.29	5.43
34	4.66	34.82	129.73	616.24	651.05	5.82	1.34	4.68
35	4.66	34.45	134.39	616.71	651.16	5.82	1.34	4.68
36	4.66	34.09	139.05	617.19	651.27	5.82	1.34	4.68
37	4.66	33.72	143.71	617.66	651.38	5.82	1.34	4.68
38	4.66	33.35	148.37	618.14	651.49	5.82	1.34	4.68
39	4.82	32.98	153.11	618.62	651.60	5.82	1.34	4.85
40	4.83	32.60	157.94	619.11	651.72	5.82	1.34	4.85
41	4.83	32.22	162.76	619.61	651.83	5.82	1.34	4.85

42	4.82	31.85	167.59	620.10	651.94	5.82	1.34	4.85
43	1.70	31.62	170.85	620.43	652.05	5.82	3.49	1.71
44	4.90	31.49	174.15	620.77	652.25	5.82	3.49	4.93
45	4.90	31.29	179.05	621.27	652.55	5.82	3.49	4.93
46	4.90	31.08	183.95	621.77	652.85	5.82	3.49	4.93
47	3.20	31.07	188.00	622.18	653.25	5.82	8.88	3.22
48	3.20	31.24	191.20	622.51	653.75	5.82	8.88	3.22
49	4.55	31.35	195.08	622.90	654.25	5.82	6.27	4.57
50	4.55	31.39	199.62	623.36	654.75	5.82	6.27	4.57
51	2.55	31.32	203.18	623.73	655.05	5.82	2.29	2.56
52	2.55	31.17	205.72	623.99	655.15	5.82	2.29	2.56
53	4.90	30.94	209.45	624.37	655.30	5.82	2.29	4.93
54	4.60	30.65	214.20	624.85	655.50	5.82	2.49	4.62
55	4.60	30.38	218.80	625.32	655.70	5.82	2.49	4.62
56	4.60	30.11	223.40	625.79	655.90	5.82	2.49	4.62
57	3.10	29.82	227.25	626.18	656.00	5.82	0.00	3.12
58	3.10	29.50	230.35	626.50	656.00	5.82	0.00	3.12
59	1.70	29.26	232.75	626.74	656.00	5.82	0.00	1.71
60	4.60	30.39	235.90	627.06	657.45	5.82	32.23	4.62
61	4.50	32.94	240.45	627.53	660.46	5.82	34.78	4.52
62	4.50	35.60	244.95	627.99	663.59	5.82	34.78	4.52
63	4.32	38.22	249.36	628.44	666.65	5.82	34.78	4.34
64	4.32	40.77	253.68	628.88	669.65	5.82	34.78	4.34
65	0.07	41.96	255.87	629.21	671.17	74.38	34.78	0.24
66	0.74	40.79	256.27	630.66	671.45	74.38	34.78	2.76
67	1.35	37.78	257.32	634.39	672.18	74.38	34.78	5.00
68	0.51	35.66	258.24	637.17	672.82	55.00	34.78	0.89
69	3.50	33.47	260.25	640.03	673.50	55.00	15.95	6.10
70	0.58	31.06	262.29	642.94	674.00	55.00	-0.07	1.01
71	2.79	29.21	263.97	644.79	674.00	45.80	-0.07	4.00
72	2.79	26.34	266.76	647.66	673.99	45.80	-0.07	4.00
73	0.61	24.45	268.46	649.54	673.99	56.35	-0.07	1.09
74	1.34	22.98	269.43	651.01	673.99	56.35	-0.07	2.42
75	0.90	21.30	270.55	652.69	673.99	56.35	-0.07	1.62
76	1.59	19.43	271.79	654.56	673.99	56.35	-0.07	2.87
77	4.93	15.09	275.05	658.90	673.98	51.95	-0.07	8.00
78	0.23	11.75	277.63	662.23	673.98	58.35	-0.07	0.44
79	3.97	8.34	279.73	665.64	673.98	58.35	-0.07	7.56
80	2.55	2.56	282.99	671.41	673.97	63.50	-0.07	5.71

Table 2 - Force Data On The 80 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	221.2	184.0	367.4	0.0	0.0	0.0
2	1204.9	242.5	1138.0	0.0	0.0	0.0
3	2308.2	207.5	1845.8	0.0	0.0	0.0
4	912.1	55.7	691.5	0.0	0.0	0.0
5	3123.7	140.7	2303.1	0.0	0.0	0.0
6	3920.6	115.1	2811.3	0.0	0.0	0.0
7	6085.6	111.0	3913.6	0.0	0.0	0.0
8	7153.3	69.8	4528.4	0.0	0.0	0.0
9	8656.3	30.0	4822.4	0.0	0.0	0.0
10	9439.5	0.0	5207.5	0.0	0.0	0.0
11	877.5	0.0	483.0	0.0	0.0	0.0
12	8964.5	0.0	6032.8	0.0	0.0	0.0
13	9992.6	0.0	6724.7	0.0	0.0	0.0
14	12402.6	0.0	8755.4	0.0	0.0	0.0
15	9696.9	0.0	6845.4	0.0	0.0	0.0
16	4827.2	0.0	2509.4	0.0	0.0	0.0
17	20988.6	0.0	10885.9	0.0	0.0	0.0
18	20945.8	0.0	10863.7	0.0	0.0	0.0
19	21148.0	0.0	10913.2	0.0	0.0	0.0
20	21185.0	0.0	10932.3	0.0	0.0	0.0
21	20878.4	0.0	10774.0	0.0	0.0	0.0
22	20914.2	0.0	10792.5	0.0	0.0	0.0
23	20950.0	0.0	10811.0	0.0	0.0	0.0

24	20985.9	0.0	10829.5	0.0	0.0	0.0
25	21021.7	0.0	10848.0	0.0	0.0	0.0
26	21057.5	0.0	10866.5	0.0	0.0	0.0
27	18038.2	0.0	9308.4	0.0	0.0	0.0
28	18064.4	0.0	9321.9	0.0	0.0	0.0
29	18090.6	0.0	9335.4	0.0	0.0	0.0
30	14652.3	0.0	7505.5	0.0	0.0	0.0
31	14712.4	0.0	7536.3	0.0	0.0	0.0
32	22729.1	0.0	11795.7	0.0	0.0	0.0
33	22696.3	0.0	11609.2	0.0	0.0	0.0
34	19469.7	0.0	9868.4	0.0	0.0	0.0
35	19265.1	0.0	9729.6	0.0	0.0	0.0
36	19060.6	0.0	9590.7	0.0	0.0	0.0
37	18856.1	0.0	9451.8	0.0	0.0	0.0
38	18651.5	0.0	9312.9	0.0	0.0	0.0
39	19096.4	0.0	9496.3	0.0	0.0	0.0
40	18877.2	0.0	9347.4	0.0	0.0	0.0
41	18657.9	0.0	9198.5	0.0	0.0	0.0
42	18438.6	0.0	9049.6	0.0	0.0	0.0
43	6450.8	0.0	3153.0	0.0	0.0	0.0
44	18513.9	0.0	8984.7	0.0	0.0	0.0
45	18395.8	0.0	8831.1	0.0	0.0	0.0
46	18277.7	0.0	8677.6	0.0	0.0	0.0
47	11931.2	0.0	5584.1	0.0	0.0	0.0
48	11998.0	0.0	5518.6	0.0	0.0	0.0
49	17116.9	0.0	7734.0	0.0	0.0	0.0
50	17136.6	0.0	7601.6	0.0	0.0	0.0
51	9585.4	0.0	4202.3	0.0	0.0	0.0
52	9537.0	0.0	4160.8	0.0	0.0	0.0
53	18190.3	0.0	7878.5	0.0	0.0	0.0
54	16918.6	0.0	7256.4	0.0	0.0	0.0
55	16770.1	0.0	7121.0	0.0	0.0	0.0
56	16621.6	0.0	6985.7	0.0	0.0	0.0
57	11092.7	0.0	4631.4	0.0	0.0	0.0
58	10975.1	0.0	4570.0	0.0	0.0	0.0
59	5968.7	0.0	2480.0	0.0	0.0	0.0
60	16773.6	0.0	6618.0	0.0	0.0	0.0
61	17785.4	0.0	6343.2	0.0	0.0	0.0
62	19225.4	0.0	6213.6	0.0	0.0	0.0
63	19799.3	0.0	5839.9	0.0	0.0	0.0
64	21124.9	0.0	5720.7	0.0	0.0	0.0
65	327.5	0.0	313.4	0.0	0.0	0.0
66	3637.6	0.0	3331.4	0.0	0.0	0.0
67	6101.3	0.0	4867.7	0.0	0.0	0.0
68	2187.7	0.0	713.9	0.0	0.0	0.0
69	14057.6	0.0	3796.3	0.0	0.0	0.0
70	2152.3	0.0	443.5	0.0	0.0	0.0
71	9774.0	0.0	1301.1	0.0	0.0	0.0
72	8813.2	0.0	585.3	0.0	0.0	0.0
73	1779.0	0.0	31.1	0.0	0.0	0.0
74	3693.8	0.0	0.0	0.0	0.0	0.0
75	2300.6	0.0	0.0	0.0	0.0	225.0
76	3702.2	0.0	0.0	0.0	0.0	396.9
77	8925.7	0.0	0.0	0.0	0.0	1232.7
78	323.6	0.0	0.0	0.0	0.0	57.4
79	3970.8	0.0	0.0	0.0	0.0	992.1
80	782.7	0.0	0.0	0.0	0.0	637.4

TOTAL WEIGHT OF SLIDING MASS = 1001936.20(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 554903.99(lbs)

TOTAL AREA OF SLIDING MASS = 8349.47(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 80 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	200.00	34.00	
2	1	200.00	34.00	
3	1	200.00	34.00	

4	1	200.00	34.00
5	3	400.00	34.00
6	3	400.00	34.00
7	3	400.00	34.00
8	3	400.00	34.00
9	3	400.00	34.00
10	3	400.00	34.00
11	3	400.00	34.00
12	3	400.00	34.00
13	3	400.00	34.00
14	3	400.00	34.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	4	0.00	10.00
28	4	0.00	10.00
29	4	0.00	10.00
30	4	0.00	10.00
31	4	0.00	10.00
32	4	0.00	10.00
33	4	0.00	10.00
34	4	0.00	10.00
35	4	0.00	10.00
36	4	0.00	10.00
37	4	0.00	10.00
38	4	0.00	10.00
39	4	0.00	10.00
40	4	0.00	10.00
41	4	0.00	10.00
42	4	0.00	10.00
43	4	0.00	10.00
44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	4	0.00	10.00
48	4	0.00	10.00
49	4	0.00	10.00
50	4	0.00	10.00
51	4	0.00	10.00
52	4	0.00	10.00
53	4	0.00	10.00
54	4	0.00	10.00
55	4	0.00	10.00
56	4	0.00	10.00
57	4	0.00	10.00
58	4	0.00	10.00
59	4	0.00	10.00
60	4	0.00	10.00
61	4	0.00	10.00
62	4	0.00	10.00
63	4	0.00	10.00
64	4	0.00	10.00
65	4	0.00	10.00
66	4	0.00	10.00
67	3	400.00	34.00
68	3	400.00	34.00
69	3	400.00	34.00
70	3	400.00	34.00
71	3	400.00	34.00
72	3	400.00	34.00
73	3	400.00	34.00
74	3	400.00	34.00
75	3	400.00	34.00

76	3	400.00	34.00
77	3	400.00	34.00
78	3	400.00	34.00
79	1	200.00	34.00
80	1	200.00	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 80 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-36.00	5.06	2.55	155.60	304.95	136.66
1	-36.00	5.06	2.55	155.60	304.95	136.66
2	-40.39	7.61	4.00	369.46	449.21	201.30
2	-40.39	7.61	4.00	369.46	449.21	201.30
3	-40.39	10.66	4.00	607.48	609.75	273.24
3	-40.39	10.66	4.00	607.48	609.75	273.24
4	-40.03	12.64	1.20	756.99	710.59	318.43
4	-40.03	12.64	1.20	756.99	710.59	318.43
5	-40.03	14.40	3.40	1000.01	1074.51	481.51
5	-40.03	14.40	3.40	1000.01	1074.51	481.51
6	-40.03	17.01	3.40	1200.22	1209.56	542.03
6	-40.03	17.01	3.40	1200.22	1209.56	542.03
7	-33.21	19.98	4.00	1256.61	1247.60	559.07
7	-33.21	19.98	4.00	1256.61	1247.60	559.07
8	-33.21	23.33	4.00	1449.83	1377.92	617.48
8	-33.21	23.33	4.00	1449.83	1377.92	617.48
9	-20.02	26.80	3.83	1382.98	1332.83	597.27
9	-20.02	26.80	3.83	1382.98	1332.83	597.27
10	-20.02	30.40	3.83	1506.03	1415.83	634.46
10	-20.02	30.40	3.83	1506.03	1415.83	634.46
11	-20.02	32.36	0.34	1573.53	1461.36	654.87
11	-20.02	32.36	0.34	1573.53	1461.36	654.87
12	-39.78	34.06	4.00	2125.68	1833.79	821.76
12	-39.78	34.06	4.00	2125.68	1833.79	821.76
13	-39.78	37.13	4.00	2345.08	1981.78	888.08
13	-39.78	37.13	4.00	2345.08	1981.78	888.08
14	-42.90	40.38	4.67	2727.88	2239.98	1003.78
14	-42.90	40.38	4.67	2727.88	2239.98	1003.78
15	-42.90	43.31	3.33	2080.30	366.81	164.38
15	-42.90	43.31	3.33	2080.30	366.81	164.38
16	5.82	45.11	1.18	1973.38	347.96	155.93
16	5.82	45.11	1.18	1973.38	347.96	155.93
17	5.82	48.25	5.13	1975.24	348.29	156.08
17	5.82	48.25	5.13	1975.24	348.29	156.08
18	5.82	53.35	5.13	1971.21	347.58	155.76
18	5.82	53.35	5.13	1971.21	347.58	155.76
19	5.82	58.48	5.18	1981.54	349.40	156.57
19	5.82	58.48	5.18	1981.54	349.40	156.57
20	5.82	63.63	5.18	1985.01	350.01	156.85
20	5.82	63.63	5.18	1985.01	350.01	156.85
21	5.82	68.73	5.09	1988.45	350.62	157.12
21	5.82	68.73	5.09	1988.45	350.62	157.12
22	5.82	73.80	5.09	1991.86	351.22	157.39
22	5.82	73.80	5.09	1991.86	351.22	157.39
23	5.82	78.87	5.09	1995.27	351.82	157.66
23	5.82	78.87	5.09	1995.27	351.82	157.66
24	5.82	83.93	5.09	1998.68	352.42	157.93
24	5.82	83.93	5.09	1998.68	352.42	157.93
25	5.82	89.00	5.09	2002.10	353.02	158.20
25	5.82	89.00	5.09	2002.10	353.02	158.20
26	5.82	94.07	5.09	2005.51	353.63	158.47
26	5.82	94.07	5.09	2005.51	353.63	158.47

27	5.82	98.77	4.36	2008.68	354.18	158.72
27	5.82	98.77	4.36	2008.68	354.18	158.72
28	5.82	103.10	4.36	2011.59	354.70	158.95
28	5.82	103.10	4.36	2011.59	354.70	158.95
29	5.82	107.43	4.36	2014.51	355.21	159.18
29	5.82	107.43	4.36	2014.51	355.21	159.18
30	5.82	111.35	3.52	2035.79	358.96	160.86
30	5.82	111.35	3.52	2035.79	358.96	160.86
31	5.82	114.85	3.52	2044.14	360.44	161.52
31	5.82	114.85	3.52	2044.14	360.44	161.52
32	5.82	119.30	5.43	2018.90	355.99	159.53
32	5.82	119.30	5.43	2018.90	355.99	159.53
33	5.82	124.70	5.43	2046.95	360.93	161.74
33	5.82	124.70	5.43	2046.95	360.93	161.74
34	5.82	129.73	4.68	2053.92	362.16	162.29
34	5.82	129.73	4.68	2053.92	362.16	162.29
35	5.82	134.39	4.68	2039.79	359.67	161.18
35	5.82	134.39	4.68	2039.79	359.67	161.18
36	5.82	139.05	4.68	2025.67	357.18	160.06
36	5.82	139.05	4.68	2025.67	357.18	160.06
37	5.82	143.71	4.68	2011.55	354.69	158.94
37	5.82	143.71	4.68	2011.55	354.69	158.94
38	5.82	148.37	4.68	1997.43	352.20	157.83
38	5.82	148.37	4.68	1997.43	352.20	157.83
39	5.82	153.11	4.85	1983.06	349.67	156.69
39	5.82	153.11	4.85	1983.06	349.67	156.69
40	5.82	157.94	4.85	1968.43	347.09	155.54
40	5.82	157.94	4.85	1968.43	347.09	155.54
41	5.82	162.76	4.85	1953.81	344.51	154.38
41	5.82	162.76	4.85	1953.81	344.51	154.38
42	5.82	167.59	4.85	1939.19	341.93	153.23
42	5.82	167.59	4.85	1939.19	341.93	153.23
43	5.82	170.85	1.71	1933.10	340.86	152.75
43	5.82	170.85	1.71	1933.10	340.86	152.75
44	5.82	174.15	4.93	1937.82	341.69	153.12
44	5.82	174.15	4.93	1937.82	341.69	153.12
45	5.82	179.05	4.93	1944.84	342.93	153.67
45	5.82	179.05	4.93	1944.84	342.93	153.67
46	5.82	183.95	4.93	1951.85	344.16	154.23
46	5.82	183.95	4.93	1951.85	344.16	154.23
47	5.82	188.00	3.22	1975.79	348.39	156.12
47	5.82	188.00	3.22	1975.79	348.39	156.12
48	5.82	191.20	3.22	2016.65	355.59	159.35
48	5.82	191.20	3.22	2016.65	355.59	159.35
49	5.82	195.08	4.57	2053.58	362.10	162.27
49	5.82	195.08	4.57	2053.58	362.10	162.27
50	5.82	199.62	4.57	2086.58	367.92	164.87
50	5.82	199.62	4.57	2086.58	367.92	164.87
51	5.82	203.18	2.56	2101.73	370.59	166.07
51	5.82	203.18	2.56	2101.73	370.59	166.07
52	5.82	205.72	2.56	2099.01	370.11	165.86
52	5.82	205.72	2.56	2099.01	370.11	165.86
53	5.82	209.45	4.93	2095.05	369.41	165.54
53	5.82	209.45	4.93	2095.05	369.41	165.54
54	5.82	214.20	4.62	2090.95	368.69	165.22
54	5.82	214.20	4.62	2090.95	368.69	165.22
55	5.82	218.80	4.62	2087.96	368.16	164.98
55	5.82	218.80	4.62	2087.96	368.16	164.98
56	5.82	223.40	4.62	2084.97	367.64	164.75
56	5.82	223.40	4.62	2084.97	367.64	164.75
57	5.82	227.25	3.12	2074.44	365.78	163.91
57	5.82	227.25	3.12	2074.44	365.78	163.91
58	5.82	230.35	3.12	2056.39	362.60	162.49
58	5.82	230.35	3.12	2056.39	362.60	162.49
59	5.82	232.75	1.71	2042.41	360.13	161.38
59	5.82	232.75	1.71	2042.41	360.13	161.38
60	5.82	235.90	4.62	2196.61	387.32	173.57
60	5.82	235.90	4.62	2196.61	387.32	173.57
61	5.82	240.45	4.52	2528.62	445.86	199.80
61	5.82	240.45	4.52	2528.62	445.86	199.80
62	5.82	244.95	4.52	2874.34	506.82	227.12
62	5.82	244.95	4.52	2874.34	506.82	227.12

63	5.82	249.36	4.34	3213.06	566.55	253.88
63	5.82	249.36	4.34	3213.06	566.55	253.88
64	5.82	253.68	4.34	3544.76	625.04	280.09
64	5.82	253.68	4.34	3544.76	625.04	280.09
65	74.38	255.87	0.24	2883.27	508.40	227.82
65	74.38	255.87	0.24	2883.27	508.40	227.82
66	74.38	256.27	2.76	2845.02	501.65	224.80
66	74.38	256.27	2.76	2845.02	501.65	224.80
67	74.38	257.32	5.00	1353.24	1312.77	588.28
67	74.38	257.32	5.00	1353.24	1312.77	588.28
68	55.00	258.24	0.89	2209.36	1890.23	847.05
68	55.00	258.24	0.89	2209.36	1890.23	847.05
69	55.00	260.25	6.10	2151.76	1851.38	829.64
69	55.00	260.25	6.10	2151.76	1851.38	829.64
70	55.00	262.29	1.01	2077.59	1801.35	807.22
70	55.00	262.29	1.01	2077.59	1801.35	807.22
71	45.80	263.97	4.00	2252.30	1919.20	860.03
71	45.80	263.97	4.00	2252.30	1919.20	860.03
72	45.80	266.76	4.00	2127.41	1834.95	822.28
72	45.80	266.76	4.00	2127.41	1834.95	822.28
73	56.35	268.46	1.09	1776.84	1598.50	716.32
73	56.35	268.46	1.09	1776.84	1598.50	716.32
74	56.35	269.43	2.42	1677.21	1531.29	686.20
74	56.35	269.43	2.42	1677.21	1531.29	686.20
75	56.35	270.55	1.62	1709.74	1553.23	696.04
75	56.35	270.55	1.62	1709.74	1553.23	696.04
76	56.35	271.79	2.87	1557.72	1450.70	650.09
76	56.35	271.79	2.87	1557.72	1450.70	650.09
77	51.95	275.05	8.00	1295.38	1273.75	570.79
77	51.95	275.05	8.00	1295.38	1273.75	570.79
78	58.35	277.63	0.44	894.56	1003.39	449.64
78	58.35	277.63	0.44	894.56	1003.39	449.64
79	58.35	279.73	7.56	725.19	689.15	308.82
79	58.35	279.73	7.56	725.19	689.15	308.82
80	63.50	282.99	5.71	225.27	351.95	157.71
80	63.50	282.99	5.71	225.27	351.95	157.71

Table 4 - Base Force Data on the 80 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-36.00	5.06	2.55	396.74	777.56	348.44
1	-36.00	5.06	2.55	396.74	777.56	348.44
2	-40.39	7.61	4.00	1477.85	1796.82	805.19
2	-40.39	7.61	4.00	1477.85	1796.82	805.19
3	-40.39	10.66	4.00	2429.93	2439.01	1092.97
3	-40.39	10.66	4.00	2429.93	2439.01	1092.97
4	-40.03	12.64	1.20	908.29	852.63	382.08
4	-40.03	12.64	1.20	908.29	852.63	382.08
5	-40.03	14.40	3.40	3400.08	3653.41	1637.17
5	-40.03	14.40	3.40	3400.08	3653.41	1637.17
6	-40.03	17.01	3.40	4080.83	4112.58	1842.93
6	-40.03	17.01	3.40	4080.83	4112.58	1842.93
7	-33.21	19.98	4.00	5026.45	4990.38	2236.29
7	-33.21	19.98	4.00	5026.45	4990.38	2236.29
8	-33.21	23.33	4.00	5799.32	5511.69	2469.90
8	-33.21	23.33	4.00	5799.32	5511.69	2469.90
9	-20.02	26.80	3.83	5296.27	5104.22	2287.31
9	-20.02	26.80	3.83	5296.27	5104.22	2287.31
10	-20.02	30.40	3.83	5767.50	5422.07	2429.74
10	-20.02	30.40	3.83	5767.50	5422.07	2429.74
11	-20.02	32.36	0.34	536.24	498.02	223.17
11	-20.02	32.36	0.34	536.24	498.02	223.17
12	-39.78	34.06	4.00	8502.72	7335.16	3287.04
12	-39.78	34.06	4.00	8502.72	7335.16	3287.04
13	-39.78	37.13	4.00	9380.32	7927.11	3552.30
13	-39.78	37.13	4.00	9380.32	7927.11	3552.30
14	-42.90	40.38	4.67	12743.46	10464.19	4689.22

14	-42.90	40.38	4.67	12743.46	10464.19	4689.22
15	-42.90	43.31	3.33	6924.16	1220.92	547.12
15	-42.90	43.31	3.33	6924.16	1220.92	547.12
16	5.82	45.11	1.18	2323.19	409.64	183.57
16	5.82	45.11	1.18	2323.19	409.64	183.57
17	5.82	48.25	5.13	10125.97	1785.48	800.11
17	5.82	48.25	5.13	10125.97	1785.48	800.11
18	5.82	53.35	5.13	10105.30	1781.84	798.48
18	5.82	53.35	5.13	10105.30	1781.84	798.48
19	5.82	58.48	5.18	10257.82	1808.73	810.53
19	5.82	58.48	5.18	10257.82	1808.73	810.53
20	5.82	63.63	5.18	10275.78	1811.90	811.95
20	5.82	63.63	5.18	10275.78	1811.90	811.95
21	5.82	68.73	5.09	10127.03	1785.67	800.20
21	5.82	68.73	5.09	10127.03	1785.67	800.20
22	5.82	73.80	5.09	10144.41	1788.73	801.57
22	5.82	73.80	5.09	10144.41	1788.73	801.57
23	5.82	78.87	5.09	10161.79	1791.80	802.94
23	5.82	78.87	5.09	10161.79	1791.80	802.94
24	5.82	83.93	5.09	10179.17	1794.86	804.32
24	5.82	83.93	5.09	10179.17	1794.86	804.32
25	5.82	89.00	5.09	10196.55	1797.93	805.69
25	5.82	89.00	5.09	10196.55	1797.93	805.69
26	5.82	94.07	5.09	10213.93	1800.99	807.06
26	5.82	94.07	5.09	10213.93	1800.99	807.06
27	5.82	98.77	4.36	8749.39	1542.75	691.34
27	5.82	98.77	4.36	8749.39	1542.75	691.34
28	5.82	103.10	4.36	8762.10	1545.00	692.34
28	5.82	103.10	4.36	8762.10	1545.00	692.34
29	5.82	107.43	4.36	8774.82	1547.24	693.35
29	5.82	107.43	4.36	8774.82	1547.24	693.35
30	5.82	111.35	3.52	7162.21	1262.89	565.93
30	5.82	111.35	3.52	7162.21	1262.89	565.93
31	5.82	114.85	3.52	7191.59	1268.07	568.25
31	5.82	114.85	3.52	7191.59	1268.07	568.25
32	5.82	119.30	5.43	10958.61	1932.30	865.90
32	5.82	119.30	5.43	10958.61	1932.30	865.90
33	5.82	124.70	5.43	11110.86	1959.14	877.93
33	5.82	124.70	5.43	11110.86	1959.14	877.93
34	5.82	129.73	4.68	9620.87	1696.42	760.20
34	5.82	129.73	4.68	9620.87	1696.42	760.20
35	5.82	134.39	4.68	9554.72	1684.76	754.97
35	5.82	134.39	4.68	9554.72	1684.76	754.97
36	5.82	139.05	4.68	9488.57	1673.09	749.75
36	5.82	139.05	4.68	9488.57	1673.09	749.75
37	5.82	143.71	4.68	9422.42	1661.43	744.52
37	5.82	143.71	4.68	9422.42	1661.43	744.52
38	5.82	148.37	4.68	9356.27	1649.76	739.29
38	5.82	148.37	4.68	9356.27	1649.76	739.29
39	5.82	153.11	4.85	9617.85	1695.89	759.96
39	5.82	153.11	4.85	9617.85	1695.89	759.96
40	5.82	157.94	4.85	9546.94	1683.38	754.36
40	5.82	157.94	4.85	9546.94	1683.38	754.36
41	5.82	162.76	4.85	9476.02	1670.88	748.76
41	5.82	162.76	4.85	9476.02	1670.88	748.76
42	5.82	167.59	4.85	9405.10	1658.37	743.15
42	5.82	167.59	4.85	9405.10	1658.37	743.15
43	5.82	170.85	1.71	3303.30	582.46	261.01
43	5.82	170.85	1.71	3303.30	582.46	261.01
44	5.82	174.15	4.93	9544.55	1682.96	754.17
44	5.82	174.15	4.93	9544.55	1682.96	754.17
45	5.82	179.05	4.93	9579.11	1689.06	756.90
45	5.82	179.05	4.93	9579.11	1689.06	756.90
46	5.82	183.95	4.93	9613.67	1695.15	759.63
46	5.82	183.95	4.93	9613.67	1695.15	759.63
47	5.82	188.00	3.22	6355.32	1120.61	502.17
47	5.82	188.00	3.22	6355.32	1120.61	502.17
48	5.82	191.20	3.22	6486.75	1143.79	512.56
48	5.82	191.20	3.22	6486.75	1143.79	512.56
49	5.82	195.08	4.57	9392.25	1656.11	742.14
49	5.82	195.08	4.57	9392.25	1656.11	742.14
50	5.82	199.62	4.57	9543.18	1682.72	754.06

50	5.82	199.62	4.57	9543.18	1682.72	754.06
51	5.82	203.18	2.56	5387.19	949.91	425.67
51	5.82	203.18	2.56	5387.19	949.91	425.67
52	5.82	205.72	2.56	5380.23	948.68	425.12
52	5.82	205.72	2.56	5380.23	948.68	425.12
53	5.82	209.45	4.93	10318.97	1819.51	815.36
53	5.82	209.45	4.93	10318.97	1819.51	815.36
54	5.82	214.20	4.62	9668.23	1704.77	763.94
54	5.82	214.20	4.62	9668.23	1704.77	763.94
55	5.82	218.80	4.62	9654.40	1702.33	762.85
55	5.82	218.80	4.62	9654.40	1702.33	762.85
56	5.82	223.40	4.62	9640.57	1699.89	761.76
56	5.82	223.40	4.62	9640.57	1699.89	761.76
57	5.82	227.25	3.12	6464.12	1139.80	510.77
57	5.82	227.25	3.12	6464.12	1139.80	510.77
58	5.82	230.35	3.12	6407.86	1129.88	506.32
58	5.82	230.35	3.12	6407.86	1129.88	506.32
59	5.82	232.75	1.71	3490.10	615.40	275.77
59	5.82	232.75	1.71	3490.10	615.40	275.77
60	5.82	235.90	4.62	10156.80	1790.92	802.55
60	5.82	235.90	4.62	10156.80	1790.92	802.55
61	5.82	240.45	4.52	11437.79	2016.79	903.77
61	5.82	240.45	4.52	11437.79	2016.79	903.77
62	5.82	244.95	4.52	13001.61	2292.53	1027.33
62	5.82	244.95	4.52	13001.61	2292.53	1027.33
63	5.82	249.36	4.34	13944.24	2458.75	1101.81
63	5.82	249.36	4.34	13944.24	2458.75	1101.81
64	5.82	253.68	4.34	15383.78	2712.58	1215.56
64	5.82	253.68	4.34	15383.78	2712.58	1215.56
65	74.38	255.87	0.24	696.55	122.82	55.04
65	74.38	255.87	0.24	696.55	122.82	55.04
66	74.38	256.27	2.76	7852.48	1384.60	620.47
66	74.38	256.27	2.76	7852.48	1384.60	620.47
67	74.38	257.32	5.00	6763.97	6561.69	2940.43
67	74.38	257.32	5.00	6763.97	6561.69	2940.43
68	55.00	258.24	0.89	1969.31	1684.86	755.02
68	55.00	258.24	0.89	1969.31	1684.86	755.02
69	55.00	260.25	6.10	13129.78	11296.89	5062.37
69	55.00	260.25	6.10	13129.78	11296.89	5062.37
70	55.00	262.29	1.01	2091.68	1813.57	812.70
70	55.00	262.29	1.01	2091.68	1813.57	812.70
71	45.80	263.97	4.00	9009.22	7676.79	3440.13
71	45.80	263.97	4.00	9009.22	7676.79	3440.13
72	45.80	266.76	4.00	8509.62	7339.81	3289.12
72	45.80	266.76	4.00	8509.62	7339.81	3289.12
73	56.35	268.46	1.09	1944.39	1749.22	783.86
73	56.35	268.46	1.09	1944.39	1749.22	783.86
74	56.35	269.43	2.42	4053.23	3700.60	1658.32
74	56.35	269.43	2.42	4053.23	3700.60	1658.32
75	56.35	270.55	1.62	2776.69	2522.52	1130.39
75	56.35	270.55	1.62	2776.69	2522.52	1130.39
76	56.35	271.79	2.87	4462.88	4156.25	1862.50
76	56.35	271.79	2.87	4462.88	4156.25	1862.50
77	51.95	275.05	8.00	10363.07	10189.98	4566.34
77	51.95	275.05	8.00	10363.07	10189.98	4566.34
78	58.35	277.63	0.44	391.33	438.94	196.70
78	58.35	277.63	0.44	391.33	438.94	196.70
79	58.35	279.73	7.56	5484.29	5211.71	2335.48
79	58.35	279.73	7.56	5484.29	5211.71	2335.48
80	63.50	282.99	5.71	1287.12	2010.91	901.13
80	63.50	282.99	5.71	1287.12	2010.91	901.13

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 80 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
58	12000.0	0.0	12000.0	90.00	0.428240E+03

Sum of the Resisting Forces = 166198.15 (lbs)

Average Available Shear Strength = 524.84(psf)

Sum of the Driving Forces = 78136.05 (lbs)

Average Mobilized Shear Stress = 246.75(psf)

Total length of the failure surface = 316.67(ft)

Factor of Safety Balance Check: FS = 2.12704

Janbu's Correction Factor (fo) = 1.0591

Janub's FS Corrected = 2.25278

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

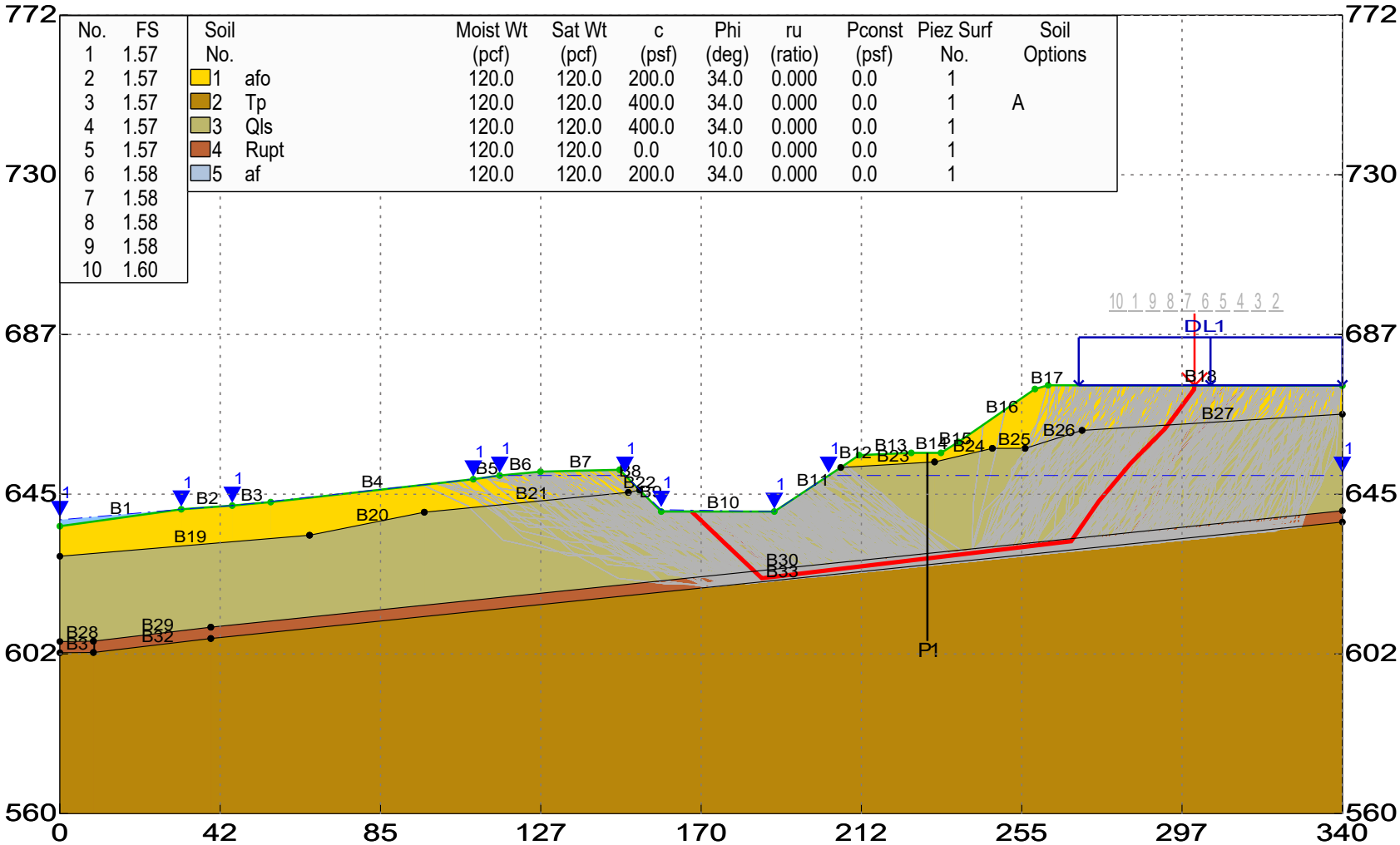
Royal Vista - Section 8
Stage 3 (Temporary Staging Pad)

LGC Geotechnical / BPP

\Sec 8 - Stage 3 (Temporary Staging Pad).gsd

No.	FS
1	1.57
2	1.57
3	1.57
4	1.57
5	1.57
6	1.58
7	1.58
8	1.58
9	1.58
10	1.60

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.57

Simplified Janbu Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 3 (Temporary Staging Pad).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 3 (Temporary Staging Pad).OUT
Unit System: English

PROJECT: Royal Vista - Section 8

DESCRIPTION: Stage 3 (Temporary Staging Pad)

BOUNDARY DATA

18 Surface Boundaries
33 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	636.500	32.200	641.000	1
2	32.200	641.000	45.700	642.000	1
3	45.700	642.000	55.900	642.900	1
4	55.900	642.900	109.600	649.000	1
5	109.600	649.000	116.600	650.000	1
6	116.600	650.000	127.400	651.000	1
7	127.400	651.000	148.400	651.500	1
8	148.400	651.500	153.700	646.100	1
9	153.700	646.100	159.400	640.400	3
10	159.400	640.400	189.400	640.400	3
11	189.400	640.400	207.000	652.100	3
12	207.000	652.100	211.900	655.400	1
13	211.900	655.400	225.700	656.000	1
14	225.700	656.000	233.600	656.000	1
15	233.600	656.000	238.200	658.900	1
16	238.200	658.900	258.500	673.000	1
17	258.500	673.000	262.000	674.000	1
18	262.000	674.000	340.000	673.900	1
19	0.000	628.500	66.200	634.100	3
20	66.200	634.100	96.600	640.200	3
21	96.600	640.200	150.700	645.500	3
22	150.700	645.500	153.700	646.100	3
23	207.000	652.100	231.900	653.600	3
24	231.900	653.600	247.200	657.200	3
25	247.200	657.200	255.900	657.200	3
26	255.900	657.200	271.000	662.000	3

27	271.000	662.000	340.000	666.300	3
28	0.000	605.800	8.900	605.900	4
29	8.900	605.900	40.000	609.600	4
30	40.000	609.600	340.000	640.600	4
31	0.000	602.800	8.900	602.900	2
32	8.900	602.900	40.000	606.600	2
33	40.000	606.600	340.000	637.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 10 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	638.20
2	32.20	641.00
3	45.70	642.00
4	109.60	649.00
5	116.60	650.00
6	149.80	650.00

7	159.40	640.90
8	189.40	640.40
9	203.80	650.00
10	340.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	18	270.100	674.000	250.000	340.000	674.000	250.000	0.00

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

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	230.00	656.00	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 13.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	170.00	621.40	240.00	628.40	3.00
2	240.10	628.40	330.00	637.40	3.00

The Simplified Janbu 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 = 4.276 FS Min = 1.568 FS Ave = 2.269
Standard Deviation = 0.492 Coefficient of Variation = 21.70 %

Critical Surface is Sequence Number 0 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	230.00	627.92

Factor Of Safety For The Critical or Specified Surface = 1.568

Table 1 - Geometry Data on the 40 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.57	2.20	169.78	638.20	640.40	-43.92	0.00	6.35
2	4.57	6.60	174.35	633.80	640.40	-43.92	0.00	6.35
3	3.75	10.58	178.51	629.82	640.40	-43.45	0.00	5.16
4	3.75	14.13	182.26	626.27	640.40	-43.45	0.00	5.16
5	1.94	16.83	185.11	623.57	640.40	-43.45	0.00	2.67
6	3.32	17.55	187.74	622.85	640.40	6.83	0.00	3.35
7	4.80	18.66	191.80	623.34	642.00	6.83	33.61	4.83
8	4.80	21.27	196.60	623.92	645.19	6.83	33.61	4.83
9	4.80	23.89	201.40	624.49	648.38	6.83	33.61	4.83
10	0.04	25.21	203.82	624.78	649.99	6.83	33.61	0.04
11	3.16	26.08	205.42	624.97	651.05	6.83	33.61	3.18
12	4.90	28.29	209.45	625.46	653.75	6.83	33.96	4.94
13	4.60	29.48	214.20	626.02	655.50	6.83	2.49	4.63
14	4.60	29.12	218.80	626.58	655.70	6.83	2.49	4.63
15	4.60	28.77	223.40	627.13	655.90	6.83	2.49	4.63
16	3.10	28.41	227.25	627.59	656.00	6.83	0.00	3.12
17	3.10	28.04	230.35	627.96	656.00	6.83	0.00	3.12
18	1.70	27.75	232.75	628.25	656.00	6.83	0.00	1.71
19	4.60	28.83	235.90	628.62	657.45	6.83	32.23	4.63
20	4.50	31.29	240.45	629.17	660.46	6.83	34.78	4.53
21	4.50	33.88	244.95	629.71	663.59	6.83	34.78	4.53
22	4.35	36.42	249.38	630.24	666.66	6.83	34.78	4.38
23	4.35	38.92	253.73	630.76	669.68	6.83	34.78	4.38
24	2.60	40.92	257.20	631.18	672.10	6.83	34.78	2.62
25	3.50	41.96	260.25	631.54	673.50	6.83	15.95	3.53
26	3.04	42.06	263.52	631.93	674.00	6.83	-0.07	3.06
27	3.04	41.70	266.56	632.30	673.99	6.83	-0.07	3.06
28	0.51	41.14	268.33	632.85	673.99	55.31	-0.07	0.90
29	1.51	39.68	269.35	634.31	673.99	55.31	-0.07	2.65
30	0.90	37.94	270.55	636.05	673.99	55.31	-0.07	1.58
31	4.48	34.05	273.24	639.94	673.99	55.31	-0.07	7.87
32	2.85	29.10	276.90	644.88	673.98	50.15	-0.07	4.45
33	2.85	25.68	279.75	648.29	673.98	50.15	-0.07	4.45
34	2.63	22.40	282.49	651.58	673.97	50.15	-0.07	4.10
35	4.57	18.51	286.09	655.46	673.97	45.32	-0.07	6.50
36	4.57	13.88	290.66	660.08	673.96	45.32	-0.07	6.50
37	0.75	11.06	293.32	662.90	673.96	53.61	-0.07	1.27
38	3.48	8.18	295.44	665.78	673.96	53.61	-0.07	5.87
39	3.48	3.45	298.92	670.50	673.95	53.61	-0.07	5.87
40	0.13	0.55	300.73	673.40	673.95	83.02	-0.07	1.10

Table 2 - Force Data On The 40 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	1207.6	93.1	1001.1	0.0	0.0	0.0
2	3622.9	71.0	2714.1	0.0	0.0	0.0
3	4758.8	41.7	3466.0	0.0	0.0	0.0
4	6355.6	26.9	4589.2	0.0	0.0	0.0
5	3921.0	8.1	2819.5	0.0	0.0	0.0
6	6996.2	4.7	3668.8	0.0	0.0	0.0
7	10745.4	0.0	3897.0	0.0	0.0	0.0
8	12252.0	0.0	4445.1	0.0	0.0	0.0
9	13758.7	0.0	4993.3	0.0	0.0	0.0
10	124.1	0.0	65.0	0.0	0.0	0.0
11	9885.4	0.0	4968.7	0.0	0.0	0.0
12	16637.2	0.0	7558.5	0.0	0.0	0.0
13	16270.4	0.0	6931.1	0.0	0.0	0.0
14	16076.6	0.0	6771.8	0.0	0.0	0.0
15	15882.7	0.0	6612.4	0.0	0.0	0.0
16	10569.1	0.0	4366.3	0.0	0.0	0.0
17	10430.9	0.0	4293.9	0.0	0.0	0.0
18	5661.5	0.0	2324.0	0.0	0.0	0.0
19	15911.4	0.0	6179.4	0.0	0.0	0.0
20	16898.0	0.0	5890.8	0.0	0.0	0.0
21	18294.6	0.0	5738.3	0.0	0.0	0.0
22	19012.4	0.0	5402.1	0.0	0.0	0.0
23	20317.5	0.0	5259.6	0.0	0.0	0.0
24	12766.9	0.0	3075.6	0.0	0.0	0.0
25	17622.0	0.0	4059.9	0.0	0.0	0.0
26	15341.0	0.0	3450.6	0.0	0.0	0.0
27	15206.7	0.0	3381.0	0.0	0.0	0.0
28	2528.5	0.0	963.0	0.0	0.0	0.0
29	7186.6	0.0	2596.3	0.0	0.0	0.0
30	4097.2	0.0	1376.4	0.0	0.0	225.0
31	18292.4	0.0	4940.0	0.0	0.0	1119.2
32	9953.5	0.0	1421.6	0.0	0.0	712.5
33	8784.3	0.0	473.9	0.0	0.0	712.5
34	7068.6	0.0	0.0	0.0	0.0	657.5
35	10151.4	0.0	0.0	0.0	0.0	1142.7
36	7613.3	0.0	0.0	0.0	0.0	1142.7
37	998.2	0.0	0.0	0.0	0.0	188.1
38	3416.6	0.0	0.0	0.0	0.0	870.0
39	1442.8	0.0	0.0	0.0	0.0	870.0
40	8.8	0.0	0.0	0.0	0.0	33.4

TOTAL WEIGHT OF SLIDING MASS = 398068.62(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 278308.82(lbs)

TOTAL AREA OF SLIDING MASS = 3317.24(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 40 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	
3	3	400.00	34.00	
4	3	400.00	34.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	

14	4	0.00	10.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	4	0.00	10.00
28	4	0.00	10.00
29	3	400.00	34.00
30	3	400.00	34.00
31	3	400.00	34.00
32	3	400.00	34.00
33	3	400.00	34.00
34	3	400.00	34.00
35	3	400.00	34.00
36	3	400.00	34.00
37	3	400.00	34.00
38	1	200.00	34.00
39	1	200.00	34.00
40	1	200.00	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 40 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-43.92	169.78	6.35	636.29	829.18	528.69
1	-43.92	169.78	6.35	636.29	829.18	528.69
2	-43.92	174.35	6.35	1069.38	1121.30	714.95
2	-43.92	174.35	6.35	1069.38	1121.30	714.95
3	-43.45	178.51	5.16	1436.89	1369.19	873.00
3	-43.45	178.51	5.16	1436.89	1369.19	873.00
4	-43.45	182.26	5.16	1782.10	1602.04	1021.47
4	-43.45	182.26	5.16	1782.10	1602.04	1021.47
5	-43.45	185.11	2.67	1084.75	191.27	121.96
5	-43.45	185.11	2.67	1084.75	191.27	121.96
6	6.83	187.74	3.35	997.23	175.84	112.12
6	6.83	187.74	3.35	997.23	175.84	112.12
7	6.83	191.80	4.83	1413.47	249.23	158.91
7	6.83	191.80	4.83	1413.47	249.23	158.91
8	6.83	196.60	4.83	1611.29	284.11	181.15
8	6.83	196.60	4.83	1611.29	284.11	181.15
9	6.83	201.40	4.83	1809.12	319.00	203.39
9	6.83	201.40	4.83	1809.12	319.00	203.39
10	6.83	203.82	0.04	1432.53	252.59	161.05
10	6.83	203.82	0.04	1432.53	252.59	161.05
11	6.83	205.42	3.18	1546.73	272.73	173.89
11	6.83	205.42	3.18	1546.73	272.73	173.89
12	6.83	209.45	4.94	1838.98	324.26	206.75
12	6.83	209.45	4.94	1838.98	324.26	206.75
13	6.83	214.20	4.63	2013.84	355.09	226.41
13	6.83	214.20	4.63	2013.84	355.09	226.41
14	6.83	218.80	4.63	2006.19	353.75	225.55
14	6.83	218.80	4.63	2006.19	353.75	225.55
15	6.83	223.40	4.63	1998.54	352.40	224.69
15	6.83	223.40	4.63	1998.54	352.40	224.69

16	6.83	227.25	3.12	1984.16	349.86	223.07
16	6.83	227.25	3.12	1984.16	349.86	223.07
17	6.83	230.35	3.12	1963.05	346.14	220.70
17	6.83	230.35	3.12	1963.05	346.14	220.70
18	6.83	232.75	1.71	1946.70	343.26	218.86
18	6.83	232.75	1.71	1946.70	343.26	218.86
19	6.83	235.90	4.63	2096.93	369.75	235.75
19	6.83	235.90	4.63	2096.93	369.75	235.75
20	6.83	240.45	4.53	2422.67	427.18	272.37
20	6.83	240.45	4.53	2422.67	427.18	272.37
21	6.83	244.95	4.53	2762.11	487.03	310.54
21	6.83	244.95	4.53	2762.11	487.03	310.54
22	6.83	249.38	4.38	3095.89	545.89	348.06
22	6.83	249.38	4.38	3095.89	545.89	348.06
23	6.83	253.73	4.38	3424.01	603.75	384.95
23	6.83	253.73	4.38	3424.01	603.75	384.95
24	6.83	257.20	2.62	3686.13	649.96	414.42
24	6.83	257.20	2.62	3686.13	649.96	414.42
25	6.83	260.25	3.53	3831.48	675.59	430.76
25	6.83	260.25	3.53	3831.48	675.59	430.76
26	6.83	263.52	3.06	3868.18	682.06	434.89
26	6.83	263.52	3.06	3868.18	682.06	434.89
27	6.83	266.56	3.06	3847.02	678.33	432.51
27	6.83	266.56	3.06	3847.02	678.33	432.51
28	55.31	268.33	0.90	3326.18	586.49	373.95
28	55.31	268.33	0.90	3326.18	586.49	373.95
29	55.31	269.35	2.65	2105.01	1819.85	1160.34
29	55.31	269.35	2.65	2105.01	1819.85	1160.34
30	55.31	270.55	1.58	2197.23	1882.05	1200.00
30	55.31	270.55	1.58	2197.23	1882.05	1200.00
31	55.31	273.24	7.87	2059.02	1788.82	1140.56
31	55.31	273.24	7.87	2059.02	1788.82	1140.56
32	50.15	276.90	4.45	2056.60	1787.19	1139.52
32	50.15	276.90	4.45	2056.60	1787.19	1139.52
33	50.15	279.75	4.45	1926.53	1699.46	1083.58
33	50.15	279.75	4.45	1926.53	1699.46	1083.58
34	50.15	282.49	4.10	1736.62	1571.37	1001.91
34	50.15	282.49	4.10	1736.62	1571.37	1001.91
35	45.32	286.09	6.50	1541.97	1440.07	918.20
35	45.32	286.09	6.50	1541.97	1440.07	918.20
36	45.32	290.66	6.50	1155.05	1179.09	751.79
36	45.32	290.66	6.50	1155.05	1179.09	751.79
37	53.61	293.32	1.27	776.80	923.96	589.12
37	53.61	293.32	1.27	776.80	923.96	589.12
38	53.61	295.44	5.87	668.36	650.81	414.96
38	53.61	295.44	5.87	668.36	650.81	414.96
39	53.61	298.92	5.87	310.27	409.28	260.96
39	53.61	298.92	5.87	310.27	409.28	260.96
40	83.02	300.73	1.10	69.91	47.16	30.07
40	83.02	300.73	1.10	69.91	47.16	30.07

Table 4 - Base Force Data on the 40 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-43.92	169.78	6.35	4038.42	5262.69	3355.52
1	-43.92	169.78	6.35	4038.42	5262.69	3355.52
2	-43.92	174.35	6.35	6787.20	7116.77	4537.68
2	-43.92	174.35	6.35	6787.20	7116.77	4537.68
3	-43.45	178.51	5.16	7418.06	7068.58	4506.95
3	-43.45	178.51	5.16	7418.06	7068.58	4506.95
4	-43.45	182.26	5.16	9200.25	8270.68	5273.42
4	-43.45	182.26	5.16	9200.25	8270.68	5273.42
5	-43.45	185.11	2.67	2901.55	511.62	326.21
5	-43.45	185.11	2.67	2901.55	511.62	326.21
6	6.83	187.74	3.35	3337.23	588.44	375.19
6	6.83	187.74	3.35	3337.23	588.44	375.19
7	6.83	191.80	4.83	6833.17	1204.87	768.23

7	6.83	191.80	4.83	6833.17	1204.87	768.23
8	6.83	196.60	4.83	7789.54	1373.51	875.75
8	6.83	196.60	4.83	7789.54	1373.51	875.75
9	6.83	201.40	4.83	8745.90	1542.14	983.27
9	6.83	201.40	4.83	8745.90	1542.14	983.27
10	6.83	203.82	0.04	59.19	10.44	6.65
10	6.83	203.82	0.04	59.19	10.44	6.65
11	6.83	205.42	3.18	4921.05	867.71	553.26
11	6.83	205.42	3.18	4921.05	867.71	553.26
12	6.83	209.45	4.94	9075.47	1600.25	1020.33
12	6.83	209.45	4.94	9075.47	1600.25	1020.33
13	6.83	214.20	4.63	9329.92	1645.12	1048.93
13	6.83	214.20	4.63	9329.92	1645.12	1048.93
14	6.83	218.80	4.63	9294.49	1638.87	1044.95
14	6.83	218.80	4.63	9294.49	1638.87	1044.95
15	6.83	223.40	4.63	9259.06	1632.62	1040.97
15	6.83	223.40	4.63	9259.06	1632.62	1040.97
16	6.83	227.25	3.12	6194.90	1092.33	696.47
16	6.83	227.25	3.12	6194.90	1092.33	696.47
17	6.83	230.35	3.12	6128.98	1080.70	689.06
17	6.83	230.35	3.12	6128.98	1080.70	689.06
18	6.83	232.75	1.71	3333.07	587.71	374.73
18	6.83	232.75	1.71	3333.07	587.71	374.73
19	6.83	235.90	4.63	9714.90	1713.00	1092.22
19	6.83	235.90	4.63	9714.90	1713.00	1092.22
20	6.83	240.45	4.53	10980.03	1936.07	1234.45
20	6.83	240.45	4.53	10980.03	1936.07	1234.45
21	6.83	244.95	4.53	12518.42	2207.34	1407.41
21	6.83	244.95	4.53	12518.42	2207.34	1407.41
22	6.83	249.38	4.38	13563.47	2391.61	1524.90
22	6.83	249.38	4.38	13563.47	2391.61	1524.90
23	6.83	253.73	4.38	15001.01	2645.08	1686.52
23	6.83	253.73	4.38	15001.01	2645.08	1686.52
24	6.83	257.20	2.62	9652.51	1702.00	1085.20
24	6.83	257.20	2.62	9652.51	1702.00	1085.20
25	6.83	260.25	3.53	13506.11	2381.49	1518.45
25	6.83	260.25	3.53	13506.11	2381.49	1518.45
26	6.83	263.52	3.06	11840.51	2087.80	1331.19
26	6.83	263.52	3.06	11840.51	2087.80	1331.19
27	6.83	266.56	3.06	11775.74	2076.38	1323.91
27	6.83	266.56	3.06	11775.74	2076.38	1323.91
28	55.31	268.33	0.90	2993.35	527.81	336.53
28	55.31	268.33	0.90	2993.35	527.81	336.53
29	55.31	269.35	2.65	5582.63	4826.36	3077.31
29	55.31	269.35	2.65	5582.63	4826.36	3077.31
30	55.31	270.55	1.58	3474.74	2976.31	1897.71
30	55.31	270.55	1.58	3474.74	2976.31	1897.71
31	55.31	273.24	7.87	16197.42	14071.93	8972.32
31	55.31	273.24	7.87	16197.42	14071.93	8972.32
32	50.15	276.90	4.45	9147.48	7949.20	5068.44
32	50.15	276.90	4.45	9147.48	7949.20	5068.44
33	50.15	279.75	4.45	8568.96	7558.98	4819.64
33	50.15	279.75	4.45	8568.96	7558.98	4819.64
34	50.15	282.49	4.10	7127.56	6449.30	4112.10
34	50.15	282.49	4.10	7127.56	6449.30	4112.10
35	45.32	286.09	6.50	10022.80	9360.47	5968.27
35	45.32	286.09	6.50	10022.80	9360.47	5968.27
36	45.32	290.66	6.50	7507.80	7664.08	4886.65
36	45.32	290.66	6.50	7507.80	7664.08	4886.65
37	53.61	293.32	1.27	985.15	1171.78	747.13
37	53.61	293.32	1.27	985.15	1171.78	747.13
38	53.61	295.44	5.87	3920.51	3817.59	2434.11
38	53.61	295.44	5.87	3920.51	3817.59	2434.11
39	53.61	298.92	5.87	1820.00	2400.78	1530.75
39	53.61	298.92	5.87	1820.00	2400.78	1530.75
40	83.02	300.73	1.10	76.87	51.85	33.06
40	83.02	300.73	1.10	76.87	51.85	33.06

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 40 Slices (Only Applicable Slices Listed)

***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
17	12000.0	0.0	12000.0	90.00	0.503303E+03

Sum of the Resisting Forces = 97369.89 (lbs)

Average Available Shear Strength = 603.35(psf)

Sum of the Driving Forces = 62083.44 (lbs)

Average Mobilized Shear Stress = 384.70(psf)

Total length of the failure surface = 161.38(ft)

Factor of Safety Balance Check: FS = 1.56837

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

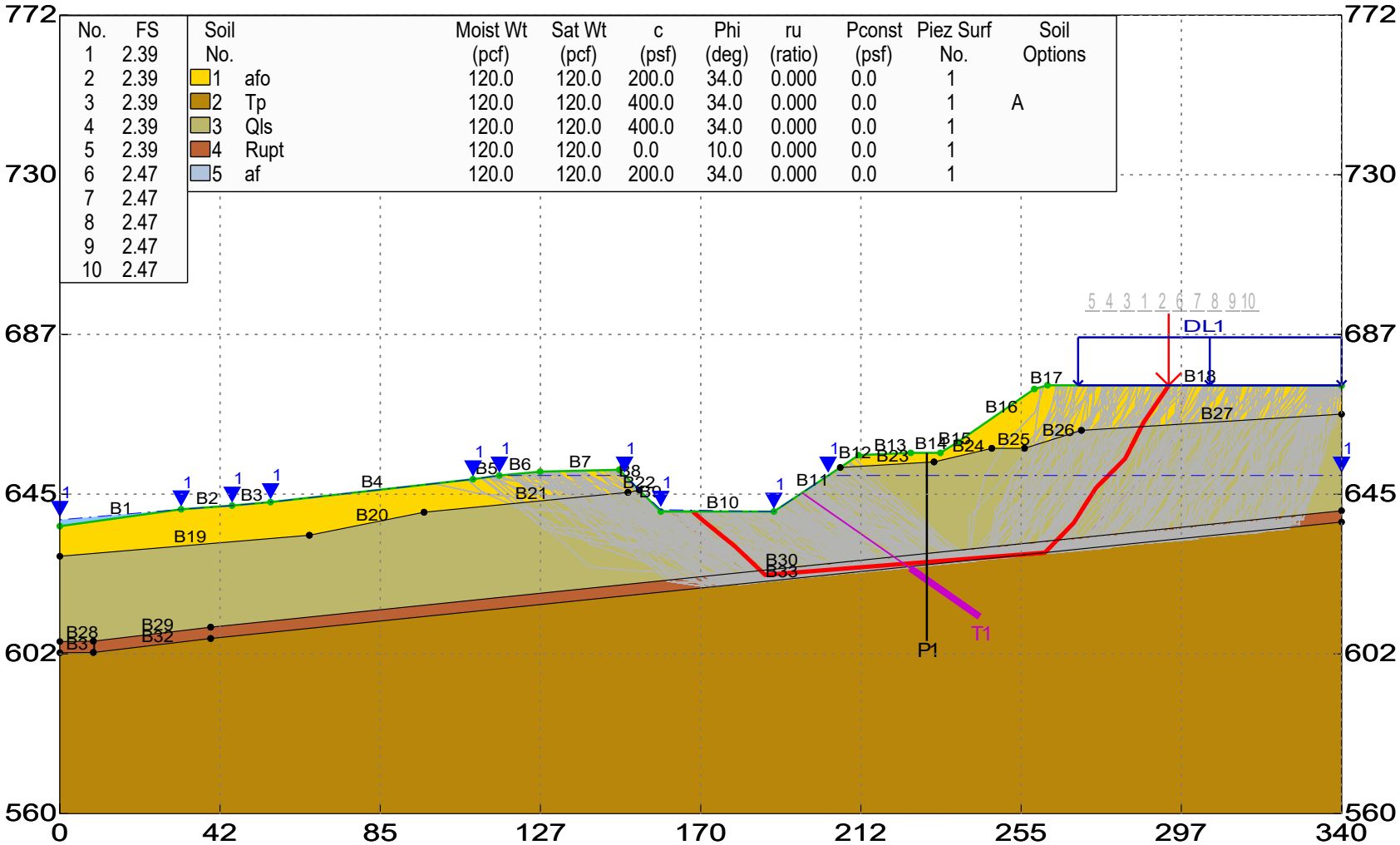
Royal Vista - Cross Section 8
Stage 4 (Temporary Staging Pad - Tieback)

LGC Geotechnical / BPP

\Sec 8 - Stage 4 (Temporary Staging Pad - Tieback).gsd

No.	FS
1	2.39
2	2.39
3	2.39
4	2.39
5	2.39
6	2.47
7	2.47
8	2.47
9	2.47
10	2.47

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 2.39

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 4 (Temporary Staging Pad - Tieback).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 4 (Temporary Staging Pad - Tieback).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 8

DESCRIPTION: Stage 4 (Temporary Staging Pad - Tieback)

BOUNDARY DATA

18 Surface Boundaries
33 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	636.500	32.200	641.000	1
2	32.200	641.000	45.700	642.000	1
3	45.700	642.000	55.900	642.900	1
4	55.900	642.900	109.600	649.000	1
5	109.600	649.000	116.600	650.000	1
6	116.600	650.000	127.400	651.000	1
7	127.400	651.000	148.400	651.500	1
8	148.400	651.500	153.700	646.100	1
9	153.700	646.100	159.400	640.400	3
10	159.400	640.400	189.400	640.400	3
11	189.400	640.400	207.000	652.100	3
12	207.000	652.100	211.900	655.400	1
13	211.900	655.400	225.700	656.000	1
14	225.700	656.000	233.600	656.000	1
15	233.600	656.000	238.200	658.900	1
16	238.200	658.900	258.500	673.000	1
17	258.500	673.000	262.000	674.000	1
18	262.000	674.000	340.000	673.900	1
19	0.000	628.500	66.200	634.100	3
20	66.200	634.100	96.600	640.200	3
21	96.600	640.200	150.700	645.500	3
22	150.700	645.500	153.700	646.100	3
23	207.000	652.100	231.900	653.600	3
24	231.900	653.600	247.200	657.200	3
25	247.200	657.200	255.900	657.200	3
26	255.900	657.200	271.000	662.000	3

27	271.000	662.000	340.000	666.300	3
28	0.000	605.800	8.900	605.900	4
29	8.900	605.900	40.000	609.600	4
30	40.000	609.600	340.000	640.600	4
31	0.000	602.800	8.900	602.900	2
32	8.900	602.900	40.000	606.600	2
33	40.000	606.600	340.000	637.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 11 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	638.20
2	32.20	641.00
3	45.70	642.00
4	55.90	642.90
5	109.60	649.00
6	116.60	650.00

7	149.80	650.00
8	159.40	640.90
9	189.40	640.40
10	203.80	650.00
11	340.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	18	270.100	674.000	250.000	340.000	674.000	250.000	0.00

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	196.90	645.39	203500.0	5.0	35.00	35.0	22.5

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	230.00	656.00	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	170.00	621.40	240.00	628.40	3.00
2	240.10	628.40	330.00	637.40	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 = 495

Number of Trial Surfaces With Valid FS = 505

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 49.5 %

Statistical Data On All Valid FS Values:
FS Max = 7.902 FS Min = 2.390 FS Ave = 3.602
Standard Deviation = 0.906 Coefficient of Variation = 25.15 %

Critical Surface is Sequence Number 126 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	223.90	626.48

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	230.00	626.96

Factor Of Safety For The Critical or Specified Surface = 2.390

Table 1 - Geometry Data on the 41 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.66	1.17	169.24	639.23	640.40	-41.34	0.00	3.54
2	4.27	4.07	172.70	636.33	640.40	-39.10	0.00	5.50
3	4.27	7.54	176.97	632.86	640.40	-39.10	0.00	5.50
4	3.39	10.89	180.80	629.51	640.40	-43.60	0.00	4.68
5	3.39	14.11	184.18	626.29	640.40	-43.60	0.00	4.68
6	1.19	16.29	186.47	624.11	640.40	-43.60	0.00	1.64
7	2.33	16.77	188.23	623.63	640.40	4.56	0.00	2.34
8	4.80	18.08	191.80	623.92	642.00	4.56	33.61	4.82

9	4.80	20.89	196.60	624.30	645.19	4.56	33.61	4.82
10	4.80	23.69	201.40	624.68	648.38	4.56	33.61	4.82
11	0.04	25.11	203.82	624.88	649.99	4.56	33.61	0.04
12	3.16	26.05	205.42	625.00	651.05	4.56	33.61	3.17
13	4.90	28.42	209.45	625.33	653.75	4.56	33.96	4.92
14	4.60	29.80	214.20	625.70	655.50	4.56	2.49	4.61
15	4.60	29.63	218.80	626.07	655.70	4.56	2.49	4.61
16	4.60	29.46	223.40	626.44	655.90	4.56	2.49	4.61
17	3.10	29.26	227.25	626.74	656.00	4.56	0.00	3.11
18	3.10	29.01	230.35	626.99	656.00	4.56	0.00	3.11
19	1.70	28.82	232.75	627.18	656.00	4.56	0.00	1.71
20	4.60	30.02	235.90	627.43	657.45	4.56	32.23	4.61
21	4.50	32.67	240.45	627.80	660.46	4.56	34.78	4.51
22	4.50	35.43	244.95	628.16	663.59	4.56	34.78	4.51
23	4.35	38.15	249.38	628.51	666.66	4.56	34.78	4.36
24	4.35	40.83	253.73	628.86	669.68	4.56	34.78	4.36
25	2.60	42.96	257.20	629.13	672.10	4.56	34.78	2.61
26	2.46	44.02	259.73	629.33	673.35	4.56	15.95	2.47
27	0.31	44.30	261.12	629.45	673.75	4.56	15.95	0.32
28	0.01	44.33	261.28	629.46	673.79	45.85	15.95	0.01
29	0.72	44.06	261.64	629.84	673.90	45.85	15.95	1.03
30	2.52	42.50	263.26	631.50	674.00	45.85	-0.07	3.62
31	4.42	38.92	266.73	635.08	673.99	45.85	-0.07	6.34
32	1.16	35.72	269.52	638.27	673.99	57.69	-0.07	2.18
33	0.90	34.09	270.55	639.90	673.99	57.69	-0.07	1.68
34	3.82	30.36	272.91	643.63	673.99	57.69	-0.07	7.14
35	3.33	25.66	276.48	648.32	673.98	45.19	-0.07	4.73
36	4.42	21.75	280.36	652.22	673.98	45.19	-0.07	6.27
37	4.36	15.25	284.75	658.72	673.97	62.98	-0.07	9.59
38	0.64	10.35	287.25	663.62	673.97	62.98	-0.07	1.41
39	3.10	7.44	289.12	666.52	673.97	55.70	-0.07	5.50
40	3.10	2.90	292.22	671.06	673.96	55.70	-0.07	5.50
41	0.36	0.31	293.95	673.65	673.96	60.00	-0.07	0.72

Table 2 - Force Data On The 41 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	372.7	55.7	332.2	0.0	0.0	0.0
2	2085.6	73.8	1492.5	0.0	0.0	0.0
3	3862.1	54.6	2658.1	0.0	0.0	0.0
4	4425.8	29.7	3218.9	0.0	0.0	0.0
5	5737.3	17.5	4143.9	0.0	0.0	0.0
6	2327.9	3.3	1676.1	0.0	0.0	0.0
7	4691.0	2.1	2449.2	0.0	0.0	0.0
8	10412.9	0.0	3761.5	0.0	0.0	0.0
9	12030.4	0.0	4347.5	0.0	0.0	0.0
10	13647.9	0.0	4933.6	0.0	0.0	0.0
11	123.6	0.0	64.5	0.0	0.0	0.0
12	9873.6	0.0	4942.9	0.0	0.0	0.0
13	16713.9	0.0	7568.6	0.0	0.0	0.0
14	16447.5	0.0	6996.1	0.0	0.0	0.0
15	16355.4	0.0	6890.5	0.0	0.0	0.0
16	16263.3	0.0	6784.9	0.0	0.0	0.0
17	10883.1	0.0	4512.8	0.0	0.0	0.0
18	10791.1	0.0	4464.9	0.0	0.0	0.0
19	5878.7	0.0	2428.1	0.0	0.0	0.0
20	16568.7	0.0	6497.9	0.0	0.0	0.0
21	17639.5	0.0	6254.4	0.0	0.0	0.0
22	19133.6	0.0	6153.3	0.0	0.0	0.0
23	19916.0	0.0	5852.1	0.0	0.0	0.0
24	21312.1	0.0	5757.7	0.0	0.0	0.0
25	13404.9	0.0	3396.3	0.0	0.0	0.0
26	12993.7	0.0	3182.3	0.0	0.0	0.0
27	1672.4	0.0	404.8	0.0	0.0	0.0
28	42.6	0.0	14.7	0.0	0.0	0.0
29	3793.4	0.0	1295.9	0.0	0.0	0.0

30	12850.8	0.0	4175.7	0.0	0.0	0.0
31	20628.4	0.0	5905.4	0.0	0.0	0.0
32	4985.3	0.0	1592.6	0.0	0.0	0.0
33	3681.6	0.0	1061.1	0.0	0.0	225.0
34	13905.6	0.0	2838.9	0.0	0.0	954.3
35	10259.2	0.0	494.7	0.0	0.0	833.0
36	11539.2	0.0	0.0	0.0	0.0	1105.2
37	7974.0	0.0	0.0	0.0	0.0	1089.4
38	795.5	0.0	0.0	0.0	0.0	160.2
39	2768.6	0.0	0.0	0.0	0.0	774.8
40	1077.3	0.0	0.0	0.0	0.0	774.8
41	13.4	0.0	0.0	0.0	0.0	89.9

TOTAL WEIGHT OF SLIDING MASS = 379879.45(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 261544.95(lbs)

TOTAL AREA OF SLIDING MASS = 3165.66(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 41 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	
3	3	400.00	34.00	
4	3	400.00	34.00	
5	3	400.00	34.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	2	300.00	12.00	A
28	2	400.00	34.00	A
29	4	0.00	10.00	
30	4	0.00	10.00	
31	3	400.00	34.00	
32	3	400.00	34.00	
33	3	400.00	34.00	
34	3	400.00	34.00	
35	3	400.00	34.00	
36	3	400.00	34.00	
37	3	400.00	34.00	
38	1	200.00	34.00	
39	1	200.00	34.00	
40	1	200.00	34.00	
41	1	200.00	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 41 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-41.34	169.24	3.54	309.72	608.91	255.12
1	-41.34	169.24	3.54	309.72	608.91	255.12
2	-39.10	172.70	5.50	507.49	742.30	311.01
2	-39.10	172.70	5.50	507.49	742.30	311.01
3	-39.10	176.97	5.50	773.16	921.50	386.09
3	-39.10	176.97	5.50	773.16	921.50	386.09
4	-43.60	180.80	4.68	1127.11	1160.24	486.12
4	-43.60	180.80	4.68	1127.11	1160.24	486.12
5	-43.60	184.18	4.68	1389.07	1336.94	560.15
5	-43.60	184.18	4.68	1389.07	1336.94	560.15
6	-43.60	186.47	1.64	1015.65	179.09	75.03
6	-43.60	186.47	1.64	1015.65	179.09	75.03
7	4.56	188.23	2.34	959.66	169.21	70.90
7	4.56	188.23	2.34	959.66	169.21	70.90
8	4.56	191.80	4.82	1379.41	243.23	101.91
8	4.56	191.80	4.82	1379.41	243.23	101.91
9	4.56	196.60	4.82	1593.32	280.95	117.71
9	4.56	196.60	4.82	1593.32	280.95	117.71
10	4.56	201.40	4.82	1807.23	318.66	133.51
10	4.56	201.40	4.82	1807.23	318.66	133.51
11	4.56	203.82	0.04	1437.21	253.42	106.18
11	4.56	203.82	0.04	1437.21	253.42	106.18
12	4.56	205.42	3.17	1555.89	274.34	114.95
12	4.56	205.42	3.17	1555.89	274.34	114.95
13	4.56	209.45	4.92	1859.45	327.87	137.37
13	4.56	209.45	4.92	1859.45	327.87	137.37
14	4.56	214.20	4.61	2046.44	360.84	151.19
14	4.56	214.20	4.61	2046.44	360.84	151.19
15	4.56	218.80	4.61	2049.29	361.35	151.40
15	4.56	218.80	4.61	2049.29	361.35	151.40
16	4.56	223.40	4.61	7094.96	1251.03	524.16
16	4.56	223.40	4.61	7094.96	1251.03	524.16
17	4.56	227.25	3.11	2046.50	360.85	151.19
17	4.56	227.25	3.11	2046.50	360.85	151.19
18	4.56	230.35	3.11	2032.35	358.36	150.15
18	4.56	230.35	3.11	2032.35	358.36	150.15
19	4.56	232.75	1.71	2021.40	356.43	149.34
19	4.56	232.75	1.71	2021.40	356.43	149.34
20	4.56	235.90	4.61	2179.92	384.38	161.05
20	4.56	235.90	4.61	2179.92	384.38	161.05
21	4.56	240.45	4.51	2518.40	444.06	186.05
21	4.56	240.45	4.51	2518.40	444.06	186.05
22	4.56	244.95	4.51	2870.57	506.16	212.07
22	4.56	244.95	4.51	2870.57	506.16	212.07
23	4.56	249.38	4.36	3216.86	567.22	237.65
23	4.56	249.38	4.36	3216.86	567.22	237.65
24	4.56	253.73	4.36	3557.29	627.25	262.80
24	4.56	253.73	4.36	3557.29	627.25	262.80
25	4.56	257.20	2.61	3829.23	675.20	282.90
25	4.56	257.20	2.61	3829.23	675.20	282.90
26	4.56	259.73	2.47	3967.26	699.54	293.09
26	4.56	259.73	2.47	3967.26	699.54	293.09
27	4.56	261.12	0.32	3992.25	1148.58	481.23
27	4.56	261.12	0.32	3992.25	1148.58	481.23
28	45.85	261.28	0.01	2930.44	2376.61	995.75
28	45.85	261.28	0.01	2930.44	2376.61	995.75
29	45.85	261.64	1.03	3723.17	656.49	275.06
29	45.85	261.64	1.03	3723.17	656.49	275.06
30	45.85	263.26	3.62	3645.61	642.82	269.33
30	45.85	263.26	3.62	3645.61	642.82	269.33
31	45.85	266.73	6.34	2702.72	2223.00	931.40
31	45.85	266.73	6.34	2702.72	2223.00	931.40
32	57.69	269.52	2.18	2204.46	1886.93	790.59
32	57.69	269.52	2.18	2204.46	1886.93	790.59

33	57.69	270.55	1.68	2309.62	1957.86	820.31
33	57.69	270.55	1.68	2309.62	1957.86	820.31
34	57.69	272.91	7.14	2164.50	1859.98	779.30
34	57.69	272.91	7.14	2164.50	1859.98	779.30
35	45.19	276.48	4.73	2327.13	1969.67	825.25
35	45.19	276.48	4.73	2327.13	1969.67	825.25
36	45.19	280.36	6.27	2048.56	1781.77	746.53
36	45.19	280.36	6.27	2048.56	1781.77	746.53
37	62.98	284.75	9.59	1079.20	1127.93	472.58
37	62.98	284.75	9.59	1079.20	1127.93	472.58
38	62.98	287.25	1.41	822.16	754.55	316.14
38	62.98	287.25	1.41	822.16	754.55	316.14
39	55.70	289.12	5.50	698.17	670.92	281.10
39	55.70	289.12	5.50	698.17	670.92	281.10
40	55.70	292.22	5.50	321.17	416.63	174.56
40	55.70	292.22	5.50	321.17	416.63	174.56
41	60.00	293.95	0.72	85.46	257.64	107.95
41	60.00	293.95	0.72	85.46	257.64	107.95

Table 4 - Base Force Data on the 41 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-41.34	169.24	3.54	1096.08	2154.89	902.86
1	-41.34	169.24	3.54	1096.08	2154.89	902.86
2	-39.10	172.70	5.50	2791.17	4082.67	1710.56
2	-39.10	172.70	5.50	2791.17	4082.67	1710.56
3	-39.10	176.97	5.50	4252.38	5068.26	2123.51
3	-39.10	176.97	5.50	4252.38	5068.26	2123.51
4	-43.60	180.80	4.68	5272.56	5427.56	2274.05
4	-43.60	180.80	4.68	5272.56	5427.56	2274.05
5	-43.60	184.18	4.68	6498.00	6254.14	2620.37
5	-43.60	184.18	4.68	6498.00	6254.14	2620.37
6	-43.60	186.47	1.64	1669.83	294.44	123.36
6	-43.60	186.47	1.64	1669.83	294.44	123.36
7	4.56	188.23	2.34	2244.57	395.78	165.82
7	4.56	188.23	2.34	2244.57	395.78	165.82
8	4.56	191.80	4.82	6642.18	1171.20	490.71
8	4.56	191.80	4.82	6642.18	1171.20	490.71
9	4.56	196.60	4.82	7672.21	1352.82	566.81
9	4.56	196.60	4.82	7672.21	1352.82	566.81
10	4.56	201.40	4.82	8702.25	1534.44	642.90
10	4.56	201.40	4.82	8702.25	1534.44	642.90
11	4.56	203.82	0.04	59.15	10.43	4.37
11	4.56	203.82	0.04	59.15	10.43	4.37
12	4.56	205.42	3.17	4930.61	869.40	364.26
12	4.56	205.42	3.17	4930.61	869.40	364.26
13	4.56	209.45	4.92	9140.21	1611.67	675.26
13	4.56	209.45	4.92	9140.21	1611.67	675.26
14	4.56	214.20	4.61	9443.50	1665.14	697.67
14	4.56	214.20	4.61	9443.50	1665.14	697.67
15	4.56	218.80	4.61	9456.67	1667.47	698.64
15	4.56	218.80	4.61	9456.67	1667.47	698.64
16	4.56	223.40	4.61	32740.42	5773.02	2418.79
16	4.56	223.40	4.61	32740.42	5773.02	2418.79
17	4.56	227.25	3.11	6364.28	1122.19	470.18
17	4.56	227.25	3.11	6364.28	1122.19	470.18
18	4.56	230.35	3.11	6320.28	1114.44	466.93
18	4.56	230.35	3.11	6320.28	1114.44	466.93
19	4.56	232.75	1.71	3447.28	607.85	254.68
19	4.56	232.75	1.71	3447.28	607.85	254.68
20	4.56	235.90	4.61	10059.46	1773.75	743.17
20	4.56	235.90	4.61	10059.46	1773.75	743.17
21	4.56	240.45	4.51	11368.79	2004.62	839.90
21	4.56	240.45	4.51	11368.79	2004.62	839.90
22	4.56	244.95	4.51	12958.56	2284.94	957.35
22	4.56	244.95	4.51	12958.56	2284.94	957.35
23	4.56	249.38	4.36	14037.77	2475.24	1037.08

23	4.56	249.38	4.36	14037.77	2475.24	1037.08
24	4.56	253.73	4.36	15523.32	2737.18	1146.83
24	4.56	253.73	4.36	15523.32	2737.18	1146.83
25	4.56	257.20	2.61	9987.61	1761.09	737.86
25	4.56	257.20	2.61	9987.61	1761.09	737.86
26	4.56	259.73	2.47	9790.38	1726.31	723.29
26	4.56	259.73	2.47	9790.38	1726.31	723.29
27	4.56	261.12	0.32	1259.88	362.47	151.87
27	4.56	261.12	0.32	1259.88	362.47	151.87
28	45.85	261.28	0.01	33.69	27.32	11.45
28	45.85	261.28	0.01	33.69	27.32	11.45
29	45.85	261.64	1.03	3834.56	676.14	283.29
29	45.85	261.64	1.03	3834.56	676.14	283.29
30	45.85	263.26	3.62	13188.66	2325.52	974.35
30	45.85	263.26	3.62	13188.66	2325.52	974.35
31	45.85	266.73	6.34	17137.66	14095.86	5905.91
31	45.85	266.73	6.34	17137.66	14095.86	5905.91
32	57.69	269.52	2.18	4796.05	4105.22	1720.01
32	57.69	269.52	2.18	4796.05	4105.22	1720.01
33	57.69	270.55	1.68	3888.50	3296.27	1381.08
33	57.69	270.55	1.68	3888.50	3296.27	1381.08
34	57.69	272.91	7.14	15456.24	13281.67	5564.78
34	57.69	272.91	7.14	15456.24	13281.67	5564.78
35	45.19	276.48	4.73	11001.63	9311.71	3901.44
35	45.19	276.48	4.73	11001.63	9311.71	3901.44
36	45.19	280.36	6.27	12849.45	11176.04	4682.56
36	45.19	280.36	6.27	12849.45	11176.04	4682.56
37	62.98	284.75	9.59	10349.51	10816.83	4532.06
37	62.98	284.75	9.59	10349.51	10816.83	4532.06
38	62.98	287.25	1.41	1159.24	1063.91	445.76
38	62.98	287.25	1.41	1159.24	1063.91	445.76
39	55.70	289.12	5.50	3839.95	3690.08	1546.07
39	55.70	289.12	5.50	3839.95	3690.08	1546.07
40	55.70	292.22	5.50	1766.46	2291.49	960.09
40	55.70	292.22	5.50	1766.46	2291.49	960.09
41	60.00	293.95	0.72	61.44	185.23	77.61
41	60.00	293.95	0.72	61.44	185.23	77.61

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 41 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
16	33339.5	23344.6	40700.0	35.00	-0.130985E+05

***Pier/Pile Slice Force Data on the 41 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
18	12000.0	0.0	12000.0	90.00	0.334917E+03

Sum of the Resisting Forces = 97593.25 (lbs)

Average Available Shear Strength = 626.81(psf)

Sum of the Driving Forces = 44150.83 (lbs)

Average Mobilized Shear Stress = 283.56(psf)

Total length of the failure surface = 155.70(ft)

Factor of Safety Balance Check: FS = 2.21045

Janbu's Correction Factor (fo) = 1.0813

```
Janub's FS Corrected =  2.39025

                    **** END OF GEOSTASE OUTPUT ****
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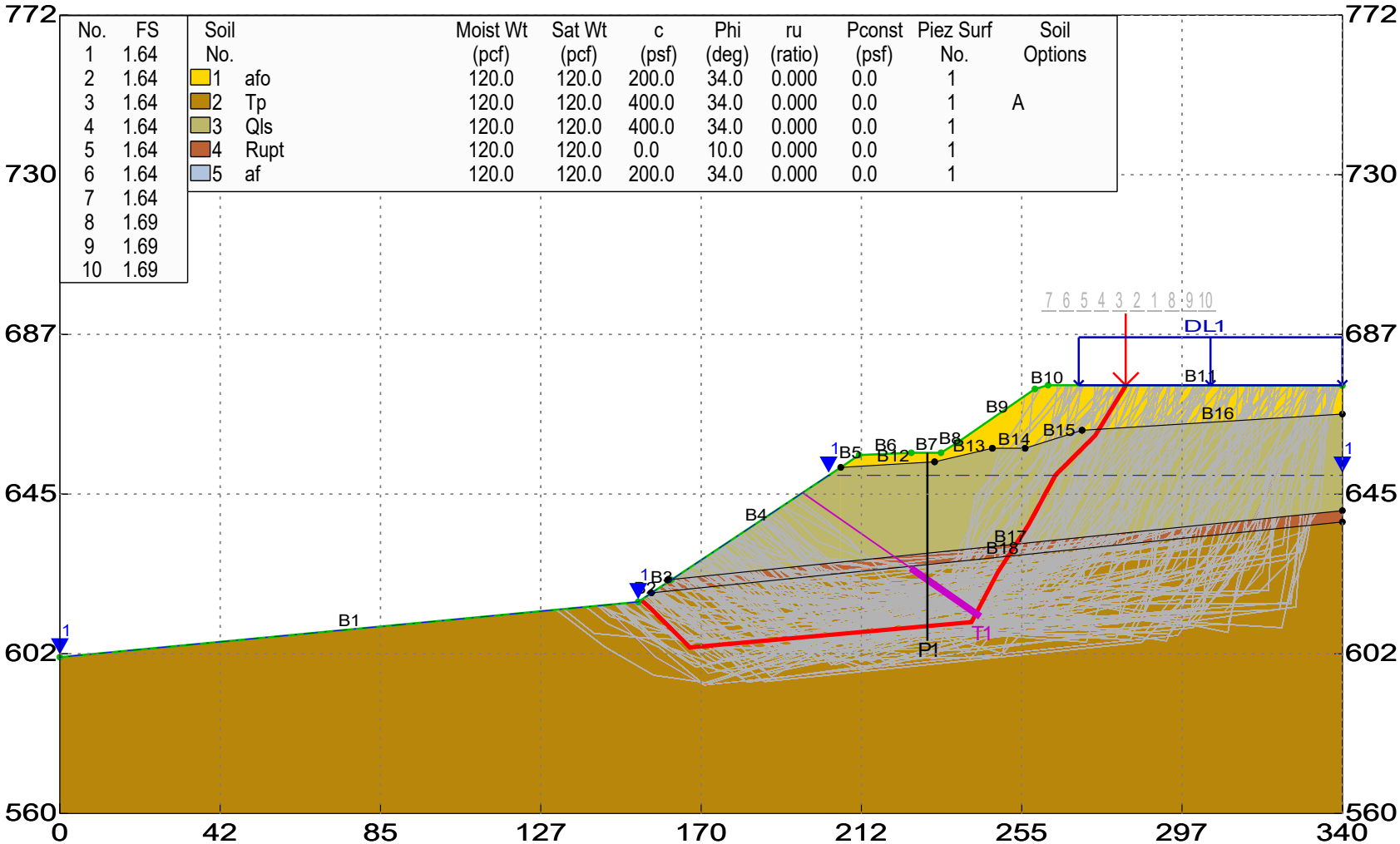
Royal Vista - Cross Section 8
Stage 5 (Temporary Backcut - Along Bedding)

LGC Geotechnical / BPP

\Sec 8 - Stage 5 (Temporary Backcut - Along Bedding).gsd

No.	FS
1	1.64
2	1.64
3	1.64
4	1.64
5	1.64
6	1.64
7	1.64
8	1.69
9	1.69
10	1.69

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.64

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 5 (Temporary Backcut - Along Bedding).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 5 (Temporary Backcut - Along Bedding).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 8

DESCRIPTION: Stage 5 (Temporary Backcut - Along Bedding)

BOUNDARY DATA

11 Surface Boundaries
18 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	601.600	153.300	616.300	2
2	153.300	616.300	156.800	618.700	2
3	156.800	618.700	162.100	622.200	4
4	162.100	622.200	207.000	652.100	3
5	207.000	652.100	211.900	655.400	1
6	211.900	655.400	225.700	656.000	1
7	225.700	656.000	233.600	656.000	1
8	233.600	656.000	238.200	658.900	1
9	238.200	658.900	258.500	673.000	1
10	258.500	673.000	262.000	674.000	1
11	262.000	674.000	340.000	673.900	1
12	207.000	652.100	231.900	653.600	3
13	231.900	653.600	247.200	657.200	3
14	247.200	657.200	255.900	657.200	3
15	255.900	657.200	271.000	662.000	3
16	271.000	662.000	340.000	666.300	3
17	161.100	622.200	340.000	640.600	4
18	156.800	618.700	340.000	637.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	601.60
2	153.30	616.30
3	203.80	650.00
4	340.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	11	270.100	674.000	250.000	340.000	674.000	250.000	0.00

NOTE - Load Stress Varies Linearly Within Specified Range.

For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	196.90	645.37	203500.0	5.0	35.00	35.0	22.5

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.

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	230.00	656.00	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 15.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	165.00	606.90	220.00	613.80	30.00
2	230.00	613.90	330.00	624.90	30.00

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 = 101

Number of Trial Surfaces With Valid FS = 899

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 10.1 %

Statistical Data On All Valid FS Values:
FS Max = 8.952 FS Min = 1.642 FS Ave = 3.437
Standard Deviation = 1.329 Coefficient of Variation = 38.68 %

Critical Surface is Sequence Number 117 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	223.96	626.43

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	230.00	609.87

Factor Of Safety For The Critical or Specified Surface = 1.642

Table 1 - Geometry Data on the 45 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.01	0.01	154.11	616.85	616.85	-41.55	34.44	0.01
2	2.31	1.83	155.27	615.82	617.65	-41.55	34.44	3.08
3	0.38	3.96	156.61	614.61	618.57	-44.94	34.44	0.54
4	0.11	4.38	156.86	614.36	618.74	-44.94	33.44	0.16
5	4.19	7.94	159.01	612.22	620.16	-44.94	33.44	5.91
6	1.00	12.24	161.60	609.63	621.87	-44.94	33.44	1.41
7	0.23	13.26	162.22	609.01	622.28	-44.94	33.66	0.33
8	4.71	17.37	164.68	606.55	623.92	-44.94	33.66	6.65
9	4.90	22.70	169.49	604.42	627.12	5.15	33.66	4.92
10	4.90	25.51	174.38	604.86	630.38	5.15	33.66	4.92
11	4.90	28.33	179.28	605.30	633.64	5.15	33.66	4.92
12	5.52	31.33	184.49	605.77	637.11	5.15	33.66	5.54
13	5.52	34.51	190.00	606.27	640.78	5.15	33.66	5.54
14	5.52	37.69	195.52	606.77	644.46	5.15	33.66	5.54
15	5.52	40.87	201.04	607.27	648.13	5.15	33.66	5.54
16	0.05	42.47	203.82	607.52	649.98	5.15	33.66	0.05
17	3.15	43.39	205.42	607.66	651.05	5.15	33.66	3.17
18	4.90	45.73	209.45	608.02	653.75	5.15	33.96	4.92
19	4.60	47.05	214.20	608.45	655.50	5.15	2.49	4.62
20	4.60	46.83	218.80	608.87	655.70	5.15	2.49	4.62
21	4.60	46.62	223.40	609.28	655.90	5.15	2.49	4.62
22	3.10	46.37	227.25	609.63	656.00	5.15	0.00	3.11
23	3.10	46.09	230.35	609.91	656.00	5.15	0.00	3.11
24	1.70	45.88	232.75	610.12	656.00	5.15	0.00	1.71
25	4.60	47.04	235.90	610.41	657.45	5.15	32.23	4.62
26	3.46	49.33	239.93	610.77	660.10	5.15	34.78	3.48
27	2.77	48.71	243.05	613.55	662.27	62.23	34.78	5.94
28	2.77	45.38	245.82	618.81	664.19	62.23	34.78	5.94
29	1.45	42.84	247.93	622.82	665.66	62.23	34.78	3.12
30	2.75	40.79	250.03	626.33	667.12	57.14	34.78	5.07

31	2.09	38.72	252.45	630.08	668.80	57.14	34.78	3.86
32	2.40	36.80	254.70	633.56	670.36	57.14	34.78	4.43
33	0.89	35.39	256.35	636.11	671.50	57.14	34.78	1.64
34	1.71	34.01	257.65	638.39	672.41	61.77	34.78	3.62
35	3.50	30.26	260.25	643.24	673.50	61.77	15.95	7.40
36	1.88	25.75	262.94	648.25	674.00	61.77	-0.07	3.97
37	0.01	23.99	263.88	650.01	674.00	61.77	-0.07	0.02
38	3.11	22.43	265.44	651.57	674.00	45.02	-0.07	4.40
39	3.11	19.31	268.55	654.68	673.99	45.02	-0.07	4.40
40	0.90	17.30	270.55	656.69	673.99	45.02	-0.07	1.27
41	3.49	15.11	272.74	658.88	673.99	45.02	-0.07	4.93
42	1.01	12.53	274.99	661.45	673.98	58.68	-0.07	1.94
43	3.39	8.91	277.19	665.07	673.98	58.68	-0.07	6.53
44	3.39	3.33	280.59	670.65	673.98	58.68	-0.07	6.53
45	0.28	0.27	282.43	673.71	673.97	61.92	-0.07	0.60

Table 2 - Force Data On The 45 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	0.0	0.0	0.0	0.0	0.0	0.0
2	506.1	0.0	238.5	0.0	0.0	0.0
3	180.5	0.0	90.4	0.0	0.0	0.0
4	59.9	0.0	30.0	0.0	0.0	0.0
5	3988.9	0.0	2015.0	0.0	0.0	0.0
6	1468.9	0.0	744.7	0.0	0.0	0.0
7	367.6	0.0	186.5	0.0	0.0	0.0
8	9810.8	0.0	4979.8	0.0	0.0	0.0
9	13334.5	0.0	4813.3	0.0	0.0	0.0
10	14991.0	0.0	5413.1	0.0	0.0	0.0
11	16647.5	0.0	6013.0	0.0	0.0	0.0
12	20749.1	0.0	7496.3	0.0	0.0	0.0
13	22853.4	0.0	8258.3	0.0	0.0	0.0
14	24957.7	0.0	9020.3	0.0	0.0	0.0
15	27062.1	0.0	9782.3	0.0	0.0	0.0
16	236.9	0.1	123.7	0.0	0.0	0.0
17	16419.5	0.0	8365.3	0.0	0.0	0.0
18	26887.2	0.0	12886.7	0.0	0.0	0.0
19	25970.8	0.0	11974.4	0.0	0.0	0.0
20	25852.5	0.0	11855.0	0.0	0.0	0.0
21	25734.1	0.0	11735.5	0.0	0.0	0.0
22	17250.7	0.0	7841.4	0.0	0.0	0.0
23	17146.8	0.0	7787.1	0.0	0.0	0.0
24	9359.0	0.0	4247.3	0.0	0.0	0.0
25	25968.0	0.0	11411.0	0.0	0.0	0.0
26	20505.7	0.0	8513.7	0.0	0.0	0.0
27	16180.9	0.0	13512.6	0.0	0.0	0.0
28	15073.2	0.0	11563.3	0.0	0.0	0.0
29	7463.5	0.0	5285.9	0.0	0.0	0.0
30	13470.5	0.0	7492.9	0.0	0.0	0.0
31	9732.4	0.0	4798.9	0.0	0.0	0.0
32	10602.4	0.0	4539.4	0.0	0.0	0.0
33	3780.3	0.0	1421.9	0.0	0.0	0.0
34	6979.5	0.0	2618.9	0.0	0.0	0.0
35	12707.2	0.0	3119.5	0.0	0.0	0.0
36	5796.4	0.0	432.6	0.0	0.0	0.0
37	23.7	0.0	0.0	0.0	0.0	0.0
38	8363.2	0.0	0.0	0.0	0.0	0.0
39	7201.9	0.0	0.0	0.0	0.0	0.0
40	1868.8	0.0	0.0	0.0	0.0	225.0
41	6321.3	0.0	0.0	0.0	0.0	871.8
42	1513.5	0.0	0.0	0.0	0.0	251.6
43	3629.9	0.0	0.0	0.0	0.0	848.7
44	1354.9	0.0	0.0	0.0	0.0	848.7
45	9.1	0.0	0.0	0.0	0.0	71.1

TOTAL WEIGHT OF SLIDING MASS = 500382.13(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 320599.28(lbs)

TOTAL AREA OF SLIDING MASS = 4169.85(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 45 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	400.00	34.00	A
2	2	400.00	34.00	A
3	2	400.00	34.00	A
4	2	400.00	34.00	A
5	2	400.00	34.00	A
6	2	400.00	34.00	A
7	2	400.00	34.00	A
8	2	400.00	34.00	A
9	2	300.00	12.00	A
10	2	300.00	12.00	A
11	2	300.00	12.00	A
12	2	300.00	12.00	A
13	2	300.00	12.00	A
14	2	300.00	12.00	A
15	2	300.00	12.00	A
16	2	300.00	12.00	A
17	2	300.00	12.00	A
18	2	300.00	12.00	A
19	2	300.00	12.00	A
20	2	300.00	12.00	A
21	2	300.00	12.00	A
22	2	300.00	12.00	A
23	2	300.00	12.00	A
24	2	300.00	12.00	A
25	2	300.00	12.00	A
26	2	300.00	12.00	A
27	2	400.00	34.00	A
28	2	400.00	34.00	A
29	2	400.00	34.00	A
30	2	400.00	34.00	A
31	4	0.00	10.00	
32	3	400.00	34.00	
33	3	400.00	34.00	
34	3	400.00	34.00	
35	3	400.00	34.00	
36	3	400.00	34.00	
37	3	400.00	34.00	
38	3	400.00	34.00	
39	3	400.00	34.00	
40	3	400.00	34.00	
41	3	400.00	34.00	
42	3	400.00	34.00	
43	1	200.00	34.00	
44	1	200.00	34.00	
45	1	200.00	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 45 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-41.55	154.11	0.01	388.94	662.34	402.94
1	-41.55	154.11	0.01	388.94	662.34	402.94

2	-41.55	155.27	3.08	622.27	819.73	498.69
2	-41.55	155.27	3.08	622.27	819.73	498.69
3	-44.94	156.61	0.54	1028.38	1093.65	665.33
3	-44.94	156.61	0.54	1028.38	1093.65	665.33
4	-44.94	156.86	0.16	1085.96	1132.49	688.96
4	-44.94	156.86	0.16	1085.96	1132.49	688.96
5	-44.94	159.01	5.91	1578.29	1464.57	890.98
5	-44.94	159.01	5.91	1578.29	1464.57	890.98
6	-44.94	161.60	1.41	2172.04	1865.06	1134.62
6	-44.94	161.60	1.41	2172.04	1865.06	1134.62
7	-44.94	162.22	0.33	2313.12	1960.22	1192.51
7	-44.94	162.22	0.33	2313.12	1960.22	1192.51
8	-44.94	164.68	6.65	2881.41	2343.54	1425.70
8	-44.94	164.68	6.65	2881.41	2343.54	1425.70
9	5.15	169.49	4.92	1704.91	662.39	402.97
9	5.15	169.49	4.92	1704.91	662.39	402.97
10	5.15	174.38	4.92	1918.51	707.79	430.59
10	5.15	174.38	4.92	1918.51	707.79	430.59
11	5.15	179.28	4.92	2132.11	753.19	458.21
11	5.15	179.28	4.92	2132.11	753.19	458.21
12	5.15	184.49	5.54	2359.29	801.48	487.59
12	5.15	184.49	5.54	2359.29	801.48	487.59
13	5.15	190.00	5.54	2600.03	852.65	518.72
13	5.15	190.00	5.54	2600.03	852.65	518.72
14	5.15	195.52	5.54	2840.78	903.83	549.85
14	5.15	195.52	5.54	2840.78	903.83	549.85
15	5.15	201.04	5.54	3081.53	955.00	580.98
15	5.15	201.04	5.54	3081.53	955.00	580.98
16	5.15	203.82	0.05	2397.94	809.70	492.58
16	5.15	203.82	0.05	2397.94	809.70	492.58
17	5.15	205.42	3.17	2515.05	834.59	507.73
17	5.15	205.42	3.17	2515.05	834.59	507.73
18	5.15	209.45	4.92	2814.36	898.21	546.43
18	5.15	209.45	4.92	2814.36	898.21	546.43
19	5.15	214.20	4.62	2997.39	937.12	570.10
19	5.15	214.20	4.62	2997.39	937.12	570.10
20	5.15	218.80	4.62	2997.52	937.14	570.12
20	5.15	218.80	4.62	2997.52	937.14	570.12
21	5.15	223.40	4.62	8009.11	2002.39	1218.17
21	5.15	223.40	4.62	8009.11	2002.39	1218.17
22	5.15	227.25	3.11	2989.76	935.49	569.11
22	5.15	227.25	3.11	2989.76	935.49	569.11
23	5.15	230.35	3.11	2973.88	932.12	567.06
23	5.15	230.35	3.11	2973.88	932.12	567.06
24	5.15	232.75	1.71	2961.58	929.50	565.47
24	5.15	232.75	1.71	2961.58	929.50	565.47
25	5.15	235.90	4.62	3117.26	962.59	585.60
25	5.15	235.90	4.62	3117.26	962.59	585.60
26	5.15	239.93	3.48	3410.97	1025.02	623.58
26	5.15	239.93	3.48	3410.97	1025.02	623.58
27	62.23	243.05	5.94	1661.88	1520.95	925.28
27	62.23	243.05	5.94	1661.88	1520.95	925.28
28	62.23	245.82	5.94	1622.83	1494.61	909.26
28	62.23	245.82	5.94	1622.83	1494.61	909.26
29	62.23	247.93	3.12	1593.07	1474.54	897.04
29	62.23	247.93	3.12	1593.07	1474.54	897.04
30	57.14	250.03	5.07	1779.52	1600.30	973.55
30	57.14	250.03	5.07	1779.52	1600.30	973.55
31	57.14	252.45	3.86	2882.92	508.34	309.25
31	57.14	252.45	3.86	2882.92	508.34	309.25
32	57.14	254.70	4.43	1763.40	1589.43	966.94
32	57.14	254.70	4.43	1763.40	1589.43	966.94
33	57.14	256.35	1.64	1757.72	1585.60	964.61
33	57.14	256.35	1.64	1757.72	1585.60	964.61
34	61.77	257.65	3.62	1564.98	1455.59	885.52
34	61.77	257.65	3.62	1564.98	1455.59	885.52
35	61.77	260.25	7.40	1483.98	1400.96	852.28
35	61.77	260.25	7.40	1483.98	1400.96	852.28
36	61.77	262.94	3.97	1359.11	1316.73	801.04
36	61.77	262.94	3.97	1359.11	1316.73	801.04
37	61.77	263.88	0.02	1303.54	1279.25	778.24
37	61.77	263.88	0.02	1303.54	1279.25	778.24

38	45.02	265.44	4.40	1677.88	1531.74	931.84
38	45.02	265.44	4.40	1677.88	1531.74	931.84
39	45.02	268.55	4.40	1419.48	1357.45	825.82
39	45.02	268.55	4.40	1419.48	1357.45	825.82
40	45.02	270.55	1.27	1425.75	1361.68	828.39
40	45.02	270.55	1.27	1425.75	1361.68	828.39
41	45.02	272.74	4.93	1243.36	1238.66	753.54
41	45.02	272.74	4.93	1243.36	1238.66	753.54
42	58.68	274.99	1.94	761.22	913.45	555.70
42	58.68	274.99	1.94	761.22	913.45	555.70
43	58.68	277.19	6.53	635.93	628.94	382.62
43	58.68	277.19	6.53	635.93	628.94	382.62
44	58.68	280.59	6.53	249.19	368.08	223.93
44	58.68	280.59	6.53	249.19	368.08	223.93
45	61.92	282.43	0.60	18.67	212.59	129.33
45	61.92	282.43	0.60	18.67	212.59	129.33

Table 4 - Base Force Data on the 45 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-41.55	154.11	0.01	4.94	8.42	5.12
1	-41.55	154.11	0.01	4.94	8.42	5.12
2	-41.55	155.27	3.08	1918.32	2527.03	1537.33
2	-41.55	155.27	3.08	1918.32	2527.03	1537.33
3	-44.94	156.61	0.54	551.77	586.79	356.97
3	-44.94	156.61	0.54	551.77	586.79	356.97
4	-44.94	156.86	0.16	175.02	182.51	111.03
4	-44.94	156.86	0.16	175.02	182.51	111.03
5	-44.94	159.01	5.91	9333.60	8661.09	5269.03
5	-44.94	159.01	5.91	9333.60	8661.09	5269.03
6	-44.94	161.60	1.41	3068.60	2634.90	1602.96
6	-44.94	161.60	1.41	3068.60	2634.90	1602.96
7	-44.94	162.22	0.33	754.78	639.63	389.12
7	-44.94	162.22	0.33	754.78	639.63	389.12
8	-44.94	164.68	6.65	19159.87	15583.28	9480.18
8	-44.94	164.68	6.65	19159.87	15583.28	9480.18
9	5.15	169.49	4.92	8381.33	3256.30	1980.99
9	5.15	169.49	4.92	8381.33	3256.30	1980.99
10	5.15	174.38	4.92	9431.37	3479.49	2116.77
10	5.15	174.38	4.92	9431.37	3479.49	2116.77
11	5.15	179.28	4.92	10481.42	3702.69	2252.55
11	5.15	179.28	4.92	10481.42	3702.69	2252.55
12	5.15	184.49	5.54	13072.39	4440.87	2701.63
12	5.15	184.49	5.54	13072.39	4440.87	2701.63
13	5.15	190.00	5.54	14406.34	4724.41	2874.12
13	5.15	190.00	5.54	14406.34	4724.41	2874.12
14	5.15	195.52	5.54	15740.28	5007.95	3046.62
14	5.15	195.52	5.54	15740.28	5007.95	3046.62
15	5.15	201.04	5.54	17074.22	5291.49	3219.11
15	5.15	201.04	5.54	17074.22	5291.49	3219.11
16	5.15	203.82	0.05	111.93	37.79	22.99
16	5.15	203.82	0.05	111.93	37.79	22.99
17	5.15	205.42	3.17	7963.35	2642.55	1607.61
17	5.15	205.42	3.17	7963.35	2642.55	1607.61
18	5.15	209.45	4.92	13846.22	4419.06	2688.36
18	5.15	209.45	4.92	13846.22	4419.06	2688.36
19	5.15	214.20	4.62	13843.85	4328.19	2633.08
19	5.15	214.20	4.62	13843.85	4328.19	2633.08
20	5.15	218.80	4.62	13844.43	4328.32	2633.16
20	5.15	218.80	4.62	13844.43	4328.32	2633.16
21	5.15	223.40	4.62	36991.14	9248.30	5626.26
21	5.15	223.40	4.62	36991.14	9248.30	5626.26
22	5.15	227.25	3.11	9305.81	2911.78	1771.40
22	5.15	227.25	3.11	9305.81	2911.78	1771.40
23	5.15	230.35	3.11	9256.36	2901.27	1765.00
23	5.15	230.35	3.11	9256.36	2901.27	1765.00
24	5.15	232.75	1.71	5055.07	1586.56	965.19

24	5.15	232.75	1.71	5055.07	1586.56	965.19
25	5.15	235.90	4.62	14397.48	4445.87	2704.67
25	5.15	235.90	4.62	14397.48	4445.87	2704.67
26	5.15	239.93	3.48	11862.84	3564.88	2168.72
26	5.15	239.93	3.48	11862.84	3564.88	2168.72
27	62.23	243.05	5.94	9874.36	9037.02	5497.73
27	62.23	243.05	5.94	9874.36	9037.02	5497.73
28	62.23	245.82	5.94	9642.36	8880.53	5402.52
28	62.23	245.82	5.94	9642.36	8880.53	5402.52
29	62.23	247.93	3.12	4964.98	4595.57	2795.74
29	62.23	247.93	3.12	4964.98	4595.57	2795.74
30	57.14	250.03	5.07	9027.27	8118.12	4938.71
30	57.14	250.03	5.07	9027.27	8118.12	4938.71
31	57.14	252.45	3.86	11131.02	1962.70	1194.02
31	57.14	252.45	3.86	11131.02	1962.70	1194.02
32	57.14	254.70	4.43	7803.99	7034.07	4279.22
32	57.14	254.70	4.43	7803.99	7034.07	4279.22
33	57.14	256.35	1.64	2883.64	2601.27	1582.50
33	57.14	256.35	1.64	2883.64	2601.27	1582.50
34	61.77	257.65	3.62	5658.07	5262.59	3201.53
34	61.77	257.65	3.62	5658.07	5262.59	3201.53
35	61.77	260.25	7.40	10981.95	10367.54	6307.16
35	61.77	260.25	7.40	10981.95	10367.54	6307.16
36	61.77	262.94	3.97	5391.40	5223.29	3177.62
36	61.77	262.94	3.97	5391.40	5223.29	3177.62
37	61.77	263.88	0.02	22.68	22.25	13.54
37	61.77	263.88	0.02	22.68	22.25	13.54
38	45.02	265.44	4.40	7377.00	6734.50	4096.98
38	45.02	265.44	4.40	7377.00	6734.50	4096.98
39	45.02	268.55	4.40	6240.95	5968.22	3630.81
39	45.02	268.55	4.40	6240.95	5968.22	3630.81
40	45.02	270.55	1.27	1815.30	1733.73	1054.73
40	45.02	270.55	1.27	1815.30	1733.73	1054.73
41	45.02	272.74	4.93	6134.13	6110.92	3717.62
41	45.02	272.74	4.93	6134.13	6110.92	3717.62
42	58.68	274.99	1.94	1474.19	1768.99	1076.18
42	58.68	274.99	1.94	1474.19	1768.99	1076.18
43	58.68	277.19	6.53	4153.68	4108.03	2499.14
43	58.68	277.19	6.53	4153.68	4108.03	2499.14
44	58.68	280.59	6.53	1627.67	2404.21	1462.62
44	58.68	280.59	6.53	1627.67	2404.21	1462.62
45	61.92	282.43	0.60	11.29	128.50	78.17
45	61.92	282.43	0.60	11.29	128.50	78.17

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 45 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 45 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
23	12000.0	0.0	12000.0	90.00	0.378412E+03

Sum of the Resisting Forces = 141901.90 (lbs)

Average Available Shear Strength = 841.51(psf)

Sum of the Driving Forces = 93742.47 (lbs)

Average Mobilized Shear Stress = 555.91(psf)

Total length of the failure surface = 168.63(ft)

```
Factor of Safety Balance Check: FS =  1.51374

Janbu's Correction Factor (fo) =  1.0845

Janub's FS Corrected =  1.64159

                    **** END OF GEOSTASE OUTPUT ****
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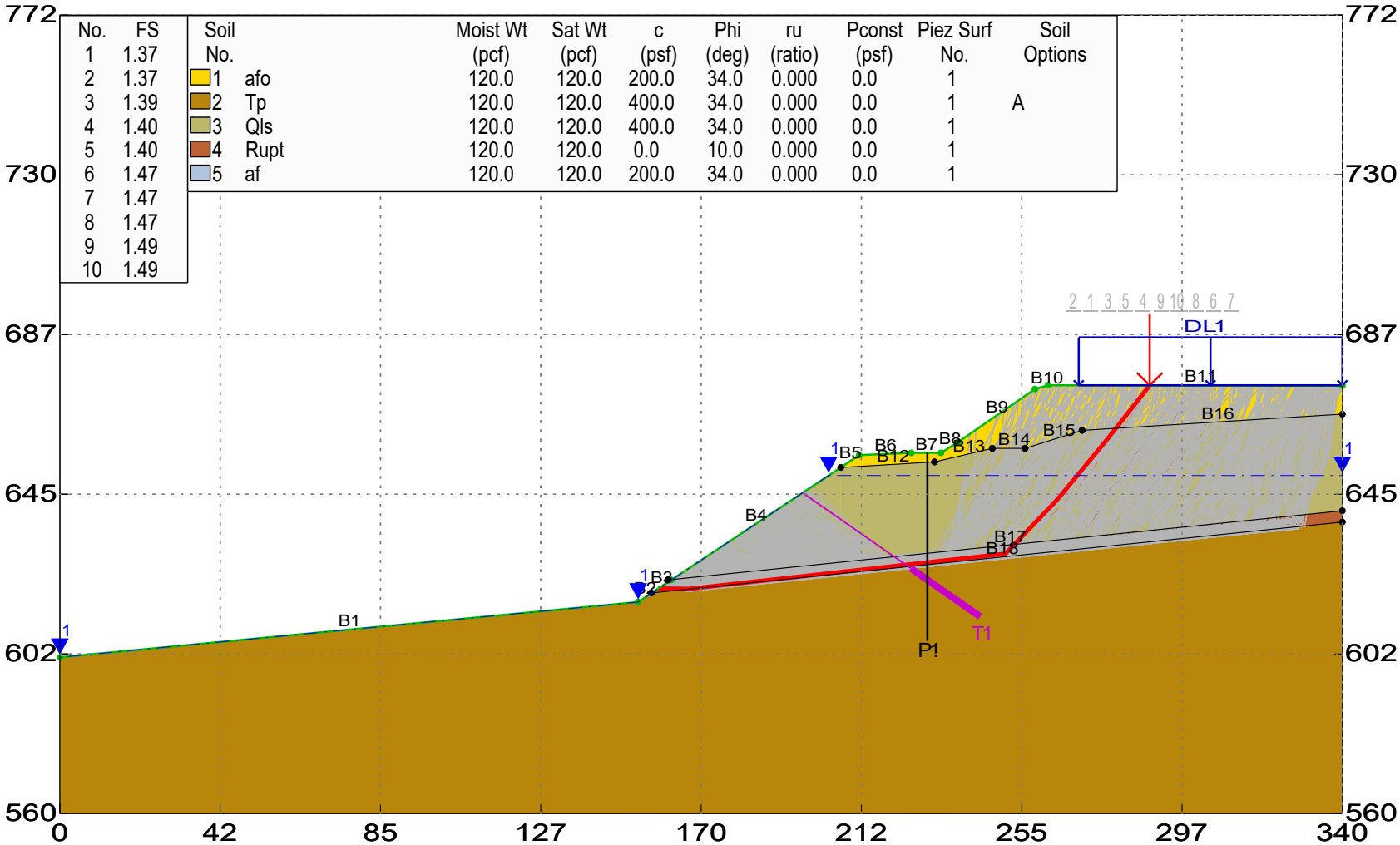
Royal Vista - Cross Section 8
Stage 5 (Temporary Backcut - Rupture)

LGC Geotechnical / BPP

\Sec 8 - Stage 5 (Temporary Backcut).gsd

No.	FS
1	1.37
2	1.37
3	1.39
4	1.40
5	1.40
6	1.47
7	1.47
8	1.47
9	1.49
10	1.49

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.37

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 5 (Temporary Backcut).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 5 (Temporary Backcut).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 8

DESCRIPTION: Stage 5 (Temporary Backcut - Rupture)

BOUNDARY DATA

11 Surface Boundaries
18 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	601.600	153.300	616.300	2
2	153.300	616.300	156.800	618.700	2
3	156.800	618.700	162.100	622.200	4
4	162.100	622.200	207.000	652.100	3
5	207.000	652.100	211.900	655.400	1
6	211.900	655.400	225.700	656.000	1
7	225.700	656.000	233.600	656.000	1
8	233.600	656.000	238.200	658.900	1
9	238.200	658.900	258.500	673.000	1
10	258.500	673.000	262.000	674.000	1
11	262.000	674.000	340.000	673.900	1
12	207.000	652.100	231.900	653.600	3
13	231.900	653.600	247.200	657.200	3
14	247.200	657.200	255.900	657.200	3
15	255.900	657.200	271.000	662.000	3
16	271.000	662.000	340.000	666.300	3
17	161.100	622.200	340.000	640.600	4
18	156.800	618.700	340.000	637.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	34.00
2	8.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	601.60
2	153.30	616.30
3	203.80	650.00
4	340.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	11	270.100	674.000	250.000	340.000	674.000	250.000	0.00

NOTE - Load Stress Varies Linearly Within Specified Range.

For Multi-Stage Analysis, Refer to Detailed Output for Distributed Loads Applied to Each Stage.

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	196.90	645.37	203500.0	5.0	35.00	35.0	22.5

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.

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	230.00	656.00	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 20.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	165.00	620.40	220.00	627.20	3.00
2	230.00	627.40	330.00	637.40	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 = 229

Number of Trial Surfaces With Valid FS = 771

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 22.9 %

Statistical Data On All Valid FS Values:
FS Max = 6.479 FS Min = 1.374 FS Ave = 2.382
Standard Deviation = 0.729 Coefficient of Variation = 30.59 %

Critical Surface is Sequence Number 352 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	224.26	626.22

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	230.00	626.86

Factor Of Safety For The Critical or Specified Surface = 1.374

Table 1 - Geometry Data on the 39 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.08	0.03	158.67	619.91	619.93	-0.73	33.44	0.08
2	2.40	0.86	159.90	619.89	620.75	-0.73	33.44	2.40
3	1.00	2.00	161.60	619.87	621.87	-0.73	33.44	1.00
4	0.23	2.42	162.22	619.86	622.28	-0.73	33.66	0.23
5	4.49	4.02	164.58	619.83	623.85	-0.73	33.66	4.49
6	4.97	6.92	169.31	620.08	627.00	6.37	33.66	5.00
7	4.97	9.67	174.27	620.64	630.31	6.37	33.66	5.00
8	4.97	12.43	179.24	621.19	633.62	6.37	33.66	5.00
9	5.52	15.33	184.49	621.78	637.11	6.37	33.66	5.55
10	5.52	18.39	190.00	622.39	640.78	6.37	33.66	5.55
11	5.52	21.45	195.52	623.01	644.46	6.37	33.66	5.55
12	5.52	24.51	201.04	623.63	648.13	6.37	33.66	5.55
13	0.05	26.05	203.82	623.94	649.98	6.37	33.66	0.05
14	3.15	26.93	205.42	624.12	651.05	6.37	33.66	3.17
15	4.90	29.18	209.45	624.57	653.75	6.37	33.96	4.93
16	4.60	30.40	214.20	625.10	655.50	6.37	2.49	4.63
17	4.60	30.09	218.80	625.61	655.70	6.37	2.49	4.63
18	4.60	29.78	223.40	626.12	655.90	6.37	2.49	4.63
19	3.10	29.45	227.25	626.55	656.00	6.37	0.00	3.12
20	3.10	29.10	230.35	626.90	656.00	6.37	0.00	3.12
21	1.70	28.83	232.75	627.17	656.00	6.37	0.00	1.71
22	4.60	29.93	235.90	627.52	657.45	6.37	32.23	4.63
23	4.50	32.43	240.45	628.03	660.46	6.37	34.78	4.53
24	4.50	35.06	244.95	628.53	663.59	6.37	34.78	4.53
25	3.45	37.37	248.92	628.98	666.35	6.37	34.78	3.47
26	2.38	37.96	251.84	630.41	668.37	46.25	34.78	3.44
27	2.87	37.04	254.46	633.15	670.20	46.25	34.78	4.15
28	2.60	36.09	257.20	636.01	672.10	46.25	34.78	3.76
29	3.50	34.30	260.25	639.20	673.50	46.25	15.95	5.06
30	2.48	31.68	263.24	642.32	674.00	46.25	-0.07	3.59

31	2.63	28.78	265.80	645.21	674.00	50.49	-0.07	4.14
32	2.63	25.59	268.43	648.40	673.99	50.49	-0.07	4.14
33	0.36	23.77	269.92	650.22	673.99	50.49	-0.07	0.56
34	0.90	23.01	270.55	650.98	673.99	50.49	-0.07	1.41
35	3.10	20.58	272.55	653.40	673.99	50.49	-0.07	4.88
36	3.10	16.82	275.65	657.16	673.98	50.49	-0.07	4.88
37	2.76	13.18	278.58	660.80	673.98	51.86	-0.07	4.47
38	4.48	8.56	282.20	665.41	673.97	51.86	-0.07	7.25
39	4.48	2.85	286.68	671.11	673.97	51.86	-0.07	7.25

Table 2 - Force Data On The 39 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	0.2	0.0	0.0	0.0	0.0	0.0
2	246.7	0.0	84.3	0.0	0.0	0.0
3	240.1	0.0	85.1	0.0	0.0	0.0
4	67.0	0.0	23.8	0.0	0.0	0.0
5	2165.9	0.0	774.7	0.0	0.0	0.0
6	4124.6	0.0	1489.4	0.0	0.0	0.0
7	5765.8	0.0	2085.1	0.0	0.0	0.0
8	7407.1	0.0	2680.7	0.0	0.0	0.0
9	10152.4	0.0	3676.3	0.0	0.0	0.0
10	12177.7	0.0	4411.3	0.0	0.0	0.0
11	14203.0	0.0	5146.4	0.0	0.0	0.0
12	16228.3	0.0	5881.4	0.0	0.0	0.0
13	145.3	0.1	76.1	0.0	0.0	0.0
14	10192.7	0.0	5125.3	0.0	0.0	0.0
15	17160.7	0.0	7825.3	0.0	0.0	0.0
16	16783.1	0.0	7193.0	0.0	0.0	0.0
17	16609.8	0.0	7044.5	0.0	0.0	0.0
18	16436.5	0.0	6896.1	0.0	0.0	0.0
19	10954.0	0.0	4563.6	0.0	0.0	0.0
20	10825.1	0.0	4496.2	0.0	0.0	0.0
21	5881.7	0.0	2437.1	0.0	0.0	0.0
22	16521.2	0.0	6492.7	0.0	0.0	0.0
23	17514.5	0.0	6207.9	0.0	0.0	0.0
24	18930.8	0.0	6065.9	0.0	0.0	0.0
25	15464.5	0.0	4552.0	0.0	0.0	0.0
26	10846.6	0.0	4208.5	0.0	0.0	0.0
27	12760.9	0.0	4363.6	0.0	0.0	0.0
28	11258.7	0.0	3281.8	0.0	0.0	0.0
29	14407.3	0.0	3411.7	0.0	0.0	0.0
30	9424.9	0.0	1718.2	0.0	0.0	0.0
31	9094.0	0.0	1236.7	0.0	0.0	0.0
32	8084.2	0.0	412.2	0.0	0.0	0.0
33	1013.1	0.0	0.0	0.0	0.0	0.0
34	2485.4	0.0	0.0	0.0	0.0	225.0
35	7661.3	0.0	0.0	0.0	0.0	775.4
36	6259.8	0.0	0.0	0.0	0.0	775.4
37	4362.0	0.0	0.0	0.0	0.0	689.6
38	4601.7	0.0	0.0	0.0	0.0	1119.5
39	1533.9	0.0	0.0	0.0	0.0	1119.5

TOTAL WEIGHT OF SLIDING MASS = 349992.39(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 242467.38(lbs)

TOTAL AREA OF SLIDING MASS = 2916.60(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 39 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	4	0.00	10.00	
2	4	0.00	10.00	

3	4	0.00	10.00
4	4	0.00	10.00
5	4	0.00	10.00
6	4	0.00	10.00
7	4	0.00	10.00
8	4	0.00	10.00
9	4	0.00	10.00
10	4	0.00	10.00
11	4	0.00	10.00
12	4	0.00	10.00
13	4	0.00	10.00
14	4	0.00	10.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	3	400.00	34.00
28	3	400.00	34.00
29	3	400.00	34.00
30	3	400.00	34.00
31	3	400.00	34.00
32	3	400.00	34.00
33	3	400.00	34.00
34	3	400.00	34.00
35	3	400.00	34.00
36	3	400.00	34.00
37	3	400.00	34.00
38	1	200.00	34.00
39	1	200.00	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 39 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-0.73	158.67	0.08	3.07	0.54	0.39
1	-0.73	158.67	0.08	3.07	0.54	0.39
2	-0.73	159.90	2.40	67.86	11.97	8.57
2	-0.73	159.90	2.40	67.86	11.97	8.57
3	-0.73	161.60	1.00	155.33	27.39	19.61
3	-0.73	161.60	1.00	155.33	27.39	19.61
4	-0.73	162.22	0.23	187.10	32.99	23.62
4	-0.73	162.22	0.23	187.10	32.99	23.62
5	-0.73	164.58	4.49	310.29	54.71	39.17
5	-0.73	164.58	4.49	310.29	54.71	39.17
6	6.37	169.31	5.00	524.27	92.44	66.19
6	6.37	169.31	5.00	524.27	92.44	66.19
7	6.37	174.27	5.00	732.29	129.12	92.45
7	6.37	174.27	5.00	732.29	129.12	92.45
8	6.37	179.24	5.00	940.32	165.80	118.71
8	6.37	179.24	5.00	940.32	165.80	118.71
9	6.37	184.49	5.55	1159.87	204.52	146.43
9	6.37	184.49	5.55	1159.87	204.52	146.43
10	6.37	190.00	5.55	1390.95	245.26	175.60
10	6.37	190.00	5.55	1390.95	245.26	175.60

11	6.37	195.52	5.55	1622.04	286.01	204.77
11	6.37	195.52	5.55	1622.04	286.01	204.77
12	6.37	201.04	5.55	1853.12	326.76	233.94
12	6.37	201.04	5.55	1853.12	326.76	233.94
13	6.37	203.82	0.05	1477.71	260.56	186.55
13	6.37	203.82	0.05	1477.71	260.56	186.55
14	6.37	205.42	3.17	1592.54	280.81	201.05
14	6.37	205.42	3.17	1592.54	280.81	201.05
15	6.37	209.45	4.93	1886.13	332.58	238.11
15	6.37	209.45	4.93	1886.13	332.58	238.11
16	6.37	214.20	4.63	2062.85	363.74	260.42
16	6.37	214.20	4.63	2062.85	363.74	260.42
17	6.37	218.80	4.63	2057.34	362.76	259.72
17	6.37	218.80	4.63	2057.34	362.76	259.72
18	6.37	223.40	4.63	7050.09	1243.12	890.02
18	6.37	223.40	4.63	7050.09	1243.12	890.02
19	6.37	227.25	3.12	2039.23	359.57	257.44
19	6.37	227.25	3.12	2039.23	359.57	257.44
20	6.37	230.35	3.12	2019.59	356.11	254.96
20	6.37	230.35	3.12	2019.59	356.11	254.96
21	6.37	232.75	1.71	2004.37	353.43	253.04
21	6.37	232.75	1.71	2004.37	353.43	253.04
22	6.37	235.90	4.63	2155.78	380.12	272.15
22	6.37	235.90	4.63	2155.78	380.12	272.15
23	6.37	240.45	4.53	2483.02	437.82	313.46
23	6.37	240.45	4.53	2483.02	437.82	313.46
24	6.37	244.95	4.53	2823.91	497.93	356.50
24	6.37	244.95	4.53	2823.91	497.93	356.50
25	6.37	248.92	3.47	3124.96	551.01	394.50
25	6.37	248.92	3.47	3124.96	551.01	394.50
26	46.25	251.84	3.44	2915.25	514.04	368.03
26	46.25	251.84	3.44	2915.25	514.04	368.03
27	46.25	254.46	4.15	1982.09	1736.94	1243.58
27	46.25	254.46	4.15	1982.09	1736.94	1243.58
28	46.25	257.20	3.76	2023.06	1764.57	1263.36
28	46.25	257.20	3.76	2023.06	1764.57	1263.36
29	46.25	260.25	5.06	2013.28	1757.97	1258.64
29	46.25	260.25	5.06	2013.28	1757.97	1258.64
30	46.25	263.24	3.59	1935.74	1705.67	1221.19
30	46.25	263.24	3.59	1935.74	1705.67	1221.19
31	50.49	265.80	4.14	1697.32	1544.85	1106.05
31	50.49	265.80	4.14	1697.32	1544.85	1106.05
32	50.49	268.43	4.14	1584.70	1468.89	1051.66
32	50.49	268.43	4.14	1584.70	1468.89	1051.66
33	50.49	269.92	0.56	1512.58	1420.25	1016.84
33	50.49	269.92	0.56	1512.58	1420.25	1016.84
34	50.49	270.55	1.41	1609.48	1485.61	1063.63
34	50.49	270.55	1.41	1609.48	1485.61	1063.63
35	50.49	272.55	4.88	1431.38	1365.48	977.62
35	50.49	272.55	4.88	1431.38	1365.48	977.62
36	50.49	275.65	4.88	1155.28	1179.25	844.29
36	50.49	275.65	4.88	1155.28	1179.25	844.29
37	51.86	278.58	4.47	859.85	979.98	701.62
37	51.86	278.58	4.47	859.85	979.98	701.62
38	51.86	282.20	7.25	646.90	636.34	455.59
38	51.86	282.20	7.25	646.90	636.34	455.59
39	51.86	286.68	7.25	236.31	359.39	257.31
39	51.86	286.68	7.25	236.31	359.39	257.31

Table 4 - Base Force Data on the 39 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-0.73	158.67	0.08	0.23	0.04	0.03
1	-0.73	158.67	0.08	0.23	0.04	0.03
2	-0.73	159.90	2.40	162.67	28.68	20.54
2	-0.73	159.90	2.40	162.67	28.68	20.54
3	-0.73	161.60	1.00	155.34	27.39	19.61

3	-0.73	161.60	1.00	155.34	27.39	19.61
4	-0.73	162.22	0.23	43.22	7.62	5.46
4	-0.73	162.22	0.23	43.22	7.62	5.46
5	-0.73	164.58	4.49	1393.87	245.78	175.97
5	-0.73	164.58	4.49	1393.87	245.78	175.97
6	6.37	169.31	5.00	2620.65	462.09	330.84
6	6.37	169.31	5.00	2620.65	462.09	330.84
7	6.37	174.27	5.00	3660.49	645.44	462.11
7	6.37	174.27	5.00	3660.49	645.44	462.11
8	6.37	179.24	5.00	4700.33	828.80	593.38
8	6.37	179.24	5.00	4700.33	828.80	593.38
9	6.37	184.49	5.55	6440.54	1135.64	813.07
9	6.37	184.49	5.55	6440.54	1135.64	813.07
10	6.37	190.00	5.55	7723.70	1361.90	975.06
10	6.37	190.00	5.55	7723.70	1361.90	975.06
11	6.37	195.52	5.55	9006.87	1588.15	1137.05
11	6.37	195.52	5.55	9006.87	1588.15	1137.05
12	6.37	201.04	5.55	10290.03	1814.41	1299.04
12	6.37	201.04	5.55	10290.03	1814.41	1299.04
13	6.37	203.82	0.05	69.12	12.19	8.73
13	6.37	203.82	0.05	69.12	12.19	8.73
14	6.37	205.42	3.17	5053.35	891.04	637.95
14	6.37	205.42	3.17	5053.35	891.04	637.95
15	6.37	209.45	4.93	9299.54	1639.76	1174.00
15	6.37	209.45	4.93	9299.54	1639.76	1174.00
16	6.37	214.20	4.63	9548.16	1683.60	1205.39
16	6.37	214.20	4.63	9548.16	1683.60	1205.39
17	6.37	218.80	4.63	9522.62	1679.10	1202.16
17	6.37	218.80	4.63	9522.62	1679.10	1202.16
18	6.37	223.40	4.63	32632.20	5753.94	4119.58
18	6.37	223.40	4.63	32632.20	5753.94	4119.58
19	6.37	227.25	3.12	6360.96	1121.61	803.02
19	6.37	227.25	3.12	6360.96	1121.61	803.02
20	6.37	230.35	3.12	6299.67	1110.80	795.29
20	6.37	230.35	3.12	6299.67	1110.80	795.29
21	6.37	232.75	1.71	3428.64	604.56	432.84
21	6.37	232.75	1.71	3428.64	604.56	432.84
22	6.37	235.90	4.63	9978.30	1759.44	1259.69
22	6.37	235.90	4.63	9978.30	1759.44	1259.69
23	6.37	240.45	4.53	11243.11	1982.46	1419.36
23	6.37	240.45	4.53	11243.11	1982.46	1419.36
24	6.37	244.95	4.53	12786.66	2254.63	1614.22
24	6.37	244.95	4.53	12786.66	2254.63	1614.22
25	6.37	248.92	3.47	10842.51	1911.83	1368.79
25	6.37	248.92	3.47	10842.51	1911.83	1368.79
26	46.25	251.84	3.44	10037.30	1769.85	1267.14
26	46.25	251.84	3.44	10037.30	1769.85	1267.14
27	46.25	254.46	4.15	8227.99	7210.31	5162.28
27	46.25	254.46	4.15	8227.99	7210.31	5162.28
28	46.25	257.20	3.76	7605.98	6634.15	4749.78
28	46.25	257.20	3.76	7605.98	6634.15	4749.78
29	46.25	260.25	5.06	10189.32	8897.21	6370.03
29	46.25	260.25	5.06	10189.32	8897.21	6370.03
30	46.25	263.24	3.59	6939.83	6115.02	4378.10
30	46.25	263.24	3.59	6939.83	6115.02	4378.10
31	50.49	265.80	4.14	7023.96	6393.03	4577.14
31	50.49	265.80	4.14	7023.96	6393.03	4577.14
32	50.49	268.43	4.14	6557.91	6078.68	4352.08
32	50.49	268.43	4.14	6557.91	6078.68	4352.08
33	50.49	269.92	0.56	844.30	792.76	567.58
33	50.49	269.92	0.56	844.30	792.76	567.58
34	50.49	270.55	1.41	2276.83	2101.60	1504.66
34	50.49	270.55	1.41	2276.83	2101.60	1504.66
35	50.49	272.55	4.88	6978.41	6657.12	4766.22
35	50.49	272.55	4.88	6978.41	6657.12	4766.22
36	50.49	275.65	4.88	5632.37	5749.21	4116.19
36	50.49	275.65	4.88	5632.37	5749.21	4116.19
37	51.86	278.58	4.47	3841.08	4377.69	3134.24
37	51.86	278.58	4.47	3841.08	4377.69	3134.24
38	51.86	282.20	7.25	4690.85	4614.27	3303.62
38	51.86	282.20	7.25	4690.85	4614.27	3303.62
39	51.86	286.68	7.25	1713.55	2606.06	1865.83

39	51.86	286.68	7.25	1713.55	2606.06	1865.83

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 39 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
18	33339.5	23344.6	40700.0	35.00	-0.231691E+05

***Pier/Pile Slice Force Data on the 39 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
20	12000.0	0.0	12000.0	90.00	0.469242E+03

Sum of the Resisting Forces = 76374.84 (lbs)

Average Available Shear Strength = 504.08(psf)

Sum of the Driving Forces = 59419.52 (lbs)

Average Mobilized Shear Stress = 392.17(psf)

Total length of the failure surface = 151.51(ft)

Factor of Safety Balance Check: FS = 1.28535

Janbu's Correction Factor (fo) = 1.0693

Janub's FS Corrected = 1.37448

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

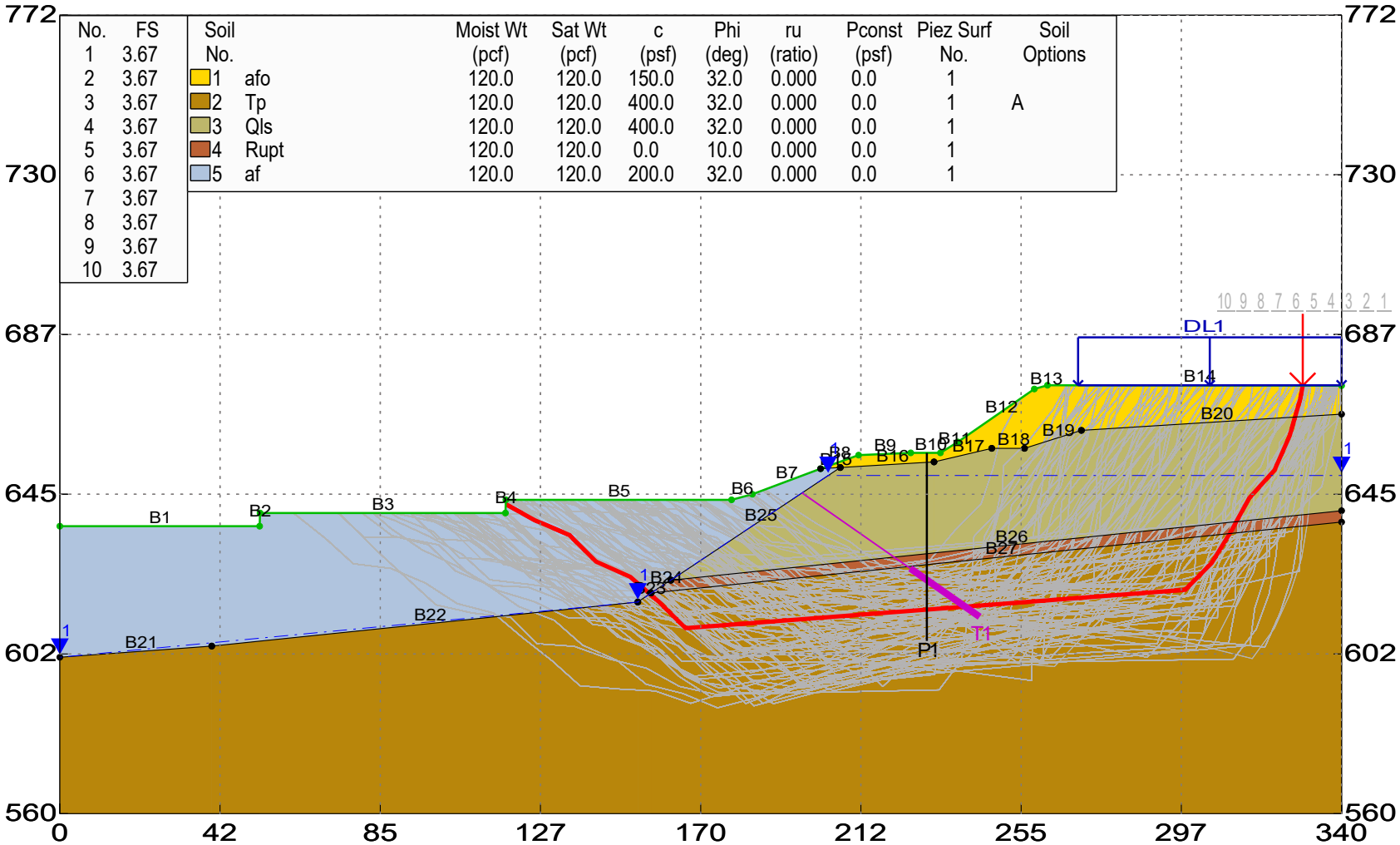
Royal Vista - Cross Section 8
Stage 6 (Final Condition - Along Bedding)

LGC Geotechnical / BPP

\Sec 8 - Stage 6 (Final Condition - Along Bedding).gsd

No.	FS
1	3.67
2	3.67
3	3.67
4	3.67
5	3.67
6	3.67
7	3.67
8	3.67
9	3.67
10	3.67

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 3.67

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

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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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 6 (Final Condition - Along Bedding).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 6 (Final Condition - Along Bedding).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 8

DESCRIPTION: Stage 6 (Final Condition - Along Bedding)

BOUNDARY DATA

14 Surface Boundaries
27 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	636.500	53.000	636.500	5
2	53.000	636.500	53.100	640.000	5
3	53.100	640.000	118.200	640.000	5
4	118.200	640.000	118.300	643.500	5
5	118.300	643.500	178.200	643.500	5
6	178.200	643.500	183.700	645.000	5
7	183.700	645.000	201.800	651.800	5
8	201.800	651.800	211.900	655.400	1
9	211.900	655.400	225.700	656.000	1
10	225.700	656.000	233.600	656.000	1
11	233.600	656.000	238.200	658.900	1
12	238.200	658.900	258.500	673.000	1
13	258.500	673.000	262.000	674.000	1
14	262.000	674.000	340.000	673.900	1
15	201.800	651.800	207.000	652.100	5
16	207.000	652.100	231.900	653.600	3
17	231.900	653.600	247.200	657.200	3
18	247.200	657.200	255.900	657.200	3
19	255.900	657.200	271.000	662.000	3
20	271.000	662.000	340.000	666.300	3
21	0.000	601.600	40.300	604.600	2
22	40.300	604.600	153.300	616.300	2
23	153.300	616.300	156.800	618.700	2
24	156.800	618.700	162.100	622.200	4
25	162.100	622.100	207.000	652.100	3
26	162.100	622.100	340.000	640.600	4

27	156.800	618.700	340.000	637.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	32.00
2	8.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	601.60
2	153.30	616.30
3	203.80	650.00
4	340.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	14	270.100	674.000	250.000	340.000	674.000	250.000	0.00

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	196.90	645.35	203500.0	5.0	35.00	35.0	22.5

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	230.00	656.00	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 10.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	165.00	605.40	220.00	612.20	40.00
2	230.00	612.40	330.00	622.40	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 = 156

Number of Trial Surfaces With Valid FS = 844

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 15.6 %

Statistical Data On All Valid FS Values:
FS Max = 10.623 FS Min = 3.673 FS Ave = 5.649
Standard Deviation = 1.232 Coefficient of Variation = 21.82 %

Critical Surface is Sequence Number 12 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	224.55	625.99

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	230.00	614.29

Factor Of Safety For The Critical or Specified Surface = 3.673

Table 1 - Geometry Data on the 64 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.03	0.58	118.28	642.36	642.93	-29.11	88.36	0.04
2	3.83	2.22	120.21	641.28	643.50	-29.11	0.00	4.38
3	3.83	4.35	124.04	639.15	643.50	-29.11	0.00	4.38
4	4.59	6.40	128.25	637.10	643.50	-23.23	0.00	5.00
5	4.59	8.37	132.84	635.13	643.50	-23.23	0.00	5.00
6	3.54	11.12	136.91	632.38	643.50	-44.93	0.00	5.00
7	3.54	14.65	140.45	628.85	643.50	-44.93	0.00	5.00
8	4.56	17.44	144.50	626.06	643.50	-24.17	0.00	5.00
9	4.56	19.49	149.06	624.01	643.50	-24.17	0.00	5.00
10	2.57	21.64	152.63	621.86	643.50	-41.20	0.00	3.42
11	2.57	23.89	155.20	619.61	643.50	-41.20	0.00	3.42
12	0.04	25.03	156.50	618.47	643.50	-41.20	0.00	0.05
13	0.28	25.17	156.66	618.33	643.50	-41.20	0.00	0.37
14	0.11	25.34	156.86	618.16	643.50	-41.20	0.00	0.15
15	1.95	26.25	157.89	617.25	643.50	-41.20	0.00	2.60
16	3.23	28.70	160.48	614.80	643.50	-44.69	0.00	4.55
17	3.88	32.22	164.04	611.28	643.50	-44.69	0.00	5.45
18	6.11	33.90	169.03	609.60	643.50	4.40	0.00	6.13
19	6.11	33.43	175.14	610.07	643.50	4.40	0.00	6.13
20	2.75	33.46	179.57	610.41	643.88	4.40	15.26	2.76
21	2.75	34.00	182.32	610.62	644.62	4.40	15.26	2.76

22	4.53	34.95	185.96	610.90	645.85	4.40	20.59	4.54
23	4.53	36.30	190.49	611.25	647.55	4.40	20.59	4.54
24	4.53	37.65	195.01	611.60	649.25	4.40	20.59	4.54
25	4.53	39.00	199.54	611.95	650.95	4.40	20.59	4.54
26	2.00	39.96	202.80	612.20	652.16	4.40	19.62	2.01
27	0.06	40.25	203.83	612.28	652.52	4.40	19.62	0.06
28	3.14	40.69	205.43	612.40	653.09	4.40	19.62	3.15
29	4.90	41.82	209.45	612.71	654.53	4.40	19.62	4.91
30	4.60	42.42	214.20	613.08	655.50	4.40	2.49	4.61
31	4.60	42.27	218.80	613.43	655.70	4.40	2.49	4.61
32	4.60	42.12	223.40	613.78	655.90	4.40	2.49	4.61
33	3.10	41.92	227.25	614.08	656.00	4.40	0.00	3.11
34	3.10	41.68	230.35	614.32	656.00	4.40	0.00	3.11
35	1.70	41.50	232.75	614.50	656.00	4.40	0.00	1.71
36	4.60	42.71	235.90	614.74	657.45	4.40	32.23	4.61
37	4.50	45.37	240.45	615.09	660.46	4.40	34.78	4.51
38	4.50	48.15	244.95	615.44	663.59	4.40	34.78	4.51
39	4.35	50.88	249.38	615.78	666.66	4.40	34.78	4.36
40	4.35	53.57	253.73	616.12	669.68	4.40	34.78	4.36
41	2.60	55.71	257.20	616.38	672.10	4.40	34.78	2.61
42	3.50	56.88	260.25	616.62	673.50	4.40	15.95	3.51
43	4.05	57.09	264.02	616.91	674.00	4.40	-0.07	4.06
44	4.05	56.77	268.08	617.22	673.99	4.40	-0.07	4.06
45	0.90	56.58	270.55	617.41	673.99	4.40	-0.07	0.90
46	4.59	56.36	273.29	617.62	673.99	4.40	-0.07	4.60
47	4.59	56.01	277.88	617.97	673.98	4.40	-0.07	4.60
48	4.59	55.65	282.47	618.33	673.97	4.40	-0.07	4.60
49	4.59	55.29	287.06	618.68	673.97	4.40	-0.07	4.60
50	4.59	54.93	291.64	619.03	673.96	4.40	-0.07	4.60
51	4.59	54.57	296.23	619.39	673.96	4.40	-0.07	4.60
52	3.51	52.61	300.28	621.34	673.95	45.43	-0.07	5.00
53	3.51	49.04	303.79	624.91	673.95	45.43	-0.07	5.00
54	4.76	43.33	307.92	630.61	673.94	58.75	-0.07	9.18
55	0.42	39.05	310.52	634.89	673.94	58.75	-0.07	0.82
56	1.34	37.47	311.40	636.47	673.94	61.45	-0.07	2.80
57	3.44	33.08	313.79	640.86	673.93	61.45	-0.07	7.20
58	2.69	28.42	316.86	645.51	673.93	47.98	-0.07	4.03
59	2.69	25.42	319.55	648.50	673.93	47.98	-0.07	4.03
60	1.30	23.20	321.55	650.72	673.92	47.98	-0.07	1.95
61	4.04	17.90	324.22	656.02	673.92	66.19	-0.07	10.00
62	1.42	10.85	326.95	663.06	673.92	73.92	-0.07	5.14
63	1.35	6.05	328.34	667.87	673.91	73.92	-0.07	4.86
64	0.68	1.85	329.35	672.06	673.91	79.65	-0.07	3.77

Table 2 - Force Data On The 64 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	2.2	0.0	0.0	0.0	0.0	0.0
2	1017.4	0.0	0.0	0.0	0.0	0.0
3	1995.7	0.0	0.0	0.0	0.0	0.0
4	3527.6	0.0	0.0	0.0	0.0	0.0
5	4615.0	0.0	0.0	0.0	0.0	0.0
6	4724.2	0.0	0.0	0.0	0.0	0.0
7	6224.2	0.0	0.0	0.0	0.0	0.0
8	9548.5	0.0	0.0	0.0	0.0	0.0
9	10669.1	0.0	0.0	0.0	0.0	0.0
10	6675.7	0.0	0.0	0.0	0.0	0.0
11	7370.1	0.0	0.0	0.0	0.0	0.0
12	114.0	0.0	0.0	0.0	0.0	0.0
13	835.9	0.0	3.4	0.0	0.0	0.0
14	346.9	0.0	3.4	0.0	0.0	0.0
15	6152.3	0.0	236.5	0.0	0.0	0.0
16	11132.9	0.0	1235.6	0.0	0.0	0.0
17	14987.9	0.0	2868.2	0.0	0.0	0.0
18	24861.1	0.0	4551.2	0.0	0.0	0.0
19	24516.3	0.0	5506.1	0.0	0.0	0.0

20	11042.8	0.0	2789.0	0.0	0.0	0.0
21	11220.5	0.0	2982.4	0.0	0.0	0.0
22	18976.0	0.0	5328.2	0.0	0.0	0.0
23	19710.1	0.0	5851.6	0.0	0.0	0.0
24	20444.2	0.0	6375.1	0.0	0.0	0.0
25	21178.2	0.0	6898.6	0.0	0.0	0.0
26	9589.9	0.0	3215.9	0.0	0.0	0.0
27	275.3	0.0	134.6	0.0	0.0	0.0
28	15347.6	0.0	7395.8	0.0	0.0	0.0
29	24588.1	0.0	11435.4	0.0	0.0	0.0
30	23418.2	0.0	10630.1	0.0	0.0	0.0
31	23333.3	0.0	10528.2	0.0	0.0	0.0
32	23248.4	0.0	10426.3	0.0	0.0	0.0
33	15594.4	0.0	6969.0	0.0	0.0	0.0
34	15505.7	0.0	6922.7	0.0	0.0	0.0
35	8465.5	0.0	3776.7	0.0	0.0	0.0
36	23573.2	0.0	10149.5	0.0	0.0	0.0
37	24498.6	0.0	9830.3	0.0	0.0	0.0
38	25999.5	0.0	9732.8	0.0	0.0	0.0
39	26559.6	0.0	9315.7	0.0	0.0	0.0
40	27962.1	0.0	9224.6	0.0	0.0	0.0
41	17382.6	0.0	5470.1	0.0	0.0	0.0
42	23890.4	0.0	7312.1	0.0	0.0	0.0
43	27745.2	0.0	8387.6	0.0	0.0	0.0
44	27591.2	0.0	8308.6	0.0	0.0	0.0
45	6110.5	0.0	1835.6	0.0	0.0	225.0
46	31027.4	0.0	9295.8	0.0	0.0	1146.8
47	30829.9	0.0	9194.4	0.0	0.0	1146.8
48	30632.4	0.0	9093.1	0.0	0.0	1146.8
49	30434.9	0.0	8991.8	0.0	0.0	1146.8
50	30237.4	0.0	8890.5	0.0	0.0	1146.8
51	30039.9	0.0	8789.2	0.0	0.0	1146.8
52	22152.8	0.0	8940.9	0.0	0.0	877.3
53	20651.0	0.0	7829.6	0.0	0.0	877.3
54	24775.2	0.0	11110.8	0.0	0.0	1191.2
55	1985.1	0.0	770.0	0.0	0.0	105.9
56	6019.6	0.0	2366.0	0.0	0.0	334.7
57	13654.0	0.0	4106.9	0.0	0.0	860.0
58	9188.6	0.0	1126.8	0.0	0.0	673.7
59	8220.5	0.0	375.6	0.0	0.0	673.7
60	3632.1	0.0	0.0	0.0	0.0	326.2
61	8670.5	0.0	0.0	0.0	0.0	1009.3
62	1852.1	0.0	0.0	0.0	0.0	355.5
63	977.5	0.0	0.0	0.0	0.0	336.8
64	150.7	0.0	0.0	0.0	0.0	169.3

TOTAL WEIGHT OF SLIDING MASS = 937699.67(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 667750.80(lbs)

TOTAL AREA OF SLIDING MASS = 7814.16(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 64 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	5	200.00	32.00	
5	5	200.00	32.00	
6	5	200.00	32.00	
7	5	200.00	32.00	
8	5	200.00	32.00	
9	5	200.00	32.00	
10	5	200.00	32.00	
11	5	200.00	32.00	
12	2	400.00	32.00	A
13	2	400.00	32.00	A
14	2	400.00	32.00	A
15	2	400.00	32.00	A

16	2	400.00	32.00	A
17	2	400.00	32.00	A
18	2	250.00	10.00	A
19	2	250.00	10.00	A
20	2	250.00	10.00	A
21	2	250.00	10.00	A
22	2	250.00	10.00	A
23	2	250.00	10.00	A
24	2	250.00	10.00	A
25	2	250.00	10.00	A
26	2	250.00	10.00	A
27	2	250.00	10.00	A
28	2	250.00	10.00	A
29	2	250.00	10.00	A
30	2	250.00	10.00	A
31	2	250.00	10.00	A
32	2	250.00	10.00	A
33	2	250.00	10.00	A
34	2	250.00	10.00	A
35	2	250.00	10.00	A
36	2	250.00	10.00	A
37	2	250.00	10.00	A
38	2	250.00	10.00	A
39	2	250.00	10.00	A
40	2	250.00	10.00	A
41	2	250.00	10.00	A
42	2	250.00	10.00	A
43	2	250.00	10.00	A
44	2	250.00	10.00	A
45	2	250.00	10.00	A
46	2	250.00	10.00	A
47	2	250.00	10.00	A
48	2	250.00	10.00	A
49	2	250.00	10.00	A
50	2	250.00	10.00	A
51	2	250.00	10.00	A
52	2	400.00	32.00	A
53	2	400.00	32.00	A
54	2	400.00	32.00	A
55	4	0.00	10.00	
56	4	0.00	10.00	
57	3	400.00	32.00	
58	3	400.00	32.00	
59	3	400.00	32.00	
60	3	400.00	32.00	
61	3	400.00	32.00	
62	3	400.00	32.00	
63	1	150.00	32.00	
64	1	150.00	32.00	

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 64 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-29.11	118.28	0.04	113.23	270.75	73.20
1	-29.11	118.28	0.04	113.23	270.75	73.20
2	-29.11	120.21	4.38	332.47	407.75	110.24
2	-29.11	120.21	4.38	332.47	407.75	110.24
3	-29.11	124.04	4.38	617.19	585.67	158.34
3	-29.11	124.04	4.38	617.19	585.67	158.34
4	-23.23	128.25	5.00	860.61	737.77	199.46
4	-23.23	128.25	5.00	860.61	737.77	199.46

5	-23.23	132.84	5.00	1117.49	898.28	242.85
5	-23.23	132.84	5.00	1117.49	898.28	242.85
6	-44.93	136.91	5.00	1704.71	1265.22	342.06
6	-44.93	136.91	5.00	1704.71	1265.22	342.06
7	-44.93	140.45	5.00	2223.25	1589.24	429.66
7	-44.93	140.45	5.00	2223.25	1589.24	429.66
8	-24.17	144.50	5.00	2309.33	1643.03	444.20
8	-24.17	144.50	5.00	2309.33	1643.03	444.20
9	-24.17	149.06	5.00	2577.00	1810.29	489.42
9	-24.17	149.06	5.00	2577.00	1810.29	489.42
10	-41.20	152.63	3.42	3153.83	2170.73	586.86
10	-41.20	152.63	3.42	3153.83	2170.73	586.86
11	-41.20	155.20	3.42	3475.52	2371.75	641.21
11	-41.20	155.20	3.42	3475.52	2371.75	641.21
12	-41.20	156.50	0.05	3699.87	2711.93	733.18
12	-41.20	156.50	0.05	3699.87	2711.93	733.18
13	-41.20	156.66	0.37	3708.58	2717.38	734.65
13	-41.20	156.66	0.37	3708.58	2717.38	734.65
14	-41.20	156.86	0.15	3717.53	2722.97	736.16
14	-41.20	156.86	0.15	3717.53	2722.97	736.16
15	-41.20	157.89	2.60	3764.87	2752.55	744.16
15	-41.20	157.89	2.60	3764.87	2752.55	744.16
16	-44.69	160.48	4.55	4015.86	2909.39	786.56
16	-44.69	160.48	4.55	4015.86	2909.39	786.56
17	-44.69	164.04	5.45	4220.70	3037.39	821.17
17	-44.69	164.04	5.45	4220.70	3037.39	821.17
18	4.40	169.03	6.13	3306.60	833.04	225.22
18	4.40	169.03	6.13	3306.60	833.04	225.22
19	4.40	175.14	6.13	3095.24	795.77	215.14
19	4.40	175.14	6.13	3095.24	795.77	215.14
20	4.40	179.57	2.76	2986.83	776.66	209.97
20	4.40	179.57	2.76	2986.83	776.66	209.97
21	4.40	182.32	2.76	2981.37	775.70	209.71
21	4.40	182.32	2.76	2981.37	775.70	209.71
22	4.40	185.96	4.54	3001.99	779.33	210.69
22	4.40	185.96	4.54	3001.99	779.33	210.69
23	4.40	190.49	4.54	3048.69	787.57	212.92
23	4.40	190.49	4.54	3048.69	787.57	212.92
24	4.40	195.01	4.54	3095.39	795.80	215.15
24	4.40	195.01	4.54	3095.39	795.80	215.15
25	4.40	199.54	4.54	3142.09	804.04	217.37
25	4.40	199.54	4.54	3142.09	804.04	217.37
26	4.40	202.80	2.01	3173.46	809.57	218.87
26	4.40	202.80	2.01	3173.46	809.57	218.87
27	4.40	203.83	0.06	2460.14	683.79	184.86
27	4.40	203.83	0.06	2460.14	683.79	184.86
28	4.40	205.43	3.15	2521.25	694.56	187.78
28	4.40	205.43	3.15	2521.25	694.56	187.78
29	4.40	209.45	4.91	2674.83	721.64	195.10
29	4.40	209.45	4.91	2674.83	721.64	195.10
30	4.40	214.20	4.61	2770.19	738.46	199.64
30	4.40	214.20	4.61	2770.19	738.46	199.64
31	4.40	218.80	4.61	2773.79	739.09	199.82
31	4.40	218.80	4.61	2773.79	739.09	199.82
32	4.40	223.40	4.61	7832.20	1631.03	440.95
32	4.40	223.40	4.61	7832.20	1631.03	440.95
33	4.40	227.25	3.11	2772.36	738.84	199.75
33	4.40	227.25	3.11	2772.36	738.84	199.75
34	4.40	230.35	3.11	2758.68	736.43	199.10
34	4.40	230.35	3.11	2758.68	736.43	199.10
35	4.40	232.75	1.71	2748.08	734.56	198.59
35	4.40	232.75	1.71	2748.08	734.56	198.59
36	4.40	235.90	4.61	2907.49	762.67	206.19
36	4.40	235.90	4.61	2907.49	762.67	206.19
37	4.40	240.45	4.51	3247.52	822.62	222.40
37	4.40	240.45	4.51	3247.52	822.62	222.40
38	4.40	244.95	4.51	3601.24	885.00	239.26
38	4.40	244.95	4.51	3601.24	885.00	239.26
39	4.40	249.38	4.36	3949.08	946.33	255.84
39	4.40	249.38	4.36	3949.08	946.33	255.84
40	4.40	253.73	4.36	4291.01	1006.62	272.14
40	4.40	253.73	4.36	4291.01	1006.62	272.14

41	4.40	257.20	2.61	4564.17	1054.79	285.16
41	4.40	257.20	2.61	4564.17	1054.79	285.16
42	4.40	260.25	3.51	4718.40	1081.98	292.52
42	4.40	260.25	3.51	4718.40	1081.98	292.52
43	4.40	264.02	4.06	4761.19	1089.53	294.56
43	4.40	264.02	4.06	4761.19	1089.53	294.56
44	4.40	268.08	4.06	4742.69	1086.26	293.67
44	4.40	268.08	4.06	4742.69	1086.26	293.67
45	4.40	270.55	0.90	4980.40	1128.18	305.01
45	4.40	270.55	0.90	4980.40	1128.18	305.01
46	4.40	273.29	4.60	4967.87	1125.97	304.41
46	4.40	273.29	4.60	4967.87	1125.97	304.41
47	4.40	277.88	4.60	4946.92	1122.28	303.41
47	4.40	277.88	4.60	4946.92	1122.28	303.41
48	4.40	282.47	4.60	4925.97	1118.58	302.41
48	4.40	282.47	4.60	4925.97	1118.58	302.41
49	4.40	287.06	4.60	4905.02	1114.89	301.41
49	4.40	287.06	4.60	4905.02	1114.89	301.41
50	4.40	291.64	4.60	4884.08	1111.19	300.41
50	4.40	291.64	4.60	4884.08	1111.19	300.41
51	4.40	296.23	4.60	4863.13	1107.50	299.42
51	4.40	296.23	4.60	4863.13	1107.50	299.42
52	45.43	300.28	5.00	3925.88	2853.16	771.36
52	45.43	300.28	5.00	3925.88	2853.16	771.36
53	45.43	303.79	5.00	3752.43	2744.78	742.06
53	45.43	303.79	5.00	3752.43	2744.78	742.06
54	58.75	307.92	9.18	3108.46	2342.38	633.27
54	58.75	307.92	9.18	3108.46	2342.38	633.27
55	58.75	310.52	0.82	3679.76	648.84	175.42
55	58.75	310.52	0.82	3679.76	648.84	175.42
56	61.45	311.40	2.80	3563.46	628.33	169.87
56	61.45	311.40	2.80	3563.46	628.33	169.87
57	61.45	313.79	7.20	2568.39	2004.91	542.03
57	61.45	313.79	7.20	2568.39	2004.91	542.03
58	47.98	316.86	4.03	2700.84	2087.67	564.41
58	47.98	316.86	4.03	2700.84	2087.67	564.41
59	47.98	319.55	4.03	2557.34	1998.00	540.17
59	47.98	319.55	4.03	2557.34	1998.00	540.17
60	47.98	321.55	1.95	2413.31	1908.00	515.83
60	47.98	321.55	1.95	2413.31	1908.00	515.83
61	66.19	324.22	10.00	1506.64	1341.46	362.67
61	66.19	324.22	10.00	1506.64	1341.46	362.67
62	73.92	326.95	5.14	700.41	837.67	226.47
62	73.92	326.95	5.14	700.41	837.67	226.47
63	73.92	328.34	4.86	503.23	464.45	125.57
63	73.92	328.34	4.86	503.23	464.45	125.57
64	79.65	329.35	3.77	235.95	147.44	39.86
64	79.65	329.35	3.77	235.95	147.44	39.86

Table 4 - Base Force Data on the 64 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-29.11	118.28	0.04	4.19	10.03	2.71
1	-29.11	118.28	0.04	4.19	10.03	2.71
2	-29.11	120.21	4.38	1456.00	1785.68	482.76
2	-29.11	120.21	4.38	1456.00	1785.68	482.76
3	-29.11	124.04	4.38	2702.92	2564.84	693.41
3	-29.11	124.04	4.38	2702.92	2564.84	693.41
4	-23.23	128.25	5.00	4303.05	3688.84	997.29
4	-23.23	128.25	5.00	4303.05	3688.84	997.29
5	-23.23	132.84	5.00	5587.45	4491.42	1214.27
5	-23.23	132.84	5.00	5587.45	4491.42	1214.27
6	-44.93	136.91	5.00	8523.54	6326.10	1710.28
6	-44.93	136.91	5.00	8523.54	6326.10	1710.28
7	-44.93	140.45	5.00	11116.25	7946.20	2148.28
7	-44.93	140.45	5.00	11116.25	7946.20	2148.28
8	-24.17	144.50	5.00	11546.67	8215.16	2220.99

8	-24.17	144.50	5.00	11546.67	8215.16	2220.99
9	-24.17	149.06	5.00	12885.02	9051.46	2447.09
9	-24.17	149.06	5.00	12885.02	9051.46	2447.09
10	-41.20	152.63	3.42	10776.34	7417.18	2005.26
10	-41.20	152.63	3.42	10776.34	7417.18	2005.26
11	-41.20	155.20	3.42	11875.50	8104.02	2190.94
11	-41.20	155.20	3.42	11875.50	8104.02	2190.94
12	-41.20	156.50	0.05	186.68	136.83	36.99
12	-41.20	156.50	0.05	186.68	136.83	36.99
13	-41.20	156.66	0.37	1364.12	999.53	270.23
13	-41.20	156.66	0.37	1364.12	999.53	270.23
14	-41.20	156.86	0.15	563.65	412.85	111.62
14	-41.20	156.86	0.15	563.65	412.85	111.62
15	-41.20	157.89	2.60	9774.73	7146.45	1932.06
15	-41.20	157.89	2.60	9774.73	7146.45	1932.06
16	-44.69	160.48	4.55	18259.50	13228.54	3576.37
16	-44.69	160.48	4.55	18259.50	13228.54	3576.37
17	-44.69	164.04	5.45	23016.17	16563.36	4477.95
17	-44.69	164.04	5.45	23016.17	16563.36	4477.95
18	4.40	169.03	6.13	20268.20	5106.24	1380.49
18	4.40	169.03	6.13	20268.20	5106.24	1380.49
19	4.40	175.14	6.13	18972.65	4877.80	1318.73
19	4.40	175.14	6.13	18972.65	4877.80	1318.73
20	4.40	179.57	2.76	8238.05	2142.12	579.13
20	4.40	179.57	2.76	8238.05	2142.12	579.13
21	4.40	182.32	2.76	8222.98	2139.47	578.41
21	4.40	182.32	2.76	8222.98	2139.47	578.41
22	4.40	185.96	4.54	13624.13	3536.89	956.21
22	4.40	185.96	4.54	13624.13	3536.89	956.21
23	4.40	190.49	4.54	13836.08	3574.27	966.31
23	4.40	190.49	4.54	13836.08	3574.27	966.31
24	4.40	195.01	4.54	14048.03	3611.64	976.42
24	4.40	195.01	4.54	14048.03	3611.64	976.42
25	4.40	199.54	4.54	14259.98	3649.01	986.52
25	4.40	199.54	4.54	14259.98	3649.01	986.52
26	4.40	202.80	2.01	6365.68	1623.92	439.03
26	4.40	202.80	2.01	6365.68	1623.92	439.03
27	4.40	203.83	0.06	140.64	39.09	10.57
27	4.40	203.83	0.06	140.64	39.09	10.57
28	4.40	205.43	3.15	7947.69	2189.46	591.93
28	4.40	205.43	3.15	7947.69	2189.46	591.93
29	4.40	209.45	4.91	13145.37	3546.50	958.81
29	4.40	209.45	4.91	13145.37	3546.50	958.81
30	4.40	214.20	4.61	12780.53	3406.95	921.08
30	4.40	214.20	4.61	12780.53	3406.95	921.08
31	4.40	218.80	4.61	12797.15	3409.88	921.87
31	4.40	218.80	4.61	12797.15	3409.88	921.87
32	4.40	223.40	4.61	36134.58	7524.90	2034.38
32	4.40	223.40	4.61	36134.58	7524.90	2034.38
33	4.40	227.25	3.11	8619.70	2297.18	621.05
33	4.40	227.25	3.11	8619.70	2297.18	621.05
34	4.40	230.35	3.11	8577.16	2289.67	619.02
34	4.40	230.35	3.11	8577.16	2289.67	619.02
35	4.40	232.75	1.71	4685.54	1252.44	338.60
35	4.40	232.75	1.71	4685.54	1252.44	338.60
36	4.40	235.90	4.61	13413.98	3518.64	951.28
36	4.40	235.90	4.61	13413.98	3518.64	951.28
37	4.40	240.45	4.51	14657.00	3712.75	1003.75
37	4.40	240.45	4.51	14657.00	3712.75	1003.75
38	4.40	244.95	4.51	16253.48	3994.25	1079.86
38	4.40	244.95	4.51	16253.48	3994.25	1079.86
39	4.40	249.38	4.36	17229.24	4128.69	1116.20
39	4.40	249.38	4.36	17229.24	4128.69	1116.20
40	4.40	253.73	4.36	18721.06	4391.74	1187.32
40	4.40	253.73	4.36	18721.06	4391.74	1187.32
41	4.40	257.20	2.61	11901.90	2750.55	743.62
41	4.40	257.20	2.61	11901.90	2750.55	743.62
42	4.40	260.25	3.51	16563.18	3798.12	1026.83
42	4.40	260.25	3.51	16563.18	3798.12	1026.83
43	4.40	264.02	4.06	19339.78	4425.62	1196.48
43	4.40	264.02	4.06	19339.78	4425.62	1196.48
44	4.40	268.08	4.06	19264.66	4412.37	1192.90

44	4.40	268.08	4.06	19264.66	4412.37	1192.90
45	4.40	270.55	0.90	4495.60	1018.36	275.32
45	4.40	270.55	0.90	4495.60	1018.36	275.32
46	4.40	273.29	4.60	22856.75	5180.49	1400.56
46	4.40	273.29	4.60	22856.75	5180.49	1400.56
47	4.40	277.88	4.60	22760.37	5163.50	1395.97
47	4.40	277.88	4.60	22760.37	5163.50	1395.97
48	4.40	282.47	4.60	22663.98	5146.50	1391.37
48	4.40	282.47	4.60	22663.98	5146.50	1391.37
49	4.40	287.06	4.60	22567.60	5129.51	1386.78
49	4.40	287.06	4.60	22567.60	5129.51	1386.78
50	4.40	291.64	4.60	22471.21	5112.51	1382.18
50	4.40	291.64	4.60	22471.21	5112.51	1382.18
51	4.40	296.23	4.60	22374.83	5095.51	1377.59
51	4.40	296.23	4.60	22374.83	5095.51	1377.59
52	45.43	300.28	5.00	19629.39	14265.80	3856.80
52	45.43	300.28	5.00	19629.39	14265.80	3856.80
53	45.43	303.79	5.00	18762.14	13723.88	3710.29
53	45.43	303.79	5.00	18762.14	13723.88	3710.29
54	58.75	307.92	9.18	28546.80	21511.45	5815.68
54	58.75	307.92	9.18	28546.80	21511.45	5815.68
55	58.75	310.52	0.82	3004.26	529.73	143.21
55	58.75	310.52	0.82	3004.26	529.73	143.21
56	61.45	311.40	2.80	9982.66	1760.21	475.88
56	61.45	311.40	2.80	9982.66	1760.21	475.88
57	61.45	313.79	7.20	18488.82	14432.54	3901.88
57	61.45	313.79	7.20	18488.82	14432.54	3901.88
58	47.98	316.86	4.03	10872.28	8403.96	2272.04
58	47.98	316.86	4.03	10872.28	8403.96	2272.04
59	47.98	319.55	4.03	10294.62	8043.00	2174.45
59	47.98	319.55	4.03	10294.62	8043.00	2174.45
60	47.98	321.55	1.95	4703.44	3718.62	1005.34
60	47.98	321.55	1.95	4703.44	3718.62	1005.34
61	66.19	324.22	10.00	15066.44	13414.55	3626.66
61	66.19	324.22	10.00	15066.44	13414.55	3626.66
62	73.92	326.95	5.14	3596.78	4301.62	1162.95
62	73.92	326.95	5.14	3596.78	4301.62	1162.95
63	73.92	328.34	4.86	2448.09	2259.45	610.85
63	73.92	328.34	4.86	2448.09	2259.45	610.85
64	79.65	329.35	3.77	889.28	555.68	150.23
64	79.65	329.35	3.77	889.28	555.68	150.23

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 64 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 64 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
34	12000.0	0.0	12000.0	90.00	0.323094E+03

Sum of the Resisting Forces = 259066.39 (lbs)

Average Available Shear Strength = 1013.94(psf)

Sum of the Driving Forces = 75918.76 (lbs)

Average Mobilized Shear Stress = 297.13(psf)

Total length of the failure surface = 255.50(ft)

Factor of Safety Balance Check: FS = 3.41242

```
Janbu's Correction Factor (fo) =  1.0765

Janub's FS Corrected =  3.67338

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

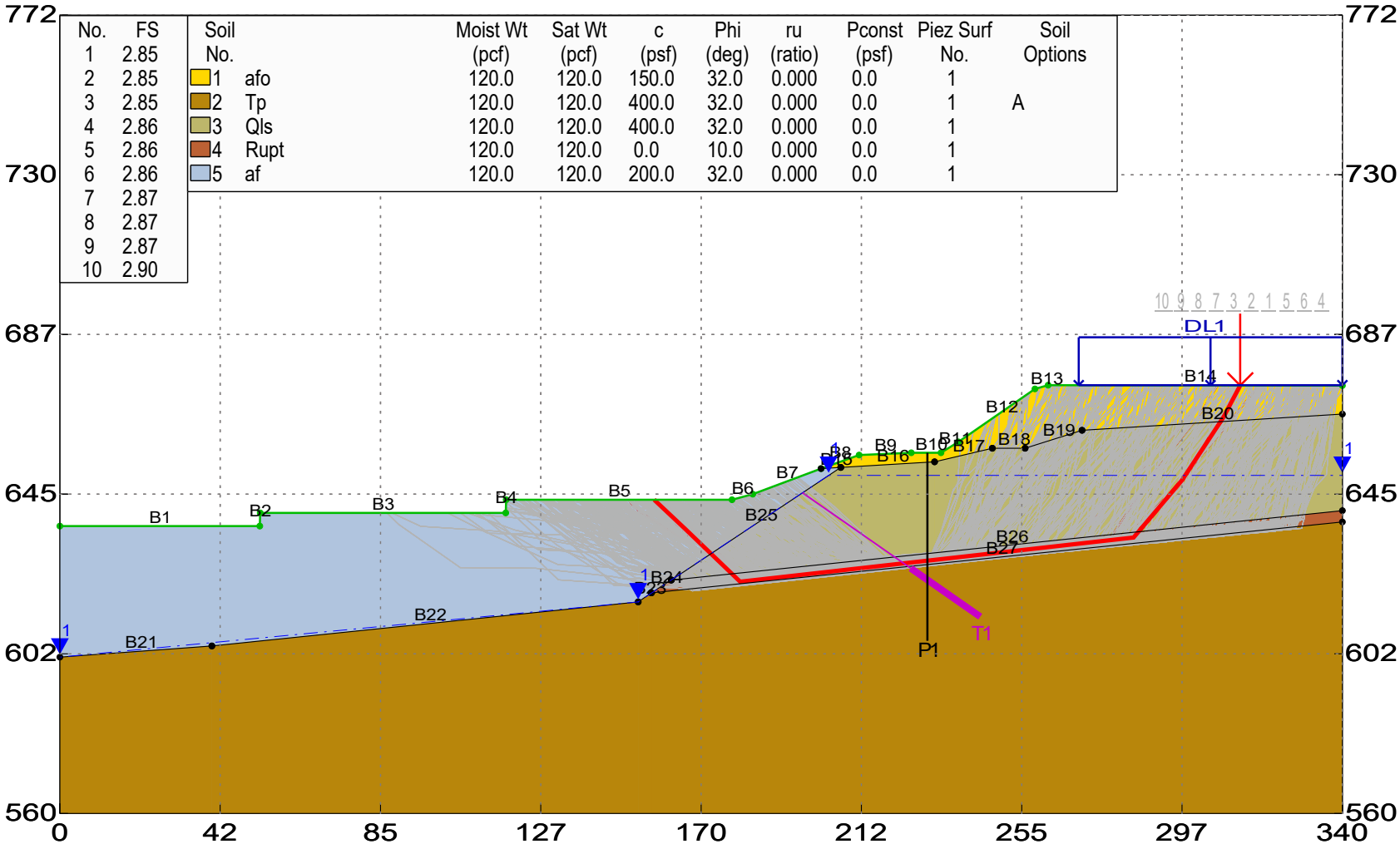
Royal Vista - Cross Section 8
Stage 6 (Final Condition - Rupture)

LGC Geotechnical / BPP

\Sec 8 - Stage 6 (Final Condition - Rupture).gsd

No.	FS
1	2.85
2	2.85
3	2.85
4	2.86
5	2.86
6	2.86
7	2.87
8	2.87
9	2.87
10	2.90

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 2.85

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 6 (Final Condition - Rupture).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 6 (Final Condition - Rupture).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 8

DESCRIPTION: Stage 6 (Final Condition - Rupture)

BOUNDARY DATA

14 Surface Boundaries
27 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	636.500	53.000	636.500	5
2	53.000	636.500	53.100	640.000	5
3	53.100	640.000	118.200	640.000	5
4	118.200	640.000	118.300	643.500	5
5	118.300	643.500	178.200	643.500	5
6	178.200	643.500	183.700	645.000	5
7	183.700	645.000	201.800	651.800	5
8	201.800	651.800	211.900	655.400	1
9	211.900	655.400	225.700	656.000	1
10	225.700	656.000	233.600	656.000	1
11	233.600	656.000	238.200	658.900	1
12	238.200	658.900	258.500	673.000	1
13	258.500	673.000	262.000	674.000	1
14	262.000	674.000	340.000	673.900	1
15	201.800	651.800	207.000	652.100	5
16	207.000	652.100	231.900	653.600	3
17	231.900	653.600	247.200	657.200	3
18	247.200	657.200	255.900	657.200	3
19	255.900	657.200	271.000	662.000	3
20	271.000	662.000	340.000	666.300	3
21	0.000	601.600	40.300	604.600	2
22	40.300	604.600	153.300	616.300	2
23	153.300	616.300	156.800	618.700	2
24	156.800	618.700	162.100	622.200	4
25	162.100	622.100	207.000	652.100	3
26	162.100	622.100	340.000	640.600	4

27	156.800	618.700	340.000	637.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	32.00
2	8.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	601.60
2	153.30	616.30
3	203.80	650.00
4	340.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	14	270.100	674.000	250.000	340.000	674.000	250.000	0.00

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

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	196.90	645.35	203500.0	5.0	35.00	35.0	22.5

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	230.00	656.00	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 20.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	165.00	620.40	220.00	627.20	3.00
2	230.00	627.40	330.00	637.40	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 = 449

Number of Trial Surfaces With Valid FS = 551

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 44.9 %

Statistical Data On All Valid FS Values:
FS Max = 7.509 FS Min = 2.850 FS Ave = 3.655
Standard Deviation = 0.740 Coefficient of Variation = 20.24 %

Critical Surface is Sequence Number 200 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	223.71	626.58

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	230.00	627.29

Factor Of Safety For The Critical or Specified Surface = 2.850

Table 1 - Geometry Data on the 45 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	4.20	1.98	159.66	641.52	643.50	-43.32	0.00	5.77
2	4.20	5.94	163.86	637.56	643.50	-43.32	0.00	5.77
3	3.32	9.52	167.62	633.98	643.50	-43.94	0.00	4.61
4	3.32	12.72	170.94	630.78	643.50	-43.94	0.00	4.61
5	0.04	14.34	172.62	629.16	643.50	-43.94	0.00	0.05
6	2.78	15.70	174.03	627.80	643.50	-43.94	0.00	3.86
7	2.78	18.38	176.81	625.12	643.50	-43.94	0.00	3.86
8	0.00	19.72	178.20	623.78	643.50	-43.94	15.26	0.01
9	2.15	21.06	179.28	622.74	643.79	-43.94	15.26	2.99
10	3.34	22.66	182.03	621.89	644.54	6.43	15.26	3.36
11	4.53	23.52	185.96	622.33	645.85	6.43	20.59	4.55
12	4.53	24.71	190.49	622.84	647.55	6.43	20.59	4.55
13	4.53	25.90	195.01	623.35	649.25	6.43	20.59	4.55
14	4.53	27.09	199.54	623.86	650.95	6.43	20.59	4.55
15	2.00	27.93	202.80	624.23	652.16	6.43	19.62	2.01
16	0.06	28.18	203.83	624.34	652.52	6.43	19.62	0.06
17	3.14	28.57	205.43	624.52	653.09	6.43	19.62	3.16
18	4.90	29.55	209.45	624.98	654.53	6.43	19.62	4.93
19	4.60	29.99	214.20	625.51	655.50	6.43	2.49	4.63
20	4.60	29.67	218.80	626.03	655.70	6.43	2.49	4.63
21	4.60	29.35	223.40	626.55	655.90	6.43	2.49	4.63

22	3.10	29.02	227.25	626.98	656.00	6.43	0.00	3.12
23	3.10	28.67	230.35	627.33	656.00	6.43	0.00	3.12
24	1.70	28.40	232.75	627.60	656.00	6.43	0.00	1.71
25	4.60	29.49	235.90	627.96	657.45	6.43	32.23	4.63
26	4.50	31.99	240.45	628.47	660.46	6.43	34.78	4.53
27	4.50	34.61	244.95	628.98	663.59	6.43	34.78	4.53
28	4.35	37.19	249.38	629.47	666.66	6.43	34.78	4.38
29	4.35	39.72	253.73	629.96	669.68	6.43	34.78	4.38
30	2.60	41.74	257.20	630.36	672.10	6.43	34.78	2.62
31	3.50	42.80	260.25	630.70	673.50	6.43	15.95	3.52
32	4.05	42.87	264.02	631.12	674.00	6.43	-0.07	4.08
33	4.05	42.41	268.08	631.58	673.99	6.43	-0.07	4.08
34	0.90	42.13	270.55	631.86	673.99	6.43	-0.07	0.91
35	4.54	41.82	273.27	632.17	673.99	6.43	-0.07	4.57
36	4.54	41.30	277.82	632.68	673.98	6.43	-0.07	4.57
37	4.54	40.78	282.36	633.19	673.97	6.43	-0.07	4.57
38	1.29	39.76	285.28	634.21	673.97	49.89	-0.07	2.00
39	5.80	35.55	288.82	638.42	673.97	49.89	-0.07	9.00
40	5.80	28.66	294.62	645.30	673.96	49.89	-0.07	9.00
41	0.82	24.58	297.93	649.37	673.95	56.78	-0.07	1.50
42	4.68	20.38	300.68	653.57	673.95	56.78	-0.07	8.54
43	4.68	13.23	305.36	660.72	673.94	56.78	-0.07	8.54
44	0.78	9.06	308.08	664.88	673.94	56.78	-0.07	1.42
45	4.45	4.23	310.70	669.70	673.94	62.28	-0.07	9.56

Table 2 - Force Data On The 45 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	998.5	0.0	0.0	0.0	0.0	0.0
2	2995.4	0.0	0.0	0.0	0.0	0.0
3	3793.9	0.0	0.0	0.0	0.0	0.0
4	5068.8	0.0	0.0	0.0	0.0	0.0
5	67.3	0.0	0.1	0.0	0.0	0.0
6	5240.6	0.0	389.0	0.0	0.0	0.0
7	6135.4	0.0	1145.7	0.0	0.0	0.0
8	9.5	0.0	2.2	0.0	0.0	0.0
9	5443.0	0.0	1407.9	0.0	0.0	0.0
10	9086.5	0.0	1972.5	0.0	0.0	0.0
11	12771.3	0.0	3099.6	0.0	0.0	0.0
12	13417.6	0.0	3593.1	0.0	0.0	0.0
13	14063.9	0.0	4086.5	0.0	0.0	0.0
14	14710.2	0.0	4579.9	0.0	0.0	0.0
15	6703.1	0.0	2181.5	0.0	0.0	0.0
16	192.8	0.0	91.8	0.0	0.0	0.0
17	10775.6	0.0	5028.2	0.0	0.0	0.0
18	17375.8	0.0	7699.7	0.0	0.0	0.0
19	16553.9	0.0	7073.8	0.0	0.0	0.0
20	16378.2	0.0	6924.1	0.0	0.0	0.0
21	16202.6	0.0	6774.4	0.0	0.0	0.0
22	10795.0	0.0	4480.9	0.0	0.0	0.0
23	10665.1	0.0	4412.9	0.0	0.0	0.0
24	5793.4	0.0	2391.1	0.0	0.0	0.0
25	16280.9	0.0	6367.6	0.0	0.0	0.0
26	17277.1	0.0	6084.4	0.0	0.0	0.0
27	18691.2	0.0	5941.1	0.0	0.0	0.0
28	19412.3	0.0	5606.9	0.0	0.0	0.0
29	20733.7	0.0	5473.1	0.0	0.0	0.0
30	13023.5	0.0	3207.4	0.0	0.0	0.0
31	17976.6	0.0	4242.1	0.0	0.0	0.0
32	20836.5	0.0	4800.5	0.0	0.0	0.0
33	20612.3	0.0	4684.5	0.0	0.0	0.0
34	4550.1	0.0	1025.2	0.0	0.0	225.0
35	22804.5	0.0	5089.1	0.0	0.0	1136.0
36	22522.2	0.0	4943.0	0.0	0.0	1136.0
37	22239.9	0.0	4796.9	0.0	0.0	1136.0
38	6152.5	0.0	1972.2	0.0	0.0	322.4

39	24729.7	0.0	6503.9	0.0	0.0	1449.3
40	19936.2	0.0	2638.8	0.0	0.0	1449.3
41	2429.5	0.0	59.0	0.0	0.0	205.9
42	11439.7	0.0	0.0	0.0	0.0	1169.5
43	7426.3	0.0	0.0	0.0	0.0	1169.5
44	845.2	0.0	0.0	0.0	0.0	194.3
45	2258.4	0.0	0.0	0.0	0.0	1111.5

TOTAL WEIGHT OF SLIDING MASS = 517415.89(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 382246.81(lbs)

TOTAL AREA OF SLIDING MASS = 4311.80(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 45 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	5	200.00	32.00	
5	5	200.00	32.00	
6	3	400.00	32.00	
7	3	400.00	32.00	
8	3	400.00	32.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	3	400.00	32.00	
40	3	400.00	32.00	
41	3	400.00	32.00	
42	3	400.00	32.00	
43	3	400.00	32.00	
44	1	150.00	32.00	
45	1	150.00	32.00	

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 45 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-43.32	159.66	5.77	397.00	448.08	158.16
1	-43.32	159.66	5.77	397.00	448.08	158.16
2	-43.32	163.86	5.77	1008.14	829.96	292.95
2	-43.32	163.86	5.77	1008.14	829.96	292.95
3	-43.94	167.62	4.61	1572.51	1182.61	417.43
3	-43.94	167.62	4.61	1572.51	1182.61	417.43
4	-43.94	170.94	4.61	2069.33	1493.06	527.01
4	-43.94	170.94	4.61	2069.33	1493.06	527.01
5	-43.94	172.62	0.05	2318.88	1649.00	582.05
5	-43.94	172.62	0.05	2318.88	1649.00	582.05
6	-43.94	174.03	3.86	2495.48	1959.35	691.59
6	-43.94	174.03	3.86	2495.48	1959.35	691.59
7	-43.94	176.81	3.86	2658.26	2061.07	727.50
7	-43.94	176.81	3.86	2658.26	2061.07	727.50
8	-43.94	178.20	0.01	2739.86	2112.05	745.49
8	-43.94	178.20	0.01	2739.86	2112.05	745.49
9	-43.94	179.28	2.99	2197.14	387.42	136.75
9	-43.94	179.28	2.99	2197.14	387.42	136.75
10	6.43	182.03	3.36	2116.52	373.20	131.73
10	6.43	182.03	3.36	2116.52	373.20	131.73
11	6.43	185.96	4.55	2125.77	374.83	132.30
11	6.43	185.96	4.55	2125.77	374.83	132.30
12	6.43	190.49	4.55	2159.98	380.86	134.43
12	6.43	190.49	4.55	2159.98	380.86	134.43
13	6.43	195.01	4.55	2194.19	386.90	136.56
13	6.43	195.01	4.55	2194.19	386.90	136.56
14	6.43	199.54	4.55	2228.40	392.93	138.69
14	6.43	199.54	4.55	2228.40	392.93	138.69
15	6.43	202.80	2.01	2250.78	396.87	140.08
15	6.43	202.80	2.01	2250.78	396.87	140.08
16	6.43	203.83	0.06	1767.38	311.64	110.00
16	6.43	203.83	0.06	1767.38	311.64	110.00
17	6.43	205.43	3.16	1825.00	321.80	113.59
17	6.43	205.43	3.16	1825.00	321.80	113.59
18	6.43	209.45	4.93	1969.83	347.33	122.60
18	6.43	209.45	4.93	1969.83	347.33	122.60
19	6.43	214.20	4.63	2055.17	362.38	127.91
19	6.43	214.20	4.63	2055.17	362.38	127.91
20	6.43	218.80	4.63	2049.36	361.36	127.55
20	6.43	218.80	4.63	2049.36	361.36	127.55
21	6.43	223.40	4.63	7080.73	1248.52	440.69
21	6.43	223.40	4.63	7080.73	1248.52	440.69
22	6.43	227.25	3.12	2030.67	358.06	126.39
22	6.43	227.25	3.12	2030.67	358.06	126.39
23	6.43	230.35	3.12	2010.71	354.54	125.14
23	6.43	230.35	3.12	2010.71	354.54	125.14
24	6.43	232.75	1.71	1995.25	351.82	124.18
24	6.43	232.75	1.71	1995.25	351.82	124.18
25	6.43	235.90	4.63	2147.67	378.69	133.67
25	6.43	235.90	4.63	2147.67	378.69	133.67
26	6.43	240.45	4.53	2477.21	436.80	154.18
26	6.43	240.45	4.53	2477.21	436.80	154.18
27	6.43	244.95	4.53	2820.52	497.33	175.54
27	6.43	244.95	4.53	2820.52	497.33	175.54
28	6.43	249.38	4.38	3158.10	556.86	196.55
28	6.43	249.38	4.38	3158.10	556.86	196.55
29	6.43	253.73	4.38	3489.96	615.37	217.21
29	6.43	253.73	4.38	3489.96	615.37	217.21
30	6.43	257.20	2.62	3755.07	662.12	233.71
30	6.43	257.20	2.62	3755.07	662.12	233.71
31	6.43	260.25	3.52	3902.52	688.12	242.89
31	6.43	260.25	3.52	3902.52	688.12	242.89
32	6.43	264.02	4.08	3937.46	694.28	245.06
32	6.43	264.02	4.08	3937.46	694.28	245.06
33	6.43	268.08	4.08	3910.75	689.57	243.40

33	6.43	268.08	4.08	3910.75	689.57	243.40
34	6.43	270.55	0.91	4142.58	730.45	257.83
34	6.43	270.55	0.91	4142.58	730.45	257.83
35	6.43	273.27	4.57	4124.63	727.28	256.71
35	6.43	273.27	4.57	4124.63	727.28	256.71
36	6.43	277.82	4.57	4094.67	722.00	254.85
36	6.43	277.82	4.57	4094.67	722.00	254.85
37	6.43	282.36	4.57	4064.71	716.72	252.98
37	6.43	282.36	4.57	4064.71	716.72	252.98
38	49.89	285.28	2.00	3740.56	659.56	232.81
38	49.89	285.28	2.00	3740.56	659.56	232.81
39	49.89	288.82	9.00	2823.84	2164.53	764.02
39	49.89	288.82	9.00	2823.84	2164.53	764.02
40	49.89	294.62	9.00	2513.35	1970.52	695.54
40	49.89	294.62	9.00	2513.35	1970.52	695.54
41	56.78	297.93	1.50	2154.90	1746.53	616.47
41	56.78	297.93	1.50	2154.90	1746.53	616.47
42	56.78	300.68	8.54	1812.77	1532.74	541.01
42	56.78	300.68	8.54	1812.77	1532.74	541.01
43	56.78	305.36	8.54	1181.86	1138.51	401.86
43	56.78	305.36	8.54	1181.86	1138.51	401.86
44	56.78	308.08	1.42	919.86	724.79	255.83
44	56.78	308.08	1.42	919.86	724.79	255.83
45	62.28	310.70	9.56	448.98	430.55	151.97
45	62.28	310.70	9.56	448.98	430.55	151.97

Table 4 - Base Force Data on the 45 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-43.32	159.66	5.77	2292.32	2587.21	913.21
1	-43.32	159.66	5.77	2292.32	2587.21	913.21
2	-43.32	163.86	5.77	5821.05	4792.21	1691.51
2	-43.32	163.86	5.77	5821.05	4792.21	1691.51
3	-43.94	167.62	4.61	7251.08	5453.21	1924.82
3	-43.94	167.62	4.61	7251.08	5453.21	1924.82
4	-43.94	170.94	4.61	9541.99	6884.73	2430.11
4	-43.94	170.94	4.61	9541.99	6884.73	2430.11
5	-43.94	172.62	0.05	125.94	89.56	31.61
5	-43.94	172.62	0.05	125.94	89.56	31.61
6	-43.94	174.03	3.86	9640.43	7569.28	2671.74
6	-43.94	174.03	3.86	9640.43	7569.28	2671.74
7	-43.94	176.81	3.86	10269.31	7962.25	2810.44
7	-43.94	176.81	3.86	10269.31	7962.25	2810.44
8	-43.94	178.20	0.01	15.31	11.80	4.17
8	-43.94	178.20	0.01	15.31	11.80	4.17
9	-43.94	179.28	2.99	6572.67	1158.94	409.07
9	-43.94	179.28	2.99	6572.67	1158.94	409.07
10	6.43	182.03	3.36	7118.21	1255.13	443.03
10	6.43	182.03	3.36	7118.21	1255.13	443.03
11	6.43	185.96	4.55	9679.93	1706.83	602.46
11	6.43	185.96	4.55	9679.93	1706.83	602.46
12	6.43	190.49	4.55	9835.73	1734.30	612.16
12	6.43	190.49	4.55	9835.73	1734.30	612.16
13	6.43	195.01	4.55	9991.52	1761.77	621.86
13	6.43	195.01	4.55	9991.52	1761.77	621.86
14	6.43	199.54	4.55	10147.31	1789.24	631.55
14	6.43	199.54	4.55	10147.31	1789.24	631.55
15	6.43	202.80	2.01	4530.03	798.77	281.94
15	6.43	202.80	2.01	4530.03	798.77	281.94
16	6.43	203.83	0.06	101.38	17.88	6.31
16	6.43	203.83	0.06	101.38	17.88	6.31
17	6.43	205.43	3.16	5772.27	1017.81	359.26
17	6.43	205.43	3.16	5772.27	1017.81	359.26
18	6.43	209.45	4.93	9713.24	1712.71	604.54
18	6.43	209.45	4.93	9713.24	1712.71	604.54
19	6.43	214.20	4.63	9513.56	1677.50	592.11
19	6.43	214.20	4.63	9513.56	1677.50	592.11

20	6.43	218.80	4.63	9486.69	1672.76	590.44
20	6.43	218.80	4.63	9486.69	1672.76	590.44
21	6.43	223.40	4.63	32777.37	5779.53	2040.01
21	6.43	223.40	4.63	32777.37	5779.53	2040.01
22	6.43	227.25	3.12	6334.90	1117.01	394.27
22	6.43	227.25	3.12	6334.90	1117.01	394.27
23	6.43	230.35	3.12	6272.62	1106.03	390.40
23	6.43	230.35	3.12	6272.62	1106.03	390.40
24	6.43	232.75	1.71	3413.38	601.87	212.44
24	6.43	232.75	1.71	3413.38	601.87	212.44
25	6.43	235.90	4.63	9941.77	1753.00	618.76
25	6.43	235.90	4.63	9941.77	1753.00	618.76
26	6.43	240.45	4.53	11217.97	1978.03	698.19
26	6.43	240.45	4.53	11217.97	1978.03	698.19
27	6.43	244.95	4.53	12772.61	2252.16	794.95
27	6.43	244.95	4.53	12772.61	2252.16	794.95
28	6.43	249.38	4.38	13824.62	2437.65	860.42
28	6.43	249.38	4.38	13824.62	2437.65	860.42
29	6.43	253.73	4.38	15277.34	2693.81	950.84
29	6.43	253.73	4.38	15277.34	2693.81	950.84
30	6.43	257.20	2.62	9824.92	1732.40	611.49
30	6.43	257.20	2.62	9824.92	1732.40	611.49
31	6.43	260.25	3.52	13745.23	2423.65	855.48
31	6.43	260.25	3.52	13745.23	2423.65	855.48
32	6.43	264.02	4.08	16047.56	2829.62	998.77
32	6.43	264.02	4.08	16047.56	2829.62	998.77
33	6.43	268.08	4.08	15938.74	2810.43	992.00
33	6.43	268.08	4.08	15938.74	2810.43	992.00
34	6.43	270.55	0.91	3751.90	661.56	233.51
34	6.43	270.55	0.91	3751.90	661.56	233.51
35	6.43	273.27	4.57	18861.66	3325.82	1173.92
35	6.43	273.27	4.57	18861.66	3325.82	1173.92
36	6.43	277.82	4.57	18724.65	3301.66	1165.39
36	6.43	277.82	4.57	18724.65	3301.66	1165.39
37	6.43	282.36	4.57	18587.64	3277.50	1156.86
37	6.43	282.36	4.57	18587.64	3277.50	1156.86
38	49.89	285.28	2.00	7487.63	1320.27	466.02
38	49.89	285.28	2.00	7487.63	1320.27	466.02
39	49.89	288.82	9.00	25412.08	19478.88	6875.48
39	49.89	288.82	9.00	25412.08	19478.88	6875.48
40	49.89	294.62	9.00	22618.00	17732.94	6259.22
40	49.89	294.62	9.00	22618.00	17732.94	6259.22
41	56.78	297.93	1.50	3239.45	2625.55	926.74
41	56.78	297.93	1.50	3239.45	2625.55	926.74
42	56.78	300.68	8.54	15478.94	13087.86	4619.63
42	56.78	300.68	8.54	15478.94	13087.86	4619.63
43	56.78	305.36	8.54	10091.77	9721.58	3431.44
43	56.78	305.36	8.54	10091.77	9721.58	3431.44
44	56.78	308.08	1.42	1305.29	1028.48	363.03
44	56.78	308.08	1.42	1305.29	1028.48	363.03
45	62.28	310.70	9.56	4291.22	4115.10	1452.51
45	62.28	310.70	9.56	4291.22	4115.10	1452.51

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 45 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
21	33339.5	23344.6	40700.0	35.00	-0.829152E+04

***Pier/Pile Slice Force Data on the 45 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
23	12000.0	0.0	12000.0	90.00	0.473132E+03

Sum of the Resisting Forces = 122457.37 (lbs)

Average Available Shear Strength = 658.23(psf)

Sum of the Driving Forces = 46166.81 (lbs)

Average Mobilized Shear Stress = 248.16(psf)

Total length of the failure surface = 186.04(ft)

Factor of Safety Balance Check: FS = 2.65250

Janbu's Correction Factor (fo) = 1.0743

Janub's FS Corrected = 2.84963

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

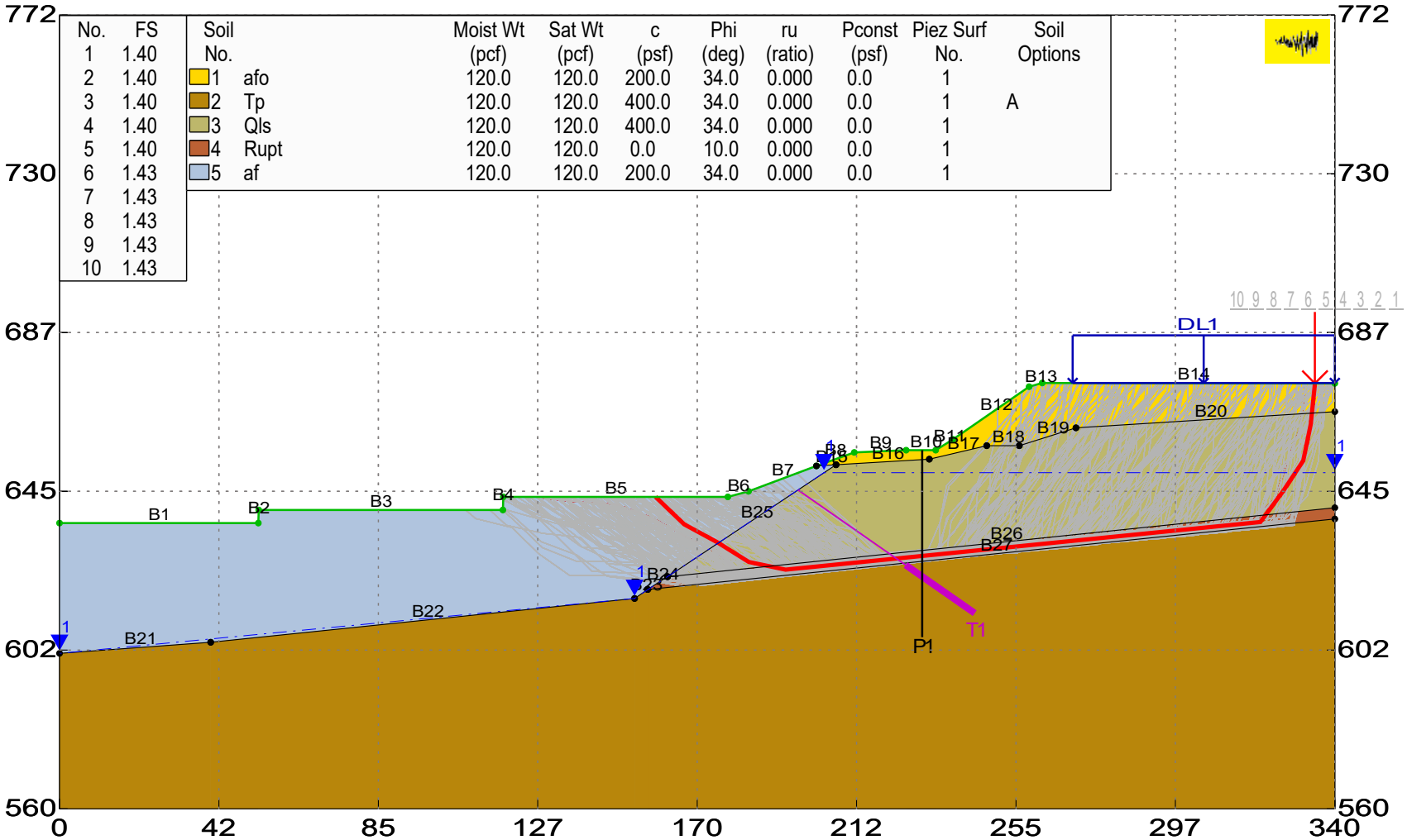
Royal Vista - Cross Section 8
Stage 6 (Final Condition - Seismic)

LGC Geotechnical / BPP

\Sec 8 - Stage 6 (Final Condition - Seismic).gsd

No.	FS
1	1.40
2	1.40
3	1.40
4	1.40
5	1.40
6	1.43
7	1.43
8	1.43
9	1.43
10	1.43

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.40

Simplified Janbu (Corrected) Method

kh = 0.15000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 6 (Final Condition - Seismic).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\8-8'\2023_06_26\Sec 8 - Stage 6 (Final Condition - Seismic).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 8

DESCRIPTION: Stage 6 (Final Condition - Seismic)

BOUNDARY DATA

14 Surface Boundaries
27 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	636.500	53.000	636.500	5
2	53.000	636.500	53.100	640.000	5
3	53.100	640.000	118.200	640.000	5
4	118.200	640.000	118.300	643.500	5
5	118.300	643.500	178.200	643.500	5
6	178.200	643.500	183.700	645.000	5
7	183.700	645.000	201.800	651.800	5
8	201.800	651.800	211.900	655.400	1
9	211.900	655.400	225.700	656.000	1
10	225.700	656.000	233.600	656.000	1
11	233.600	656.000	238.200	658.900	1
12	238.200	658.900	258.500	673.000	1
13	258.500	673.000	262.000	674.000	1
14	262.000	674.000	340.000	673.900	1
15	201.800	651.800	207.000	652.100	5
16	207.000	652.100	231.900	653.600	3
17	231.900	653.600	247.200	657.200	3
18	247.200	657.200	255.900	657.200	3
19	255.900	657.200	271.000	662.000	3
20	271.000	662.000	340.000	666.300	3
21	0.000	601.600	40.300	604.600	2
22	40.300	604.600	153.300	616.300	2
23	153.300	616.300	156.800	618.700	2
24	156.800	618.700	162.100	622.200	4
25	162.100	622.100	207.000	652.100	3
26	162.100	622.100	340.000	640.600	4

27	156.800	618.700	340.000	637.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	400.00	32.00
2	8.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	601.60
2	153.30	616.30
3	203.80	650.00
4	340.00	650.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

DISTRIBUTED LOAD(S)

1 Load(s) Specified

Load No.	BND No.	X - 1 (ft)	Y - 1 (ft)	Stress (psf)	X - 2 (ft)	Y - 2 (ft)	Stress (psf)	Deflection (deg from Vert)
1	14	270.100	674.000	250.000	340.000	674.000	250.000	0.00

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

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.15000(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 Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	196.90	645.35	203500.0	5.0	35.00	35.0	22.5

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	230.00	656.00	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 10.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	165.00	620.40	220.00	627.20	3.00
2	230.00	627.40	330.00	637.40	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 = 217

Number of Trial Surfaces With Valid FS = 783

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 21.7 %

Statistical Data On All Valid FS Values:
FS Max = 4.980 FS Min = 1.396 FS Ave = 1.822
Standard Deviation = 0.420 Coefficient of Variation = 23.03 %

Critical Surface is Sequence Number 56 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	223.09	627.01

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	230.00	627.70

Factor Of Safety For The Critical or Specified Surface = 1.396

Table 1 - Geometry Data on the 54 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.38	0.19	159.13	643.31	643.50	-44.36	0.00	0.54
2	3.59	2.12	161.12	641.38	643.50	-44.13	0.00	5.00
3	3.59	5.60	164.70	637.90	643.50	-44.13	0.00	5.00
4	4.40	8.53	168.70	634.97	643.50	-28.39	0.00	5.00
5	4.40	10.90	173.10	632.60	643.50	-28.39	0.00	5.00
6	0.33	12.20	175.46	631.30	643.50	-32.07	0.00	0.39
7	0.05	12.31	175.65	631.19	643.50	-32.07	0.00	0.06
8	2.52	13.12	176.94	630.38	643.50	-32.07	0.00	2.98
9	2.75	15.15	179.57	628.73	643.88	-32.07	15.26	3.25
10	2.75	17.62	182.32	627.00	644.62	-32.07	15.26	3.25

11	0.07	18.89	183.74	626.12	645.01	-32.07	20.59	0.08
12	2.78	19.74	185.16	625.81	645.55	-11.87	20.59	2.84
13	2.78	21.37	187.94	625.22	646.59	-11.87	20.59	2.84
14	4.23	23.42	191.44	624.49	647.91	-11.87	20.59	4.32
15	4.12	25.23	195.62	624.25	649.48	5.74	20.59	4.14
16	4.12	26.36	199.74	624.66	651.03	5.74	20.59	4.14
17	2.00	27.19	202.80	624.97	652.16	5.74	19.62	2.01
18	0.06	27.45	203.83	625.07	652.52	5.74	19.62	0.06
19	3.14	27.86	205.43	625.23	653.09	5.74	19.62	3.16
20	4.90	28.89	209.45	625.64	654.53	5.74	19.62	4.92
21	4.60	29.38	214.20	626.12	655.50	5.74	2.49	4.62
22	4.60	29.12	218.80	626.58	655.70	5.74	2.49	4.62
23	4.60	28.86	223.40	627.04	655.90	5.74	2.49	4.62
24	3.10	28.57	227.25	627.43	656.00	5.74	0.00	3.12
25	3.10	28.26	230.35	627.74	656.00	5.74	0.00	3.12
26	1.70	28.02	232.75	627.98	656.00	5.74	0.00	1.71
27	4.60	29.15	235.90	628.30	657.45	5.74	32.23	4.62
28	4.50	31.71	240.45	628.75	660.46	5.74	34.78	4.52
29	4.50	34.38	244.95	629.21	663.59	5.74	34.78	4.52
30	4.35	37.01	249.38	629.65	666.66	5.74	34.78	4.37
31	4.35	39.59	253.73	630.09	669.68	5.74	34.78	4.37
32	2.60	41.66	257.20	630.44	672.10	5.74	34.78	2.61
33	3.50	42.76	260.25	630.74	673.50	5.74	15.95	3.52
34	4.05	42.87	264.02	631.12	674.00	5.74	-0.07	4.07
35	4.05	42.46	268.08	631.53	673.99	5.74	-0.07	4.07
36	0.90	42.21	270.55	631.78	673.99	5.74	-0.07	0.90
37	4.92	41.91	273.46	632.07	673.99	5.74	-0.07	4.94
38	4.92	41.41	278.37	632.57	673.98	5.74	-0.07	4.94
39	4.92	40.91	283.29	633.06	673.97	5.74	-0.07	4.94
40	4.92	40.41	288.20	633.55	673.97	5.74	-0.07	4.94
41	4.92	39.91	293.12	634.05	673.96	5.74	-0.07	4.94
42	4.92	39.41	298.04	634.54	673.95	5.74	-0.07	4.94
43	4.92	38.91	302.95	635.04	673.95	5.74	-0.07	4.94
44	4.92	38.41	307.87	635.53	673.94	5.74	-0.07	4.94
45	4.92	37.91	312.78	636.02	673.93	5.74	-0.07	4.94
46	4.92	37.41	317.70	636.52	673.93	5.74	-0.07	4.94
47	1.41	36.20	320.86	637.72	673.92	53.69	-0.07	2.38
48	4.51	32.17	323.82	641.75	673.92	53.69	-0.07	7.62
49	3.42	26.50	327.79	647.41	673.92	56.57	-0.07	6.20
50	2.09	22.33	330.54	651.58	673.91	56.57	-0.07	3.80
51	1.99	15.84	332.58	658.07	673.91	78.49	-0.07	10.00
52	0.30	9.46	333.73	664.44	673.91	84.11	-0.07	2.97
53	0.72	4.49	334.25	669.42	673.91	84.11	-0.07	7.03
54	0.08	0.50	334.65	673.41	673.91	85.20	-0.07	1.00

Table 2 - Force Data On The 54 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	8.7	0.0	0.0	1.3	0.0	0.0
2	911.4	0.0	0.0	136.7	0.0	0.0
3	2410.8	0.0	0.0	361.6	0.0	0.0
4	4501.0	0.0	0.0	675.2	0.0	0.0
5	5755.8	0.0	0.0	863.4	0.0	0.0
6	484.3	0.0	0.0	72.6	0.0	0.0
7	70.0	0.0	0.1	10.5	0.0	0.0
8	3975.2	0.0	218.0	596.3	0.0	0.0
9	4998.8	0.0	715.5	749.8	0.0	0.0
10	5814.9	0.0	1214.0	872.2	0.0	0.0
11	161.2	0.0	38.0	24.2	0.0	0.0
12	6578.6	0.0	1440.0	986.8	0.0	0.0
13	7120.7	0.0	1738.5	1068.1	0.0	0.0
14	11896.0	0.0	3224.0	1784.4	0.0	0.0
15	12476.9	0.0	3628.6	1871.5	0.0	0.0
16	13037.8	0.0	4046.3	1955.7	0.0	0.0
17	6524.6	0.0	2114.2	978.7	0.0	0.0
18	187.8	0.0	89.1	28.2	0.0	0.0

19	10507.1	0.0	4881.5	1576.1	0.0	0.0
20	16985.9	0.0	7486.1	2547.9	0.0	0.0
21	16219.7	0.0	6890.0	2433.0	0.0	0.0
22	16074.9	0.0	6756.7	2411.2	0.0	0.0
23	15930.1	0.0	6623.3	2389.5	0.0	0.0
24	10628.7	0.0	4388.3	1594.3	0.0	0.0
25	10512.8	0.0	4327.7	1576.9	0.0	0.0
26	5715.9	0.0	2347.6	857.4	0.0	0.0
27	16092.2	0.0	6260.9	2413.8	0.0	0.0
28	17122.3	0.0	5995.7	2568.4	0.0	0.0
29	18566.0	0.0	5868.1	2784.9	0.0	0.0
30	19319.3	0.0	5551.2	2897.9	0.0	0.0
31	20668.3	0.0	5431.9	3100.2	0.0	0.0
32	12997.6	0.0	3189.7	1949.6	0.0	0.0
33	17957.2	0.0	4226.5	2693.6	0.0	0.0
34	20836.4	0.0	4794.3	3125.5	0.0	0.0
35	20636.1	0.0	4691.0	3095.4	0.0	0.0
36	4558.6	0.0	1028.4	683.8	0.0	225.0
37	24722.9	0.0	5526.7	3708.4	0.0	1228.9
38	24427.8	0.0	5374.4	3664.2	0.0	1228.9
39	24132.7	0.0	5222.1	3619.9	0.0	1228.9
40	23837.5	0.0	5069.8	3575.6	0.0	1228.9
41	23542.4	0.0	4917.5	3531.4	0.0	1228.9
42	23247.3	0.0	4765.2	3487.1	0.0	1228.9
43	22952.2	0.0	4612.9	3442.8	0.0	1228.9
44	22657.0	0.0	4460.6	3398.6	0.0	1228.9
45	22361.9	0.0	4308.3	3354.3	0.0	1228.9
46	22066.8	0.0	4156.0	3310.0	0.0	1228.9
47	6121.2	0.0	1822.7	918.2	0.0	352.3
48	17419.6	0.0	3921.5	2612.9	0.0	1128.2
49	10869.1	0.0	1001.8	1630.4	0.0	854.4
50	5605.2	0.0	0.0	840.8	0.0	523.0
51	3791.9	0.0	0.0	568.8	0.0	498.7
52	345.5	0.0	0.0	51.8	0.0	76.1
53	388.6	0.0	0.0	58.3	0.0	180.3
54	5.0	0.0	0.0	0.7	0.0	20.8

TOTAL WEIGHT OF SLIDING MASS = 636737.91(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 476383.20(lbs)

TOTAL AREA OF SLIDING MASS = 5306.15(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 54 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	34.00	
2	5	200.00	34.00	
3	5	200.00	34.00	
4	5	200.00	34.00	
5	5	200.00	34.00	
6	5	200.00	34.00	
7	5	200.00	34.00	
8	3	400.00	34.00	
9	3	400.00	34.00	
10	3	400.00	34.00	
11	3	400.00	34.00	
12	3	400.00	34.00	
13	3	400.00	34.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	

25	4	0.00	10.00
26	4	0.00	10.00
27	4	0.00	10.00
28	4	0.00	10.00
29	4	0.00	10.00
30	4	0.00	10.00
31	4	0.00	10.00
32	4	0.00	10.00
33	4	0.00	10.00
34	4	0.00	10.00
35	4	0.00	10.00
36	4	0.00	10.00
37	4	0.00	10.00
38	4	0.00	10.00
39	4	0.00	10.00
40	4	0.00	10.00
41	4	0.00	10.00
42	4	0.00	10.00
43	4	0.00	10.00
44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	4	0.00	10.00
48	3	400.00	34.00
49	3	400.00	34.00
50	3	400.00	34.00
51	3	400.00	34.00
52	3	400.00	34.00
53	1	200.00	34.00
54	1	200.00	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 54 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-44.36	159.13	0.54	348.87	435.32	311.16
1	-44.36	159.13	0.54	348.87	435.32	311.16
2	-44.13	161.12	5.00	807.76	744.84	532.40
2	-44.13	161.12	5.00	807.76	744.84	532.40
3	-44.13	164.70	5.00	1645.81	1310.11	936.45
3	-44.13	164.70	5.00	1645.81	1310.11	936.45
4	-28.39	168.70	5.00	1534.89	1235.30	882.97
4	-28.39	168.70	5.00	1534.89	1235.30	882.97
5	-28.39	173.10	5.00	1930.73	1502.30	1073.82
5	-28.39	173.10	5.00	1930.73	1502.30	1073.82
6	-32.07	175.46	0.39	2306.77	1755.93	1255.12
6	-32.07	175.46	0.39	2306.77	1755.93	1255.12
7	-32.07	175.65	0.06	2325.84	1768.80	1264.31
7	-32.07	175.65	0.06	2325.84	1768.80	1264.31
8	-32.07	176.94	2.98	2504.65	2089.41	1493.48
8	-32.07	176.94	2.98	2504.65	2089.41	1493.48
9	-32.07	179.57	3.25	2646.59	2185.14	1561.91
9	-32.07	179.57	3.25	2646.59	2185.14	1561.91
10	-32.07	182.32	3.25	2858.30	2327.95	1663.98
10	-32.07	182.32	3.25	2858.30	2327.95	1663.98
11	-32.07	183.74	0.08	2967.54	2401.63	1716.65
11	-32.07	183.74	0.08	2967.54	2401.63	1716.65
12	-11.87	185.16	2.84	2160.67	1857.39	1327.63
12	-11.87	185.16	2.84	2160.67	1857.39	1327.63
13	-11.87	187.94	2.84	2261.64	1925.50	1376.32
13	-11.87	187.94	2.84	2261.64	1925.50	1376.32
14	-11.87	191.44	4.32	2125.52	374.79	267.89

14	-11.87	191.44	4.32	2125.52	374.79	267.89
15	5.74	195.62	4.14	2122.56	374.26	267.52
15	5.74	195.62	4.14	2122.56	374.26	267.52
16	5.74	199.74	4.14	2157.32	380.39	271.90
16	5.74	199.74	4.14	2157.32	380.39	271.90
17	5.74	202.80	2.01	2180.86	384.54	274.87
17	5.74	202.80	2.01	2180.86	384.54	274.87
18	5.74	203.83	0.06	1715.19	302.44	216.18
18	5.74	203.83	0.06	1715.19	302.44	216.18
19	5.74	205.43	3.16	1773.58	312.73	223.53
19	5.74	205.43	3.16	1773.58	312.73	223.53
20	5.74	209.45	4.92	1920.31	338.60	242.03
20	5.74	209.45	4.92	1920.31	338.60	242.03
21	5.74	214.20	4.62	2008.41	354.14	253.13
21	5.74	214.20	4.62	2008.41	354.14	253.13
22	5.74	218.80	4.62	2005.81	353.68	252.80
22	5.74	218.80	4.62	2005.81	353.68	252.80
23	5.74	223.40	4.62	7010.12	1236.07	883.53
23	5.74	223.40	4.62	7010.12	1236.07	883.53
24	5.74	227.25	3.12	1993.07	351.43	251.20
24	5.74	227.25	3.12	1993.07	351.43	251.20
25	5.74	230.35	3.12	1975.36	348.31	248.97
25	5.74	230.35	3.12	1975.36	348.31	248.97
26	5.74	232.75	1.71	1961.66	345.89	247.24
26	5.74	232.75	1.71	1961.66	345.89	247.24
27	5.74	235.90	4.62	2115.33	372.99	266.61
27	5.74	235.90	4.62	2115.33	372.99	266.61
28	5.74	240.45	4.52	2446.04	431.30	308.29
28	5.74	240.45	4.52	2446.04	431.30	308.29
29	5.74	244.95	4.52	2790.38	492.02	351.69
29	5.74	244.95	4.52	2790.38	492.02	351.69
30	5.74	249.38	4.37	3128.99	551.73	394.37
30	5.74	249.38	4.37	3128.99	551.73	394.37
31	5.74	253.73	4.37	3461.86	610.42	436.32
31	5.74	253.73	4.37	3461.86	610.42	436.32
32	5.74	257.20	2.61	3727.77	657.31	469.83
32	5.74	257.20	2.61	3727.77	657.31	469.83
33	5.74	260.25	3.52	3876.45	683.52	488.57
33	5.74	260.25	3.52	3876.45	683.52	488.57
34	5.74	264.02	4.07	3913.78	690.10	493.28
34	5.74	264.02	4.07	3913.78	690.10	493.28
35	5.74	268.08	4.07	3890.03	685.92	490.28
35	5.74	268.08	4.07	3890.03	685.92	490.28
36	5.74	270.55	0.90	4122.17	726.85	519.54
36	5.74	270.55	0.90	4122.17	726.85	519.54
37	5.74	273.46	4.94	4105.12	723.84	517.39
37	5.74	273.46	4.94	4105.12	723.84	517.39
38	5.74	278.37	4.94	4076.30	718.76	513.76
38	5.74	278.37	4.94	4076.30	718.76	513.76
39	5.74	283.29	4.94	4047.48	713.68	510.13
39	5.74	283.29	4.94	4047.48	713.68	510.13
40	5.74	288.20	4.94	4018.66	708.60	506.50
40	5.74	288.20	4.94	4018.66	708.60	506.50
41	5.74	293.12	4.94	3989.84	703.52	502.86
41	5.74	293.12	4.94	3989.84	703.52	502.86
42	5.74	298.04	4.94	3961.02	698.43	499.23
42	5.74	298.04	4.94	3961.02	698.43	499.23
43	5.74	302.95	4.94	3932.20	693.35	495.60
43	5.74	302.95	4.94	3932.20	693.35	495.60
44	5.74	307.87	4.94	3903.38	688.27	491.97
44	5.74	307.87	4.94	3903.38	688.27	491.97
45	5.74	312.78	4.94	3874.56	683.19	488.33
45	5.74	312.78	4.94	3874.56	683.19	488.33
46	5.74	317.70	4.94	3845.74	678.11	484.70
46	5.74	317.70	4.94	3845.74	678.11	484.70
47	53.69	320.86	2.38	3233.42	570.14	407.53
47	53.69	320.86	2.38	3233.42	570.14	407.53
48	53.69	323.82	7.62	1865.80	1658.50	1185.47
48	53.69	323.82	7.62	1865.80	1658.50	1185.47
49	56.57	327.79	6.20	1572.87	1460.92	1044.24
49	56.57	327.79	6.20	1572.87	1460.92	1044.24
50	56.57	330.54	3.80	1382.39	1332.44	952.41

50	56.57	330.54	3.80	1382.39	1332.44	952.41
51	78.49	332.58	10.00	182.19	522.89	373.75
51	78.49	332.58	10.00	182.19	522.89	373.75
52	84.11	333.73	2.97	230.39	155.40	111.08
52	84.11	333.73	2.97	230.39	155.40	111.08
53	84.11	334.25	7.03	131.15	88.46	63.23
53	84.11	334.25	7.03	131.15	88.46	63.23
54	85.20	334.65	1.00	43.27	29.19	20.86
54	85.20	334.65	1.00	43.27	29.19	20.86

Table 4 - Base Force Data on the 54 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-44.36	159.13	0.54	187.45	233.90	167.19
1	-44.36	159.13	0.54	187.45	233.90	167.19
2	-44.13	161.12	5.00	4038.80	3724.21	2662.01
2	-44.13	161.12	5.00	4038.80	3724.21	2662.01
3	-44.13	164.70	5.00	8229.06	6550.57	4682.26
3	-44.13	164.70	5.00	8229.06	6550.57	4682.26
4	-28.39	168.70	5.00	7674.47	6176.50	4414.87
4	-28.39	168.70	5.00	7674.47	6176.50	4414.87
5	-28.39	173.10	5.00	9653.67	7511.48	5369.10
5	-28.39	173.10	5.00	9653.67	7511.48	5369.10
6	-32.07	175.46	0.39	900.80	685.70	490.13
6	-32.07	175.46	0.39	900.80	685.70	490.13
7	-32.07	175.65	0.06	129.99	98.86	70.66
7	-32.07	175.65	0.06	129.99	98.86	70.66
8	-32.07	176.94	2.98	7462.33	6225.16	4449.66
8	-32.07	176.94	2.98	7462.33	6225.16	4449.66
9	-32.07	179.57	3.25	8588.59	7091.14	5068.64
9	-32.07	179.57	3.25	8588.59	7091.14	5068.64
10	-32.07	182.32	3.25	9275.62	7554.55	5399.88
10	-32.07	182.32	3.25	9275.62	7554.55	5399.88
11	-32.07	183.74	0.08	248.99	201.51	144.03
11	-32.07	183.74	0.08	248.99	201.51	144.03
12	-11.87	185.16	2.84	6130.96	5270.40	3767.21
12	-11.87	185.16	2.84	6130.96	5270.40	3767.21
13	-11.87	187.94	2.84	6417.49	5463.67	3905.35
13	-11.87	187.94	2.84	6417.49	5463.67	3905.35
14	-11.87	191.44	4.32	9192.74	1620.93	1158.62
14	-11.87	191.44	4.32	9192.74	1620.93	1158.62
15	5.74	195.62	4.14	8791.72	1550.22	1108.07
15	5.74	195.62	4.14	8791.72	1550.22	1108.07
16	5.74	199.74	4.14	8935.73	1575.61	1126.22
16	5.74	199.74	4.14	8935.73	1575.61	1126.22
17	5.74	202.80	2.01	4383.70	772.96	552.50
17	5.74	202.80	2.01	4383.70	772.96	552.50
18	5.74	203.83	0.06	98.26	17.33	12.38
18	5.74	203.83	0.06	98.26	17.33	12.38
19	5.74	205.43	3.16	5602.43	987.86	706.11
19	5.74	205.43	3.16	5602.43	987.86	706.11
20	5.74	209.45	4.92	9456.92	1667.51	1191.91
20	5.74	209.45	4.92	9456.92	1667.51	1191.91
21	5.74	214.20	4.62	9285.22	1637.23	1170.27
21	5.74	214.20	4.62	9285.22	1637.23	1170.27
22	5.74	218.80	4.62	9273.22	1635.12	1168.76
22	5.74	218.80	4.62	9273.22	1635.12	1168.76
23	5.74	223.40	4.62	32408.99	5714.58	4084.70
23	5.74	223.40	4.62	32408.99	5714.58	4084.70
24	5.74	227.25	3.12	6209.64	1094.93	782.64
24	5.74	227.25	3.12	6209.64	1094.93	782.64
25	5.74	230.35	3.12	6154.48	1085.20	775.69
25	5.74	230.35	3.12	6154.48	1085.20	775.69
26	5.74	232.75	1.71	3351.62	590.98	422.42
26	5.74	232.75	1.71	3351.62	590.98	422.42
27	5.74	235.90	4.62	9779.56	1724.40	1232.58
27	5.74	235.90	4.62	9779.56	1724.40	1232.58

28	5.74	240.45	4.52	11062.63	1950.64	1394.29
28	5.74	240.45	4.52	11062.63	1950.64	1394.29
29	5.74	244.95	4.52	12619.99	2225.24	1590.57
29	5.74	244.95	4.52	12619.99	2225.24	1590.57
30	5.74	249.38	4.37	13679.69	2412.10	1724.13
30	5.74	249.38	4.37	13679.69	2412.10	1724.13
31	5.74	253.73	4.37	15134.96	2668.70	1907.55
31	5.74	253.73	4.37	15134.96	2668.70	1907.55
32	5.74	257.20	2.61	9741.03	1717.61	1227.72
32	5.74	257.20	2.61	9741.03	1717.61	1227.72
33	5.74	260.25	3.52	13635.93	2404.38	1718.62
33	5.74	260.25	3.52	13635.93	2404.38	1718.62
34	5.74	264.02	4.07	15930.66	2809.00	2007.84
34	5.74	264.02	4.07	15930.66	2809.00	2007.84
35	5.74	268.08	4.07	15834.00	2791.96	1995.65
35	5.74	268.08	4.07	15834.00	2791.96	1995.65
36	5.74	270.55	0.90	3728.64	657.46	469.94
36	5.74	270.55	0.90	3728.64	657.46	469.94
37	5.74	273.46	4.94	20280.40	3575.98	2556.06
37	5.74	273.46	4.94	20280.40	3575.98	2556.06
38	5.74	278.37	4.94	20138.01	3550.88	2538.12
38	5.74	278.37	4.94	20138.01	3550.88	2538.12
39	5.74	283.29	4.94	19995.63	3525.77	2520.17
39	5.74	283.29	4.94	19995.63	3525.77	2520.17
40	5.74	288.20	4.94	19853.25	3500.66	2502.22
40	5.74	288.20	4.94	19853.25	3500.66	2502.22
41	5.74	293.12	4.94	19710.87	3475.56	2484.28
41	5.74	293.12	4.94	19710.87	3475.56	2484.28
42	5.74	298.04	4.94	19568.49	3450.45	2466.33
42	5.74	298.04	4.94	19568.49	3450.45	2466.33
43	5.74	302.95	4.94	19426.10	3425.35	2448.39
43	5.74	302.95	4.94	19426.10	3425.35	2448.39
44	5.74	307.87	4.94	19283.72	3400.24	2430.44
44	5.74	307.87	4.94	19283.72	3400.24	2430.44
45	5.74	312.78	4.94	19141.34	3375.13	2412.50
45	5.74	312.78	4.94	19141.34	3375.13	2412.50
46	5.74	317.70	4.94	18998.96	3350.03	2394.55
46	5.74	317.70	4.94	18998.96	3350.03	2394.55
47	53.69	320.86	2.38	7693.95	1356.65	969.71
47	53.69	320.86	2.38	7693.95	1356.65	969.71
48	53.69	323.82	7.62	14218.29	12638.55	9033.86
48	53.69	323.82	7.62	14218.29	12638.55	9033.86
49	56.57	327.79	6.20	9756.31	9061.86	6477.29
49	56.57	327.79	6.20	9756.31	9061.86	6477.29
50	56.57	330.54	3.80	5249.13	5059.44	3616.42
50	56.57	330.54	3.80	5249.13	5059.44	3616.42
51	78.49	332.58	10.00	1821.88	5228.87	3737.53
51	78.49	332.58	10.00	1821.88	5228.87	3737.53
52	84.11	333.73	2.97	683.48	461.02	329.53
52	84.11	333.73	2.97	683.48	461.02	329.53
53	84.11	334.25	7.03	922.40	622.17	444.72
53	84.11	334.25	7.03	922.40	622.17	444.72
54	85.20	334.65	1.00	43.06	29.04	20.76
54	85.20	334.65	1.00	43.06	29.04	20.76

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 54 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
23	33339.5	23344.6	40700.0	35.00	0.816822E+04

***Pier/Pile Slice Force Data on the 54 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

```
25      12000.0              0.0         12000.0          90.00       0.422116E+03

  Sum of the Resisting Forces =  141370.04 (lbs)

  Average Available Shear Strength =    677.16(psf)

  Sum of the Driving Forces =   108309.56 (lbs)

  Average Mobilized Shear Stress =     518.80(psf)

  Total length of the failure surface =     208.77(ft)

  Factor of Safety Balance Check: FS =  1.30524

  Janbu's Correction Factor (fo) =  1.0697

  Janub's FS Corrected =  1.39625

       The FS Calculation To Determine The Seismic Yield
       Coefficient (ky) Did Not Converge in 30  Iterations.

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

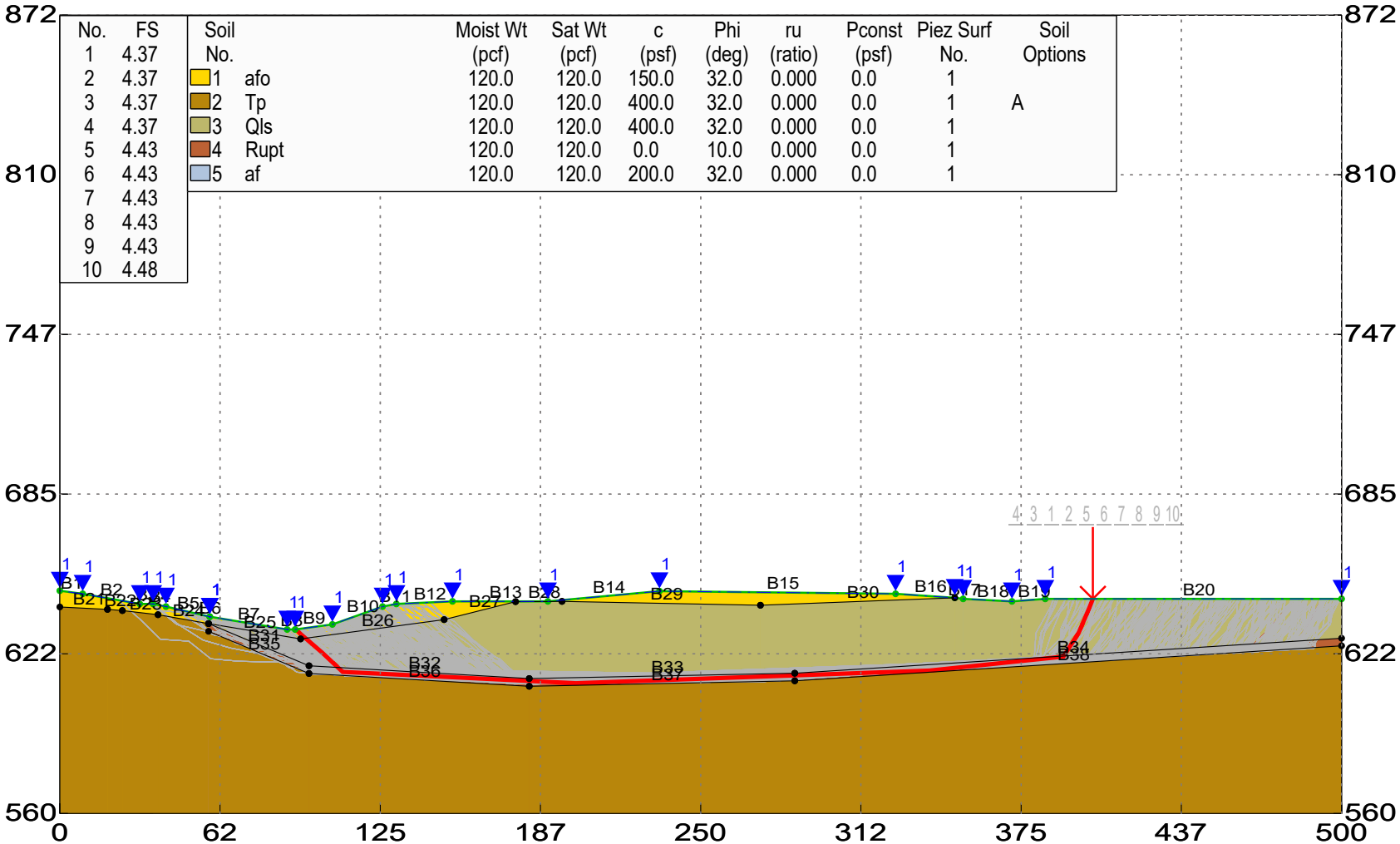
Royal Vista - Cross Section 9
Stage 1 (Existing Condition)

LGC Geotechnical / BPP

\Sec 9 - Stage 1 (Existing Condition).gsd

No.	FS
1	4.37
2	4.37
3	4.37
4	4.37
5	4.43
6	4.43
7	4.43
8	4.43
9	4.43
10	4.48

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 4.37

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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

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

Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 1 (Existing Condition).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 1 (Existing Condition).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 9

DESCRIPTION: Stage 1 (Existing Condition)

BOUNDARY DATA

20 Surface Boundaries
38 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.200	8.900	646.000	1
2	8.900	646.000	31.200	642.000	1
3	31.200	642.000	36.400	642.000	1
4	36.400	642.000	41.400	641.000	1
5	41.400	641.000	58.500	637.000	1
6	58.500	637.000	58.500	637.000	1
7	58.500	637.000	88.700	632.000	1
8	88.700	632.000	91.800	632.000	1
9	91.800	632.000	106.300	634.000	1
10	106.300	634.000	125.900	641.000	1
11	125.900	641.000	131.300	642.000	1
12	131.300	642.000	153.200	643.000	1
13	153.200	643.000	190.400	643.000	1
14	190.400	643.000	233.900	647.000	1
15	233.900	647.000	326.000	646.000	1
16	326.000	646.000	349.100	644.400	1
17	349.100	644.400	352.400	644.000	3
18	352.400	644.000	371.400	643.000	3
19	371.400	643.000	384.400	644.000	3
20	384.400	644.000	500.000	644.000	3
21	0.000	640.800	18.600	639.900	2
22	18.600	639.900	24.400	639.400	2
23	24.400	639.400	38.300	637.800	2
24	38.300	637.800	58.000	634.300	2
25	58.000	634.300	93.900	628.300	3
26	93.900	628.300	149.900	635.900	3

27	149.900	635.900	177.800	642.900	3
28	177.800	642.900	195.900	643.000	3
29	195.900	643.000	273.300	641.500	3
30	273.300	641.500	349.100	644.400	3
31	58.000	634.300	97.200	617.800	4
32	97.200	617.800	183.100	612.800	4
33	183.100	612.800	286.700	614.900	4
34	286.700	614.900	500.000	628.600	4
35	58.000	631.300	97.200	614.800	2
36	97.200	614.800	183.100	609.800	2
37	183.100	609.800	286.700	611.900	2
38	286.700	611.900	500.000	625.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	32.00
2	7.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 21 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	647.20

2	8.90	646.00
3	31.20	642.00
4	36.40	642.00
5	41.40	641.00
6	58.50	637.00
7	58.50	637.00
8	88.70	632.00
9	91.80	632.00
10	106.30	634.00
11	125.90	641.00
12	131.30	642.00
13	153.20	643.00
14	190.40	643.00
15	233.90	647.00
16	326.00	646.00
17	349.10	644.40
18	352.40	644.00
19	371.40	643.00
20	384.40	644.00
21	500.00	644.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	377.00	643.43	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

PIER/PILE LOAD DATA HAS BEEN SUPPRESSED

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.

4 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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	95.00	616.00	180.00	612.00	3.00
2	181.00	612.00	285.00	613.00	3.00
3	286.00	614.00	375.00	619.50	3.00
4	380.00	620.00	490.00	626.00	3.00

The Simplified Janbu (Corrected) 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 = 61.264 FS Min = 4.366 FS Ave = 15.609
Standard Deviation = 10.206 Coefficient of Variation = 65.39 %

Critical Surface is Sequence Number 149 of Those Analyzed.

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

Factor Of Safety For The Critical or Specified Surface = 4.366

Table 1 - Geometry Data on the 76 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	1.90	1.07	93.08	631.10	632.18	-44.83	7.85	2.68
2	1.84	3.07	94.95	629.36	632.43	-40.90	7.85	2.43
3	3.24	5.62	97.49	627.16	632.78	-40.90	7.85	4.28
4	3.24	8.87	100.72	624.36	633.23	-40.90	7.85	4.28
5	3.96	12.64	104.32	621.08	633.73	-43.44	7.85	5.45
6	2.18	16.21	107.39	618.18	634.39	-43.44	19.65	3.00
7	1.85	18.84	109.41	616.27	635.11	-43.44	19.65	2.55
8	5.19	21.10	112.93	615.27	636.37	-2.78	19.65	5.20
9	5.19	23.20	118.12	615.01	638.22	-2.78	19.65	5.20
10	5.19	25.31	123.31	614.76	640.07	-2.78	19.65	5.20
11	2.70	26.68	127.25	614.57	641.25	-2.78	10.49	2.70
12	2.70	27.31	129.95	614.44	641.75	-2.78	10.49	2.70
13	4.65	27.84	133.63	614.26	642.11	-2.78	2.61	4.66
14	4.65	28.28	138.28	614.04	642.32	-2.78	2.61	4.66
15	4.65	28.72	142.93	613.81	642.53	-2.78	2.61	4.66
16	4.65	29.16	147.58	613.59	642.74	-2.78	2.61	4.66
17	3.30	29.53	151.55	613.39	642.92	-2.78	2.61	3.30
18	4.92	29.81	155.66	613.19	643.00	-2.78	0.00	4.93
19	4.92	30.05	160.58	612.95	643.00	-2.78	0.00	4.93
20	4.92	30.28	165.50	612.72	643.00	-2.78	0.00	4.93
21	4.92	30.52	170.42	612.48	643.00	-2.78	0.00	4.93
22	4.92	30.76	175.34	612.24	643.00	-2.78	0.00	4.93
23	2.65	30.94	179.12	612.06	643.00	-2.78	0.00	2.65
24	2.65	31.07	181.77	611.93	643.00	-2.78	0.00	2.65
25	3.65	31.23	184.93	611.77	643.00	-2.78	0.00	3.65
26	3.65	31.40	188.58	611.60	643.00	-2.78	0.00	3.65
27	2.75	31.68	191.78	611.44	643.13	-2.78	5.25	2.75
28	2.75	32.07	194.53	611.31	643.38	-2.78	5.25	2.75
29	2.72	32.45	197.26	611.18	643.63	-2.78	5.25	2.72
30	2.72	32.84	199.97	611.04	643.88	-2.78	5.25	2.72
31	4.65	33.16	203.66	611.06	644.22	2.06	5.25	4.66
32	4.65	33.42	208.31	611.23	644.65	2.06	5.25	4.66
33	4.65	33.68	212.96	611.40	645.07	2.06	5.25	4.66
34	4.65	33.94	217.62	611.56	645.50	2.06	5.25	4.66
35	4.65	34.20	222.27	611.73	645.93	2.06	5.25	4.66
36	4.65	34.46	226.92	611.90	646.36	2.06	5.25	4.66
37	4.65	34.72	231.57	612.07	646.79	2.06	5.25	4.66
38	4.92	34.73	236.36	612.24	646.97	2.06	-0.62	4.93
39	4.92	34.50	241.29	612.42	646.92	2.06	-0.62	4.93
40	4.92	34.27	246.21	612.59	646.87	2.06	-0.62	4.93
41	4.92	34.04	251.14	612.77	646.81	2.06	-0.62	4.93
42	4.92	33.81	256.06	612.95	646.76	2.06	-0.62	4.93
43	4.92	33.58	260.99	613.13	646.71	2.06	-0.62	4.93
44	4.93	33.35	265.91	613.30	646.65	2.06	-0.62	4.93
45	4.92	33.12	270.84	613.48	646.60	2.06	-0.62	4.93
46	4.47	32.90	275.53	613.65	646.55	2.06	-0.62	4.47
47	4.47	32.69	280.00	613.81	646.50	2.06	-0.62	4.47
48	4.47	32.48	284.47	613.97	646.45	2.06	-0.62	4.47
49	4.91	32.26	289.16	614.14	646.40	2.06	-0.62	4.92

50	4.91	32.03	294.07	614.32	646.35	2.06	-0.62	4.92
51	4.91	31.80	298.98	614.50	646.29	2.06	-0.62	4.92
52	4.91	31.57	303.89	614.67	646.24	2.06	-0.62	4.92
53	4.91	31.34	308.81	614.85	646.19	2.06	-0.62	4.92
54	4.91	31.11	313.72	615.03	646.13	2.06	-0.62	4.92
55	4.91	30.88	318.63	615.20	646.08	2.06	-0.62	4.92
56	4.91	30.65	323.54	615.38	646.03	2.06	-0.62	4.92
57	4.39	30.30	328.19	615.55	645.85	2.06	-3.96	4.39
58	4.39	29.84	332.58	615.71	645.54	2.06	-3.96	4.39
59	4.39	29.38	336.97	615.86	645.24	2.06	-3.96	4.39
60	4.97	28.71	341.65	616.20	644.92	5.95	-3.96	4.99
61	4.97	27.85	346.62	616.72	644.57	5.95	-3.96	4.99
62	3.30	27.05	350.75	617.15	644.20	5.95	-6.91	3.32
63	4.75	26.30	354.78	617.57	643.88	5.95	-3.01	4.78
64	4.75	25.56	359.53	618.07	643.62	5.95	-3.01	4.78
65	4.75	24.81	364.28	618.56	643.38	5.95	-3.01	4.78
66	4.75	24.07	369.03	619.06	643.12	5.95	-3.01	4.78
67	4.33	23.64	373.57	619.53	643.17	5.95	4.40	4.36
68	4.33	23.52	377.90	619.98	643.50	5.95	4.40	4.36
69	4.33	23.40	382.23	620.43	643.83	5.95	4.40	4.36
70	3.56	23.16	386.18	620.84	644.00	5.95	0.00	3.58
71	3.56	22.79	389.74	621.21	644.00	5.95	0.00	3.58
72	0.15	22.48	391.59	621.52	644.00	57.63	0.00	0.29
73	2.87	20.10	393.10	623.90	644.00	57.63	0.00	5.36
74	2.87	15.57	395.97	628.43	644.00	57.63	0.00	5.36
75	4.32	8.25	399.57	635.75	644.00	66.86	0.00	11.00
76	1.24	1.60	402.35	642.40	644.00	68.80	0.00	3.43

Table 2 - Force Data On The 76 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	244.7	0.0	176.1	0.0	0.0	0.0
2	677.2	0.0	457.2	0.0	0.0	0.0
3	2183.9	0.0	1474.5	0.0	0.0	0.0
4	3447.6	0.0	2327.7	0.0	0.0	0.0
5	6003.5	0.0	4219.1	0.0	0.0	0.0
6	4244.8	0.0	2696.1	0.0	0.0	0.0
7	4179.9	0.0	2654.8	0.0	0.0	0.0
8	13140.3	0.0	6067.1	0.0	0.0	0.0
9	14451.4	0.0	6672.5	0.0	0.0	0.0
10	15762.6	0.0	7277.9	0.0	0.0	0.0
11	8643.7	0.0	4350.8	0.0	0.0	0.0
12	8848.2	0.0	4453.7	0.0	0.0	0.0
13	15536.7	0.0	8071.8	0.0	0.0	0.0
14	15781.1	0.0	8198.7	0.0	0.0	0.0
15	16025.4	0.0	8325.7	0.0	0.0	0.0
16	16269.8	0.0	8452.6	0.0	0.0	0.0
17	11694.5	0.0	6075.6	0.0	0.0	0.0
18	17597.7	0.0	9161.6	0.0	0.0	0.0
19	17738.6	0.0	9234.9	0.0	0.0	0.0
20	17879.5	0.0	9308.3	0.0	0.0	0.0
21	18020.4	0.0	9381.6	0.0	0.0	0.0
22	18161.3	0.0	9455.0	0.0	0.0	0.0
23	9840.4	0.0	5123.0	0.0	0.0	0.0
24	9881.3	0.0	5144.3	0.0	0.0	0.0
25	13677.0	0.0	7120.4	0.0	0.0	0.0
26	13754.6	0.0	7160.8	0.0	0.0	0.0
27	10456.0	0.0	5397.9	0.0	0.0	0.0
28	10583.5	0.0	5463.7	0.0	0.0	0.0
29	10576.8	0.0	5460.3	0.0	0.0	0.0
30	10701.2	0.0	5524.4	0.0	0.0	0.0
31	18512.3	0.0	9551.9	0.0	0.0	0.0
32	18657.5	0.0	9626.8	0.0	0.0	0.0
33	18802.8	0.0	9701.8	0.0	0.0	0.0
34	18948.1	0.0	9776.7	0.0	0.0	0.0
35	19093.4	0.0	9851.7	0.0	0.0	0.0

36	19238.7	0.0	9926.7	0.0	0.0	0.0
37	19384.0	0.0	10001.6	0.0	0.0	0.0
38	20527.3	0.0	10679.9	0.0	0.0	0.0
39	20390.9	0.0	10608.9	0.0	0.0	0.0
40	20254.4	0.0	10537.9	0.0	0.0	0.0
41	20118.0	0.0	10466.9	0.0	0.0	0.0
42	19981.5	0.0	10395.9	0.0	0.0	0.0
43	19845.0	0.0	10324.9	0.0	0.0	0.0
44	19708.6	0.0	10253.9	0.0	0.0	0.0
45	19572.1	0.0	10182.9	0.0	0.0	0.0
46	17632.7	0.0	9173.9	0.0	0.0	0.0
47	17520.4	0.0	9115.5	0.0	0.0	0.0
48	17408.2	0.0	9057.1	0.0	0.0	0.0
49	19016.2	0.0	9893.7	0.0	0.0	0.0
50	18880.4	0.0	9823.0	0.0	0.0	0.0
51	18744.6	0.0	9752.4	0.0	0.0	0.0
52	18608.9	0.0	9681.7	0.0	0.0	0.0
53	18473.1	0.0	9611.1	0.0	0.0	0.0
54	18337.3	0.0	9540.5	0.0	0.0	0.0
55	18201.6	0.0	9469.8	0.0	0.0	0.0
56	18065.8	0.0	9399.2	0.0	0.0	0.0
57	15955.0	0.0	8262.3	0.0	0.0	0.0
58	15711.7	0.0	8136.3	0.0	0.0	0.0
59	15468.4	0.0	8010.3	0.0	0.0	0.0
60	17117.6	0.0	8906.6	0.0	0.0	0.0
61	16603.8	0.0	8639.3	0.0	0.0	0.0
62	10711.4	0.0	5519.0	0.0	0.0	0.0
63	14993.5	0.0	7817.2	0.0	0.0	0.0
64	14568.8	0.0	7595.8	0.0	0.0	0.0
65	14144.1	0.0	7374.4	0.0	0.0	0.0
66	13719.4	0.0	7152.9	0.0	0.0	0.0
67	12291.5	0.0	6388.4	0.0	0.0	0.0
68	12230.0	0.0	6356.4	0.0	0.0	0.0
69	12168.4	0.0	6324.4	0.0	0.0	0.0
70	9884.4	0.0	5167.7	0.0	0.0	0.0
71	9726.2	0.0	5085.0	0.0	0.0	0.0
72	414.0	0.0	402.1	0.0	0.0	0.0
73	6916.4	0.0	6717.2	0.0	0.0	0.0
74	5359.4	0.0	5205.0	0.0	0.0	0.0
75	4280.9	0.0	5664.4	0.0	0.0	0.0
76	237.6	0.0	341.6	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1052429.85(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 509978.19(lbs)

TOTAL AREA OF SLIDING MASS = 8770.25(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 76 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	150.00	32.00	
2	1	150.00	32.00	
3	3	400.00	32.00	
4	3	400.00	32.00	
5	3	400.00	32.00	
6	3	400.00	32.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	

20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	4	0.00	10.00
24	4	0.00	10.00
25	4	0.00	10.00
26	4	0.00	10.00
27	4	0.00	10.00
28	4	0.00	10.00
29	4	0.00	10.00
30	4	0.00	10.00
31	4	0.00	10.00
32	4	0.00	10.00
33	4	0.00	10.00
34	4	0.00	10.00
35	4	0.00	10.00
36	4	0.00	10.00
37	4	0.00	10.00
38	4	0.00	10.00
39	4	0.00	10.00
40	4	0.00	10.00
41	4	0.00	10.00
42	4	0.00	10.00
43	4	0.00	10.00
44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	4	0.00	10.00
48	4	0.00	10.00
49	4	0.00	10.00
50	4	0.00	10.00
51	4	0.00	10.00
52	4	0.00	10.00
53	4	0.00	10.00
54	4	0.00	10.00
55	4	0.00	10.00
56	4	0.00	10.00
57	4	0.00	10.00
58	4	0.00	10.00
59	4	0.00	10.00
60	4	0.00	10.00
61	4	0.00	10.00
62	4	0.00	10.00
63	4	0.00	10.00
64	4	0.00	10.00
65	4	0.00	10.00
66	4	0.00	10.00
67	4	0.00	10.00
68	4	0.00	10.00
69	4	0.00	10.00
70	4	0.00	10.00
71	4	0.00	10.00
72	4	0.00	10.00
73	3	400.00	32.00
74	3	400.00	32.00
75	3	400.00	32.00
76	3	400.00	32.00

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 76 Slices

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

1	-44.83	93.08	2.68	115.78	222.35	51.19
1	-44.83	93.08	2.68	115.78	222.35	51.19
2	-40.90	94.95	2.43	242.73	301.68	69.45
2	-40.90	94.95	2.43	242.73	301.68	69.45
3	-40.90	97.49	4.28	473.90	696.12	160.27
3	-40.90	97.49	4.28	473.90	696.12	160.27
4	-40.90	100.72	4.28	693.29	833.22	191.83
4	-40.90	100.72	4.28	693.29	833.22	191.83
5	-43.44	104.32	5.45	969.96	1006.10	231.63
5	-43.44	104.32	5.45	969.96	1006.10	231.63
6	-43.44	107.39	3.00	1325.32	1228.15	282.75
6	-43.44	107.39	3.00	1325.32	1228.15	282.75
7	-43.44	109.41	2.55	1268.71	223.71	51.50
7	-43.44	109.41	2.55	1268.71	223.71	51.50
8	-2.78	112.93	5.20	1367.05	241.05	55.50
8	-2.78	112.93	5.20	1367.05	241.05	55.50
9	-2.78	118.12	5.20	1503.45	265.10	61.03
9	-2.78	118.12	5.20	1503.45	265.10	61.03
10	-2.78	123.31	5.20	1639.86	289.15	66.57
10	-2.78	123.31	5.20	1639.86	289.15	66.57
11	-2.78	127.25	2.70	1595.11	281.26	64.75
11	-2.78	127.25	2.70	1595.11	281.26	64.75
12	-2.78	129.95	2.70	1632.83	287.91	66.29
12	-2.78	129.95	2.70	1632.83	287.91	66.29
13	-2.78	133.63	4.66	1610.69	284.01	65.39
13	-2.78	133.63	4.66	1610.69	284.01	65.39
14	-2.78	138.28	4.66	1636.02	288.47	66.41
14	-2.78	138.28	4.66	1636.02	288.47	66.41
15	-2.78	142.93	4.66	1661.35	292.94	67.44
15	-2.78	142.93	4.66	1661.35	292.94	67.44
16	-2.78	147.58	4.66	1686.68	297.41	68.47
16	-2.78	147.58	4.66	1686.68	297.41	68.47
17	-2.78	151.55	3.30	1708.34	301.23	69.35
17	-2.78	151.55	3.30	1708.34	301.23	69.35
18	-2.78	155.66	4.93	1720.35	303.34	69.84
18	-2.78	155.66	4.93	1720.35	303.34	69.84
19	-2.78	160.58	4.93	1734.13	305.77	70.40
19	-2.78	160.58	4.93	1734.13	305.77	70.40
20	-2.78	165.50	4.93	1747.90	308.20	70.96
20	-2.78	165.50	4.93	1747.90	308.20	70.96
21	-2.78	170.42	4.93	1761.68	310.63	71.52
21	-2.78	170.42	4.93	1761.68	310.63	71.52
22	-2.78	175.34	4.93	1775.46	313.06	72.08
22	-2.78	175.34	4.93	1775.46	313.06	72.08
23	-2.78	179.12	2.65	1786.05	314.93	72.51
23	-2.78	179.12	2.65	1786.05	314.93	72.51
24	-2.78	181.77	2.65	1793.47	316.24	72.81
24	-2.78	181.77	2.65	1793.47	316.24	72.81
25	-2.78	184.93	3.65	1802.29	317.79	73.16
25	-2.78	184.93	3.65	1802.29	317.79	73.16
26	-2.78	188.58	3.65	1812.51	319.59	73.58
26	-2.78	188.58	3.65	1812.51	319.59	73.58
27	-2.78	191.78	2.75	1845.38	325.39	74.91
27	-2.78	191.78	2.75	1845.38	325.39	74.91
28	-2.78	194.53	2.75	1867.88	329.36	75.83
28	-2.78	194.53	2.75	1867.88	329.36	75.83
29	-2.78	197.26	2.72	1890.24	333.30	76.73
29	-2.78	197.26	2.72	1890.24	333.30	76.73
30	-2.78	199.97	2.72	1912.45	337.22	77.64
30	-2.78	199.97	2.72	1912.45	337.22	77.64
31	2.06	203.66	4.66	1924.30	339.31	78.12
31	2.06	203.66	4.66	1924.30	339.31	78.12
32	2.06	208.31	4.66	1939.40	341.97	78.73
32	2.06	208.31	4.66	1939.40	341.97	78.73
33	2.06	212.96	4.66	1954.50	344.63	79.34
33	2.06	212.96	4.66	1954.50	344.63	79.34
34	2.06	217.62	4.66	1969.60	347.29	79.96
34	2.06	217.62	4.66	1969.60	347.29	79.96
35	2.06	222.27	4.66	1984.70	349.96	80.57
35	2.06	222.27	4.66	1984.70	349.96	80.57
36	2.06	226.92	4.66	1999.81	352.62	81.18
36	2.06	226.92	4.66	1999.81	352.62	81.18

37	2.06	231.57	4.66	2014.91	355.28	81.80
37	2.06	231.57	4.66	2014.91	355.28	81.80
38	2.06	236.36	4.93	1997.87	352.28	81.10
38	2.06	236.36	4.93	1997.87	352.28	81.10
39	2.06	241.29	4.93	1984.59	349.94	80.56
39	2.06	241.29	4.93	1984.59	349.94	80.56
40	2.06	246.21	4.93	1971.31	347.59	80.03
40	2.06	246.21	4.93	1971.31	347.59	80.03
41	2.06	251.14	4.93	1958.02	345.25	79.49
41	2.06	251.14	4.93	1958.02	345.25	79.49
42	2.06	256.06	4.93	1944.74	342.91	78.95
42	2.06	256.06	4.93	1944.74	342.91	78.95
43	2.06	260.99	4.93	1931.46	340.57	78.41
43	2.06	260.99	4.93	1931.46	340.57	78.41
44	2.06	265.91	4.93	1918.18	338.23	77.87
44	2.06	265.91	4.93	1918.18	338.23	77.87
45	2.06	270.84	4.93	1904.90	335.89	77.33
45	2.06	270.84	4.93	1904.90	335.89	77.33
46	2.06	275.53	4.47	1892.24	333.65	76.82
46	2.06	275.53	4.47	1892.24	333.65	76.82
47	2.06	280.00	4.47	1880.19	331.53	76.33
47	2.06	280.00	4.47	1880.19	331.53	76.33
48	2.06	284.47	4.47	1868.14	329.40	75.84
48	2.06	284.47	4.47	1868.14	329.40	75.84
49	2.06	289.16	4.92	1855.50	327.17	75.32
49	2.06	289.16	4.92	1855.50	327.17	75.32
50	2.06	294.07	4.92	1842.25	324.84	74.79
50	2.06	294.07	4.92	1842.25	324.84	74.79
51	2.06	298.98	4.92	1829.00	322.50	74.25
51	2.06	298.98	4.92	1829.00	322.50	74.25
52	2.06	303.89	4.92	1815.76	320.17	73.71
52	2.06	303.89	4.92	1815.76	320.17	73.71
53	2.06	308.81	4.92	1802.51	317.83	73.17
53	2.06	308.81	4.92	1802.51	317.83	73.17
54	2.06	313.72	4.92	1789.26	315.49	72.64
54	2.06	313.72	4.92	1789.26	315.49	72.64
55	2.06	318.63	4.92	1776.01	313.16	72.10
55	2.06	318.63	4.92	1776.01	313.16	72.10
56	2.06	323.54	4.92	1762.77	310.82	71.56
56	2.06	323.54	4.92	1762.77	310.82	71.56
57	2.06	328.19	4.39	1751.64	308.86	71.11
57	2.06	328.19	4.39	1751.64	308.86	71.11
58	2.06	332.58	4.39	1724.94	304.15	70.02
58	2.06	332.58	4.39	1724.94	304.15	70.02
59	2.06	336.97	4.39	1698.23	299.44	68.94
59	2.06	336.97	4.39	1698.23	299.44	68.94
60	5.95	341.65	4.99	1655.22	291.86	67.19
60	5.95	341.65	4.99	1655.22	291.86	67.19
61	5.95	346.62	4.99	1605.54	283.10	65.18
61	5.95	346.62	4.99	1605.54	283.10	65.18
62	5.95	350.75	3.32	1575.56	277.81	63.96
62	5.95	350.75	3.32	1575.56	277.81	63.96
63	5.95	354.78	4.78	1513.05	266.79	61.42
63	5.95	354.78	4.78	1513.05	266.79	61.42
64	5.95	359.53	4.78	1470.19	259.23	59.68
64	5.95	359.53	4.78	1470.19	259.23	59.68
65	5.95	364.28	4.78	1427.33	251.68	57.94
65	5.95	364.28	4.78	1427.33	251.68	57.94
66	5.95	369.03	4.78	1384.47	244.12	56.20
66	5.95	369.03	4.78	1384.47	244.12	56.20
67	5.95	373.57	4.36	1364.22	240.55	55.38
67	5.95	373.57	4.36	1364.22	240.55	55.38
68	5.95	377.90	4.36	1357.40	239.35	55.10
68	5.95	377.90	4.36	1357.40	239.35	55.10
69	5.95	382.23	4.36	1350.57	238.14	54.83
69	5.95	382.23	4.36	1350.57	238.14	54.83
70	5.95	386.18	3.58	1327.99	234.16	53.91
70	5.95	386.18	3.58	1327.99	234.16	53.91
71	5.95	389.74	3.58	1306.73	230.41	53.05
71	5.95	389.74	3.58	1306.73	230.41	53.05
72	57.63	391.59	0.29	1214.35	214.12	49.30
72	57.63	391.59	0.29	1214.35	214.12	49.30

73	57.63	393.10	5.36	815.75	909.74	209.45
73	57.63	393.10	5.36	815.75	909.74	209.45
74	57.63	395.97	5.36	604.70	777.86	179.08
74	57.63	395.97	5.36	604.70	777.86	179.08
75	66.86	399.57	11.00	352.56	220.30	50.72
75	66.86	399.57	11.00	352.56	220.30	50.72
76	68.80	402.35	3.43	66.50	41.55	9.57
76	68.80	402.35	3.43	66.50	41.55	9.57

Table 4 - Base Force Data on the 76 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-44.83	93.08	2.68	309.87	595.06	137.00
1	-44.83	93.08	2.68	309.87	595.06	137.00
2	-40.90	94.95	2.43	590.12	733.42	168.85
2	-40.90	94.95	2.43	590.12	733.42	168.85
3	-40.90	97.49	4.28	2030.39	2982.50	686.65
3	-40.90	97.49	4.28	2030.39	2982.50	686.65
4	-40.90	100.72	4.28	2970.37	3569.86	821.88
4	-40.90	100.72	4.28	2970.37	3569.86	821.88
5	-43.44	104.32	5.45	5285.41	5482.34	1262.18
5	-43.44	104.32	5.45	5285.41	5482.34	1262.18
6	-43.44	107.39	3.00	3982.30	3690.33	849.61
6	-43.44	107.39	3.00	3982.30	3690.33	849.61
7	-43.44	109.41	2.55	3230.29	569.59	131.13
7	-43.44	109.41	2.55	3230.29	569.59	131.13
8	-2.78	112.93	5.20	7103.11	1252.47	288.35
8	-2.78	112.93	5.20	7103.11	1252.47	288.35
9	-2.78	118.12	5.20	7811.85	1377.44	317.12
9	-2.78	118.12	5.20	7811.85	1377.44	317.12
10	-2.78	123.31	5.20	8520.59	1502.41	345.90
10	-2.78	123.31	5.20	8520.59	1502.41	345.90
11	-2.78	127.25	2.70	4311.86	760.30	175.04
11	-2.78	127.25	2.70	4311.86	760.30	175.04
12	-2.78	129.95	2.70	4413.84	778.28	179.18
12	-2.78	129.95	2.70	4413.84	778.28	179.18
13	-2.78	133.63	4.66	7498.50	1322.19	304.40
13	-2.78	133.63	4.66	7498.50	1322.19	304.40
14	-2.78	138.28	4.66	7616.43	1342.98	309.19
14	-2.78	138.28	4.66	7616.43	1342.98	309.19
15	-2.78	142.93	4.66	7734.37	1363.78	313.98
15	-2.78	142.93	4.66	7734.37	1363.78	313.98
16	-2.78	147.58	4.66	7852.30	1384.57	318.77
16	-2.78	147.58	4.66	7852.30	1384.57	318.77
17	-2.78	151.55	3.30	5644.14	995.21	229.13
17	-2.78	151.55	3.30	5644.14	995.21	229.13
18	-2.78	155.66	4.93	8474.08	1494.21	344.01
18	-2.78	155.66	4.93	8474.08	1494.21	344.01
19	-2.78	160.58	4.93	8541.94	1506.17	346.76
19	-2.78	160.58	4.93	8541.94	1506.17	346.76
20	-2.78	165.50	4.93	8609.80	1518.14	349.52
20	-2.78	165.50	4.93	8609.80	1518.14	349.52
21	-2.78	170.42	4.93	8677.66	1530.10	352.27
21	-2.78	170.42	4.93	8677.66	1530.10	352.27
22	-2.78	175.34	4.93	8745.51	1542.07	355.03
22	-2.78	175.34	4.93	8745.51	1542.07	355.03
23	-2.78	179.12	2.65	4738.61	835.54	192.36
23	-2.78	179.12	2.65	4738.61	835.54	192.36
24	-2.78	181.77	2.65	4758.29	839.02	193.16
24	-2.78	181.77	2.65	4758.29	839.02	193.16
25	-2.78	184.93	3.65	6586.11	1161.31	267.36
25	-2.78	184.93	3.65	6586.11	1161.31	267.36
26	-2.78	188.58	3.65	6623.45	1167.89	268.88
26	-2.78	188.58	3.65	6623.45	1167.89	268.88
27	-2.78	191.78	2.75	5080.77	895.88	206.26
27	-2.78	191.78	2.75	5080.77	895.88	206.26
28	-2.78	194.53	2.75	5142.71	906.80	208.77

28	-2.78	194.53	2.75	5142.71	906.80	208.77
29	-2.78	197.26	2.72	5139.49	906.23	208.64
29	-2.78	197.26	2.72	5139.49	906.23	208.64
30	-2.78	199.97	2.72	5199.90	916.88	211.09
30	-2.78	199.97	2.72	5199.90	916.88	211.09
31	2.06	203.66	4.66	8958.86	1579.69	363.69
31	2.06	203.66	4.66	8958.86	1579.69	363.69
32	2.06	208.31	4.66	9029.17	1592.09	366.54
32	2.06	208.31	4.66	9029.17	1592.09	366.54
33	2.06	212.96	4.66	9099.48	1604.48	369.40
33	2.06	212.96	4.66	9099.48	1604.48	369.40
34	2.06	217.62	4.66	9169.78	1616.88	372.25
34	2.06	217.62	4.66	9169.78	1616.88	372.25
35	2.06	222.27	4.66	9240.09	1629.28	375.10
35	2.06	222.27	4.66	9240.09	1629.28	375.10
36	2.06	226.92	4.66	9310.40	1641.68	377.96
36	2.06	226.92	4.66	9310.40	1641.68	377.96
37	2.06	231.57	4.66	9380.71	1654.07	380.81
37	2.06	231.57	4.66	9380.71	1654.07	380.81
38	2.06	236.36	4.93	9845.88	1736.09	399.70
38	2.06	236.36	4.93	9845.88	1736.09	399.70
39	2.06	241.29	4.93	9780.43	1724.55	397.04
39	2.06	241.29	4.93	9780.43	1724.55	397.04
40	2.06	246.21	4.93	9714.98	1713.01	394.38
40	2.06	246.21	4.93	9714.98	1713.01	394.38
41	2.06	251.14	4.93	9649.52	1701.47	391.72
41	2.06	251.14	4.93	9649.52	1701.47	391.72
42	2.06	256.06	4.93	9584.07	1689.93	389.07
42	2.06	256.06	4.93	9584.07	1689.93	389.07
43	2.06	260.99	4.93	9518.62	1678.39	386.41
43	2.06	260.99	4.93	9518.62	1678.39	386.41
44	2.06	265.91	4.93	9453.16	1666.85	383.75
44	2.06	265.91	4.93	9453.16	1666.85	383.75
45	2.06	270.84	4.93	9387.71	1655.31	381.10
45	2.06	270.84	4.93	9387.71	1655.31	381.10
46	2.06	275.53	4.47	8457.47	1491.28	343.33
46	2.06	275.53	4.47	8457.47	1491.28	343.33
47	2.06	280.00	4.47	8403.63	1481.79	341.15
47	2.06	280.00	4.47	8403.63	1481.79	341.15
48	2.06	284.47	4.47	8349.79	1472.29	338.96
48	2.06	284.47	4.47	8349.79	1472.29	338.96
49	2.06	289.16	4.92	9121.05	1608.29	370.27
49	2.06	289.16	4.92	9121.05	1608.29	370.27
50	2.06	294.07	4.92	9055.93	1596.80	367.63
50	2.06	294.07	4.92	9055.93	1596.80	367.63
51	2.06	298.98	4.92	8990.81	1585.32	364.98
51	2.06	298.98	4.92	8990.81	1585.32	364.98
52	2.06	303.89	4.92	8925.69	1573.84	362.34
52	2.06	303.89	4.92	8925.69	1573.84	362.34
53	2.06	308.81	4.92	8860.56	1562.36	359.70
53	2.06	308.81	4.92	8860.56	1562.36	359.70
54	2.06	313.72	4.92	8795.44	1550.87	357.05
54	2.06	313.72	4.92	8795.44	1550.87	357.05
55	2.06	318.63	4.92	8730.32	1539.39	354.41
55	2.06	318.63	4.92	8730.32	1539.39	354.41
56	2.06	323.54	4.92	8665.20	1527.91	351.77
56	2.06	323.54	4.92	8665.20	1527.91	351.77
57	2.06	328.19	4.39	7691.35	1356.19	312.23
57	2.06	328.19	4.39	7691.35	1356.19	312.23
58	2.06	332.58	4.39	7574.07	1335.51	307.47
58	2.06	332.58	4.39	7574.07	1335.51	307.47
59	2.06	336.97	4.39	7456.79	1314.83	302.71
59	2.06	336.97	4.39	7456.79	1314.83	302.71
60	5.95	341.65	4.99	8267.50	1457.78	335.62
60	5.95	341.65	4.99	8267.50	1457.78	335.62
61	5.95	346.62	4.99	8019.33	1414.02	325.55
61	5.95	346.62	4.99	8019.33	1414.02	325.55
62	5.95	350.75	3.32	5227.53	921.75	212.21
62	5.95	350.75	3.32	5227.53	921.75	212.21
63	5.95	354.78	4.78	7225.91	1274.12	293.34
63	5.95	354.78	4.78	7225.91	1274.12	293.34
64	5.95	359.53	4.78	7021.23	1238.03	285.03

64	5.95	359.53	4.78	7021.23	1238.03	285.03
65	5.95	364.28	4.78	6816.56	1201.94	276.72
65	5.95	364.28	4.78	6816.56	1201.94	276.72
66	5.95	369.03	4.78	6611.88	1165.85	268.41
66	5.95	369.03	4.78	6611.88	1165.85	268.41
67	5.95	373.57	4.36	5943.66	1048.03	241.28
67	5.95	373.57	4.36	5943.66	1048.03	241.28
68	5.95	377.90	4.36	5913.91	1042.78	240.08
68	5.95	377.90	4.36	5913.91	1042.78	240.08
69	5.95	382.23	4.36	5884.16	1037.54	238.87
69	5.95	382.23	4.36	5884.16	1037.54	238.87
70	5.95	386.18	3.58	4749.44	837.45	192.80
70	5.95	386.18	3.58	4749.44	837.45	192.80
71	5.95	389.74	3.58	4673.39	824.05	189.72
71	5.95	389.74	3.58	4673.39	824.05	189.72
72	57.63	391.59	0.29	348.11	61.38	14.13
72	57.63	391.59	0.29	348.11	61.38	14.13
73	57.63	393.10	5.36	4369.70	4873.16	1121.93
73	57.63	393.10	5.36	4369.70	4873.16	1121.93
74	57.63	395.97	5.36	3239.19	4166.74	959.30
74	57.63	395.97	5.36	3239.19	4166.74	959.30
75	66.86	399.57	11.00	3878.17	2423.35	557.92
75	66.86	399.57	11.00	3878.17	2423.35	557.92
76	68.80	402.35	3.43	227.89	142.40	32.78
76	68.80	402.35	3.43	227.89	142.40	32.78

Sum of the Resisting Forces = 105388.74 (lbs)

Average Available Shear Strength = 317.66(psf)

Sum of the Driving Forces = 25098.73 (lbs)

Average Mobilized Shear Stress = 75.65(psf)

Total length of the failure surface = 331.77(ft)

Factor of Safety Balance Check: FS = 4.19897

Janbu's Correction Factor (fo) = 1.0397

Janub's FS Corrected = 4.36559

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

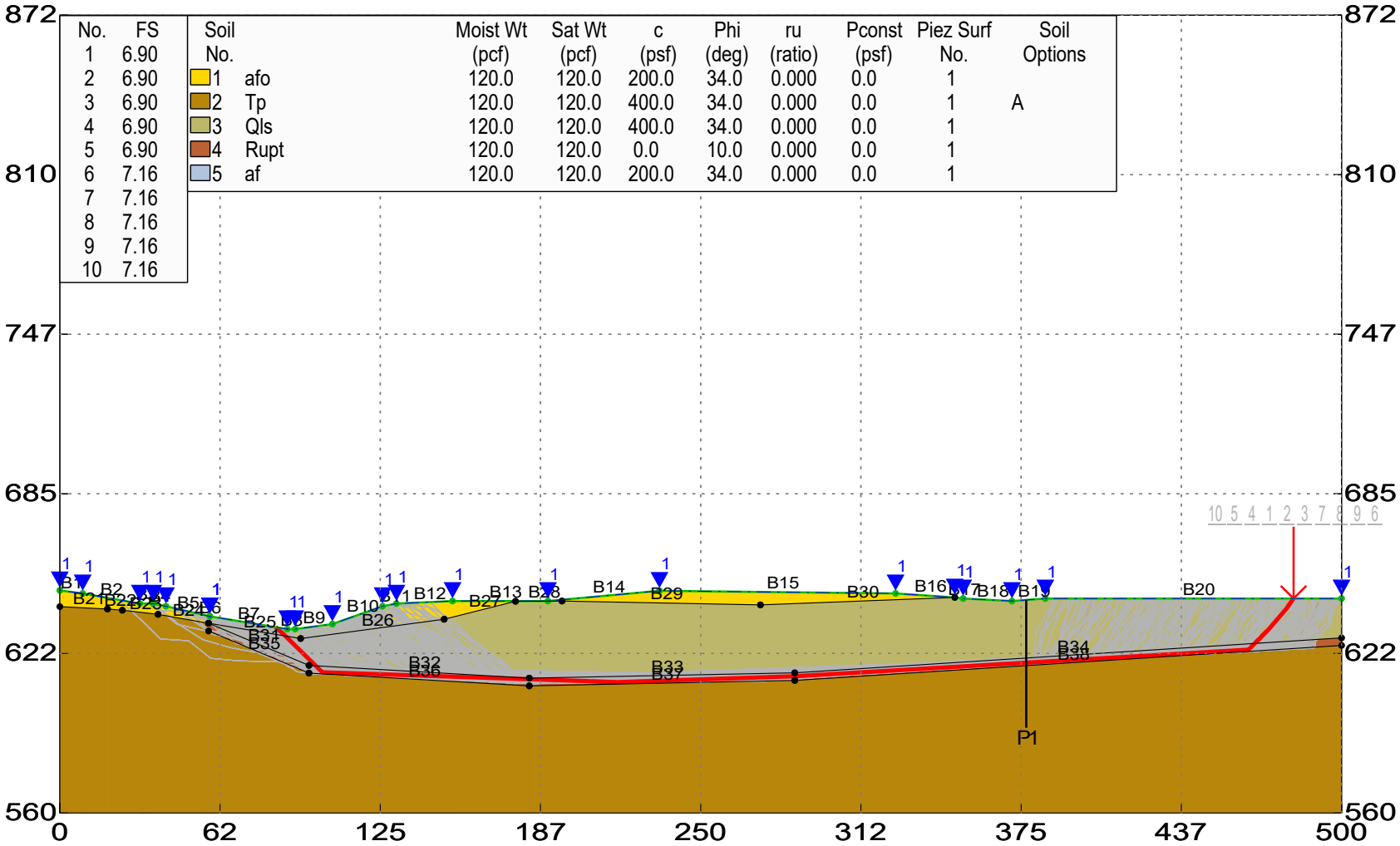
Royal Vista - Cross Section 9
Stage 2 (Existing Condition - Shear Pin)

LGC Geotechnical / BPP

\Sec 9 - Stage 2 (Existing Condition - Shear Pin).gsd

No.	FS
1	6.90
2	6.90
3	6.90
4	6.90
5	6.90
6	7.16
7	7.16
8	7.16
9	7.16
10	7.16

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 6.90

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 2 (Existing Condition - Shear Pin).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 2 (Existing Condition - Shear Pin).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 9

DESCRIPTION: Stage 2 (Existing Condition - Shear Pin)

BOUNDARY DATA

20 Surface Boundaries
38 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.200	8.900	646.000	1
2	8.900	646.000	31.200	642.000	1
3	31.200	642.000	36.400	642.000	1
4	36.400	642.000	41.400	641.000	1
5	41.400	641.000	58.500	637.000	1
6	58.500	637.000	58.500	637.000	1
7	58.500	637.000	88.700	632.000	1
8	88.700	632.000	91.800	632.000	1
9	91.800	632.000	106.300	634.000	1
10	106.300	634.000	125.900	641.000	1
11	125.900	641.000	131.300	642.000	1
12	131.300	642.000	153.200	643.000	1
13	153.200	643.000	190.400	643.000	1
14	190.400	643.000	233.900	647.000	1
15	233.900	647.000	326.000	646.000	1
16	326.000	646.000	349.100	644.400	1
17	349.100	644.400	352.400	644.000	3
18	352.400	644.000	371.400	643.000	3
19	371.400	643.000	384.400	644.000	3
20	384.400	644.000	500.000	644.000	3
21	0.000	640.800	18.600	639.900	2
22	18.600	639.900	24.400	639.400	2
23	24.400	639.400	38.300	637.800	2
24	38.300	637.800	58.000	634.300	2
25	58.000	634.300	93.900	628.300	3
26	93.900	628.300	149.900	635.900	3

27	149.900	635.900	177.800	642.900	3
28	177.800	642.900	195.900	643.000	3
29	195.900	643.000	273.300	641.500	3
30	273.300	641.500	349.100	644.400	3
31	58.000	634.300	97.200	617.800	4
32	97.200	617.800	183.100	612.800	4
33	183.100	612.800	286.700	614.900	4
34	286.700	614.900	500.000	628.600	4
35	58.000	631.300	97.200	614.800	2
36	97.200	614.800	183.100	609.800	2
37	183.100	609.800	286.700	611.900	2
38	286.700	611.900	500.000	625.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 21 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	647.20

2	8.90	646.00
3	31.20	642.00
4	36.40	642.00
5	41.40	641.00
6	58.50	637.00
7	58.50	637.00
8	88.70	632.00
9	91.80	632.00
10	106.30	634.00
11	125.90	641.00
12	131.30	642.00
13	153.20	643.00
14	190.40	643.00
15	233.90	647.00
16	326.00	646.00
17	349.10	644.40
18	352.40	644.00
19	371.40	643.00
20	384.40	644.00
21	500.00	644.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	377.00	643.43	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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.

4 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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	95.00	616.00	180.00	612.00	3.00
2	181.00	612.00	285.00	613.00	3.00
3	286.00	614.00	375.00	619.50	3.00
4	380.00	620.00	490.00	626.00	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 = 296

Number of Trial Surfaces With Valid FS = 704

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 29.6 %

Statistical Data On All Valid FS Values:
FS Max = 449.767 FS Min = 6.900 FS Ave = 37.334
Standard Deviation = 59.276 Coefficient of Variation = 158.77 %

Critical Surface is Sequence Number 23 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	377.00	618.84

Factor Of Safety For The Critical or Specified Surface = 6.900

Table 1 - Geometry Data on the 94 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.52	0.88	85.45	631.66	632.54	-40.76	-9.40	3.33
2	1.30	2.29	87.36	629.93	632.22	-44.69	-9.40	1.83
3	0.68	3.11	88.36	628.94	632.06	-44.69	-9.40	0.96
4	3.10	4.93	90.25	627.07	632.00	-44.69	0.00	4.36
5	2.10	7.64	92.85	624.50	632.14	-44.69	7.85	2.95
6	0.63	9.18	94.22	623.15	632.33	-44.69	7.85	0.89
7	2.63	11.02	95.85	621.54	632.56	-44.62	7.85	3.69
8	2.63	13.97	98.48	618.95	632.92	-44.62	7.85	3.69
9	2.57	16.90	101.08	616.38	633.28	-44.62	7.85	3.61
10	3.94	18.68	104.33	615.05	633.73	-1.93	7.85	3.94
11	4.90	19.98	108.75	614.90	634.88	-1.93	19.65	4.90
12	4.90	21.89	113.65	614.73	636.62	-1.93	19.65	4.90
13	4.90	23.81	118.55	614.57	638.38	-1.93	19.65	4.90
14	4.90	25.72	123.45	614.40	640.12	-1.93	19.65	4.90
15	2.70	26.98	127.25	614.27	641.25	-1.93	10.49	2.70
16	2.70	27.57	129.95	614.18	641.75	-1.93	10.49	2.70
17	4.65	28.05	133.63	614.06	642.11	-1.93	2.61	4.65
18	4.65	28.42	138.28	613.90	642.32	-1.93	2.61	4.65
19	4.65	28.79	142.93	613.74	642.53	-1.93	2.61	4.65
20	4.65	29.16	147.58	613.59	642.74	-1.93	2.61	4.65
21	3.30	29.47	151.55	613.45	642.92	-1.93	2.61	3.30
22	4.92	29.68	155.66	613.32	643.00	-1.93	0.00	4.92
23	4.92	29.85	160.58	613.15	643.00	-1.93	0.00	4.92
24	4.92	30.02	165.50	612.98	643.00	-1.93	0.00	4.92
25	4.92	30.18	170.42	612.82	643.00	-1.93	0.00	4.92
26	4.92	30.35	175.34	612.65	643.00	-1.93	0.00	4.92
27	2.65	30.48	179.12	612.52	643.00	-1.93	0.00	2.65
28	2.65	30.57	181.77	612.43	643.00	-1.93	0.00	2.65
29	3.65	30.67	184.93	612.33	643.00	-1.93	0.00	3.65
30	3.65	30.79	188.58	612.21	643.00	-1.93	0.00	3.65
31	2.75	31.03	191.78	612.10	643.13	-1.93	5.25	2.75
32	2.75	31.37	194.53	612.01	643.38	-1.93	5.25	2.75
33	5.42	31.89	198.61	611.87	643.75	-1.93	5.25	5.42
34	5.42	32.57	204.03	611.68	644.25	-1.93	5.25	5.42
35	5.42	33.25	209.45	611.50	644.75	-1.93	5.25	5.42
36	5.42	33.93	214.87	611.32	645.25	-1.93	5.25	5.42
37	5.44	34.43	220.30	611.32	645.75	1.91	5.25	5.44

38	5.44	34.75	225.74	611.50	646.25	1.91	5.25	5.44
39	5.44	35.07	231.18	611.68	646.75	1.91	5.25	5.44
40	4.92	35.12	236.36	611.85	646.97	1.91	-0.62	4.93
41	4.92	34.90	241.29	612.02	646.92	1.91	-0.62	4.93
42	4.92	34.68	246.21	612.18	646.87	1.91	-0.62	4.93
43	4.92	34.47	251.14	612.35	646.81	1.91	-0.62	4.93
44	4.92	34.25	256.06	612.51	646.76	1.91	-0.62	4.93
45	4.92	34.03	260.99	612.68	646.71	1.91	-0.62	4.93
46	4.93	33.81	265.91	612.84	646.65	1.91	-0.62	4.93
47	4.92	33.59	270.84	613.00	646.60	1.91	-0.62	4.93
48	4.34	33.39	275.47	613.16	646.55	1.91	-0.62	4.34
49	4.34	33.20	279.81	613.30	646.50	1.91	-0.62	4.34
50	4.34	33.01	284.15	613.45	646.45	1.91	-0.62	4.34
51	0.38	32.90	286.51	613.53	646.43	3.36	-0.62	0.38
52	4.91	32.71	289.16	613.69	646.40	3.36	-0.62	4.92
53	4.91	32.37	294.07	613.98	646.35	3.36	-0.62	4.92
54	4.91	32.03	298.98	614.26	646.29	3.36	-0.62	4.92
55	4.91	31.69	303.89	614.55	646.24	3.36	-0.62	4.92
56	4.91	31.35	308.81	614.84	646.19	3.36	-0.62	4.92
57	4.91	31.00	313.72	615.13	646.13	3.36	-0.62	4.92
58	4.91	30.66	318.63	615.42	646.08	3.36	-0.62	4.92
59	4.91	30.32	323.54	615.71	646.03	3.36	-0.62	4.92
60	4.62	29.85	328.31	615.99	645.84	3.36	-3.96	4.63
61	4.62	29.26	332.93	616.26	645.52	3.36	-3.96	4.63
62	4.62	28.67	337.55	616.53	645.20	3.36	-3.96	4.63
63	4.62	28.08	342.17	616.80	644.88	3.36	-3.96	4.63
64	4.62	27.49	346.79	617.07	644.56	3.36	-3.96	4.63
65	3.30	26.90	350.75	617.30	644.20	3.36	-6.91	3.31
66	4.75	26.34	354.78	617.54	643.88	3.36	-3.01	4.76
67	4.75	25.81	359.53	617.82	643.62	3.36	-3.01	4.76
68	4.75	25.28	364.28	618.10	643.38	3.36	-3.01	4.76
69	4.75	24.75	369.03	618.38	643.12	3.36	-3.01	4.76
70	4.33	24.53	373.57	618.64	643.17	3.36	4.40	4.34
71	4.33	24.60	377.90	618.90	643.50	3.36	4.40	4.34
72	4.33	24.68	382.23	619.15	643.83	3.36	4.40	4.34
73	4.96	24.58	386.88	619.42	644.00	3.36	0.00	4.96
74	4.96	24.29	391.83	619.71	644.00	3.36	0.00	4.96
75	4.96	24.00	396.79	620.00	644.00	3.36	0.00	4.96
76	4.96	23.70	401.75	620.30	644.00	3.36	0.00	4.96
77	4.96	23.41	406.70	620.59	644.00	3.36	0.00	4.96
78	4.96	23.12	411.66	620.88	644.00	3.36	0.00	4.96
79	4.96	22.83	416.62	621.17	644.00	3.36	0.00	4.96
80	4.96	22.54	421.57	621.46	644.00	3.36	0.00	4.96
81	4.96	22.25	426.53	621.75	644.00	3.36	0.00	4.96
82	4.96	21.96	431.49	622.04	644.00	3.36	0.00	4.96
83	4.96	21.67	436.44	622.33	644.00	3.36	0.00	4.96
84	4.96	21.38	441.40	622.62	644.00	3.36	0.00	4.96
85	4.96	21.09	446.35	622.91	644.00	3.36	0.00	4.96
86	4.96	20.80	451.31	623.20	644.00	3.36	0.00	4.96
87	4.96	20.51	456.27	623.49	644.00	3.36	0.00	4.96
88	4.96	20.21	461.22	623.79	644.00	3.36	0.00	4.96
89	2.45	18.82	464.93	625.18	644.00	45.48	0.00	3.50
90	2.63	16.24	467.47	627.76	644.00	45.48	0.00	3.75
91	2.63	13.56	470.10	630.44	644.00	45.48	0.00	3.75
92	3.57	10.13	473.20	633.87	644.00	49.50	0.00	5.50
93	3.57	5.95	476.77	638.05	644.00	49.50	0.00	5.50
94	2.71	1.93	479.91	642.07	644.00	54.94	0.00	4.72

Table 2 - Force Data On The 94 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	265.6	0.0	177.5	0.0	0.0	0.0
2	358.7	0.0	255.4	0.0	0.0	0.0
3	255.8	0.0	182.1	0.0	0.0	0.0
4	1833.0	0.0	1340.7	0.0	0.0	0.0
5	1926.3	0.0	1382.7	0.0	0.0	0.0

6	696.0	0.0	499.6	0.0	0.0	0.0
7	3475.9	0.0	2491.8	0.0	0.0	0.0
8	4408.7	0.0	3160.4	0.0	0.0	0.0
9	5216.1	0.0	3739.3	0.0	0.0	0.0
10	8829.6	0.0	4508.2	0.0	0.0	0.0
11	11747.6	0.0	5420.8	0.0	0.0	0.0
12	12873.7	0.0	5940.4	0.0	0.0	0.0
13	13999.8	0.0	6460.1	0.0	0.0	0.0
14	15125.9	0.0	6979.7	0.0	0.0	0.0
15	8740.7	0.0	4397.0	0.0	0.0	0.0
16	8932.2	0.0	4493.3	0.0	0.0	0.0
17	15651.0	0.0	8126.2	0.0	0.0	0.0
18	15857.0	0.0	8233.1	0.0	0.0	0.0
19	16062.9	0.0	8340.1	0.0	0.0	0.0
20	16268.8	0.0	8447.0	0.0	0.0	0.0
21	11670.6	0.0	6059.5	0.0	0.0	0.0
22	17526.0	0.0	9118.7	0.0	0.0	0.0
23	17623.9	0.0	9169.6	0.0	0.0	0.0
24	17721.8	0.0	9220.6	0.0	0.0	0.0
25	17819.7	0.0	9271.5	0.0	0.0	0.0
26	17917.6	0.0	9322.5	0.0	0.0	0.0
27	9691.3	0.0	5042.3	0.0	0.0	0.0
28	9719.7	0.0	5057.1	0.0	0.0	0.0
29	13434.0	0.0	6989.7	0.0	0.0	0.0
30	13487.9	0.0	7017.7	0.0	0.0	0.0
31	10239.4	0.0	5282.9	0.0	0.0	0.0
32	10353.5	0.0	5341.7	0.0	0.0	0.0
33	20741.1	0.0	10701.0	0.0	0.0	0.0
34	21184.1	0.0	10929.6	0.0	0.0	0.0
35	21627.2	0.0	11158.2	0.0	0.0	0.0
36	22070.2	0.0	11386.7	0.0	0.0	0.0
37	22474.3	0.0	11595.1	0.0	0.0	0.0
38	22682.3	0.0	11702.4	0.0	0.0	0.0
39	22890.3	0.0	11809.7	0.0	0.0	0.0
40	20755.1	0.0	10797.4	0.0	0.0	0.0
41	20626.4	0.0	10730.4	0.0	0.0	0.0
42	20497.6	0.0	10663.4	0.0	0.0	0.0
43	20368.9	0.0	10596.5	0.0	0.0	0.0
44	20240.2	0.0	10529.5	0.0	0.0	0.0
45	20111.5	0.0	10462.6	0.0	0.0	0.0
46	19982.8	0.0	10395.6	0.0	0.0	0.0
47	19854.0	0.0	10328.6	0.0	0.0	0.0
48	17389.7	0.0	9046.6	0.0	0.0	0.0
49	17289.7	0.0	8994.6	0.0	0.0	0.0
50	17189.8	0.0	8942.6	0.0	0.0	0.0
51	1498.1	0.0	780.3	0.0	0.0	0.0
52	19283.8	0.0	10043.6	0.0	0.0	0.0
53	19082.4	0.0	9938.7	0.0	0.0	0.0
54	18881.0	0.0	9833.8	0.0	0.0	0.0
55	18679.6	0.0	9729.0	0.0	0.0	0.0
56	18478.2	0.0	9624.1	0.0	0.0	0.0
57	18276.8	0.0	9519.2	0.0	0.0	0.0
58	18075.4	0.0	9414.3	0.0	0.0	0.0
59	17874.0	0.0	9309.4	0.0	0.0	0.0
60	16551.2	0.0	8580.3	0.0	0.0	0.0
61	16223.5	0.0	8410.4	0.0	0.0	0.0
62	15895.8	0.0	8240.5	0.0	0.0	0.0
63	15568.1	0.0	8070.6	0.0	0.0	0.0
64	15240.3	0.0	7900.7	0.0	0.0	0.0
65	10651.4	0.0	5467.9	0.0	0.0	0.0
66	15011.6	0.0	7797.9	0.0	0.0	0.0
67	14710.3	0.0	7641.3	0.0	0.0	0.0
68	14408.9	0.0	7484.8	0.0	0.0	0.0
69	14107.5	0.0	7328.2	0.0	0.0	0.0
70	12753.1	0.0	6603.9	0.0	0.0	0.0
71	12794.2	0.0	6625.2	0.0	0.0	0.0
72	12835.2	0.0	6646.5	0.0	0.0	0.0
73	14617.7	0.0	7614.3	0.0	0.0	0.0
74	14444.7	0.0	7524.1	0.0	0.0	0.0
75	14271.7	0.0	7434.0	0.0	0.0	0.0
76	14098.7	0.0	7343.9	0.0	0.0	0.0
77	13925.7	0.0	7253.8	0.0	0.0	0.0

78	13752.7	0.0	7163.7	0.0	0.0	0.0
79	13579.7	0.0	7073.6	0.0	0.0	0.0
80	13406.7	0.0	6983.5	0.0	0.0	0.0
81	13233.7	0.0	6893.4	0.0	0.0	0.0
82	13060.7	0.0	6803.3	0.0	0.0	0.0
83	12887.7	0.0	6713.1	0.0	0.0	0.0
84	12714.7	0.0	6623.0	0.0	0.0	0.0
85	12541.7	0.0	6532.9	0.0	0.0	0.0
86	12368.7	0.0	6442.8	0.0	0.0	0.0
87	12195.7	0.0	6352.7	0.0	0.0	0.0
88	12022.7	0.0	6262.6	0.0	0.0	0.0
89	5541.9	0.0	4110.0	0.0	0.0	0.0
90	5123.5	0.0	3799.7	0.0	0.0	0.0
91	4279.7	0.0	3173.9	0.0	0.0	0.0
92	4343.8	0.0	3478.2	0.0	0.0	0.0
93	2551.2	0.0	2042.8	0.0	0.0	0.0
94	627.8	0.0	568.2	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 1270177.53(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 614744.50(lbs)

TOTAL AREA OF SLIDING MASS = 10584.81(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 94 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	1	200.00	34.00	
2	1	200.00	34.00	
3	3	400.00	34.00	
4	3	400.00	34.00	
5	3	400.00	34.00	
6	3	400.00	34.00	
7	3	400.00	34.00	
8	3	400.00	34.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	4	0.00	10.00	
40	4	0.00	10.00	
41	4	0.00	10.00	
42	4	0.00	10.00	
43	4	0.00	10.00	

44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	4	0.00	10.00
48	4	0.00	10.00
49	4	0.00	10.00
50	4	0.00	10.00
51	4	0.00	10.00
52	4	0.00	10.00
53	4	0.00	10.00
54	4	0.00	10.00
55	4	0.00	10.00
56	4	0.00	10.00
57	4	0.00	10.00
58	4	0.00	10.00
59	4	0.00	10.00
60	4	0.00	10.00
61	4	0.00	10.00
62	4	0.00	10.00
63	4	0.00	10.00
64	4	0.00	10.00
65	4	0.00	10.00
66	4	0.00	10.00
67	4	0.00	10.00
68	4	0.00	10.00
69	4	0.00	10.00
70	4	0.00	10.00
71	4	0.00	10.00
72	4	0.00	10.00
73	4	0.00	10.00
74	4	0.00	10.00
75	4	0.00	10.00
76	4	0.00	10.00
77	4	0.00	10.00
78	4	0.00	10.00
79	4	0.00	10.00
80	4	0.00	10.00
81	4	0.00	10.00
82	4	0.00	10.00
83	4	0.00	10.00
84	4	0.00	10.00
85	4	0.00	10.00
86	4	0.00	10.00
87	4	0.00	10.00
88	4	0.00	10.00
89	4	0.00	10.00
90	3	400.00	34.00
91	3	400.00	34.00
92	3	400.00	34.00
93	3	400.00	34.00
94	3	400.00	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 94 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-40.76	85.45	3.33	85.25	257.50	37.24
1	-40.76	85.45	3.33	85.25	257.50	37.24
2	-44.69	87.36	1.83	183.85	324.01	46.86
2	-44.69	87.36	1.83	183.85	324.01	46.86
3	-44.69	88.36	0.96	270.65	582.55	84.26
3	-44.69	88.36	0.96	270.65	582.55	84.26

4	-44.69	90.25	4.36	381.06	657.03	95.03
4	-44.69	90.25	4.36	381.06	657.03	95.03
5	-44.69	92.85	2.95	564.80	780.96	112.96
5	-44.69	92.85	2.95	564.80	780.96	112.96
6	-44.69	94.22	0.89	665.30	848.75	122.76
6	-44.69	94.22	0.89	665.30	848.75	122.76
7	-44.62	95.85	3.69	784.64	929.25	134.40
7	-44.62	95.85	3.69	784.64	929.25	134.40
8	-44.62	98.48	3.69	977.59	1059.40	153.23
8	-44.62	98.48	3.69	977.59	1059.40	153.23
9	-44.62	101.08	3.61	1019.61	179.79	26.00
9	-44.62	101.08	3.61	1019.61	179.79	26.00
10	-1.93	104.33	3.94	1098.91	193.77	28.03
10	-1.93	104.33	3.94	1098.91	193.77	28.03
11	-1.93	108.75	4.90	1292.96	227.98	32.98
11	-1.93	108.75	4.90	1292.96	227.98	32.98
12	-1.93	113.65	4.90	1416.90	249.84	36.14
12	-1.93	113.65	4.90	1416.90	249.84	36.14
13	-1.93	118.55	4.90	1540.85	271.69	39.30
13	-1.93	118.55	4.90	1540.85	271.69	39.30
14	-1.93	123.45	4.90	1664.79	293.55	42.46
14	-1.93	123.45	4.90	1664.79	293.55	42.46
15	-1.93	127.25	2.70	1611.15	284.09	41.09
15	-1.93	127.25	2.70	1611.15	284.09	41.09
16	-1.93	129.95	2.70	1646.44	290.31	41.99
16	-1.93	129.95	2.70	1646.44	290.31	41.99
17	-1.93	133.63	4.65	1620.67	285.77	41.33
17	-1.93	133.63	4.65	1620.67	285.77	41.33
18	-1.93	138.28	4.65	1642.00	289.53	41.88
18	-1.93	138.28	4.65	1642.00	289.53	41.88
19	-1.93	142.93	4.65	1663.32	293.29	42.42
19	-1.93	142.93	4.65	1663.32	293.29	42.42
20	-1.93	147.58	4.65	1684.65	297.05	42.96
20	-1.93	147.58	4.65	1684.65	297.05	42.96
21	-1.93	151.55	3.30	1702.88	300.26	43.43
21	-1.93	151.55	3.30	1702.88	300.26	43.43
22	-1.93	155.66	4.92	1711.38	301.76	43.65
22	-1.93	155.66	4.92	1711.38	301.76	43.65
23	-1.93	160.58	4.92	1720.94	303.45	43.89
23	-1.93	160.58	4.92	1720.94	303.45	43.89
24	-1.93	165.50	4.92	1730.50	305.13	44.13
24	-1.93	165.50	4.92	1730.50	305.13	44.13
25	-1.93	170.42	4.92	1740.06	306.82	44.38
25	-1.93	170.42	4.92	1740.06	306.82	44.38
26	-1.93	175.34	4.92	1749.62	308.50	44.62
26	-1.93	175.34	4.92	1749.62	308.50	44.62
27	-1.93	179.12	2.65	1756.97	309.80	44.81
27	-1.93	179.12	2.65	1756.97	309.80	44.81
28	-1.93	181.77	2.65	1762.12	310.71	44.94
28	-1.93	181.77	2.65	1762.12	310.71	44.94
29	-1.93	184.93	3.65	1768.24	311.79	45.10
29	-1.93	184.93	3.65	1768.24	311.79	45.10
30	-1.93	188.58	3.65	1775.33	313.04	45.28
30	-1.93	188.58	3.65	1775.33	313.04	45.28
31	-1.93	191.78	2.75	1805.09	318.29	46.04
31	-1.93	191.78	2.75	1805.09	318.29	46.04
32	-1.93	194.53	2.75	1825.19	321.83	46.55
32	-1.93	194.53	2.75	1825.19	321.83	46.55
33	-1.93	198.61	5.42	1855.05	327.10	47.31
33	-1.93	198.61	5.42	1855.05	327.10	47.31
34	-1.93	204.03	5.42	1894.68	334.08	48.32
34	-1.93	204.03	5.42	1894.68	334.08	48.32
35	-1.93	209.45	5.42	1934.30	341.07	49.33
35	-1.93	209.45	5.42	1934.30	341.07	49.33
36	-1.93	214.87	5.42	1973.93	348.06	50.34
36	-1.93	214.87	5.42	1973.93	348.06	50.34
37	1.91	220.30	5.44	1999.47	352.56	50.99
37	1.91	220.30	5.44	1999.47	352.56	50.99
38	1.91	225.74	5.44	2017.97	355.82	51.47
38	1.91	225.74	5.44	2017.97	355.82	51.47
39	1.91	231.18	5.44	2036.48	359.09	51.94
39	1.91	231.18	5.44	2036.48	359.09	51.94

40	1.91	236.36	4.93	2021.31	356.41	51.55
40	1.91	236.36	4.93	2021.31	356.41	51.55
41	1.91	241.29	4.93	2008.77	354.20	51.23
41	1.91	241.29	4.93	2008.77	354.20	51.23
42	1.91	246.21	4.93	1996.24	351.99	50.91
42	1.91	246.21	4.93	1996.24	351.99	50.91
43	1.91	251.14	4.93	1983.70	349.78	50.59
43	1.91	251.14	4.93	1983.70	349.78	50.59
44	1.91	256.06	4.93	1971.17	347.57	50.27
44	1.91	256.06	4.93	1971.17	347.57	50.27
45	1.91	260.99	4.93	1958.63	345.36	49.95
45	1.91	260.99	4.93	1958.63	345.36	49.95
46	1.91	265.91	4.93	1946.09	343.15	49.63
46	1.91	265.91	4.93	1946.09	343.15	49.63
47	1.91	270.84	4.93	1933.56	340.94	49.31
47	1.91	270.84	4.93	1933.56	340.94	49.31
48	1.91	275.47	4.34	1921.77	338.86	49.01
48	1.91	275.47	4.34	1921.77	338.86	49.01
49	1.91	279.81	4.34	1910.72	336.91	48.73
49	1.91	279.81	4.34	1910.72	336.91	48.73
50	1.91	284.15	4.34	1899.67	334.96	48.45
50	1.91	284.15	4.34	1899.67	334.96	48.45
51	3.36	286.51	0.38	1892.13	333.63	48.26
51	3.36	286.51	0.38	1892.13	333.63	48.26
52	3.36	289.16	4.92	1881.54	331.77	47.99
52	3.36	289.16	4.92	1881.54	331.77	47.99
53	3.36	294.07	4.92	1861.89	328.30	47.49
53	3.36	294.07	4.92	1861.89	328.30	47.49
54	3.36	298.98	4.92	1842.24	324.84	46.98
54	3.36	298.98	4.92	1842.24	324.84	46.98
55	3.36	303.89	4.92	1822.59	321.37	46.48
55	3.36	303.89	4.92	1822.59	321.37	46.48
56	3.36	308.81	4.92	1802.94	317.91	45.98
56	3.36	308.81	4.92	1802.94	317.91	45.98
57	3.36	313.72	4.92	1783.29	314.44	45.48
57	3.36	313.72	4.92	1783.29	314.44	45.48
58	3.36	318.63	4.92	1763.64	310.98	44.98
58	3.36	318.63	4.92	1763.64	310.98	44.98
59	3.36	323.54	4.92	1743.99	307.51	44.48
59	3.36	323.54	4.92	1743.99	307.51	44.48
60	3.36	328.31	4.63	1725.83	304.31	44.02
60	3.36	328.31	4.63	1725.83	304.31	44.02
61	3.36	332.93	4.63	1691.66	298.29	43.14
61	3.36	332.93	4.63	1691.66	298.29	43.14
62	3.36	337.55	4.63	1657.49	292.26	42.27
62	3.36	337.55	4.63	1657.49	292.26	42.27
63	3.36	342.17	4.63	1623.31	286.23	41.40
63	3.36	342.17	4.63	1623.31	286.23	41.40
64	3.36	346.79	4.63	1589.14	280.21	40.53
64	3.36	346.79	4.63	1589.14	280.21	40.53
65	3.36	350.75	3.31	1571.16	277.04	40.07
65	3.36	350.75	3.31	1571.16	277.04	40.07
66	3.36	354.78	4.76	1519.15	267.87	38.74
66	3.36	354.78	4.76	1519.15	267.87	38.74
67	3.36	359.53	4.76	1488.65	262.49	37.97
67	3.36	359.53	4.76	1488.65	262.49	37.97
68	3.36	364.28	4.76	1458.15	257.11	37.19
68	3.36	364.28	4.76	1458.15	257.11	37.19
69	3.36	369.03	4.76	1427.65	251.73	36.41
69	3.36	369.03	4.76	1427.65	251.73	36.41
70	3.36	373.57	4.34	1419.45	250.29	36.20
70	3.36	373.57	4.34	1419.45	250.29	36.20
71	3.36	377.90	4.34	1424.02	251.09	36.32
71	3.36	377.90	4.34	1424.02	251.09	36.32
72	3.36	382.23	4.34	1428.60	251.90	36.43
72	3.36	382.23	4.34	1428.60	251.90	36.43
73	3.36	386.88	4.96	1413.46	249.23	36.05
73	3.36	386.88	4.96	1413.46	249.23	36.05
74	3.36	391.83	4.96	1396.73	246.28	35.62
74	3.36	391.83	4.96	1396.73	246.28	35.62
75	3.36	396.79	4.96	1380.01	243.33	35.20
75	3.36	396.79	4.96	1380.01	243.33	35.20

76	3.36	401.75	4.96	1363.28	240.38	34.77
76	3.36	401.75	4.96	1363.28	240.38	34.77
77	3.36	406.70	4.96	1346.55	237.43	34.34
77	3.36	406.70	4.96	1346.55	237.43	34.34
78	3.36	411.66	4.96	1329.82	234.48	33.92
78	3.36	411.66	4.96	1329.82	234.48	33.92
79	3.36	416.62	4.96	1313.10	231.53	33.49
79	3.36	416.62	4.96	1313.10	231.53	33.49
80	3.36	421.57	4.96	1296.37	228.58	33.06
80	3.36	421.57	4.96	1296.37	228.58	33.06
81	3.36	426.53	4.96	1279.64	225.64	32.64
81	3.36	426.53	4.96	1279.64	225.64	32.64
82	3.36	431.49	4.96	1262.91	222.69	32.21
82	3.36	431.49	4.96	1262.91	222.69	32.21
83	3.36	436.44	4.96	1246.18	219.74	31.78
83	3.36	436.44	4.96	1246.18	219.74	31.78
84	3.36	441.40	4.96	1229.46	216.79	31.36
84	3.36	441.40	4.96	1229.46	216.79	31.36
85	3.36	446.35	4.96	1212.73	213.84	30.93
85	3.36	446.35	4.96	1212.73	213.84	30.93
86	3.36	451.31	4.96	1196.00	210.89	30.50
86	3.36	451.31	4.96	1196.00	210.89	30.50
87	3.36	456.27	4.96	1179.27	207.94	30.08
87	3.36	456.27	4.96	1179.27	207.94	30.08
88	3.36	461.22	4.96	1162.55	204.99	29.65
88	3.36	461.22	4.96	1162.55	204.99	29.65
89	45.48	464.93	3.50	1055.79	186.16	26.93
89	45.48	464.93	3.50	1055.79	186.16	26.93
90	45.48	467.47	3.75	793.01	934.89	135.22
90	45.48	467.47	3.75	793.01	934.89	135.22
91	45.48	470.10	3.75	653.32	840.67	121.59
91	45.48	470.10	3.75	653.32	840.67	121.59
92	49.50	473.20	5.50	459.39	709.87	102.67
92	49.50	473.20	5.50	459.39	709.87	102.67
93	49.50	476.77	5.50	243.95	564.54	81.65
93	49.50	476.77	5.50	243.95	564.54	81.65
94	54.94	479.91	4.72	97.22	65.58	9.48
94	54.94	479.91	4.72	97.22	65.58	9.48

Table 4 - Base Force Data on the 94 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-40.76	85.45	3.33	283.77	857.15	123.98
1	-40.76	85.45	3.33	283.77	857.15	123.98
2	-44.69	87.36	1.83	337.13	594.15	85.94
2	-44.69	87.36	1.83	337.13	594.15	85.94
3	-44.69	88.36	0.96	260.75	561.25	81.18
3	-44.69	88.36	0.96	260.75	561.25	81.18
4	-44.69	90.25	4.36	1661.63	2865.01	414.39
4	-44.69	90.25	4.36	1661.63	2865.01	414.39
5	-44.69	92.85	2.95	1668.38	2306.91	333.67
5	-44.69	92.85	2.95	1668.38	2306.91	333.67
6	-44.69	94.22	0.89	591.00	753.96	109.05
6	-44.69	94.22	0.89	591.00	753.96	109.05
7	-44.62	95.85	3.69	2897.89	3431.96	496.39
7	-44.62	95.85	3.69	2897.89	3431.96	496.39
8	-44.62	98.48	3.69	3610.52	3912.64	565.92
8	-44.62	98.48	3.69	3610.52	3912.64	565.92
9	-44.62	101.08	3.61	3684.32	649.65	93.96
9	-44.62	101.08	3.61	3684.32	649.65	93.96
10	-1.93	104.33	3.94	4330.22	763.53	110.44
10	-1.93	104.33	3.94	4330.22	763.53	110.44
11	-1.93	108.75	4.90	6339.12	1117.76	161.67
11	-1.93	108.75	4.90	6339.12	1117.76	161.67
12	-1.93	113.65	4.90	6946.77	1224.90	177.17
12	-1.93	113.65	4.90	6946.77	1224.90	177.17
13	-1.93	118.55	4.90	7554.43	1332.05	192.67

13	-1.93	118.55	4.90	7554.43	1332.05	192.67
14	-1.93	123.45	4.90	8162.09	1439.20	208.16
14	-1.93	123.45	4.90	8162.09	1439.20	208.16
15	-1.93	127.25	2.70	4352.57	767.48	111.01
15	-1.93	127.25	2.70	4352.57	767.48	111.01
16	-1.93	129.95	2.70	4447.92	784.29	113.44
16	-1.93	129.95	2.70	4447.92	784.29	113.44
17	-1.93	133.63	4.65	7540.42	1329.58	192.31
17	-1.93	133.63	4.65	7540.42	1329.58	192.31
18	-1.93	138.28	4.65	7639.63	1347.07	194.84
18	-1.93	138.28	4.65	7639.63	1347.07	194.84
19	-1.93	142.93	4.65	7738.84	1364.57	197.37
19	-1.93	142.93	4.65	7738.84	1364.57	197.37
20	-1.93	147.58	4.65	7838.06	1382.06	199.90
20	-1.93	147.58	4.65	7838.06	1382.06	199.90
21	-1.93	151.55	3.30	5622.68	991.43	143.40
21	-1.93	151.55	3.30	5622.68	991.43	143.40
22	-1.93	155.66	4.92	8424.75	1485.51	214.86
22	-1.93	155.66	4.92	8424.75	1485.51	214.86
23	-1.93	160.58	4.92	8471.81	1493.81	216.06
23	-1.93	160.58	4.92	8471.81	1493.81	216.06
24	-1.93	165.50	4.92	8518.87	1502.11	217.26
24	-1.93	165.50	4.92	8518.87	1502.11	217.26
25	-1.93	170.42	4.92	8565.94	1510.41	218.46
25	-1.93	170.42	4.92	8565.94	1510.41	218.46
26	-1.93	175.34	4.92	8613.00	1518.70	219.66
26	-1.93	175.34	4.92	8613.00	1518.70	219.66
27	-1.93	179.12	2.65	4658.62	821.44	118.81
27	-1.93	179.12	2.65	4658.62	821.44	118.81
28	-1.93	181.77	2.65	4672.27	823.85	119.16
28	-1.93	181.77	2.65	4672.27	823.85	119.16
29	-1.93	184.93	3.65	6457.74	1138.67	164.70
29	-1.93	184.93	3.65	6457.74	1138.67	164.70
30	-1.93	188.58	3.65	6483.64	1143.24	165.36
30	-1.93	188.58	3.65	6483.64	1143.24	165.36
31	-1.93	191.78	2.75	4966.81	875.78	126.67
31	-1.93	191.78	2.75	4966.81	875.78	126.67
32	-1.93	194.53	2.75	5022.13	885.54	128.08
32	-1.93	194.53	2.75	5022.13	885.54	128.08
33	-1.93	198.61	5.42	10060.82	1773.99	256.59
33	-1.93	198.61	5.42	10060.82	1773.99	256.59
34	-1.93	204.03	5.42	10275.72	1811.89	262.07
34	-1.93	204.03	5.42	10275.72	1811.89	262.07
35	-1.93	209.45	5.42	10490.62	1849.78	267.55
35	-1.93	209.45	5.42	10490.62	1849.78	267.55
36	-1.93	214.87	5.42	10705.51	1887.67	273.03
36	-1.93	214.87	5.42	10705.51	1887.67	273.03
37	1.91	220.30	5.44	10882.12	1918.81	277.53
37	1.91	220.30	5.44	10882.12	1918.81	277.53
38	1.91	225.74	5.44	10982.85	1936.57	280.10
38	1.91	225.74	5.44	10982.85	1936.57	280.10
39	1.91	231.18	5.44	11083.57	1954.33	282.67
39	1.91	231.18	5.44	11083.57	1954.33	282.67
40	1.91	236.36	4.93	9960.49	1756.30	254.03
40	1.91	236.36	4.93	9960.49	1756.30	254.03
41	1.91	241.29	4.93	9898.72	1745.41	252.45
41	1.91	241.29	4.93	9898.72	1745.41	252.45
42	1.91	246.21	4.93	9836.94	1734.52	250.88
42	1.91	246.21	4.93	9836.94	1734.52	250.88
43	1.91	251.14	4.93	9775.17	1723.63	249.30
43	1.91	251.14	4.93	9775.17	1723.63	249.30
44	1.91	256.06	4.93	9713.39	1712.73	247.73
44	1.91	256.06	4.93	9713.39	1712.73	247.73
45	1.91	260.99	4.93	9651.62	1701.84	246.15
45	1.91	260.99	4.93	9651.62	1701.84	246.15
46	1.91	265.91	4.93	9589.85	1690.95	244.58
46	1.91	265.91	4.93	9589.85	1690.95	244.58
47	1.91	270.84	4.93	9528.07	1680.06	243.00
47	1.91	270.84	4.93	9528.07	1680.06	243.00
48	1.91	275.47	4.34	8345.42	1471.52	212.84
48	1.91	275.47	4.34	8345.42	1471.52	212.84
49	1.91	279.81	4.34	8297.45	1463.06	211.62

49	1.91	279.81	4.34	8297.45	1463.06	211.62
50	1.91	284.15	4.34	8249.48	1454.61	210.39
50	1.91	284.15	4.34	8249.48	1454.61	210.39
51	3.36	286.51	0.38	719.31	126.83	18.34
51	3.36	286.51	0.38	719.31	126.83	18.34
52	3.36	289.16	4.92	9258.98	1632.61	236.14
52	3.36	289.16	4.92	9258.98	1632.61	236.14
53	3.36	294.07	4.92	9162.28	1615.56	233.67
53	3.36	294.07	4.92	9162.28	1615.56	233.67
54	3.36	298.98	4.92	9065.59	1598.51	231.21
54	3.36	298.98	4.92	9065.59	1598.51	231.21
55	3.36	303.89	4.92	8968.89	1581.46	228.74
55	3.36	303.89	4.92	8968.89	1581.46	228.74
56	3.36	308.81	4.92	8872.19	1564.41	226.27
56	3.36	308.81	4.92	8872.19	1564.41	226.27
57	3.36	313.72	4.92	8775.50	1547.36	223.81
57	3.36	313.72	4.92	8775.50	1547.36	223.81
58	3.36	318.63	4.92	8678.80	1530.31	221.34
58	3.36	318.63	4.92	8678.80	1530.31	221.34
59	3.36	323.54	4.92	8582.11	1513.26	218.88
59	3.36	323.54	4.92	8582.11	1513.26	218.88
60	3.36	328.31	4.63	7987.05	1408.33	203.70
60	3.36	328.31	4.63	7987.05	1408.33	203.70
61	3.36	332.93	4.63	7828.91	1380.45	199.67
61	3.36	332.93	4.63	7828.91	1380.45	199.67
62	3.36	337.55	4.63	7670.76	1352.56	195.63
62	3.36	337.55	4.63	7670.76	1352.56	195.63
63	3.36	342.17	4.63	7512.62	1324.68	191.60
63	3.36	342.17	4.63	7512.62	1324.68	191.60
64	3.36	346.79	4.63	7354.47	1296.79	187.57
64	3.36	346.79	4.63	7354.47	1296.79	187.57
65	3.36	350.75	3.31	5193.75	915.80	132.46
65	3.36	350.75	3.31	5193.75	915.80	132.46
66	3.36	354.78	4.76	7228.39	1274.56	184.35
66	3.36	354.78	4.76	7228.39	1274.56	184.35
67	3.36	359.53	4.76	7083.27	1248.97	180.65
67	3.36	359.53	4.76	7083.27	1248.97	180.65
68	3.36	364.28	4.76	6938.15	1223.38	176.95
68	3.36	364.28	4.76	6938.15	1223.38	176.95
69	3.36	369.03	4.76	6793.02	1197.79	173.25
69	3.36	369.03	4.76	6793.02	1197.79	173.25
70	3.36	373.57	4.34	6161.53	1086.44	157.14
70	3.36	373.57	4.34	6161.53	1086.44	157.14
71	3.36	377.90	4.34	6181.39	1089.95	157.65
71	3.36	377.90	4.34	6181.39	1089.95	157.65
72	3.36	382.23	4.34	6201.25	1093.45	158.15
72	3.36	382.23	4.34	6201.25	1093.45	158.15
73	3.36	386.88	4.96	7017.68	1237.41	178.98
73	3.36	386.88	4.96	7017.68	1237.41	178.98
74	3.36	391.83	4.96	6934.63	1222.76	176.86
74	3.36	391.83	4.96	6934.63	1222.76	176.86
75	3.36	396.79	4.96	6851.58	1208.12	174.74
75	3.36	396.79	4.96	6851.58	1208.12	174.74
76	3.36	401.75	4.96	6768.53	1193.47	172.62
76	3.36	401.75	4.96	6768.53	1193.47	172.62
77	3.36	406.70	4.96	6685.48	1178.83	170.50
77	3.36	406.70	4.96	6685.48	1178.83	170.50
78	3.36	411.66	4.96	6602.42	1164.19	168.39
78	3.36	411.66	4.96	6602.42	1164.19	168.39
79	3.36	416.62	4.96	6519.37	1149.54	166.27
79	3.36	416.62	4.96	6519.37	1149.54	166.27
80	3.36	421.57	4.96	6436.32	1134.90	164.15
80	3.36	421.57	4.96	6436.32	1134.90	164.15
81	3.36	426.53	4.96	6353.27	1120.25	162.03
81	3.36	426.53	4.96	6353.27	1120.25	162.03
82	3.36	431.49	4.96	6270.22	1105.61	159.91
82	3.36	431.49	4.96	6270.22	1105.61	159.91
83	3.36	436.44	4.96	6187.17	1090.96	157.80
83	3.36	436.44	4.96	6187.17	1090.96	157.80
84	3.36	441.40	4.96	6104.12	1076.32	155.68
84	3.36	441.40	4.96	6104.12	1076.32	155.68
85	3.36	446.35	4.96	6021.07	1061.68	153.56

85	3.36	446.35	4.96	6021.07	1061.68	153.56
86	3.36	451.31	4.96	5938.01	1047.03	151.44
86	3.36	451.31	4.96	5938.01	1047.03	151.44
87	3.36	456.27	4.96	5854.96	1032.39	149.32
87	3.36	456.27	4.96	5854.96	1032.39	149.32
88	3.36	461.22	4.96	5771.91	1017.74	147.21
88	3.36	461.22	4.96	5771.91	1017.74	147.21
89	45.48	464.93	3.50	3694.70	651.48	94.23
89	45.48	464.93	3.50	3694.70	651.48	94.23
90	45.48	467.47	3.75	2973.99	3506.09	507.12
90	45.48	467.47	3.75	2973.99	3506.09	507.12
91	45.48	470.10	3.75	2450.14	3152.75	456.01
91	45.48	470.10	3.75	2450.14	3152.75	456.01
92	49.50	473.20	5.50	2526.67	3904.26	564.71
92	49.50	473.20	5.50	2526.67	3904.26	564.71
93	49.50	476.77	5.50	1341.70	3104.99	449.10
93	49.50	476.77	5.50	1341.70	3104.99	449.10
94	54.94	479.91	4.72	458.60	309.33	44.74
94	54.94	479.91	4.72	458.60	309.33	44.74

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 94 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
71	12000.0	0.0	12000.0	90.00	0.633792E+03

Sum of the Resisting Forces = 126071.67 (lbs)

Average Available Shear Strength = 304.67(psf)

Sum of the Driving Forces = 18862.68 (lbs)

Average Mobilized Shear Stress = 45.58(psf)

Total length of the failure surface = 413.79(ft)

Factor of Safety Balance Check: FS = 6.68365

Janbu's Correction Factor (fo) = 1.0323

Janub's FS Corrected = 6.89966

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

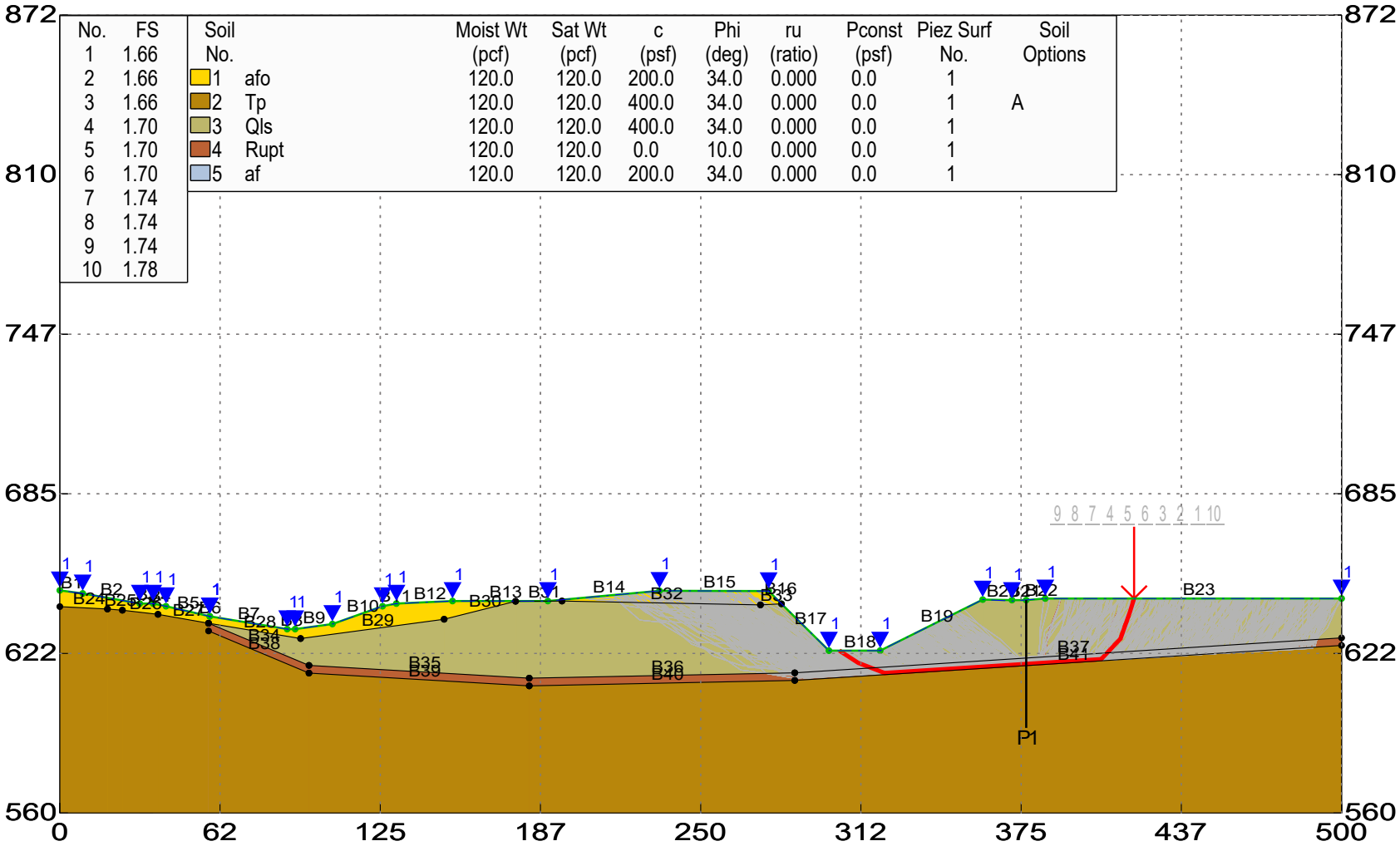
Royal Vista - Cross Section 9
Stage 3 (Temporary Staging Pad)

LGC Geotechnical / BPP

\Sec 9 - Stage 3 (Temporary Staging Pad).gsd

No.	FS
1	1.66
2	1.66
3	1.66
4	1.70
5	1.70
6	1.70
7	1.74
8	1.74
9	1.74
10	1.78

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.66

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 3 (Temporary Staging Pad).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 3 (Temporary Staging Pad).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 9

DESCRIPTION: Stage 3 (Temporary Staging Pad)

BOUNDARY DATA

23 Surface Boundaries
41 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.200	8.900	646.000	1
2	8.900	646.000	31.200	642.000	1
3	31.200	642.000	36.400	642.000	1
4	36.400	642.000	41.400	641.000	1
5	41.400	641.000	58.500	637.000	1
6	58.500	637.000	58.500	637.000	1
7	58.500	637.000	88.700	632.000	1
8	88.700	632.000	91.800	632.000	1
9	91.800	632.000	106.300	634.000	1
10	106.300	634.000	125.900	641.000	1
11	125.900	641.000	131.300	642.000	1
12	131.300	642.000	153.200	643.000	1
13	153.200	643.000	190.400	643.000	1
14	190.400	643.000	233.900	647.000	1
15	233.900	647.000	276.500	646.900	1
16	276.500	646.900	281.500	641.900	1
17	281.500	641.900	300.000	623.600	3
18	300.000	623.600	320.000	623.600	3
19	320.000	623.600	360.000	643.600	3
20	360.000	643.600	371.400	643.400	3
21	371.400	643.400	377.000	643.400	3
22	377.000	643.400	384.400	644.000	3
23	384.400	644.000	500.000	644.000	3
24	0.000	640.800	18.600	639.900	2
25	18.600	639.900	24.400	639.400	2
26	24.400	639.400	38.300	637.800	2

27	38.300	637.800	58.000	634.300	2
28	58.000	634.300	93.900	628.300	3
29	93.900	628.300	149.900	635.900	3
30	149.900	635.900	177.800	642.900	3
31	177.800	642.900	195.900	643.000	3
32	195.900	643.000	273.300	641.500	3
33	273.300	641.500	281.500	641.900	3
34	58.000	634.300	97.200	617.800	4
35	97.200	617.800	183.100	612.800	4
36	183.100	612.800	286.700	614.900	4
37	286.700	614.900	500.000	628.600	4
38	58.000	631.300	97.200	614.800	2
39	97.200	614.800	183.100	609.800	2
40	183.100	609.800	286.700	611.900	2
41	286.700	611.900	500.000	625.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 22 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point	X-Water	Y-Water

No.	(ft)	(ft)
1	0.00	647.20
2	8.90	646.00
3	31.20	642.00
4	36.40	642.00
5	41.40	641.00
6	58.50	637.00
7	58.50	637.00
8	88.70	632.00
9	91.80	632.00
10	106.30	634.00
11	125.90	641.00
12	131.30	642.00
13	153.20	643.00
14	190.40	643.00
15	233.90	647.00
16	276.50	646.90
17	300.00	623.60
18	320.00	623.60
19	360.00	643.60
20	371.40	643.00
21	384.40	644.00
22	500.00	644.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	377.00	643.40	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	286.00	614.00	375.00	619.50	3.00
2	380.00	620.00	490.00	626.00	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 = 386

Number of Trial Surfaces With Valid FS = 614

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 38.6 %

Statistical Data On All Valid FS Values:
FS Max = 596.931 FS Min = 1.662 FS Ave = 16.227
Standard Deviation = 60.541 Coefficient of Variation = 373.09 %

Critical Surface is Sequence Number 60 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	377.00	618.37

Factor Of Safety For The Critical or Specified Surface = 1.662

Table 1 - Geometry Data on the 30 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	3.69	1.20	305.93	622.40	623.60	-33.07	0.00	4.40
2	3.69	3.60	309.61	620.00	623.60	-33.07	0.00	4.40
3	2.56	5.29	312.74	618.31	623.60	-21.12	0.00	2.75
4	2.56	6.29	315.30	617.31	623.60	-21.12	0.00	2.75
5	3.42	7.44	318.29	616.16	623.60	-21.12	0.00	3.66
6	1.72	8.86	320.86	615.17	624.03	-21.12	26.57	1.84
7	4.79	10.67	324.11	614.99	625.65	3.65	26.57	4.80
8	4.79	12.75	328.89	615.30	628.05	3.65	26.57	4.80
9	4.79	14.84	333.68	615.60	630.44	3.65	26.57	4.80
10	4.79	16.93	338.47	615.91	632.83	3.65	26.57	4.80
11	4.79	19.01	343.25	616.21	635.23	3.65	26.57	4.80
12	4.79	21.10	348.04	616.52	637.62	3.65	26.57	4.80
13	4.79	23.19	352.82	616.82	640.01	3.65	26.57	4.80
14	4.79	25.27	357.61	617.13	642.40	3.65	26.57	4.80
15	5.70	26.09	362.85	617.46	643.55	3.65	-1.01	5.71
16	5.70	25.62	368.55	617.83	643.45	3.65	-1.01	5.71
17	2.60	25.31	372.70	618.09	643.40	3.65	0.00	2.61
18	2.60	25.14	375.30	618.26	643.40	3.65	0.00	2.61
19	0.40	25.05	376.80	618.35	643.40	3.65	0.00	0.40
20	3.70	25.06	378.85	618.49	643.55	3.65	4.64	3.71
21	3.70	25.13	382.55	618.72	643.85	3.65	4.64	3.71
22	5.46	24.99	387.13	619.01	644.00	3.65	0.00	5.48
23	5.46	24.64	392.60	619.36	644.00	3.65	0.00	5.48
24	5.46	24.29	398.06	619.71	644.00	3.65	0.00	5.48
25	5.46	23.94	403.53	620.06	644.00	3.65	0.00	5.48
26	2.32	22.52	407.42	621.48	644.00	47.07	0.00	3.40
27	2.59	19.88	409.87	624.12	644.00	47.07	0.00	3.80
28	2.59	17.10	412.46	626.90	644.00	47.07	0.00	3.80
29	3.67	10.53	415.59	633.47	644.00	70.49	0.00	11.00
30	1.62	2.67	418.24	641.33	644.00	73.08	0.00	5.58

Table 2 - Force Data On The 30 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	530.6	0.0	329.3	0.0	0.0	0.0
2	1591.9	0.0	987.8	0.0	0.0	0.0
3	1629.2	0.0	908.2	0.0	0.0	0.0
4	1934.0	0.0	1078.1	0.0	0.0	0.0
5	3050.5	0.0	1700.5	0.0	0.0	0.0
6	1824.9	0.0	813.8	0.0	0.0	0.0
7	6124.5	0.0	2553.0	0.0	0.0	0.0
8	7323.0	0.0	3052.6	0.0	0.0	0.0
9	8521.5	0.0	3552.2	0.0	0.0	0.0
10	9720.1	0.0	4051.8	0.0	0.0	0.0
11	10918.6	0.0	4551.4	0.0	0.0	0.0
12	12117.1	0.0	5051.0	0.0	0.0	0.0
13	13315.7	0.0	5550.6	0.0	0.0	0.0
14	14514.2	0.0	6050.2	0.0	0.0	0.0
15	17843.0	0.0	9236.1	0.0	0.0	0.0
16	17525.6	0.0	9000.0	0.0	0.0	0.0
17	7895.8	0.0	4041.5	0.0	0.0	0.0
18	7844.0	0.0	4047.0	0.0	0.0	0.0
19	1202.2	0.0	623.1	0.0	0.0	0.0
20	11128.6	0.0	5769.9	0.0	0.0	0.0
21	11156.9	0.0	5781.0	0.0	0.0	0.0
22	16383.9	0.0	8537.0	0.0	0.0	0.0
23	16155.1	0.0	8417.8	0.0	0.0	0.0
24	15926.2	0.0	8298.5	0.0	0.0	0.0
25	15697.4	0.0	8179.3	0.0	0.0	0.0
26	6264.6	0.0	4782.5	0.0	0.0	0.0
27	6172.4	0.0	4712.1	0.0	0.0	0.0
28	5309.0	0.0	4053.0	0.0	0.0	0.0
29	4640.4	0.0	7225.2	0.0	0.0	0.0
30	520.8	0.0	930.6	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 254781.68(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 131440.42(lbs)

TOTAL AREA OF SLIDING MASS = 2123.18(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 30 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	3	400.00	34.00	
3	3	400.00	34.00	
4	3	400.00	34.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	

26	4	0.00	10.00
27	3	400.00	34.00
28	3	400.00	34.00
29	3	400.00	34.00
30	3	400.00	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 30 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-33.07	305.93	4.40	329.67	622.37	375.58
1	-33.07	305.93	4.40	329.67	622.37	375.58
2	-33.07	309.61	4.40	522.30	752.29	453.99
2	-33.07	309.61	4.40	522.30	752.29	453.99
3	-21.12	312.74	2.75	485.68	727.59	439.08
3	-21.12	312.74	2.75	485.68	727.59	439.08
4	-21.12	315.30	2.75	554.21	773.82	466.98
4	-21.12	315.30	2.75	554.21	773.82	466.98
5	-21.12	318.29	3.66	448.20	79.03	47.69
5	-21.12	318.29	3.66	448.20	79.03	47.69
6	-21.12	320.86	1.84	649.41	114.51	69.10
6	-21.12	320.86	1.84	649.41	114.51	69.10
7	3.65	324.11	4.80	742.03	130.84	78.96
7	3.65	324.11	4.80	742.03	130.84	78.96
8	3.65	328.89	4.80	887.25	156.45	94.41
8	3.65	328.89	4.80	887.25	156.45	94.41
9	3.65	333.68	4.80	1032.46	182.05	109.86
9	3.65	333.68	4.80	1032.46	182.05	109.86
10	3.65	338.47	4.80	1177.67	207.66	125.31
10	3.65	338.47	4.80	1177.67	207.66	125.31
11	3.65	343.25	4.80	1322.89	233.26	140.77
11	3.65	343.25	4.80	1322.89	233.26	140.77
12	3.65	348.04	4.80	1468.10	258.87	156.22
12	3.65	348.04	4.80	1468.10	258.87	156.22
13	3.65	352.82	4.80	1613.31	284.47	171.67
13	3.65	352.82	4.80	1613.31	284.47	171.67
14	3.65	357.61	4.80	1758.52	310.08	187.12
14	3.65	357.61	4.80	1758.52	310.08	187.12
15	3.65	362.85	5.71	1502.41	264.92	159.87
15	3.65	362.85	5.71	1502.41	264.92	159.87
16	3.65	368.55	5.71	1488.15	262.40	158.35
16	3.65	368.55	5.71	1488.15	262.40	158.35
17	3.65	372.70	2.61	1474.92	260.07	156.94
17	3.65	372.70	2.61	1474.92	260.07	156.94
18	3.65	375.30	2.61	1453.04	256.21	154.62
18	3.65	375.30	2.61	1453.04	256.21	154.62
19	3.65	376.80	0.40	1440.42	253.99	153.27
19	3.65	376.80	0.40	1440.42	253.99	153.27
20	3.65	378.85	3.71	1441.05	254.10	153.34
20	3.65	378.85	3.71	1441.05	254.10	153.34
21	3.65	382.55	3.71	1445.66	254.91	153.83
21	3.65	382.55	3.71	1445.66	254.91	153.83
22	3.65	387.13	5.48	1428.82	251.94	152.04
22	3.65	387.13	5.48	1428.82	251.94	152.04
23	3.65	392.60	5.48	1408.86	248.42	149.92
23	3.65	392.60	5.48	1408.86	248.42	149.92
24	3.65	398.06	5.48	1388.90	244.90	147.79
24	3.65	398.06	5.48	1388.90	244.90	147.79
25	3.65	403.53	5.48	1368.95	241.38	145.67
25	3.65	403.53	5.48	1368.95	241.38	145.67
26	47.07	407.42	3.40	1156.16	203.86	123.03
26	47.07	407.42	3.40	1156.16	203.86	123.03

27	47.07	409.87	3.80	592.58	799.70	482.60
27	47.07	409.87	3.80	592.58	799.70	482.60
28	47.07	412.46	3.80	483.32	726.00	438.13
28	47.07	412.46	3.80	483.32	726.00	438.13
29	70.49	415.59	11.00	272.64	183.90	110.98
29	70.49	415.59	11.00	272.64	183.90	110.98
30	73.08	418.24	5.58	63.42	42.78	25.82
30	73.08	418.24	5.58	63.42	42.78	25.82

Table 4 - Base Force Data on the 30 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-33.07	305.93	4.40	1449.80	2736.97	1651.69
1	-33.07	305.93	4.40	1449.80	2736.97	1651.69
2	-33.07	309.61	4.40	2296.90	3308.35	1996.50
2	-33.07	309.61	4.40	2296.90	3308.35	1996.50
3	-21.12	312.74	2.75	1335.01	1999.99	1206.94
3	-21.12	312.74	2.75	1335.01	1999.99	1206.94
4	-21.12	315.30	2.75	1523.39	2127.05	1283.62
4	-21.12	315.30	2.75	1523.39	2127.05	1283.62
5	-21.12	318.29	3.66	1641.58	289.45	174.68
5	-21.12	318.29	3.66	1641.58	289.45	174.68
6	-21.12	320.86	1.84	1194.82	210.68	127.14
6	-21.12	320.86	1.84	1194.82	210.68	127.14
7	3.65	324.11	4.80	3558.21	627.41	378.63
7	3.65	324.11	4.80	3558.21	627.41	378.63
8	3.65	328.89	4.80	4254.54	750.19	452.72
8	3.65	328.89	4.80	4254.54	750.19	452.72
9	3.65	333.68	4.80	4950.87	872.97	526.82
9	3.65	333.68	4.80	4950.87	872.97	526.82
10	3.65	338.47	4.80	5647.20	995.75	600.91
10	3.65	338.47	4.80	5647.20	995.75	600.91
11	3.65	343.25	4.80	6343.52	1118.53	675.01
11	3.65	343.25	4.80	6343.52	1118.53	675.01
12	3.65	348.04	4.80	7039.85	1241.32	749.10
12	3.65	348.04	4.80	7039.85	1241.32	749.10
13	3.65	352.82	4.80	7736.18	1364.10	823.20
13	3.65	352.82	4.80	7736.18	1364.10	823.20
14	3.65	357.61	4.80	8432.51	1486.88	897.29
14	3.65	357.61	4.80	8432.51	1486.88	897.29
15	3.65	362.85	5.71	8581.20	1513.10	913.11
15	3.65	362.85	5.71	8581.20	1513.10	913.11
16	3.65	368.55	5.71	8499.75	1498.74	904.45
16	3.65	368.55	5.71	8499.75	1498.74	904.45
17	3.65	372.70	2.61	3842.59	677.55	408.89
17	3.65	372.70	2.61	3842.59	677.55	408.89
18	3.65	375.30	2.61	3785.61	667.50	402.82
18	3.65	375.30	2.61	3785.61	667.50	402.82
19	3.65	376.80	0.40	577.34	101.80	61.43
19	3.65	376.80	0.40	577.34	101.80	61.43
20	3.65	378.85	3.71	5342.74	942.07	568.51
20	3.65	378.85	3.71	5342.74	942.07	568.51
21	3.65	382.55	3.71	5359.84	945.08	570.33
21	3.65	382.55	3.71	5359.84	945.08	570.33
22	3.65	387.13	5.48	7823.66	1379.52	832.51
22	3.65	387.13	5.48	7823.66	1379.52	832.51
23	3.65	392.60	5.48	7714.38	1360.25	820.88
23	3.65	392.60	5.48	7714.38	1360.25	820.88
24	3.65	398.06	5.48	7605.10	1340.98	809.25
24	3.65	398.06	5.48	7605.10	1340.98	809.25
25	3.65	403.53	5.48	7495.82	1321.72	797.62
25	3.65	403.53	5.48	7495.82	1321.72	797.62
26	47.07	407.42	3.40	3935.15	693.87	418.73
26	47.07	407.42	3.40	3935.15	693.87	418.73
27	47.07	409.87	3.80	2250.71	3037.40	1832.99
27	47.07	409.87	3.80	2250.71	3037.40	1832.99
28	47.07	412.46	3.80	1835.75	2757.50	1664.08

28	47.07	412.46	3.80	1835.75	2757.50	1664.08
29	70.49	415.59	11.00	2999.01	2022.86	1220.74
29	70.49	415.59	11.00	2999.01	2022.86	1220.74
30	73.08	418.24	5.58	354.13	238.87	144.15
30	73.08	418.24	5.58	354.13	238.87	144.15

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 30 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
19	12000.0	0.0	12000.0	90.00	-0.153280E+03

Sum of the Resisting Forces = 34711.48 (lbs)

Average Available Shear Strength = 262.78(psf)

Sum of the Driving Forces = 22302.59 (lbs)

Average Mobilized Shear Stress = 168.84(psf)

Total length of the failure surface = 132.09(ft)

Factor of Safety Balance Check: FS = 1.55639

Janbu's Correction Factor (fo) = 1.0677

Janub's FS Corrected = 1.66176

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

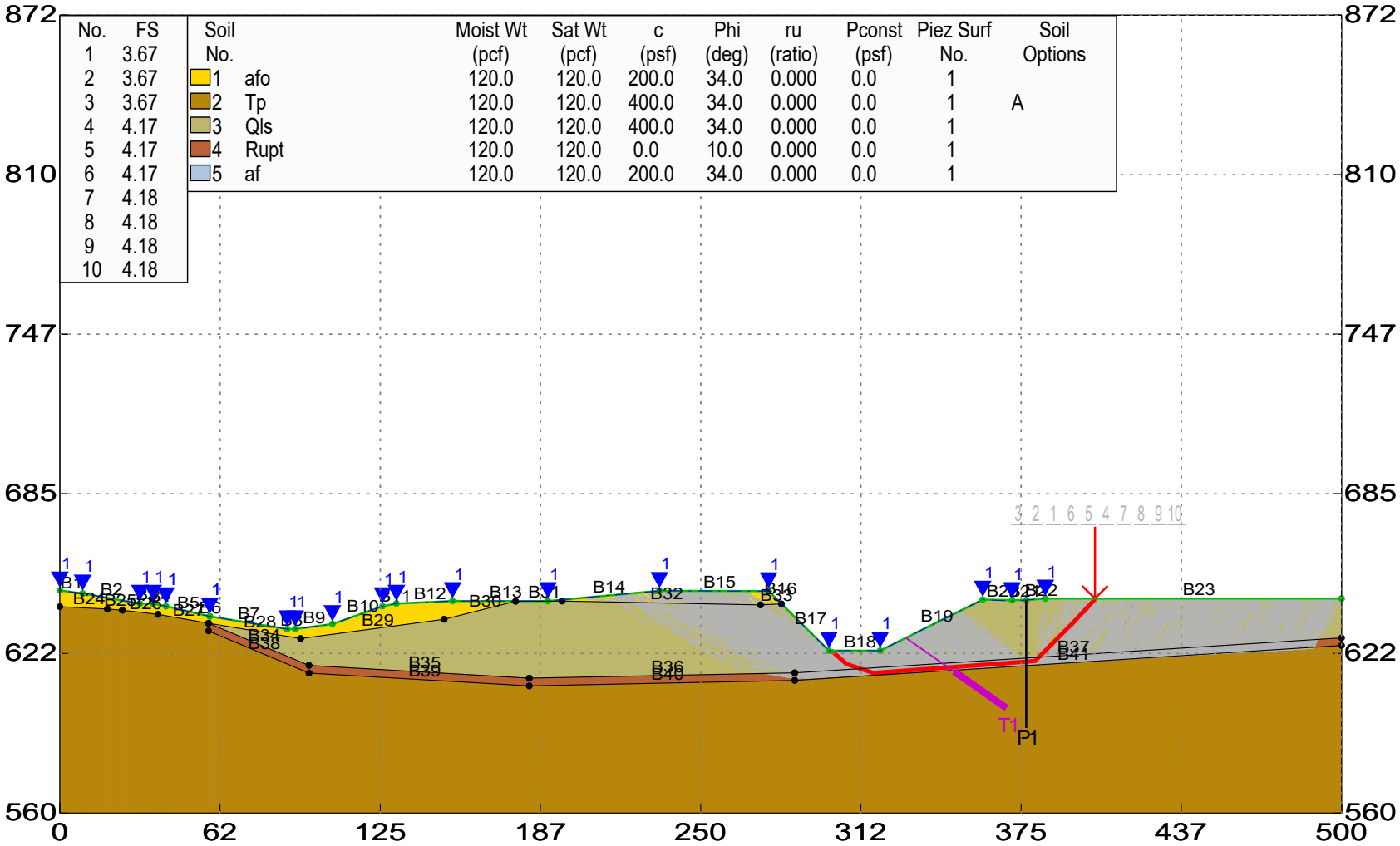
Royal Vista - Cross Section 9
Stage 4 (Temporary Staging Pad - Tieback)

LGC Geotechnical / BPP

\Sec 9 - Stage 4 (Temporary Staging Pad - Tieback).gsd

No.	FS
1	3.67
2	3.67
3	3.67
4	4.17
5	4.17
6	4.17
7	4.18
8	4.18
9	4.18
10	4.18

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 3.67

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 4 (Temporary Staging Pad - Tieback).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 4 (Temporary Staging Pad - Tieback).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 9

DESCRIPTION: Stage 4 (Temporary Staging Pad - Tieback)

BOUNDARY DATA

23 Surface Boundaries
41 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.200	8.900	646.000	1
2	8.900	646.000	31.200	642.000	1
3	31.200	642.000	36.400	642.000	1
4	36.400	642.000	41.400	641.000	1
5	41.400	641.000	58.500	637.000	1
6	58.500	637.000	58.500	637.000	1
7	58.500	637.000	88.700	632.000	1
8	88.700	632.000	91.800	632.000	1
9	91.800	632.000	106.300	634.000	1
10	106.300	634.000	125.900	641.000	1
11	125.900	641.000	131.300	642.000	1
12	131.300	642.000	153.200	643.000	1
13	153.200	643.000	190.400	643.000	1
14	190.400	643.000	233.900	647.000	1
15	233.900	647.000	276.500	646.900	1
16	276.500	646.900	281.500	641.900	1
17	281.500	641.900	300.000	623.600	3
18	300.000	623.600	320.000	623.600	3
19	320.000	623.600	360.000	643.600	3
20	360.000	643.600	371.400	643.400	3
21	371.400	643.400	377.000	643.400	3
22	377.000	643.400	384.400	644.000	3
23	384.400	644.000	500.000	644.000	3
24	0.000	640.800	18.600	639.900	2
25	18.600	639.900	24.400	639.400	2
26	24.400	639.400	38.300	637.800	2

27	38.300	637.800	58.000	634.300	2
28	58.000	634.300	93.900	628.300	3
29	93.900	628.300	149.900	635.900	3
30	149.900	635.900	177.800	642.900	3
31	177.800	642.900	195.900	643.000	3
32	195.900	643.000	273.300	641.500	3
33	273.300	641.500	281.500	641.900	3
34	58.000	634.300	97.200	617.800	4
35	97.200	617.800	183.100	612.800	4
36	183.100	612.800	286.700	614.900	4
37	286.700	614.900	500.000	628.600	4
38	58.000	631.300	97.200	614.800	2
39	97.200	614.800	183.100	609.800	2
40	183.100	609.800	286.700	611.900	2
41	286.700	611.900	500.000	625.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 21 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point	X-Water	Y-Water

No.	(ft)	(ft)
1	0.00	647.20
2	8.90	646.00
3	31.20	642.00
4	36.40	642.00
5	41.40	641.00
6	58.50	637.00
7	58.50	637.00
8	88.70	632.00
9	91.80	632.00
10	106.30	634.00
11	125.90	641.00
12	131.30	642.00
13	153.20	643.00
14	190.40	643.00
15	233.90	647.00
16	276.50	646.90
17	300.00	623.60
18	320.00	623.60
19	360.00	643.60
20	371.40	643.00
21	384.40	644.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	330.00	628.60	226000.0	20.0	35.00	23.0	25.0

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.

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	377.00	643.40	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	286.00	614.00	375.00	619.50	3.00
2	380.00	620.00	490.00	626.00	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 = 659

Number of Trial Surfaces With Valid FS = 341

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 65.9 %

Statistical Data On All Valid FS Values:
FS Max = 223.947 FS Min = 3.668 FS Ave = 17.122
Standard Deviation = 31.020 Coefficient of Variation = 181.17 %

Critical Surface is Sequence Number 34 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	346.57	617.00

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	377.00	619.27

Factor Of Safety For The Critical or Specified Surface = 3.668

Table 1 - Geometry Data on the 29 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.97	1.30	302.44	622.30	623.60	-41.25	0.00	3.96
2	2.97	3.91	305.41	619.69	623.60	-41.25	0.00	3.96
3	2.68	5.68	308.24	617.92	623.60	-18.94	0.00	2.83
4	2.68	6.60	310.92	617.00	623.60	-18.94	0.00	2.83
5	2.52	7.49	313.52	616.11	623.60	-18.94	0.00	2.67
6	2.52	8.36	316.04	615.24	623.60	-18.94	0.00	2.67
7	2.69	8.69	318.65	614.91	623.60	4.27	0.00	2.70

8	5.00	9.65	322.50	615.20	624.85	4.27	26.57	5.01
9	5.00	11.78	327.50	615.57	627.35	4.27	26.57	5.01
10	5.00	13.90	332.50	615.95	629.85	4.27	26.57	5.01
11	5.00	16.03	337.50	616.32	632.35	4.27	26.57	5.01
12	5.00	18.16	342.50	616.69	634.85	4.27	26.57	5.01
13	5.00	20.28	347.50	617.07	637.35	4.27	26.57	5.01
14	5.00	22.41	352.50	617.44	639.85	4.27	26.57	5.01
15	5.00	24.54	357.50	617.81	642.35	4.27	26.57	5.01
16	5.70	25.34	362.85	618.21	643.55	4.27	-1.01	5.72
17	5.70	24.81	368.55	618.64	643.45	4.27	-1.01	5.72
18	2.60	24.45	372.70	618.95	643.40	4.27	0.00	2.61
19	2.60	24.26	375.30	619.14	643.40	4.27	0.00	2.61
20	0.40	24.15	376.80	619.25	643.40	4.27	0.00	0.40
21	3.40	24.14	378.70	619.40	643.54	4.27	4.64	3.41
22	1.47	23.47	381.13	620.27	643.73	45.38	4.64	2.09
23	2.53	21.60	383.13	622.30	643.90	45.38	4.64	3.61
24	3.72	18.53	386.26	625.47	644.00	45.38	0.00	5.30
25	3.87	14.69	390.06	629.31	644.00	45.31	0.00	5.50
26	3.87	10.78	393.92	633.22	644.00	45.31	0.00	5.50
27	3.74	6.81	397.73	637.19	644.00	47.12	0.00	5.50
28	3.74	2.78	401.47	641.22	644.00	47.12	0.00	5.50
29	0.46	0.38	403.57	643.62	644.00	59.16	0.00	0.89

Table 2 - Force Data On The 29 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	465.6	0.0	322.1	0.0	0.0	0.0
2	1396.9	0.0	966.2	0.0	0.0	0.0
3	1826.5	0.0	1004.2	0.0	0.0	0.0
4	2122.4	0.0	1166.9	0.0	0.0	0.0
5	2266.5	0.0	1246.1	0.0	0.0	0.0
6	2528.4	0.0	1390.1	0.0	0.0	0.0
7	2809.5	0.0	1465.0	0.0	0.0	0.0
8	5790.7	0.0	2415.6	0.0	0.0	0.0
9	7066.6	0.0	2947.9	0.0	0.0	0.0
10	8342.5	0.0	3480.1	0.0	0.0	0.0
11	9618.4	0.0	4012.4	0.0	0.0	0.0
12	10894.3	0.0	4544.7	0.0	0.0	0.0
13	12170.3	0.0	5076.9	0.0	0.0	0.0
14	13446.2	0.0	5609.2	0.0	0.0	0.0
15	14722.1	0.0	6141.5	0.0	0.0	0.0
16	17330.7	0.0	8976.5	0.0	0.0	0.0
17	16971.0	0.0	8718.4	0.0	0.0	0.0
18	7628.9	0.0	3906.1	0.0	0.0	0.0
19	7568.3	0.0	3907.1	0.0	0.0	0.0
20	1159.0	0.0	601.2	0.0	0.0	0.0
21	9838.3	0.0	5105.0	0.0	0.0	0.0
22	4137.1	0.0	3046.7	0.0	0.0	0.0
23	6570.3	0.0	4837.0	0.0	0.0	0.0
24	8277.1	0.0	0.0	0.0	0.0	0.0
25	6819.2	0.0	0.0	0.0	0.0	0.0
26	5004.3	0.0	0.0	0.0	0.0	0.0
27	3059.0	0.0	0.0	0.0	0.0	0.0
28	1249.0	0.0	0.0	0.0	0.0	0.0
29	21.0	0.0	0.0	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 191099.93(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 113325.76(lbs)

TOTAL AREA OF SLIDING MASS = 1592.50(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 29 SLICES

Slice	Soil	Cohesion	Phi(Deg)	Options

No.	Type	(psf)	
1	3	400.00	34.00
2	3	400.00	34.00
3	3	400.00	34.00
4	3	400.00	34.00
5	4	0.00	10.00
6	4	0.00	10.00
7	4	0.00	10.00
8	4	0.00	10.00
9	4	0.00	10.00
10	4	0.00	10.00
11	4	0.00	10.00
12	4	0.00	10.00
13	4	0.00	10.00
14	4	0.00	10.00
15	4	0.00	10.00
16	4	0.00	10.00
17	4	0.00	10.00
18	4	0.00	10.00
19	4	0.00	10.00
20	4	0.00	10.00
21	4	0.00	10.00
22	4	0.00	10.00
23	3	400.00	34.00
24	3	400.00	34.00
25	3	400.00	34.00
26	3	400.00	34.00
27	3	400.00	34.00
28	3	400.00	34.00
29	3	400.00	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 29 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-41.25	302.44	3.96	214.31	544.56	149.00
1	-41.25	302.44	3.96	214.31	544.56	149.00
2	-41.25	305.41	3.96	395.89	667.03	182.51
2	-41.25	305.41	3.96	395.89	667.03	182.51
3	-18.94	308.24	2.83	393.61	665.49	182.09
3	-18.94	308.24	2.83	393.61	665.49	182.09
4	-18.94	310.92	2.83	450.44	703.83	192.58
4	-18.94	310.92	2.83	450.44	703.83	192.58
5	-18.94	313.52	2.67	439.22	77.45	21.19
5	-18.94	313.52	2.67	439.22	77.45	21.19
6	-18.94	316.04	2.67	489.97	86.39	23.64
6	-18.94	316.04	2.67	489.97	86.39	23.64
7	4.27	318.65	2.70	498.54	87.91	24.05
7	4.27	318.65	2.70	498.54	87.91	24.05
8	4.27	322.50	5.01	673.76	118.80	32.51
8	4.27	322.50	5.01	673.76	118.80	32.51
9	4.27	327.50	5.01	822.22	144.98	39.67
9	4.27	327.50	5.01	822.22	144.98	39.67
10	4.27	332.50	5.01	970.68	171.16	46.83
10	4.27	332.50	5.01	970.68	171.16	46.83
11	4.27	337.50	5.01	1119.14	197.33	54.00
11	4.27	337.50	5.01	1119.14	197.33	54.00
12	4.27	342.50	5.01	1267.59	223.51	61.16
12	4.27	342.50	5.01	1267.59	223.51	61.16
13	4.27	347.50	5.01	2707.38	477.38	130.62
13	4.27	347.50	5.01	2707.38	477.38	130.62
14	4.27	352.50	5.01	1564.51	275.87	75.48

14	4.27	352.50	5.01	1564.51	275.87	75.48
15	4.27	357.50	5.01	1712.97	302.04	82.65
15	4.27	357.50	5.01	1712.97	302.04	82.65
16	4.27	362.85	5.72	1464.39	258.21	70.65
16	4.27	362.85	5.72	1464.39	258.21	70.65
17	4.27	368.55	5.72	1446.53	255.06	69.79
17	4.27	368.55	5.72	1446.53	255.06	69.79
18	4.27	372.70	2.61	1430.50	252.24	69.02
18	4.27	372.70	2.61	1430.50	252.24	69.02
19	4.27	375.30	2.61	1406.93	248.08	67.88
19	4.27	375.30	2.61	1406.93	248.08	67.88
20	4.27	376.80	0.40	1393.33	245.68	67.22
20	4.27	376.80	0.40	1393.33	245.68	67.22
21	4.27	378.70	3.41	1392.58	245.55	67.19
21	4.27	378.70	3.41	1392.58	245.55	67.19
22	45.38	381.13	2.09	1292.18	227.85	62.34
22	45.38	381.13	2.09	1292.18	227.85	62.34
23	45.38	383.13	3.61	945.34	1037.64	283.92
23	45.38	383.13	3.61	945.34	1037.64	283.92
24	45.38	386.26	5.30	1755.98	1584.43	433.53
24	45.38	386.26	5.30	1755.98	1584.43	433.53
25	45.31	390.06	5.50	1372.47	1325.74	362.75
25	45.31	390.06	5.50	1372.47	1325.74	362.75
26	45.31	393.92	5.50	981.03	1061.71	290.51
26	45.31	393.92	5.50	981.03	1061.71	290.51
27	47.12	397.73	5.50	570.99	785.14	214.83
27	47.12	397.73	5.50	570.99	785.14	214.83
28	47.12	401.47	5.50	171.84	515.91	141.16
28	47.12	401.47	5.50	171.84	515.91	141.16
29	59.16	403.57	0.89	34.57	23.32	6.38
29	59.16	403.57	0.89	34.57	23.32	6.38

Table 4 - Base Force Data on the 29 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-41.25	302.44	3.96	847.94	2154.56	589.54
1	-41.25	302.44	3.96	847.94	2154.56	589.54
2	-41.25	305.41	3.96	1566.36	2639.14	722.13
2	-41.25	305.41	3.96	1566.36	2639.14	722.13
3	-18.94	308.24	2.83	1115.55	1886.11	516.08
3	-18.94	308.24	2.83	1115.55	1886.11	516.08
4	-18.94	310.92	2.83	1276.63	1994.76	545.81
4	-18.94	310.92	2.83	1276.63	1994.76	545.81
5	-18.94	313.52	2.67	1170.90	206.46	56.49
5	-18.94	313.52	2.67	1170.90	206.46	56.49
6	-18.94	316.04	2.67	1306.18	230.32	63.02
6	-18.94	316.04	2.67	1306.18	230.32	63.02
7	4.27	318.65	2.70	1347.14	237.54	65.00
7	4.27	318.65	2.70	1347.14	237.54	65.00
8	4.27	322.50	5.01	3378.20	595.67	162.99
8	4.27	322.50	5.01	3378.20	595.67	162.99
9	4.27	327.50	5.01	4122.56	726.92	198.90
9	4.27	327.50	5.01	4122.56	726.92	198.90
10	4.27	332.50	5.01	4866.92	858.17	234.81
10	4.27	332.50	5.01	4866.92	858.17	234.81
11	4.27	337.50	5.01	5611.27	989.42	270.73
11	4.27	337.50	5.01	5611.27	989.42	270.73
12	4.27	342.50	5.01	6355.63	1120.67	306.64
12	4.27	342.50	5.01	6355.63	1120.67	306.64
13	4.27	347.50	5.01	13574.60	2393.57	654.93
13	4.27	347.50	5.01	13574.60	2393.57	654.93
14	4.27	352.50	5.01	7844.34	1383.17	378.47
14	4.27	352.50	5.01	7844.34	1383.17	378.47
15	4.27	357.50	5.01	8588.69	1514.42	414.38
15	4.27	357.50	5.01	8588.69	1514.42	414.38
16	4.27	362.85	5.72	8370.30	1475.91	403.84
16	4.27	362.85	5.72	8370.30	1475.91	403.84

17	4.27	368.55	5.72	8268.21	1457.91	398.92
17	4.27	368.55	5.72	8268.21	1457.91	398.92
18	4.27	372.70	2.61	3729.66	657.64	179.95
18	4.27	372.70	2.61	3729.66	657.64	179.95
19	4.27	375.30	2.61	3668.20	646.80	176.98
19	4.27	375.30	2.61	3668.20	646.80	176.98
20	4.27	376.80	0.40	558.88	98.55	26.96
20	4.27	376.80	0.40	558.88	98.55	26.96
21	4.27	378.70	3.41	4742.53	836.24	228.81
21	4.27	378.70	3.41	4742.53	836.24	228.81
22	45.38	381.13	2.09	2702.89	476.59	130.41
22	45.38	381.13	2.09	2702.89	476.59	130.41
23	45.38	383.13	3.61	3411.78	3744.88	1024.69
23	45.38	383.13	3.61	3411.78	3744.88	1024.69
24	45.38	386.26	5.30	9305.38	8396.26	2297.41
24	45.38	386.26	5.30	9305.38	8396.26	2297.41
25	45.31	390.06	5.50	7548.58	7291.58	1995.14
25	45.31	390.06	5.50	7548.58	7291.58	1995.14
26	45.31	393.92	5.50	5395.68	5839.43	1597.80
26	45.31	393.92	5.50	5395.68	5839.43	1597.80
27	47.12	397.73	5.50	3140.45	4318.26	1181.57
27	47.12	397.73	5.50	3140.45	4318.26	1181.57
28	47.12	401.47	5.50	945.14	2837.50	776.41
28	47.12	401.47	5.50	945.14	2837.50	776.41
29	59.16	403.57	0.89	30.84	20.80	5.69
29	59.16	403.57	0.89	30.84	20.80	5.69

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 29 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
13	9256.4	6481.4	11300.0	35.00	0.666341E+04

***Pier/Pile Slice Force Data on the 29 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
20	12000.0	0.0	12000.0	90.00	-0.179265E+03

Sum of the Resisting Forces = 45615.29 (lbs)

Average Available Shear Strength = 392.99(psf)

Sum of the Driving Forces = 13288.81 (lbs)

Average Mobilized Shear Stress = 114.49(psf)

Total length of the failure surface = 116.07(ft)

Factor of Safety Balance Check: FS = 3.43261

Janbu's Correction Factor (fo) = 1.0686

Janub's FS Corrected = 3.66803

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

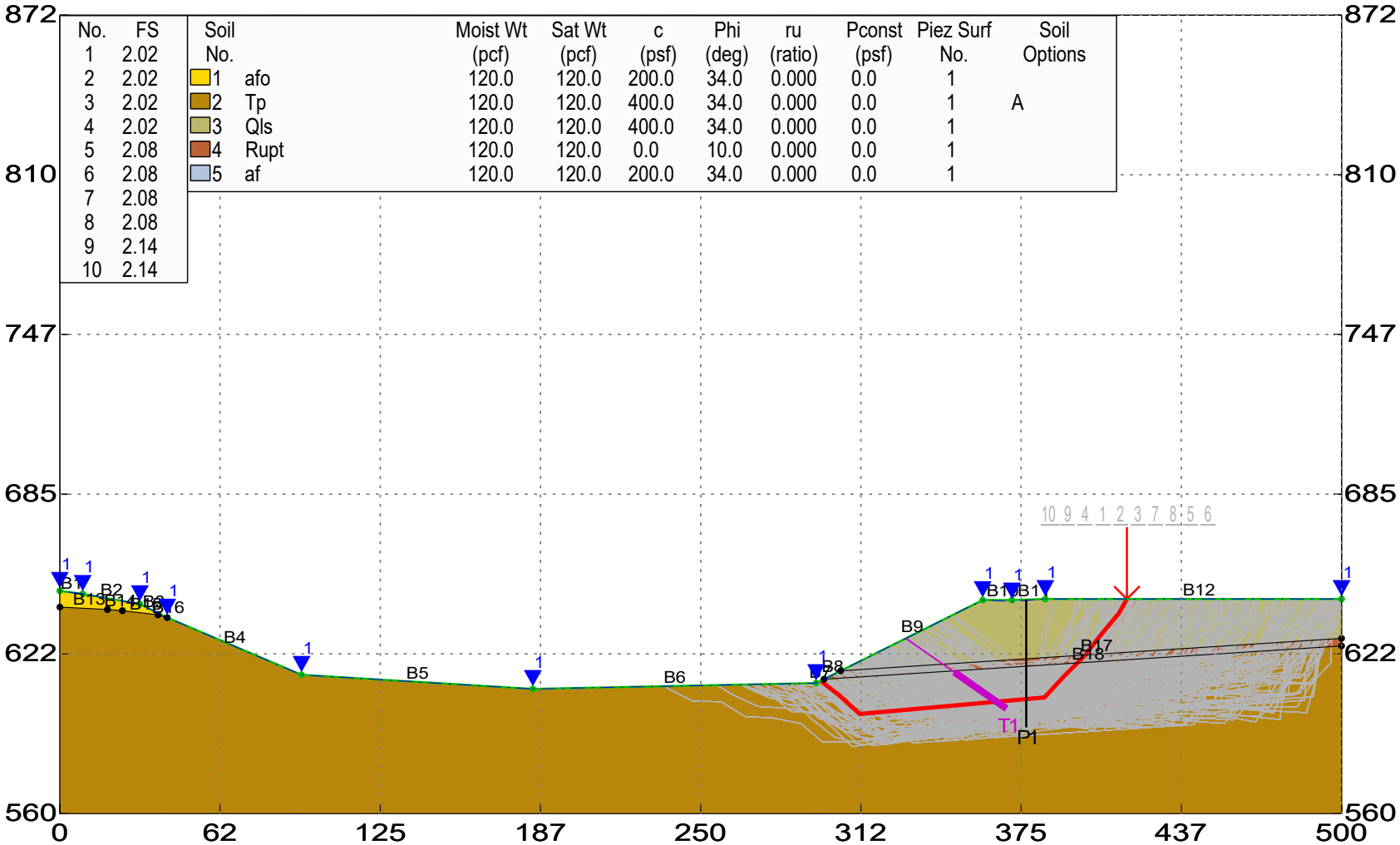
Royal Vista - Cross Section 9
Stage 5 (Temporary Backcut - Along Bedding)

LGC Geotechnical / BPP

\Sec 9 - Stage 5 (Temporary Backcut - Along Bedding).gsd

No.	FS
1	2.02
2	2.02
3	2.02
4	2.02
5	2.08
6	2.08
7	2.08
8	2.08
9	2.14
10	2.14

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 2.02

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 5 (Temporary Backcut - Along Bedding).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 5 (Temporary Backcut - Along Bedding).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 9

DESCRIPTION: Stage 5 (Temporary Backcut - Along Bedding)

BOUNDARY DATA

12 Surface Boundaries
18 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.200	8.900	646.000	1
2	8.900	646.000	31.200	642.000	1
3	31.200	642.000	41.900	636.700	1
4	41.900	636.700	94.300	614.300	2
5	94.300	614.300	184.500	608.800	2
6	184.500	608.800	295.000	611.100	2
7	295.000	611.100	298.100	612.600	2
8	298.100	612.600	304.600	615.900	4
9	304.600	615.900	360.000	643.600	3
10	360.000	643.600	371.400	643.600	3
11	371.400	643.600	384.400	644.000	3
12	384.400	644.000	500.000	644.000	3
13	0.000	640.800	18.600	639.900	2
14	18.600	639.900	24.400	639.400	2
15	24.400	639.400	38.300	637.800	2
16	38.300	637.800	41.900	636.700	2
17	304.600	615.900	500.000	628.600	4
18	298.100	612.600	500.000	625.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 11 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	647.20
2	8.90	646.00
3	31.20	642.00
4	41.90	636.70
5	94.30	614.30
6	184.50	608.80
7	295.00	611.10
8	360.00	643.60
9	371.40	643.00
10	384.40	644.00
11	500.00	644.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	330.00	628.60	226000.0	20.0	35.00	23.0	25.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	377.00	643.77	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	305.00	600.50	375.00	605.00	30.00
2	380.00	606.00	490.00	612.00	30.00

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 = 825.953 FS Min = 2.021 FS Ave = 18.665
Standard Deviation = 70.980 Coefficient of Variation = 380.28 %

Critical Surface is Sequence Number 145 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	342.17	620.08

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	377.00	604.84

Factor Of Safety For The Critical or Specified Surface = 2.021

Table 1 - Geometry Data on the 33 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	1.34	0.84	297.43	611.43	612.28	-37.75	25.82	1.69
2	2.90	3.55	299.55	609.79	613.34	-37.75	26.92	3.67
3	2.90	7.27	302.46	607.54	614.81	-37.75	26.92	3.67
4	0.69	9.62	304.25	606.10	615.72	-42.49	26.92	0.94
5	3.71	12.74	306.45	604.08	616.83	-42.49	26.57	5.03
6	3.71	18.00	310.16	600.69	618.68	-42.49	26.57	5.03
7	4.80	21.61	314.42	599.20	620.81	5.14	26.57	4.82
8	4.80	23.57	319.22	599.63	623.21	5.14	26.57	4.82
9	4.80	25.54	324.01	600.07	625.61	5.14	26.57	4.82
10	4.80	27.51	328.81	600.50	628.01	5.14	26.57	4.82
11	4.80	29.48	333.61	600.93	630.41	5.14	26.57	4.82
12	4.80	31.44	338.41	601.36	632.80	5.14	26.57	4.82
13	4.80	33.41	343.21	601.79	635.20	5.14	26.57	4.82
14	4.80	35.38	348.00	602.23	637.60	5.14	26.57	4.82
15	4.80	37.34	352.80	602.66	640.00	5.14	26.57	4.82
16	4.80	39.31	357.60	603.09	642.40	5.14	26.57	4.82
17	5.70	40.04	362.85	603.56	643.60	5.14	0.00	5.72
18	5.70	39.53	368.55	604.07	643.60	5.14	0.00	5.72
19	4.23	39.14	373.52	604.52	643.67	5.14	1.76	4.25
20	4.23	38.89	377.75	604.90	643.80	5.14	1.76	4.25
21	4.23	38.64	381.99	605.28	643.93	5.14	1.76	4.25
22	0.30	38.36	384.25	605.64	644.00	47.42	1.76	0.44
23	3.57	36.26	386.19	607.74	644.00	47.42	0.00	5.28
24	3.57	32.37	389.76	611.63	644.00	47.42	0.00	5.28
25	2.69	29.08	392.89	614.92	644.00	45.09	0.00	3.80
26	2.69	26.38	395.57	617.62	644.00	45.09	0.00	3.80
27	2.39	23.84	398.11	620.16	644.00	45.09	0.00	3.39
28	0.58	22.27	399.60	621.73	644.00	51.69	0.00	0.93
29	3.12	19.93	401.45	624.07	644.00	51.69	0.00	5.04
30	3.12	15.98	404.57	628.02	644.00	51.69	0.00	5.04
31	3.52	11.89	407.89	632.11	644.00	50.20	0.00	5.50
32	3.52	7.67	411.41	636.33	644.00	50.20	0.00	5.50
33	3.07	2.78	414.70	641.22	644.00	61.10	0.00	6.34

Table 2 - Force Data On The 33 Slices (Excluding Reinforcement)

Ubeta Force	Ualpha Force	Earthquake Force	Distributed

Slice No.	Weight (lbs)	Top (lbs)	Bot (lbs)	Hor (lbs)	Ver (lbs)	Load (lbs)
1	135.4	0.0	74.6	0.0	0.0	0.0
2	1236.1	0.0	657.5	0.0	0.0	0.0
3	2533.9	0.0	1336.2	0.0	0.0	0.0
4	798.4	0.0	450.5	0.0	0.0	0.0
5	5672.9	0.0	3200.5	0.0	0.0	0.0
6	8011.7	0.0	4520.0	0.0	0.0	0.0
7	12440.5	0.0	5196.2	0.0	0.0	0.0
8	13573.1	0.0	5669.2	0.0	0.0	0.0
9	14705.7	0.0	6142.3	0.0	0.0	0.0
10	15838.3	0.0	6615.4	0.0	0.0	0.0
11	16970.9	0.0	7088.4	0.0	0.0	0.0
12	18103.5	0.0	7561.5	0.0	0.0	0.0
13	19236.1	0.0	8034.6	0.0	0.0	0.0
14	20368.7	0.0	8507.6	0.0	0.0	0.0
15	21501.3	0.0	8980.7	0.0	0.0	0.0
16	22633.9	0.0	9453.8	0.0	0.0	0.0
17	27386.1	0.0	14205.4	0.0	0.0	0.0
18	27035.1	0.0	13915.8	0.0	0.0	0.0
19	19888.1	0.0	10190.1	0.0	0.0	0.0
20	19760.6	0.0	10175.5	0.0	0.0	0.0
21	19633.2	0.0	10160.8	0.0	0.0	0.0
22	1370.9	0.0	1047.2	0.0	0.0	0.0
23	15543.6	0.0	11945.5	0.0	0.0	0.0
24	13876.9	0.0	10664.7	0.0	0.0	0.0
25	9372.8	0.0	6903.0	0.0	0.0	0.0
26	8504.4	0.0	6263.5	0.0	0.0	0.0
27	6848.9	0.0	5044.2	0.0	0.0	0.0
28	1538.9	0.0	1291.0	0.0	0.0	0.0
29	7465.4	0.0	6262.7	0.0	0.0	0.0
30	5985.4	0.0	5021.1	0.0	0.0	0.0
31	5023.4	0.0	4081.0	0.0	0.0	0.0
32	3238.2	0.0	2630.8	0.0	0.0	0.0
33	1021.3	0.0	1098.8	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 387253.34(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 206740.37(lbs)

TOTAL AREA OF SLIDING MASS = 3227.11(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 33 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	2	400.00	34.00	A
2	2	400.00	34.00	A
3	2	400.00	34.00	A
4	2	400.00	34.00	A
5	2	400.00	34.00	A
6	2	400.00	34.00	A
7	2	300.00	12.00	A
8	2	300.00	12.00	A
9	2	300.00	12.00	A
10	2	300.00	12.00	A
11	2	300.00	12.00	A
12	2	300.00	12.00	A
13	2	300.00	12.00	A
14	2	300.00	12.00	A
15	2	300.00	12.00	A
16	2	300.00	12.00	A
17	2	300.00	12.00	A
18	2	300.00	12.00	A
19	2	300.00	12.00	A
20	2	300.00	12.00	A
21	2	300.00	12.00	A
22	2	400.00	34.00	A
23	2	400.00	34.00	A
24	2	400.00	34.00	A

25	2	400.00	34.00	A
26	2	400.00	34.00	A
27	4	0.00	10.00	
28	4	0.00	10.00	
29	3	400.00	34.00	
30	3	400.00	34.00	
31	3	400.00	34.00	
32	3	400.00	34.00	
33	3	400.00	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 33 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-37.75	297.43	1.69	307.76	607.59	297.24
1	-37.75	297.43	1.69	307.76	607.59	297.24
2	-37.75	299.55	3.67	570.37	784.72	383.90
2	-37.75	299.55	3.67	570.37	784.72	383.90
3	-37.75	302.46	3.67	933.47	1029.63	503.71
3	-37.75	302.46	3.67	933.47	1029.63	503.71
4	-42.49	304.25	0.94	1296.39	1274.42	623.46
4	-42.49	304.25	0.94	1296.39	1274.42	623.46
5	-42.49	306.45	5.03	1622.44	1494.35	731.05
5	-42.49	306.45	5.03	1622.44	1494.35	731.05
6	-42.49	310.16	5.03	2171.32	1864.57	912.17
6	-42.49	310.16	5.03	2171.32	1864.57	912.17
7	5.14	314.42	4.82	1484.69	615.58	301.15
7	5.14	314.42	4.82	1484.69	615.58	301.15
8	5.14	319.22	4.82	1621.15	644.59	315.34
8	5.14	319.22	4.82	1621.15	644.59	315.34
9	5.14	324.01	4.82	1757.62	673.59	329.53
9	5.14	324.01	4.82	1757.62	673.59	329.53
10	5.14	328.81	4.82	1894.08	702.60	343.72
10	5.14	328.81	4.82	1894.08	702.60	343.72
11	5.14	333.61	4.82	2030.55	731.61	357.91
11	5.14	333.61	4.82	2030.55	731.61	357.91
12	5.14	338.41	4.82	2167.01	760.61	372.10
12	5.14	338.41	4.82	2167.01	760.61	372.10
13	5.14	343.21	4.82	3640.70	1073.85	525.34
13	5.14	343.21	4.82	3640.70	1073.85	525.34
14	5.14	348.00	4.82	2439.95	818.63	400.48
14	5.14	348.00	4.82	2439.95	818.63	400.48
15	5.14	352.80	4.82	2576.41	847.63	414.67
15	5.14	352.80	4.82	2576.41	847.63	414.67
16	5.14	357.60	4.82	2712.88	876.64	428.86
16	5.14	357.60	4.82	2712.88	876.64	428.86
17	5.14	362.85	5.72	2284.75	785.64	384.34
17	5.14	362.85	5.72	2284.75	785.64	384.34
18	5.14	368.55	5.72	2273.89	783.33	383.22
18	5.14	368.55	5.72	2273.89	783.33	383.22
19	5.14	373.52	4.25	2262.71	780.95	382.05
19	5.14	373.52	4.25	2262.71	780.95	382.05
20	5.14	377.75	4.25	2236.32	775.34	379.31
20	5.14	377.75	4.25	2236.32	775.34	379.31
21	5.14	381.99	4.25	2209.93	769.73	376.56
21	5.14	381.99	4.25	2209.93	769.73	376.56
22	47.42	384.25	0.44	1431.99	1365.89	668.21
22	47.42	384.25	0.44	1431.99	1365.89	668.21
23	47.42	386.19	5.28	1334.55	1300.17	636.06
23	47.42	386.19	5.28	1334.55	1300.17	636.06
24	47.42	389.76	5.28	1173.57	1191.59	582.94
24	47.42	389.76	5.28	1173.57	1191.59	582.94

25	45.09	392.89	3.80	1074.02	1124.43	550.09
25	45.09	392.89	3.80	1074.02	1124.43	550.09
26	45.09	395.57	3.80	959.95	1047.50	512.45
26	45.09	395.57	3.80	959.95	1047.50	512.45
27	45.09	398.11	3.39	1254.75	221.25	108.24
27	45.09	398.11	3.39	1254.75	221.25	108.24
28	51.69	399.60	0.93	1146.47	202.15	98.90
28	51.69	399.60	0.93	1146.47	202.15	98.90
29	51.69	401.45	5.04	603.61	807.14	394.86
29	51.69	401.45	5.04	603.61	807.14	394.86
30	51.69	404.57	5.04	447.18	701.63	343.24
30	51.69	404.57	5.04	447.18	701.63	343.24
31	50.20	407.89	5.50	299.78	602.20	294.61
31	50.20	407.89	5.50	299.78	602.20	294.61
32	50.20	411.41	5.50	129.73	487.51	238.49
32	50.20	411.41	5.50	129.73	487.51	238.49
33	61.10	414.70	6.34	96.86	65.33	31.96
33	61.10	414.70	6.34	96.86	65.33	31.96

Table 4 - Base Force Data on the 33 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-37.75	297.43	1.69	521.31	1029.18	503.49
1	-37.75	297.43	1.69	521.31	1029.18	503.49
2	-37.75	299.55	3.67	2095.13	2882.49	1410.15
2	-37.75	299.55	3.67	2095.13	2882.49	1410.15
3	-37.75	302.46	3.67	3428.88	3782.12	1850.26
3	-37.75	302.46	3.67	3428.88	3782.12	1850.26
4	-42.49	304.25	0.94	1215.38	1194.79	584.50
4	-42.49	304.25	0.94	1215.38	1194.79	584.50
5	-42.49	306.45	5.03	8162.90	7518.44	3678.12
5	-42.49	306.45	5.03	8162.90	7518.44	3678.12
6	-42.49	310.16	5.03	10924.44	9381.12	4589.36
6	-42.49	310.16	5.03	10924.44	9381.12	4589.36
7	5.14	314.42	4.82	7152.37	2965.51	1450.77
7	5.14	314.42	4.82	7152.37	2965.51	1450.77
8	5.14	319.22	4.82	7809.79	3105.25	1519.13
8	5.14	319.22	4.82	7809.79	3105.25	1519.13
9	5.14	324.01	4.82	8467.20	3244.99	1587.49
9	5.14	324.01	4.82	8467.20	3244.99	1587.49
10	5.14	328.81	4.82	9124.62	3384.73	1655.85
10	5.14	328.81	4.82	9124.62	3384.73	1655.85
11	5.14	333.61	4.82	9782.03	3524.46	1724.21
11	5.14	333.61	4.82	9782.03	3524.46	1724.21
12	5.14	338.41	4.82	10439.44	3664.20	1792.57
12	5.14	338.41	4.82	10439.44	3664.20	1792.57
13	5.14	343.21	4.82	17538.81	5173.22	2530.80
13	5.14	343.21	4.82	17538.81	5173.22	2530.80
14	5.14	348.00	4.82	11754.27	3943.68	1929.30
14	5.14	348.00	4.82	11754.27	3943.68	1929.30
15	5.14	352.80	4.82	12411.69	4083.42	1997.66
15	5.14	352.80	4.82	12411.69	4083.42	1997.66
16	5.14	357.60	4.82	13069.10	4223.15	2066.02
16	5.14	357.60	4.82	13069.10	4223.15	2066.02
17	5.14	362.85	5.72	13075.74	4496.25	2199.62
17	5.14	362.85	5.72	13075.74	4496.25	2199.62
18	5.14	368.55	5.72	13013.57	4483.03	2193.16
18	5.14	368.55	5.72	13013.57	4483.03	2193.16
19	5.14	373.52	4.25	9619.19	3319.98	1624.17
19	5.14	373.52	4.25	9619.19	3319.98	1624.17
20	5.14	377.75	4.25	9506.99	3296.13	1612.51
20	5.14	377.75	4.25	9506.99	3296.13	1612.51
21	5.14	381.99	4.25	9394.78	3272.28	1600.84
21	5.14	381.99	4.25	9394.78	3272.28	1600.84
22	47.42	384.25	0.44	630.31	601.22	294.12
22	47.42	384.25	0.44	630.31	601.22	294.12
23	47.42	386.19	5.28	7046.32	6864.77	3358.33

23	47.42	386.19	5.28	7046.32	6864.77	3358.33
24	47.42	389.76	5.28	6196.37	6291.47	3077.87
24	47.42	389.76	5.28	6196.37	6291.47	3077.87
25	45.09	392.89	3.80	4085.96	4277.76	2092.73
25	45.09	392.89	3.80	4085.96	4277.76	2092.73
26	45.09	395.57	3.80	3652.01	3985.06	1949.54
26	45.09	395.57	3.80	3652.01	3985.06	1949.54
27	45.09	398.11	3.39	4255.19	750.31	367.06
27	45.09	398.11	3.39	4255.19	750.31	367.06
28	51.69	399.60	0.93	1065.01	187.79	91.87
28	51.69	399.60	0.93	1065.01	187.79	91.87
29	51.69	401.45	5.04	3039.51	4064.39	1988.35
29	51.69	401.45	5.04	3039.51	4064.39	1988.35
30	51.69	404.57	5.04	2251.79	3533.06	1728.42
30	51.69	404.57	5.04	2251.79	3533.06	1728.42
31	50.20	407.89	5.50	1648.79	3312.12	1620.33
31	50.20	407.89	5.50	1648.79	3312.12	1620.33
32	50.20	411.41	5.50	713.54	2681.29	1311.72
32	50.20	411.41	5.50	713.54	2681.29	1311.72
33	61.10	414.70	6.34	614.35	414.38	202.72
33	61.10	414.70	6.34	614.35	414.38	202.72

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 33 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)

***Pier/Pile Slice Force Data on the 33 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
20	12000.0	0.0	12000.0	90.00	0.811284E+03

Sum of the Resisting Forces = 99913.99 (lbs)

Average Available Shear Strength = 699.89(psf)

Sum of the Driving Forces = 53254.90 (lbs)

Average Mobilized Shear Stress = 373.05(psf)

Total length of the failure surface = 142.76(ft)

Factor of Safety Balance Check: FS = 1.87615

Janbu's Correction Factor (fo) = 1.0770

Janub's FS Corrected = 2.02065

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

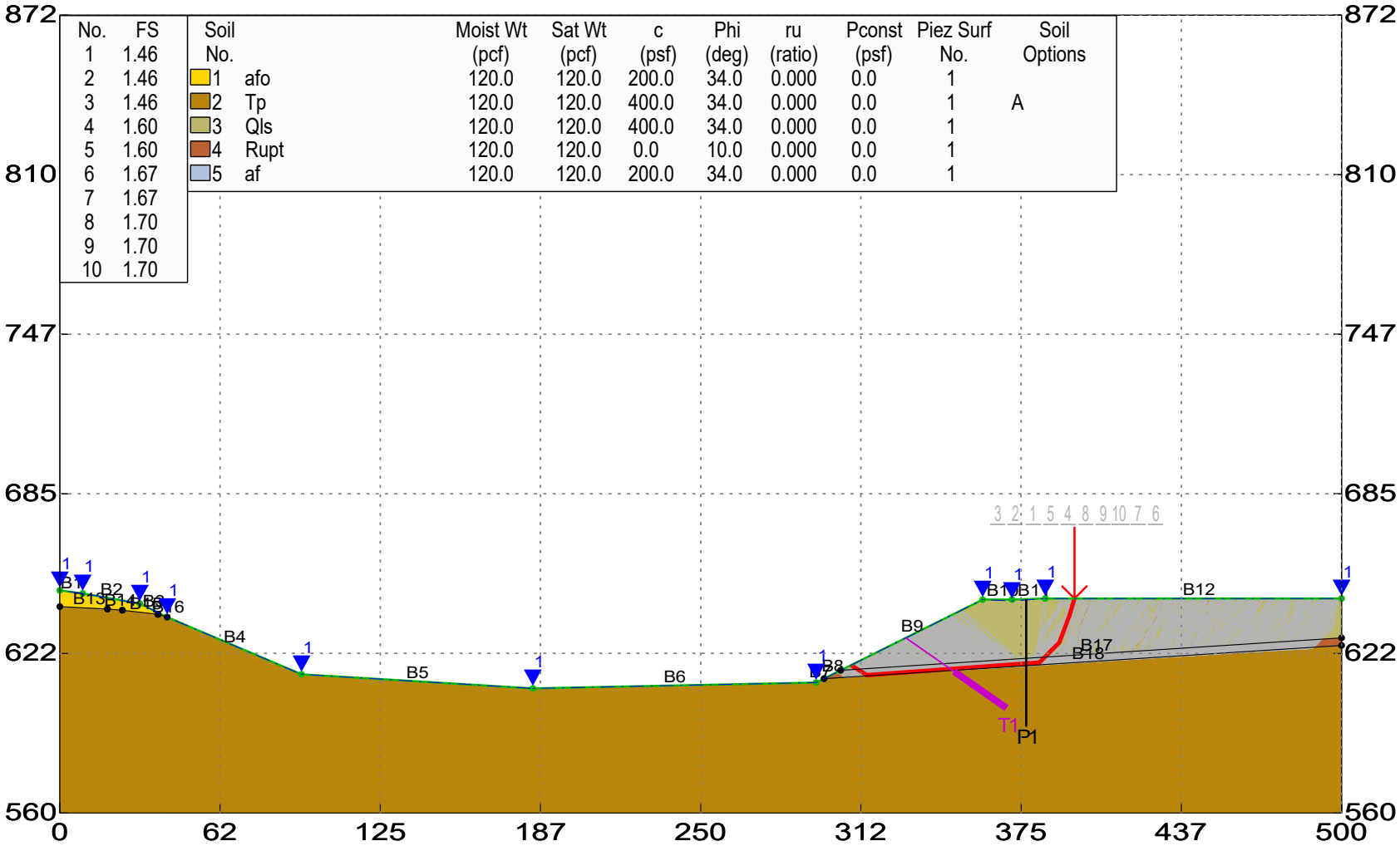
Royal Vista - Cross Section 9
Stage 5 (Temporary Backcut - Rupture)

LGC Geotechnical / BPP

\Sec 9 - Stage 5 (Temporary Backcut).gsd

No.	FS
1	1.46
2	1.46
3	1.46
4	1.60
5	1.60
6	1.67
7	1.67
8	1.70
9	1.70
10	1.70

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.46

Simplified Janbu (Corrected) Method

GEOSTASE
Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 5 (Temporary Backcut).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 5 (Temporary Backcut).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 9

DESCRIPTION: Stage 5 (Temporary Backcut - Rupture)

BOUNDARY DATA

12 Surface Boundaries
18 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	647.200	8.900	646.000	1
2	8.900	646.000	31.200	642.000	1
3	31.200	642.000	41.900	636.700	1
4	41.900	636.700	94.300	614.300	2
5	94.300	614.300	184.500	608.800	2
6	184.500	608.800	295.000	611.100	2
7	295.000	611.100	298.100	612.600	2
8	298.100	612.600	304.600	615.900	4
9	304.600	615.900	360.000	643.600	3
10	360.000	643.600	371.400	643.600	3
11	371.400	643.600	384.400	644.000	3
12	384.400	644.000	500.000	644.000	3
13	0.000	640.800	18.600	639.900	2
14	18.600	639.900	24.400	639.400	2
15	24.400	639.400	38.300	637.800	2
16	38.300	637.800	41.900	636.700	2
17	304.600	615.900	500.000	628.600	4
18	298.100	612.600	500.000	625.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface No.	Water Option
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1	0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1	0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1	0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1	0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 11 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	647.20
2	8.90	646.00
3	31.20	642.00
4	41.90	636.70
5	94.30	614.30
6	184.50	608.80
7	295.00	611.10
8	360.00	643.60
9	371.40	643.00
10	384.40	644.00
11	500.00	644.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	330.00	628.60	226000.0	20.0	35.00	23.0	25.0

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.

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	377.00	643.77	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	305.00	614.50	375.00	619.00	3.00
2	380.00	620.00	490.00	626.00	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 = 330

Number of Trial Surfaces With Valid FS = 670

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 33.0 %

Statistical Data On All Valid FS Values:

FS Max = 542.582 FS Min = 1.458 FS Ave = 9.815
Standard Deviation = 38.946 Coefficient of Variation = 396.82 %

Critical Surface is Sequence Number 104 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	347.44	616.39

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	377.00	618.57

Factor Of Safety For The Critical or Specified Surface = 1.458

Table 1 - Geometry Data on the 21 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.47	1.41	309.87	617.12	618.53	-32.79	26.57	2.94
2	3.63	4.91	312.92	615.15	620.06	-32.79	26.57	4.32
3	5.03	8.06	317.25	614.17	622.23	4.21	26.57	5.04
4	5.03	10.20	322.28	614.54	624.74	4.21	26.57	5.04
5	5.03	12.35	327.31	614.91	627.26	4.21	26.57	5.04
6	5.03	14.49	332.34	615.28	629.77	4.21	26.57	5.04
7	5.03	16.63	337.37	615.65	632.28	4.21	26.57	5.04
8	5.03	18.78	342.40	616.02	634.80	4.21	26.57	5.04
9	5.03	20.92	347.43	616.39	637.31	4.21	26.57	5.04
10	5.03	23.07	352.46	616.76	639.83	4.21	26.57	5.04
11	5.03	25.21	357.49	617.13	642.34	4.21	26.57	5.04
12	5.70	26.07	362.85	617.53	643.60	4.21	0.00	5.72
13	5.70	25.65	368.55	617.95	643.60	4.21	0.00	5.72
14	5.37	25.33	374.09	618.35	643.68	4.21	1.76	5.39
15	5.37	25.10	379.46	618.75	643.85	4.21	1.76	5.39
16	2.12	23.95	383.20	620.01	643.96	45.12	1.76	3.00
17	0.14	22.85	384.33	621.15	644.00	45.12	1.76	0.20
18	2.75	21.40	385.78	622.60	644.00	45.12	0.00	3.90
19	2.75	18.64	388.53	625.36	644.00	45.12	0.00	3.90
20	3.86	12.11	391.83	631.89	644.00	69.46	0.00	11.00
21	2.04	3.48	394.78	640.52	644.00	73.69	0.00	7.25

Table 2 - Force Data On The 21 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	419.8	0.0	207.7	0.0	0.0	0.0
2	2139.5	0.0	1058.7	0.0	0.0	0.0
3	4863.1	0.0	2028.5	0.0	0.0	0.0
4	6157.1	0.0	2568.3	0.0	0.0	0.0
5	7451.1	0.0	3108.0	0.0	0.0	0.0
6	8745.0	0.0	3647.8	0.0	0.0	0.0
7	10039.0	0.0	4187.5	0.0	0.0	0.0
8	11333.0	0.0	4727.3	0.0	0.0	0.0
9	12627.0	0.0	5267.0	0.0	0.0	0.0

10	13920.9	0.0	5806.8	0.0	0.0	0.0
11	15214.9	0.0	6346.6	0.0	0.0	0.0
12	17833.8	0.0	9219.7	0.0	0.0	0.0
13	17546.6	0.0	8963.6	0.0	0.0	0.0
14	16323.8	0.0	8302.3	0.0	0.0	0.0
15	16175.3	0.0	8308.1	0.0	0.0	0.0
16	6094.0	0.0	4454.1	0.0	0.0	0.0
17	378.2	0.0	277.0	0.0	0.0	0.0
18	7067.5	0.0	5208.2	0.0	0.0	0.0
19	6155.0	0.0	4535.8	0.0	0.0	0.0
20	5607.5	0.0	8310.2	0.0	0.0	0.0
21	849.9	0.0	1573.3	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 186941.89(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 100019.56(lbs)

TOTAL AREA OF SLIDING MASS = 1557.85(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 21 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	3	400.00	34.00	
2	4	0.00	10.00	
3	4	0.00	10.00	
4	4	0.00	10.00	
5	4	0.00	10.00	
6	4	0.00	10.00	
7	4	0.00	10.00	
8	4	0.00	10.00	
9	4	0.00	10.00	
10	4	0.00	10.00	
11	4	0.00	10.00	
12	4	0.00	10.00	
13	4	0.00	10.00	
14	4	0.00	10.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	3	400.00	34.00	
18	3	400.00	34.00	
19	3	400.00	34.00	
20	3	400.00	34.00	
21	3	400.00	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 21 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-32.79	309.87	2.94	425.51	687.01	477.10
1	-32.79	309.87	2.94	425.51	687.01	477.10
2	-32.79	312.92	4.32	375.37	66.19	45.96
2	-32.79	312.92	4.32	375.37	66.19	45.96
3	4.21	317.25	5.04	559.35	98.63	68.49
3	4.21	317.25	5.04	559.35	98.63	68.49
4	4.21	322.28	5.04	708.18	124.87	86.72
4	4.21	322.28	5.04	708.18	124.87	86.72
5	4.21	327.31	5.04	857.01	151.11	104.94
5	4.21	327.31	5.04	857.01	151.11	104.94
6	4.21	332.34	5.04	1005.85	177.36	123.17
6	4.21	332.34	5.04	1005.85	177.36	123.17

7	4.21	337.37	5.04	1154.68	203.60	141.39
7	4.21	337.37	5.04	1154.68	203.60	141.39
8	4.21	342.40	5.04	1303.51	229.84	159.62
8	4.21	342.40	5.04	1303.51	229.84	159.62
9	4.21	347.43	5.04	2728.86	481.17	334.15
9	4.21	347.43	5.04	2728.86	481.17	334.15
10	4.21	352.46	5.04	1601.17	282.33	196.07
10	4.21	352.46	5.04	1601.17	282.33	196.07
11	4.21	357.49	5.04	1750.01	308.57	214.29
11	4.21	357.49	5.04	1750.01	308.57	214.29
12	4.21	362.85	5.72	1501.24	264.71	183.83
12	4.21	362.85	5.72	1501.24	264.71	183.83
13	4.21	368.55	5.72	1495.70	263.73	183.15
13	4.21	368.55	5.72	1495.70	263.73	183.15
14	4.21	374.09	5.39	1483.49	261.58	181.66
14	4.21	374.09	5.39	1483.49	261.58	181.66
15	4.21	379.46	5.39	1455.03	256.56	178.17
15	4.21	379.46	5.39	1455.03	256.56	178.17
16	45.12	383.20	3.00	1231.00	217.06	150.74
16	45.12	383.20	3.00	1231.00	217.06	150.74
17	45.12	384.33	0.20	685.94	862.67	599.09
17	45.12	384.33	0.20	685.94	862.67	599.09
18	45.12	385.78	3.90	624.56	821.27	570.34
18	45.12	385.78	3.90	624.56	821.27	570.34
19	45.12	388.53	3.90	518.42	749.68	520.62
19	45.12	388.53	3.90	518.42	749.68	520.62
20	69.46	391.83	11.00	299.61	202.09	140.34
20	69.46	391.83	11.00	299.61	202.09	140.34
21	73.69	394.78	7.25	74.22	50.06	34.76
21	73.69	394.78	7.25	74.22	50.06	34.76

Table 4 - Base Force Data on the 21 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-32.79	309.87	2.94	1251.59	2020.76	1403.34
1	-32.79	309.87	2.94	1251.59	2020.76	1403.34
2	-32.79	312.92	4.32	1622.18	286.03	198.64
2	-32.79	312.92	4.32	1622.18	286.03	198.64
3	4.21	317.25	5.04	2820.72	497.37	345.40
3	4.21	317.25	5.04	2820.72	497.37	345.40
4	4.21	322.28	5.04	3571.26	629.71	437.31
4	4.21	322.28	5.04	3571.26	629.71	437.31
5	4.21	327.31	5.04	4321.80	762.05	529.21
5	4.21	327.31	5.04	4321.80	762.05	529.21
6	4.21	332.34	5.04	5072.34	894.39	621.12
6	4.21	332.34	5.04	5072.34	894.39	621.12
7	4.21	337.37	5.04	5822.88	1026.73	713.02
7	4.21	337.37	5.04	5822.88	1026.73	713.02
8	4.21	342.40	5.04	6573.42	1159.07	804.93
8	4.21	342.40	5.04	6573.42	1159.07	804.93
9	4.21	347.43	5.04	13761.27	2426.48	1685.10
9	4.21	347.43	5.04	13761.27	2426.48	1685.10
10	4.21	352.46	5.04	8074.50	1423.75	988.74
10	4.21	352.46	5.04	8074.50	1423.75	988.74
11	4.21	357.49	5.04	8825.04	1556.09	1080.64
11	4.21	357.49	5.04	8825.04	1556.09	1080.64
12	4.21	362.85	5.72	8580.28	1512.93	1050.67
12	4.21	362.85	5.72	8580.28	1512.93	1050.67
13	4.21	368.55	5.72	8548.62	1507.35	1046.80
13	4.21	368.55	5.72	8548.62	1507.35	1046.80
14	4.21	374.09	5.39	7989.23	1408.72	978.30
14	4.21	374.09	5.39	7989.23	1408.72	978.30
15	4.21	379.46	5.39	7835.95	1381.69	959.53
15	4.21	379.46	5.39	7835.95	1381.69	959.53
16	45.12	383.20	3.00	3699.04	652.24	452.96
16	45.12	383.20	3.00	3699.04	652.24	452.96
17	45.12	384.33	0.20	134.06	168.60	117.09

17	45.12	384.33	0.20	134.06	168.60	117.09
18	45.12	385.78	3.90	2435.68	3202.82	2224.23
18	45.12	385.78	3.90	2435.68	3202.82	2224.23
19	45.12	388.53	3.90	2021.73	2923.61	2030.33
19	45.12	388.53	3.90	2021.73	2923.61	2030.33
20	69.46	391.83	11.00	3295.70	2222.98	1543.77
20	69.46	391.83	11.00	3295.70	2222.98	1543.77
21	73.69	394.78	7.25	537.96	362.86	251.99
21	73.69	394.78	7.25	537.96	362.86	251.99

****SLICE REINFORCEMENT DATA****

Tieback Slice Force Data on the 21 Slices (Only Applicable Slices Listed)

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
9	9256.4	6481.4	11300.0	35.00	-0.618648E+02

***Pier/Pile Slice Force Data on the 21 Slices (Only Applicable Slices Listed)
***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
15	12000.0	0.0	12000.0	90.00	0.217158E+04

Sum of the Resisting Forces = 23866.03 (lbs)

Average Available Shear Strength = 229.26(psf)

Sum of the Driving Forces = 17597.20 (lbs)

Average Mobilized Shear Stress = 169.04(psf)

Total length of the failure surface = 104.10(ft)

Factor of Safety Balance Check: FS = 1.35624

Janbu's Correction Factor (fo) = 1.0750

Janub's FS Corrected = 1.45796

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

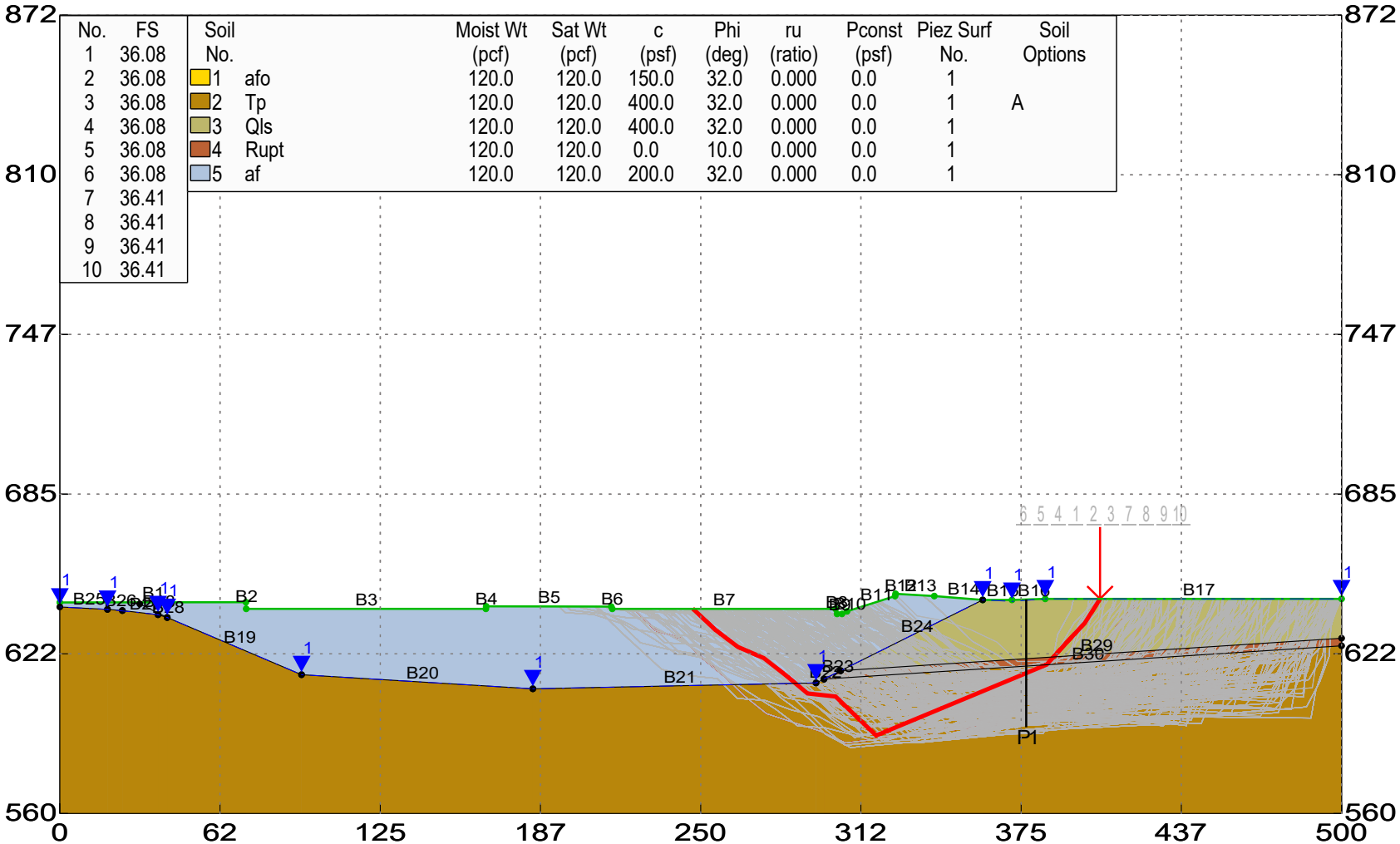
Royal Vista - Cross Section 9
Stage 6 (Final Condition - Along Bedding (Static))

LGC Geotechnical / BPP

\Sec 9 - Stage 6 (Final Condition - Along Bedding(Static).gsd

No.	FS
1	36.08
2	36.08
3	36.08
4	36.08
5	36.08
6	36.08
7	36.41
8	36.41
9	36.41
10	36.41

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 36.08

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

*** GEOSTASE(R) ***

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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.
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Analysis Date: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 6 (Final Condition - Along Bedding(Static).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 6 (Final Condition - Along Bedding(Static).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 9

DESCRIPTION: Stage 6 (Final Condition - Along Bedding (Static))

BOUNDARY DATA

17 Surface Boundaries
30 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	642.600	72.600	642.700	5
2	72.600	642.700	72.700	640.100	5
3	72.700	640.100	166.200	640.100	5
4	166.200	640.100	166.300	641.100	5
5	166.300	641.100	215.100	641.000	5
6	215.100	641.000	215.500	640.100	5
7	215.500	640.100	302.600	640.100	5
8	302.600	640.100	303.200	638.100	5
9	303.200	638.100	305.100	638.100	5
10	305.100	638.100	307.100	639.100	5
11	307.100	639.100	325.800	645.100	5
12	325.800	645.100	326.000	646.000	5
13	326.000	646.000	341.100	645.100	5
14	341.100	645.100	360.000	643.600	5
15	360.000	643.600	371.400	643.600	3
16	371.400	643.600	384.400	644.000	3
17	384.400	644.000	500.000	644.000	3
18	31.200	642.000	41.900	636.700	5
19	41.900	636.700	94.300	614.300	2
20	94.300	614.300	184.500	608.800	2
21	184.500	608.800	295.000	611.100	2
22	295.000	611.100	298.100	612.600	2
23	298.100	612.600	304.600	615.900	4
24	304.600	615.900	360.000	643.600	3
25	0.000	640.800	18.600	639.900	2
26	18.600	639.900	24.400	639.400	2

27	24.400	639.400	38.300	637.800	2
28	38.300	637.800	41.900	636.700	2
29	304.600	615.900	500.000	628.600	4
30	298.100	612.600	500.000	625.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	32.00
2	7.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 11 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	640.80
2	18.60	639.90
3	38.30	637.80
4	41.90	636.70
5	94.30	614.30
6	184.50	608.80
7	295.00	611.10
8	360.00	643.60
9	371.40	643.00

10	384.40	644.00
11	500.00	644.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	330.00	628.60	226000.0	20.0	35.00	23.0	25.0

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.

TIEBACK ANCHOR LOAD DATA HAS BEEN SUPPRESSED

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	377.00	643.77	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 11.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	305.00	600.50	375.00	605.00	30.00
2	380.00	606.00	490.00	612.00	30.00

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 = 568

Number of Trial Surfaces With Valid FS = 432

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 56.8 %

Statistical Data On All Valid FS Values:
FS Max = 646.199 FS Min = 36.079 FS Ave = 145.372
Standard Deviation = 141.980 Coefficient of Variation = 97.67 %

Critical Surface is Sequence Number 134 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	377.00	614.94

Factor Of Safety For The Critical or Specified Surface = 36.079

Table 1 - Geometry Data on the 46 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	0.83	0.34	247.31	639.76	640.10	-39.35	0.00	1.08
2	3.99	2.57	249.72	637.53	640.10	-43.42	0.00	5.50
3	3.99	6.36	253.72	633.74	640.10	-43.42	0.00	5.50
4	4.39	9.91	257.91	630.19	640.10	-37.12	0.00	5.50
5	4.39	13.22	262.29	626.88	640.10	-37.12	0.00	5.50
6	5.04	15.98	267.01	624.12	640.10	-23.48	0.00	5.50
7	5.04	18.17	272.05	621.93	640.10	-23.48	0.00	5.50
8	4.33	20.96	276.74	619.14	640.10	-38.03	0.00	5.50
9	4.33	24.35	281.07	615.75	640.10	-38.03	0.00	5.50
10	3.72	27.61	285.10	612.49	640.10	-40.02	0.00	4.86
11	4.70	31.14	289.31	608.96	640.10	-40.02	0.00	6.14
12	3.34	33.30	293.33	606.80	640.10	-6.31	0.00	3.36
13	3.10	33.66	296.55	606.44	640.10	-6.31	0.00	3.12
14	4.50	34.08	300.35	606.02	640.10	-6.31	0.00	4.53
15	0.00	34.33	302.60	605.77	640.10	-44.10	0.00	0.00
16	0.60	33.62	302.90	605.48	639.10	-44.10	-73.30	0.84
17	1.40	33.59	303.90	604.51	638.10	-44.10	0.00	1.95
18	0.50	34.51	304.85	603.59	638.10	-44.10	0.00	0.70
19	2.00	36.22	306.10	602.38	638.60	-44.10	26.57	2.78
20	3.40	39.88	308.80	599.76	639.65	-44.10	17.79	4.73
21	3.98	44.61	312.49	596.22	640.83	-43.61	17.79	5.50
22	3.98	49.68	316.47	592.43	642.11	-43.61	17.79	5.50
23	3.67	52.04	320.30	591.30	643.33	22.64	17.79	3.97
24	3.67	51.69	323.97	592.83	644.51	22.64	17.79	3.97
25	0.20	51.92	325.90	593.63	645.55	22.64	77.47	0.22
26	5.03	51.13	328.52	594.72	645.85	22.64	-3.41	5.45
27	5.03	48.73	333.55	596.82	645.55	22.64	-3.41	5.45
28	5.03	46.33	338.58	598.92	645.25	22.64	-3.41	5.45
29	4.72	43.96	343.46	600.96	644.91	22.64	-4.54	5.12
30	4.72	41.61	348.19	602.93	644.54	22.64	-4.54	5.12
31	4.72	39.26	352.91	604.90	644.16	22.64	-4.54	5.12

32	4.73	36.92	357.64	606.87	643.79	22.64	-4.54	5.12
33	5.70	34.56	362.85	609.04	643.60	22.64	0.00	6.18
34	5.70	32.18	368.55	611.42	643.60	22.64	0.00	6.18
35	4.33	30.16	373.57	613.51	643.67	22.64	1.76	4.70
36	4.33	28.48	377.90	615.32	643.80	22.64	1.76	4.70
37	4.33	26.81	382.23	617.13	643.93	22.64	1.76	4.70
38	0.36	25.90	384.58	618.10	644.00	22.64	0.00	0.39
39	0.23	25.77	384.87	618.23	644.00	22.64	0.00	0.25
40	2.70	24.21	386.34	619.79	644.00	48.26	0.00	4.06
41	4.62	20.11	390.00	623.89	644.00	48.26	0.00	6.94
42	3.75	15.51	394.19	628.49	644.00	47.05	0.00	5.50
43	3.75	11.48	397.93	632.52	644.00	47.05	0.00	5.50
44	2.94	7.14	401.27	636.86	644.00	57.74	0.00	5.50
45	2.94	2.49	404.21	641.51	644.00	57.74	0.00	5.50
46	0.08	0.08	405.72	643.92	644.00	63.17	0.00	0.18

Table 2 - Force Data On The 46 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	34.3	0.0	0.0	0.0	0.0	0.0
2	1234.3	0.0	0.0	0.0	0.0	0.0
3	3046.6	0.0	0.0	0.0	0.0	0.0
4	5212.8	0.0	0.0	0.0	0.0	0.0
5	6959.6	0.0	0.0	0.0	0.0	0.0
6	9673.8	0.0	0.0	0.0	0.0	0.0
7	11000.2	0.0	0.0	0.0	0.0	0.0
8	10896.7	0.0	0.0	0.0	0.0	0.0
9	12658.3	0.0	0.0	0.0	0.0	0.0
10	12322.8	0.0	0.0	0.0	0.0	0.0
11	17580.2	0.0	775.5	0.0	0.0	0.0
12	13328.4	0.0	893.1	0.0	0.0	0.0
13	12520.8	0.0	845.9	0.0	0.0	0.0
14	18394.2	0.0	1751.5	0.0	0.0	0.0
15	8.2	0.0	1.3	0.0	0.0	0.0
16	2420.6	0.0	399.1	0.0	0.0	0.0
17	5642.9	0.0	1074.2	0.0	0.0	0.0
18	2070.6	0.0	432.1	0.0	0.0	0.0
19	8692.9	0.0	1983.8	0.0	0.0	0.0
20	16261.8	0.0	4307.0	0.0	0.0	0.0
21	21316.6	0.0	6485.9	0.0	0.0	0.0
22	23740.1	0.0	8074.2	0.0	0.0	0.0
23	22909.7	0.0	6439.6	0.0	0.0	0.0
24	22754.4	0.0	6500.0	0.0	0.0	0.0
25	1246.0	0.0	356.1	0.0	0.0	0.0
26	30880.1	0.0	9020.4	0.0	0.0	0.0
27	29431.1	0.0	9134.1	0.0	0.0	0.0
28	27982.0	0.0	9247.8	0.0	0.0	0.0
29	24922.8	0.0	8784.7	0.0	0.0	0.0
30	23592.9	0.0	8884.9	0.0	0.0	0.0
31	22263.0	0.0	8985.1	0.0	0.0	0.0
32	20933.1	0.0	9085.3	0.0	0.0	0.0
33	23637.5	0.0	13223.1	0.0	0.0	0.0
34	22011.6	0.0	12194.3	0.0	0.0	0.0
35	15680.7	0.0	8637.0	0.0	0.0	0.0
36	14810.4	0.0	8207.8	0.0	0.0	0.0
37	13940.0	0.0	7778.6	0.0	0.0	0.0
38	1123.0	0.0	632.7	0.0	0.0	0.0
39	702.1	0.0	395.6	0.0	0.0	0.0
40	7844.7	0.0	6126.8	0.0	0.0	0.0
41	11157.8	0.0	8714.3	0.0	0.0	0.0
42	6972.3	0.0	5321.3	0.0	0.0	0.0
43	5161.9	0.0	3939.6	0.0	0.0	0.0
44	2515.2	0.0	2450.7	0.0	0.0	0.0
45	876.9	0.0	854.4	0.0	0.0	0.0
46	0.8	0.0	0.9	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 568366.80(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 412235.26(lbs)

TOTAL AREA OF SLIDING MASS = 4736.39(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 46 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	5	200.00	32.00	
5	5	200.00	32.00	
6	5	200.00	32.00	
7	5	200.00	32.00	
8	5	200.00	32.00	
9	5	200.00	32.00	
10	5	200.00	32.00	
11	2	400.00	32.00	A
12	2	400.00	32.00	A
13	2	400.00	32.00	A
14	2	400.00	32.00	A
15	2	400.00	32.00	A
16	2	400.00	32.00	A
17	2	400.00	32.00	A
18	2	400.00	32.00	A
19	2	400.00	32.00	A
20	2	400.00	32.00	A
21	2	400.00	32.00	A
22	2	400.00	32.00	A
23	2	400.00	32.00	A
24	2	400.00	32.00	A
25	2	400.00	32.00	A
26	2	400.00	32.00	A
27	2	400.00	32.00	A
28	2	400.00	32.00	A
29	2	400.00	32.00	A
30	2	400.00	32.00	A
31	2	400.00	32.00	A
32	2	400.00	32.00	A
33	2	400.00	32.00	A
34	2	400.00	32.00	A
35	2	400.00	32.00	A
36	2	400.00	32.00	A
37	2	400.00	32.00	A
38	2	400.00	32.00	A
39	4	0.00	10.00	
40	4	0.00	10.00	
41	3	400.00	32.00	
42	3	400.00	32.00	
43	3	400.00	32.00	
44	3	400.00	32.00	
45	3	400.00	32.00	
46	3	400.00	32.00	

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 46 Slices

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

1	-39.35	247.31	1.08	41.72	26.07	0.73
1	-39.35	247.31	1.08	41.72	26.07	0.73
2	-43.42	249.72	5.50	320.41	400.22	11.27
2	-43.42	249.72	5.50	320.41	400.22	11.27
3	-43.42	253.72	5.50	782.32	688.85	19.39
3	-43.42	253.72	5.50	782.32	688.85	19.39
4	-37.12	257.91	5.50	1210.48	956.39	26.92
4	-37.12	257.91	5.50	1210.48	956.39	26.92
5	-37.12	262.29	5.50	1614.57	1208.89	34.03
5	-37.12	262.29	5.50	1614.57	1208.89	34.03
6	-23.48	267.01	5.50	1936.07	1409.79	39.69
6	-23.48	267.01	5.50	1936.07	1409.79	39.69
7	-23.48	272.05	5.50	2201.17	1575.44	44.35
7	-23.48	272.05	5.50	2201.17	1575.44	44.35
8	-38.03	276.74	5.50	2557.72	1798.24	50.62
8	-38.03	276.74	5.50	2557.72	1798.24	50.62
9	-38.03	281.07	5.50	2970.43	2056.13	57.88
9	-38.03	281.07	5.50	2970.43	2056.13	57.88
10	-40.02	285.10	4.86	3371.05	2306.46	64.93
10	-40.02	285.10	4.86	3371.05	2306.46	64.93
11	-40.02	289.31	6.14	3679.15	2698.99	75.98
11	-40.02	289.31	6.14	3679.15	2698.99	75.98
12	-6.31	293.33	3.36	3739.20	2736.51	77.04
12	-6.31	293.33	3.36	3739.20	2736.51	77.04
13	-6.31	296.55	3.12	3776.95	2760.10	77.70
13	-6.31	296.55	3.12	3776.95	2760.10	77.70
14	-6.31	300.35	4.53	3711.45	2719.17	76.55
14	-6.31	300.35	4.53	3711.45	2719.17	76.55
15	-44.10	302.60	0.00	3743.73	2739.34	77.12
15	-44.10	302.60	0.00	3743.73	2739.34	77.12
16	-44.10	302.90	0.84	3634.66	2671.19	75.20
16	-44.10	302.90	0.84	3634.66	2671.19	75.20
17	-44.10	303.90	1.95	3556.17	2622.14	73.82
17	-44.10	303.90	1.95	3556.17	2622.14	73.82
18	-44.10	304.85	0.70	3597.73	2648.11	74.55
18	-44.10	304.85	0.70	3597.73	2648.11	74.55
19	-44.10	306.10	2.78	3713.52	2720.46	76.59
19	-44.10	306.10	2.78	3713.52	2720.46	76.59
20	-44.10	308.80	4.73	3959.32	2874.06	80.91
20	-44.10	308.80	4.73	3959.32	2874.06	80.91
21	-43.61	312.49	5.50	4261.60	3062.94	86.23
21	-43.61	312.49	5.50	4261.60	3062.94	86.23
22	-43.61	316.47	5.50	4587.23	3266.42	91.96
22	-43.61	316.47	5.50	4587.23	3266.42	91.96
23	22.64	320.30	3.97	4583.53	3264.11	91.89
23	22.64	320.30	3.97	4583.53	3264.11	91.89
24	22.64	323.97	3.97	4526.44	3228.44	90.89
24	22.64	323.97	3.97	4526.44	3228.44	90.89
25	22.64	325.90	0.22	4546.10	3240.72	91.23
25	22.64	325.90	0.22	4546.10	3240.72	91.23
26	22.64	328.52	5.45	4441.14	3175.13	89.39
26	22.64	328.52	5.45	4441.14	3175.13	89.39
27	22.64	333.55	5.45	4134.81	2983.72	84.00
27	22.64	333.55	5.45	4134.81	2983.72	84.00
28	22.64	338.58	5.45	3828.48	2792.30	78.61
28	22.64	338.58	5.45	3828.48	2792.30	78.61
29	22.64	343.46	5.12	3525.98	2603.28	73.29
29	22.64	343.46	5.12	3525.98	2603.28	73.29
30	22.64	348.19	5.12	3227.30	2416.64	68.03
30	22.64	348.19	5.12	3227.30	2416.64	68.03
31	22.64	352.91	5.12	2928.61	2230.00	62.78
31	22.64	352.91	5.12	2928.61	2230.00	62.78
32	22.64	357.64	5.12	2629.93	2043.36	57.53
32	22.64	357.64	5.12	2629.93	2043.36	57.53
33	22.64	362.85	6.18	1985.20	1640.49	46.18
33	22.64	362.85	6.18	1985.20	1640.49	46.18
34	22.64	368.55	6.18	1867.46	1566.92	44.11
34	22.64	368.55	6.18	1867.46	1566.92	44.11
35	22.64	373.57	4.70	1760.17	1499.88	42.22
35	22.64	373.57	4.70	1760.17	1499.88	42.22
36	22.64	377.90	4.70	1651.59	1432.03	40.31
36	22.64	377.90	4.70	1651.59	1432.03	40.31

37	22.64	382.23	4.70	1543.01	1364.18	38.40
37	22.64	382.23	4.70	1543.01	1364.18	38.40
38	22.64	384.58	0.39	1474.96	1321.66	37.21
38	22.64	384.58	0.39	1474.96	1321.66	37.21
39	22.64	384.87	0.25	1481.22	261.18	7.35
39	22.64	384.87	0.25	1481.22	261.18	7.35
40	48.26	386.34	4.06	1386.38	244.46	6.88
40	48.26	386.34	4.06	1386.38	244.46	6.88
41	48.26	390.00	6.94	1121.09	1100.54	30.98
41	48.26	390.00	6.94	1121.09	1100.54	30.98
42	47.05	394.19	5.50	862.68	939.06	26.44
42	47.05	394.19	5.50	862.68	939.06	26.44
43	47.05	397.93	5.50	635.39	797.04	22.44
43	47.05	397.93	5.50	635.39	797.04	22.44
44	57.74	401.27	5.50	399.38	249.56	7.03
44	57.74	401.27	5.50	399.38	249.56	7.03
45	57.74	404.21	5.50	139.24	87.00	2.45
45	57.74	404.21	5.50	139.24	87.00	2.45
46	63.17	405.72	0.18	4.55	2.84	0.08
46	63.17	405.72	0.18	4.55	2.84	0.08

Table 4 - Base Force Data on the 46 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-39.35	247.31	1.08	45.05	28.15	0.79
1	-39.35	247.31	1.08	45.05	28.15	0.79
2	-43.42	249.72	5.50	1762.27	2201.19	61.97
2	-43.42	249.72	5.50	1762.27	2201.19	61.97
3	-43.42	253.72	5.50	4302.75	3788.65	106.66
3	-43.42	253.72	5.50	4302.75	3788.65	106.66
4	-37.12	257.91	5.50	6657.66	5260.17	148.09
4	-37.12	257.91	5.50	6657.66	5260.17	148.09
5	-37.12	262.29	5.50	8880.13	6648.92	187.18
5	-37.12	262.29	5.50	8880.13	6648.92	187.18
6	-23.48	267.01	5.50	10648.39	7753.85	218.29
6	-23.48	267.01	5.50	10648.39	7753.85	218.29
7	-23.48	272.05	5.50	12106.42	8664.93	243.94
7	-23.48	272.05	5.50	12106.42	8664.93	243.94
8	-38.03	276.74	5.50	14067.45	9890.32	278.43
8	-38.03	276.74	5.50	14067.45	9890.32	278.43
9	-38.03	281.07	5.50	16337.36	11308.71	318.37
9	-38.03	281.07	5.50	16337.36	11308.71	318.37
10	-40.02	285.10	4.86	16374.24	11203.23	315.40
10	-40.02	285.10	4.86	16374.24	11203.23	315.40
11	-40.02	289.31	6.14	22599.85	16579.03	466.74
11	-40.02	289.31	6.14	22599.85	16579.03	466.74
12	-6.31	293.33	3.36	12547.26	9182.64	258.51
12	-6.31	293.33	3.36	12547.26	9182.64	258.51
13	-6.31	296.55	3.12	11780.01	8608.54	242.35
13	-6.31	296.55	3.12	11780.01	8608.54	242.35
14	-6.31	300.35	4.53	16796.07	12305.54	346.43
14	-6.31	300.35	4.53	16796.07	12305.54	346.43
15	-44.10	302.60	0.00	10.34	7.56	0.21
15	-44.10	302.60	0.00	10.34	7.56	0.21
16	-44.10	302.90	0.84	3036.55	2231.63	62.83
16	-44.10	302.90	0.84	3036.55	2231.63	62.83
17	-44.10	303.90	1.95	6932.28	5111.52	143.90
17	-44.10	303.90	1.95	6932.28	5111.52	143.90
18	-44.10	304.85	0.70	2504.74	1843.62	51.90
18	-44.10	304.85	0.70	2504.74	1843.62	51.90
19	-44.10	306.10	2.78	10341.42	7575.96	213.28
19	-44.10	306.10	2.78	10341.42	7575.96	213.28
20	-44.10	308.80	4.73	18733.20	13598.37	382.82
20	-44.10	308.80	4.73	18733.20	13598.37	382.82
21	-43.61	312.49	5.50	23438.80	16846.18	474.26
21	-43.61	312.49	5.50	23438.80	16846.18	474.26
22	-43.61	316.47	5.50	25229.77	17965.31	505.76

22	-43.61	316.47	5.50	25229.77	17965.31	505.76
23	22.64	320.30	3.97	18219.47	12974.78	365.27
23	22.64	320.30	3.97	18219.47	12974.78	365.27
24	22.64	323.97	3.97	17992.55	12832.98	361.28
24	22.64	323.97	3.97	17992.55	12832.98	361.28
25	22.64	325.90	0.22	985.12	702.25	19.77
25	22.64	325.90	0.22	985.12	702.25	19.77
26	22.64	328.52	5.45	24219.71	17315.55	487.47
26	22.64	328.52	5.45	24219.71	17315.55	487.47
27	22.64	333.55	5.45	22549.15	16271.67	458.08
27	22.64	333.55	5.45	22549.15	16271.67	458.08
28	22.64	338.58	5.45	20878.59	15227.79	428.70
28	22.64	338.58	5.45	20878.59	15227.79	428.70
29	22.64	343.46	5.12	18050.96	13327.26	375.19
29	22.64	343.46	5.12	18050.96	13327.26	375.19
30	22.64	348.19	5.12	16521.88	12371.78	348.29
30	22.64	348.19	5.12	16521.88	12371.78	348.29
31	22.64	352.91	5.12	14992.80	11416.31	321.39
31	22.64	352.91	5.12	14992.80	11416.31	321.39
32	22.64	357.64	5.12	13463.73	10460.84	294.50
32	22.64	357.64	5.12	13463.73	10460.84	294.50
33	22.64	362.85	6.18	12260.21	10131.35	285.22
33	22.64	362.85	6.18	12260.21	10131.35	285.22
34	22.64	368.55	6.18	11533.09	9676.99	272.43
34	22.64	368.55	6.18	11533.09	9676.99	272.43
35	22.64	373.57	4.70	8264.12	7042.02	198.25
35	22.64	373.57	4.70	8264.12	7042.02	198.25
36	22.64	377.90	4.70	7754.33	6723.47	189.28
36	22.64	377.90	4.70	7754.33	6723.47	189.28
37	22.64	382.23	4.70	7244.54	6404.92	180.31
37	22.64	382.23	4.70	7244.54	6404.92	180.31
38	22.64	384.58	0.39	577.51	517.48	14.57
38	22.64	384.58	0.39	577.51	517.48	14.57
39	22.64	384.87	0.25	364.35	64.24	1.81
39	22.64	384.87	0.25	364.35	64.24	1.81
40	48.26	386.34	4.06	5622.01	991.31	27.91
40	48.26	386.34	4.06	5622.01	991.31	27.91
41	48.26	390.00	6.94	7785.82	7643.05	215.17
41	48.26	390.00	6.94	7785.82	7643.05	215.17
42	47.05	394.19	5.50	4744.74	5164.84	145.40
42	47.05	394.19	5.50	4744.74	5164.84	145.40
43	47.05	397.93	5.50	3494.64	4383.69	123.41
43	47.05	397.93	5.50	3494.64	4383.69	123.41
44	57.74	401.27	5.50	2196.59	1372.58	38.64
44	57.74	401.27	5.50	2196.59	1372.58	38.64
45	57.74	404.21	5.50	765.80	478.52	13.47
45	57.74	404.21	5.50	765.80	478.52	13.47
46	63.17	405.72	0.18	0.84	0.52	0.01
46	63.17	405.72	0.18	0.84	0.52	0.01

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 46 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
36	12000.0	0.0	12000.0	90.00	0.450397E+04

Sum of the Resisting Forces = 307941.92 (lbs)

Average Available Shear Strength = 1584.53(psf)

Sum of the Driving Forces = 9281.75 (lbs)

Average Mobilized Shear Stress = 47.76(psf)

Total length of the failure surface = 194.34(ft)

```
Factor of Safety Balance Check: FS = 33.17714

Janbu's Correction Factor (fo) =  1.0875

Janub's FS Corrected = 36.07856

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

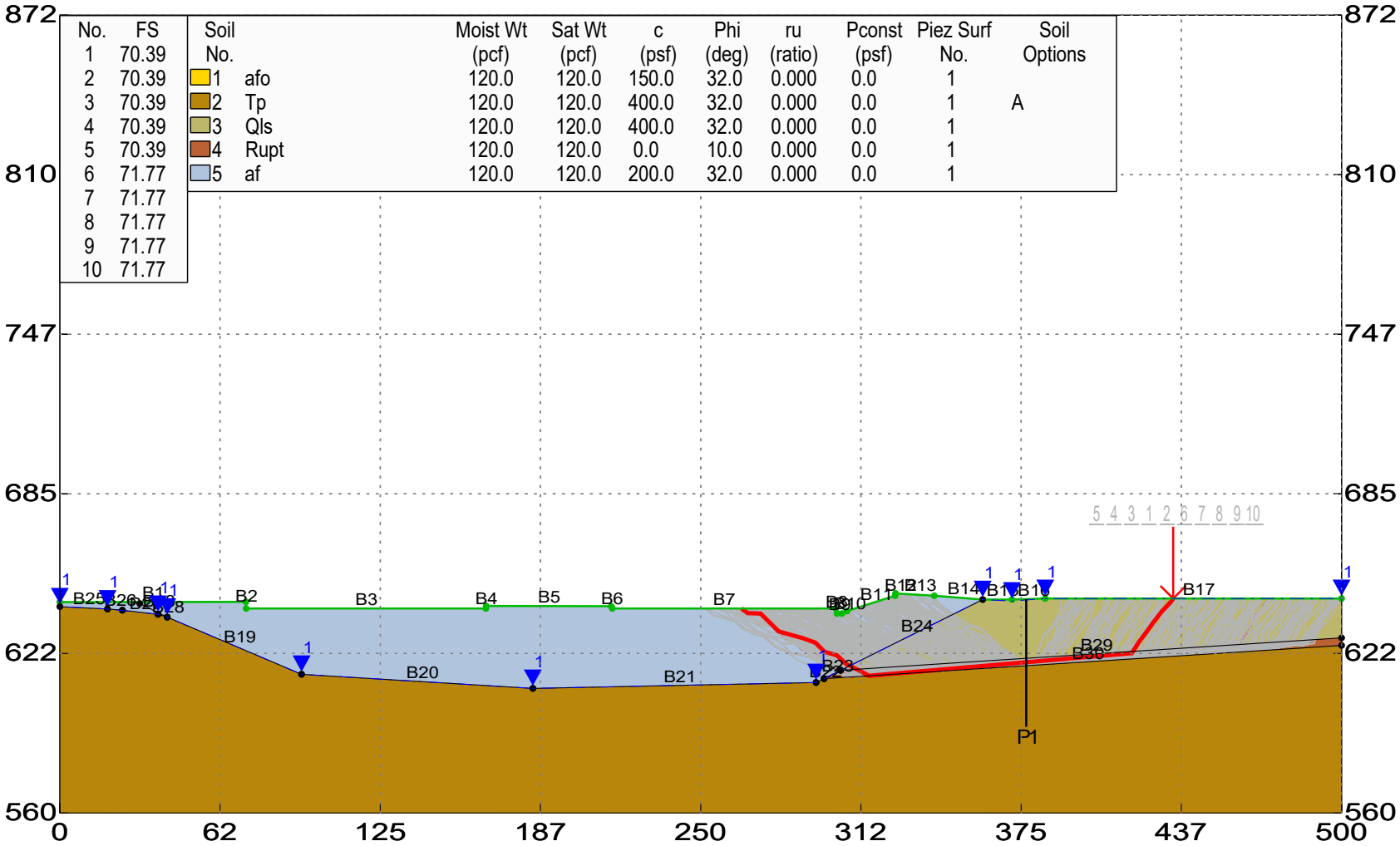
Royal Vista - Cross Section 9
Stage 6 (Final Condition - Rupture (Static))

LGC Geotechnical / BPP

\Sec 9 - Stage 6 (Final Condition - Rupture(Static).gsd

No.	FS
1	70.39
2	70.39
3	70.39
4	70.39
5	70.39
6	71.77
7	71.77
8	71.77
9	71.77
10	71.77

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	150.0	32.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	32.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	32.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	32.0	0.000	0.0	1	



GEOSTASE FS = 70.39

Simplified Janbu (Corrected) Method

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 6 (Final Condition - Rupture(Static).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 6 (Final Condition - Rupture(Static).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 9

DESCRIPTION: Stage 6 (Final Condition - Rupture (Static))

BOUNDARY DATA

17 Surface Boundaries
30 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	642.600	72.600	642.700	5
2	72.600	642.700	72.700	640.100	5
3	72.700	640.100	166.200	640.100	5
4	166.200	640.100	166.300	641.100	5
5	166.300	641.100	215.100	641.000	5
6	215.100	641.000	215.500	640.100	5
7	215.500	640.100	302.600	640.100	5
8	302.600	640.100	303.200	638.100	5
9	303.200	638.100	305.100	638.100	5
10	305.100	638.100	307.100	639.100	5
11	307.100	639.100	325.800	645.100	5
12	325.800	645.100	326.000	646.000	5
13	326.000	646.000	341.100	645.100	5
14	341.100	645.100	360.000	643.600	5
15	360.000	643.600	371.400	643.600	3
16	371.400	643.600	384.400	644.000	3
17	384.400	644.000	500.000	644.000	3
18	31.200	642.000	41.900	636.700	5
19	41.900	636.700	94.300	614.300	2
20	94.300	614.300	184.500	608.800	2
21	184.500	608.800	295.000	611.100	2
22	295.000	611.100	298.100	612.600	2
23	298.100	612.600	304.600	615.900	4
24	304.600	615.900	360.000	643.600	3
25	0.000	640.800	18.600	639.900	2
26	18.600	639.900	24.400	639.400	2

27	24.400	639.400	38.300	637.800	2
28	38.300	637.800	41.900	636.700	2
29	304.600	615.900	500.000	628.600	4
30	298.100	612.600	500.000	625.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	150.00	32.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	32.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	32.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	32.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	32.00
2	7.0	250.00	10.00
3	90.0	400.00	32.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 11 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	640.80
2	18.60	639.90
3	38.30	637.80
4	41.90	636.70
5	94.30	614.30
6	184.50	608.80
7	295.00	611.10
8	360.00	643.60
9	371.40	643.00

10	384.40	644.00
11	500.00	644.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

TIEBACK LOAD(S)

1 Tieback Load(s) Specified

Capacity in the Bonded Length will be Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	330.00	628.60	226000.0	20.0	35.00	23.0	25.0

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.

TIEBACK ANCHOR LOAD DATA HAS BEEN SUPPRESSED

PIER/PILE LOAD(S)

1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	377.00	643.77	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between Individual Piers/Piles.

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 = 5.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	305.00	614.50	375.00	619.00	3.00
2	380.00	619.70	490.00	626.70	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 = 808

Number of Trial Surfaces With Valid FS = 192

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 80.8 %

Statistical Data On All Valid FS Values:
FS Max = 820.057 FS Min = 70.394 FS Ave = 196.323
Standard Deviation = 151.865 Coefficient of Variation = 77.35 %

Critical Surface is Sequence Number 181 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	377.00	619.03

Factor Of Safety For The Critical or Specified Surface = 70.394

Table 1 - Geometry Data on the 49 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	2.46	0.92	267.14	639.18	640.10	-36.83	0.00	3.07
2	5.00	1.91	270.86	638.19	640.10	-1.72	0.00	5.00
3	3.56	3.75	275.14	636.35	640.10	-44.65	0.00	5.00
4	3.55	7.27	278.69	632.83	640.10	-44.84	0.00	5.00
5	4.82	9.70	282.87	630.40	640.10	-15.48	0.00	5.00
6	4.81	11.04	287.69	629.06	640.10	-15.78	0.00	5.00
7	4.70	12.58	292.44	627.52	640.10	-19.95	0.00	5.00
8	3.54	15.20	296.56	624.90	640.10	-45.00	0.00	5.00
9	4.27	17.57	300.46	622.53	640.10	-15.97	0.00	4.44
10	0.54	17.37	302.87	621.84	639.21	-15.97	-73.30	0.56
11	0.06	16.48	303.17	621.73	638.21	-43.58	-73.30	0.09
12	1.90	17.30	304.15	620.80	638.10	-43.58	0.00	2.62
13	1.66	19.41	305.93	619.10	638.51	-43.58	26.57	2.29
14	0.34	20.79	306.93	618.23	639.01	-26.70	26.57	0.38
15	0.99	21.37	307.59	617.89	639.26	-26.70	17.79	1.11
16	2.67	22.87	309.42	616.97	639.85	-26.70	17.79	2.99
17	0.46	24.17	310.99	616.18	640.35	-26.70	17.79	0.52
18	4.41	26.23	313.43	614.90	641.13	-27.93	17.79	4.99
19	0.01	28.11	315.64	613.73	641.84	-27.93	17.79	0.01
20	0.21	28.14	315.75	613.73	641.87	4.95	17.79	0.21
21	4.98	28.75	318.34	613.96	642.71	4.95	17.79	4.99
22	4.98	29.91	323.31	614.39	644.30	4.95	17.79	4.99
23	0.20	30.94	325.90	614.61	645.55	4.95	77.47	0.20
24	5.03	31.01	328.52	614.84	645.85	4.95	-3.41	5.05
25	5.03	30.28	333.55	615.27	645.55	4.95	-3.41	5.05
26	5.03	29.54	338.58	615.71	645.25	4.95	-3.41	5.05
27	4.72	28.78	343.46	616.13	644.91	4.95	-4.54	4.74
28	4.72	28.00	348.19	616.54	644.54	4.95	-4.54	4.74
29	4.72	27.21	352.91	616.95	644.16	4.95	-4.54	4.74
30	4.73	26.43	357.64	617.36	643.79	4.95	-4.54	4.74
31	5.70	25.79	362.85	617.81	643.60	4.95	0.00	5.72

32	5.70	25.30	368.55	618.30	643.60	4.95	0.00	5.72
33	4.33	24.93	373.57	618.74	643.67	4.95	1.76	4.35
34	4.33	24.69	377.90	619.11	643.80	4.95	1.76	4.35
35	4.33	24.45	382.23	619.49	643.93	4.95	1.76	4.35
36	4.82	24.12	386.81	619.88	644.00	4.95	0.00	4.84
37	4.82	23.70	391.63	620.30	644.00	4.95	0.00	4.84
38	4.82	23.28	396.46	620.72	644.00	4.95	0.00	4.84
39	4.82	22.87	401.28	621.13	644.00	4.95	0.00	4.84
40	4.82	22.45	406.10	621.55	644.00	4.95	0.00	4.84
41	4.82	22.03	410.92	621.97	644.00	4.95	0.00	4.84
42	4.82	21.61	415.74	622.39	644.00	4.95	0.00	4.84
43	0.45	21.05	418.38	622.95	644.00	58.06	0.00	0.84
44	2.20	18.93	419.70	625.07	644.00	58.06	0.00	4.16
45	3.02	15.17	422.31	628.83	644.00	52.79	0.00	5.00
46	2.92	11.15	425.29	632.85	644.00	54.21	0.00	5.00
47	3.06	7.15	428.28	636.85	644.00	52.26	0.00	5.00
48	3.43	3.35	431.53	640.65	644.00	46.63	0.00	5.00
49	1.06	0.77	433.77	643.23	644.00	55.26	0.00	1.87

Table 2 - Force Data On The 49 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	270.8	0.0	0.0	0.0	0.0	0.0
2	1147.7	0.0	0.0	0.0	0.0	0.0
3	1599.0	0.0	0.0	0.0	0.0	0.0
4	3090.9	0.0	0.0	0.0	0.0	0.0
5	5606.3	0.0	0.0	0.0	0.0	0.0
6	6375.7	0.0	0.0	0.0	0.0	0.0
7	7092.1	0.0	0.0	0.0	0.0	0.0
8	6447.1	0.0	0.0	0.0	0.0	0.0
9	9007.4	0.0	0.0	0.0	0.0	0.0
10	1117.3	0.0	0.0	0.0	0.0	0.0
11	126.4	0.0	0.0	0.0	0.0	0.0
12	3945.4	0.0	0.0	0.0	0.0	0.0
13	3863.1	0.0	0.0	0.0	0.0	0.0
14	852.1	0.0	0.0	0.0	0.0	0.0
15	2535.7	0.0	0.0	0.0	0.0	0.0
16	7334.0	0.0	200.1	0.0	0.0	0.0
17	1346.0	0.0	75.5	0.0	0.0	0.0
18	13882.5	0.0	1349.8	0.0	0.0	0.0
19	25.8	0.0	3.3	0.0	0.0	0.0
20	692.3	0.0	79.5	0.0	0.0	0.0
21	17165.9	0.0	2196.6	0.0	0.0	0.0
22	17862.2	0.0	2709.6	0.0	0.0	0.0
23	742.5	0.0	119.6	0.0	0.0	0.0
24	18730.7	0.0	3283.5	0.0	0.0	0.0
25	18286.4	0.0	3808.4	0.0	0.0	0.0
26	17842.2	0.0	4333.3	0.0	0.0	0.0
27	16318.4	0.0	4545.4	0.0	0.0	0.0
28	15874.0	0.0	5008.0	0.0	0.0	0.0
29	15429.6	0.0	5470.5	0.0	0.0	0.0
30	14985.1	0.0	5933.0	0.0	0.0	0.0
31	17640.5	0.0	9128.5	0.0	0.0	0.0
32	17303.2	0.0	8846.1	0.0	0.0	0.0
33	12963.4	0.0	6591.5	0.0	0.0	0.0
34	12837.8	0.0	6580.2	0.0	0.0	0.0
35	12712.1	0.0	6569.0	0.0	0.0	0.0
36	13955.4	0.0	7283.9	0.0	0.0	0.0
37	13714.0	0.0	7157.9	0.0	0.0	0.0
38	13472.5	0.0	7031.9	0.0	0.0	0.0
39	13231.1	0.0	6905.9	0.0	0.0	0.0
40	12989.6	0.0	6779.9	0.0	0.0	0.0
41	12748.2	0.0	6653.8	0.0	0.0	0.0
42	12506.8	0.0	6527.8	0.0	0.0	0.0
43	1124.6	0.0	1105.5	0.0	0.0	0.0
44	4996.0	0.0	4910.9	0.0	0.0	0.0

45	5505.2	0.0	4733.3	0.0	0.0	0.0
46	3913.4	0.0	3479.4	0.0	0.0	0.0
47	2624.5	0.0	2229.9	0.0	0.0	0.0
48	1381.5	0.0	1046.0	0.0	0.0	0.0
49	98.1	0.0	89.5	0.0	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 415312.09(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 280571.86(lbs)

TOTAL AREA OF SLIDING MASS = 3460.93(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 49 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	32.00	
2	5	200.00	32.00	
3	5	200.00	32.00	
4	5	200.00	32.00	
5	5	200.00	32.00	
6	5	200.00	32.00	
7	5	200.00	32.00	
8	5	200.00	32.00	
9	5	200.00	32.00	
10	5	200.00	32.00	
11	5	200.00	32.00	
12	5	200.00	32.00	
13	5	200.00	32.00	
14	5	200.00	32.00	
15	5	200.00	32.00	
16	3	400.00	32.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	2	400.00	32.00	A
20	2	250.00	10.00	A
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	
31	4	0.00	10.00	
32	4	0.00	10.00	
33	4	0.00	10.00	
34	4	0.00	10.00	
35	4	0.00	10.00	
36	4	0.00	10.00	
37	4	0.00	10.00	
38	4	0.00	10.00	
39	4	0.00	10.00	
40	4	0.00	10.00	
41	4	0.00	10.00	
42	4	0.00	10.00	
43	4	0.00	10.00	
44	3	400.00	32.00	
45	3	400.00	32.00	
46	3	400.00	32.00	
47	3	400.00	32.00	
48	3	400.00	32.00	
49	3	400.00	32.00	

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 49 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-36.83	267.14	3.07	113.37	270.84	3.81
1	-36.83	267.14	3.07	113.37	270.84	3.81
2	-1.72	270.86	5.00	229.79	343.59	4.83
2	-1.72	270.86	5.00	229.79	343.59	4.83
3	-44.65	275.14	5.00	456.72	485.39	6.82
3	-44.65	275.14	5.00	456.72	485.39	6.82
4	-44.84	278.69	5.00	883.14	751.85	10.56
4	-44.84	278.69	5.00	883.14	751.85	10.56
5	-15.48	282.87	5.00	1167.32	929.42	13.06
5	-15.48	282.87	5.00	1167.32	929.42	13.06
6	-15.78	287.69	5.00	1329.45	1030.74	14.48
6	-15.78	287.69	5.00	1329.45	1030.74	14.48
7	-19.95	292.44	5.00	1515.30	1146.86	16.12
7	-19.95	292.44	5.00	1515.30	1146.86	16.12
8	-45.00	296.56	5.00	1843.95	1352.23	19.00
8	-45.00	296.56	5.00	1843.95	1352.23	19.00
9	-15.97	300.46	4.44	2115.58	1521.96	21.39
9	-15.97	300.46	4.44	2115.58	1521.96	21.39
10	-15.97	302.87	0.56	2090.85	1506.51	21.17
10	-15.97	302.87	0.56	2090.85	1506.51	21.17
11	-43.58	303.17	0.09	1998.02	1448.50	20.35
11	-43.58	303.17	0.09	1998.02	1448.50	20.35
12	-43.58	304.15	2.62	2098.25	1511.13	21.23
12	-43.58	304.15	2.62	2098.25	1511.13	21.23
13	-43.58	305.93	2.29	2353.44	1670.59	23.47
13	-43.58	305.93	2.29	2353.44	1670.59	23.47
14	-26.70	306.93	0.38	2507.83	1767.07	24.83
14	-26.70	306.93	0.38	2507.83	1767.07	24.83
15	-26.70	307.59	1.11	2577.61	1810.67	25.44
15	-26.70	307.59	1.11	2577.61	1810.67	25.44
16	-26.70	309.42	2.99	2693.76	2083.25	29.27
16	-26.70	309.42	2.99	2693.76	2083.25	29.27
17	-26.70	310.99	0.52	2758.14	486.33	6.83
17	-26.70	310.99	0.52	2758.14	486.33	6.83
18	-27.93	313.43	4.99	2881.62	508.11	7.14
18	-27.93	313.43	4.99	2881.62	508.11	7.14
19	-27.93	315.64	0.01	3007.78	2279.47	32.03
19	-27.93	315.64	0.01	3007.78	2279.47	32.03
20	4.95	315.75	0.21	2989.47	777.12	10.92
20	4.95	315.75	0.21	2989.47	777.12	10.92
21	4.95	318.34	4.99	3009.16	530.60	7.46
21	4.95	318.34	4.99	3009.16	530.60	7.46
22	4.95	323.31	4.99	3046.37	537.16	7.55
22	4.95	323.31	4.99	3046.37	537.16	7.55
23	4.95	325.90	0.20	3115.86	549.41	7.72
23	4.95	325.90	0.20	3115.86	549.41	7.72
24	4.95	328.52	5.05	3070.69	541.45	7.61
24	4.95	328.52	5.05	3070.69	541.45	7.61
25	4.95	333.55	5.05	2878.58	507.57	7.13
25	4.95	333.55	5.05	2878.58	507.57	7.13
26	4.95	338.58	5.05	2686.47	473.70	6.66
26	4.95	338.58	5.05	2686.47	473.70	6.66
27	4.95	343.46	4.74	2494.65	439.87	6.18
27	4.95	343.46	4.74	2494.65	439.87	6.18
28	4.95	348.19	4.74	2303.10	406.10	5.71
28	4.95	348.19	4.74	2303.10	406.10	5.71
29	4.95	352.91	4.74	2111.56	372.32	5.23
29	4.95	352.91	4.74	2111.56	372.32	5.23
30	4.95	357.64	4.74	1920.01	338.55	4.76
30	4.95	357.64	4.74	1920.01	338.55	4.76
31	4.95	362.85	5.72	1498.95	264.31	3.71
31	4.95	362.85	5.72	1498.95	264.31	3.71
32	4.95	368.55	5.72	1489.13	262.57	3.69

32	4.95	368.55	5.72	1489.13	262.57	3.69
33	4.95	373.57	4.35	1475.77	260.22	3.66
33	4.95	373.57	4.35	1475.77	260.22	3.66
34	4.95	377.90	4.35	1449.37	255.56	3.59
34	4.95	377.90	4.35	1449.37	255.56	3.59
35	4.95	382.23	4.35	1422.96	250.91	3.53
35	4.95	382.23	4.35	1422.96	250.91	3.53
36	4.95	386.81	4.84	1388.82	244.89	3.44
36	4.95	386.81	4.84	1388.82	244.89	3.44
37	4.95	391.63	4.84	1364.79	240.65	3.38
37	4.95	391.63	4.84	1364.79	240.65	3.38
38	4.95	396.46	4.84	1340.76	236.41	3.32
38	4.95	396.46	4.84	1340.76	236.41	3.32
39	4.95	401.28	4.84	1316.73	232.18	3.26
39	4.95	401.28	4.84	1316.73	232.18	3.26
40	4.95	406.10	4.84	1292.71	227.94	3.20
40	4.95	406.10	4.84	1292.71	227.94	3.20
41	4.95	410.92	4.84	1268.68	223.70	3.14
41	4.95	410.92	4.84	1268.68	223.70	3.14
42	4.95	415.74	4.84	1244.65	219.47	3.08
42	4.95	415.74	4.84	1244.65	219.47	3.08
43	58.06	418.38	0.84	1207.19	212.86	2.99
43	58.06	418.38	0.84	1207.19	212.86	2.99
44	58.06	419.70	4.16	1064.33	1065.07	14.97
44	58.06	419.70	4.16	1064.33	1065.07	14.97
45	52.79	422.31	5.00	855.25	934.42	13.13
45	52.79	422.31	5.00	855.25	934.42	13.13
46	54.21	425.29	5.00	625.78	791.03	11.12
46	54.21	425.29	5.00	625.78	791.03	11.12
47	52.26	428.28	5.00	398.99	649.32	9.12
47	52.26	428.28	5.00	398.99	649.32	9.12
48	46.63	431.53	5.00	191.21	119.48	1.68
48	46.63	431.53	5.00	191.21	119.48	1.68
49	55.26	433.77	1.87	43.63	27.26	0.38
49	55.26	433.77	1.87	43.63	27.26	0.38

Table 4 - Base Force Data on the 49 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-36.83	267.14	3.07	347.72	830.72	11.67
1	-36.83	267.14	3.07	347.72	830.72	11.67
2	-1.72	270.86	5.00	1148.97	1717.95	24.14
2	-1.72	270.86	5.00	1148.97	1717.95	24.14
3	-44.65	275.14	5.00	2283.62	2426.96	34.10
3	-44.65	275.14	5.00	2283.62	2426.96	34.10
4	-44.84	278.69	5.00	4415.69	3759.23	52.82
4	-44.84	278.69	5.00	4415.69	3759.23	52.82
5	-15.48	282.87	5.00	5836.61	4647.12	65.30
5	-15.48	282.87	5.00	5836.61	4647.12	65.30
6	-15.78	287.69	5.00	6647.27	5153.68	72.42
6	-15.78	287.69	5.00	6647.27	5153.68	72.42
7	-19.95	292.44	5.00	7576.49	5734.32	80.58
7	-19.95	292.44	5.00	7576.49	5734.32	80.58
8	-45.00	296.56	5.00	9219.77	6761.15	95.01
8	-45.00	296.56	5.00	9219.77	6761.15	95.01
9	-15.97	300.46	4.44	9398.29	6761.19	95.01
9	-15.97	300.46	4.44	9398.29	6761.19	95.01
10	-15.97	302.87	0.56	1165.82	840.00	11.80
10	-15.97	302.87	0.56	1165.82	840.00	11.80
11	-43.58	303.17	0.09	176.36	127.85	1.80
11	-43.58	303.17	0.09	176.36	127.85	1.80
12	-43.58	304.15	2.62	5502.91	3963.12	55.69
12	-43.58	304.15	2.62	5502.91	3963.12	55.69
13	-43.58	305.93	2.29	5387.28	3824.17	53.74
13	-43.58	305.93	2.29	5387.28	3824.17	53.74
14	-26.70	306.93	0.38	959.00	675.73	9.50
14	-26.70	306.93	0.38	959.00	675.73	9.50

15	-26.70	307.59	1.11	2853.65	2004.58	28.17
15	-26.70	307.59	1.11	2853.65	2004.58	28.17
16	-26.70	309.42	2.99	8056.90	6230.88	87.56
16	-26.70	309.42	2.99	8056.90	6230.88	87.56
17	-26.70	310.99	0.52	1433.04	252.68	3.55
17	-26.70	310.99	0.52	1433.04	252.68	3.55
18	-27.93	313.43	4.99	14383.19	2536.14	35.64
18	-27.93	313.43	4.99	14383.19	2536.14	35.64
19	-27.93	315.64	0.01	25.99	19.70	0.28
19	-27.93	315.64	0.01	25.99	19.70	0.28
20	4.95	315.75	0.21	615.15	159.91	2.25
20	4.95	315.75	0.21	615.15	159.91	2.25
21	4.95	318.34	4.99	15029.98	2650.19	37.24
21	4.95	318.34	4.99	15029.98	2650.19	37.24
22	4.95	323.31	4.99	15215.82	2682.96	37.70
22	4.95	323.31	4.99	15215.82	2682.96	37.70
23	4.95	325.90	0.20	625.50	110.29	1.55
23	4.95	325.90	0.20	625.50	110.29	1.55
24	4.95	328.52	5.05	15513.56	2735.46	38.44
24	4.95	328.52	5.05	15513.56	2735.46	38.44
25	4.95	333.55	5.05	14542.99	2564.32	36.03
25	4.95	333.55	5.05	14542.99	2564.32	36.03
26	4.95	338.58	5.05	13572.43	2393.19	33.63
26	4.95	338.58	5.05	13572.43	2393.19	33.63
27	4.95	343.46	4.74	11831.24	2086.17	29.31
27	4.95	343.46	4.74	11831.24	2086.17	29.31
28	4.95	348.19	4.74	10922.82	1925.99	27.06
28	4.95	348.19	4.74	10922.82	1925.99	27.06
29	4.95	352.91	4.74	10014.39	1765.81	24.81
29	4.95	352.91	4.74	10014.39	1765.81	24.81
30	4.95	357.64	4.74	9105.97	1605.63	22.56
30	4.95	357.64	4.74	9105.97	1605.63	22.56
31	4.95	362.85	5.72	8575.96	1512.17	21.25
31	4.95	362.85	5.72	8575.96	1512.17	21.25
32	4.95	368.55	5.72	8519.76	1502.26	21.11
32	4.95	368.55	5.72	8519.76	1502.26	21.11
33	4.95	373.57	4.35	6418.92	1131.83	15.90
33	4.95	373.57	4.35	6418.92	1131.83	15.90
34	4.95	377.90	4.35	6304.06	1111.58	15.62
34	4.95	377.90	4.35	6304.06	1111.58	15.62
35	4.95	382.23	4.35	6189.20	1091.32	15.34
35	4.95	382.23	4.35	6189.20	1091.32	15.34
36	4.95	386.81	4.84	6722.08	1185.28	16.66
36	4.95	386.81	4.84	6722.08	1185.28	16.66
37	4.95	391.63	4.84	6605.78	1164.78	16.37
37	4.95	391.63	4.84	6605.78	1164.78	16.37
38	4.95	396.46	4.84	6489.48	1144.27	16.08
38	4.95	396.46	4.84	6489.48	1144.27	16.08
39	4.95	401.28	4.84	6373.18	1123.76	15.79
39	4.95	401.28	4.84	6373.18	1123.76	15.79
40	4.95	406.10	4.84	6256.89	1103.26	15.50
40	4.95	406.10	4.84	6256.89	1103.26	15.50
41	4.95	410.92	4.84	6140.59	1082.75	15.21
41	4.95	410.92	4.84	6140.59	1082.75	15.21
42	4.95	415.74	4.84	6024.29	1062.24	14.93
42	4.95	415.74	4.84	6024.29	1062.24	14.93
43	58.06	418.38	0.84	1016.10	179.17	2.52
43	58.06	418.38	0.84	1016.10	179.17	2.52
44	58.06	419.70	4.16	4425.79	4428.86	62.23
44	58.06	419.70	4.16	4425.79	4428.86	62.23
45	52.79	422.31	5.00	4276.23	4672.08	65.65
45	52.79	422.31	5.00	4276.23	4672.08	65.65
46	54.21	425.29	5.00	3128.89	3955.15	55.58
46	54.21	425.29	5.00	3128.89	3955.15	55.58
47	52.26	428.28	5.00	1994.96	3246.59	45.62
47	52.26	428.28	5.00	1994.96	3246.59	45.62
48	46.63	431.53	5.00	956.03	597.39	8.39
48	46.63	431.53	5.00	956.03	597.39	8.39
49	55.26	433.77	1.87	81.52	50.94	0.72
49	55.26	433.77	1.87	81.52	50.94	0.72

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 49 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
34	12000.0	0.0	12000.0	90.00	0.934498E+03

Sum of the Resisting Forces = 94638.31 (lbs)

Average Available Shear Strength = 503.85(psf)

Sum of the Driving Forces = 1430.16 (lbs)

Average Mobilized Shear Stress = 7.61(psf)

Total length of the failure surface = 187.83(ft)

Factor of Safety Balance Check: FS = 66.17302

Janbu's Correction Factor (fo) = 1.0638

Janub's FS Corrected = 70.39410

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

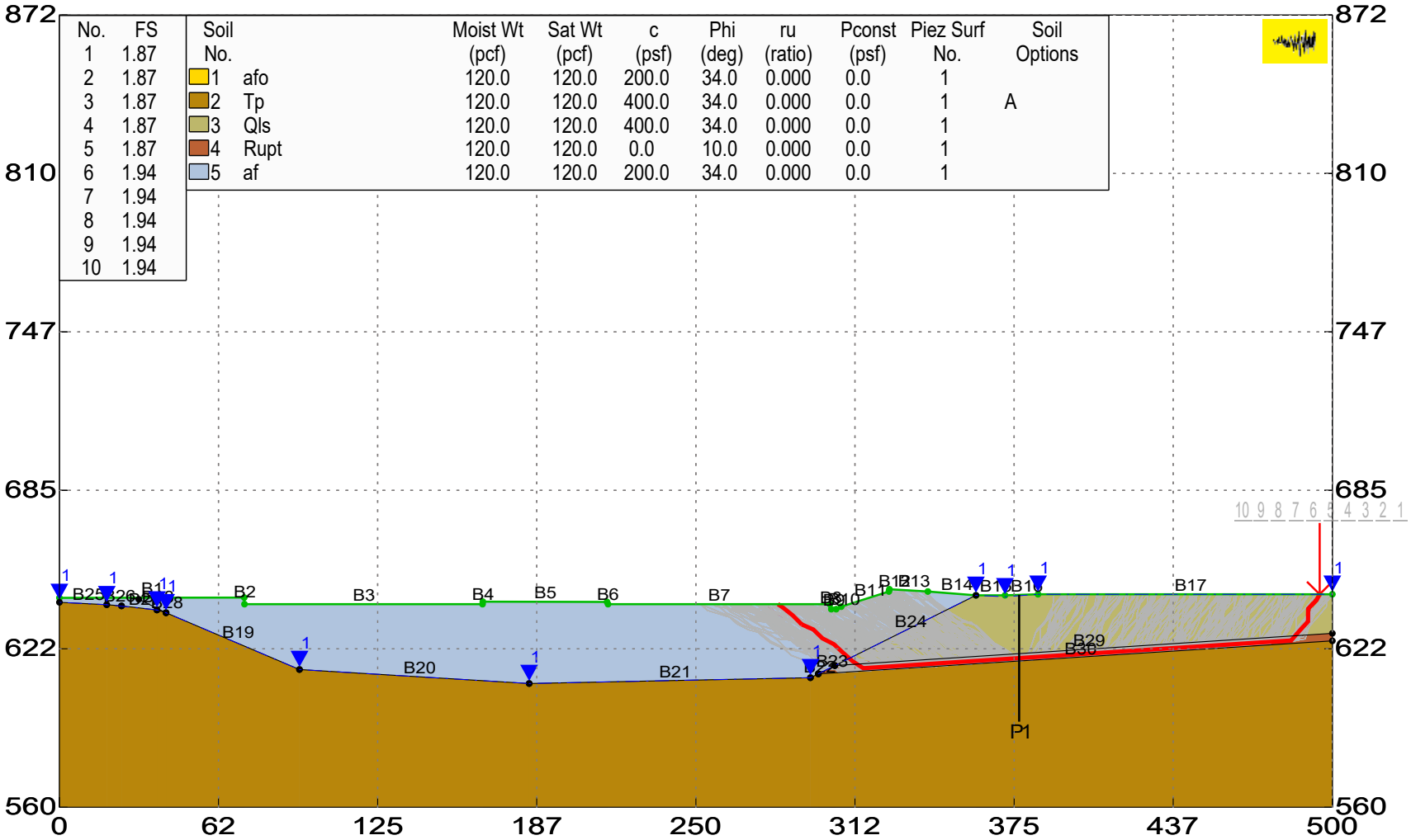
Royal Vista - Cross Section 9
Stage 6 (Final Condition - Rupture (Seismic))

LGC Geotechnical / BPP

\Sec 9 - Stage 6 (Final Condition - Rupture(Seismic).gsd

No.	FS
1	1.87
2	1.87
3	1.87
4	1.87
5	1.87
6	1.94
7	1.94
8	1.94
9	1.94
10	1.94

Soil No.		Moist Wt (pcf)	Sat Wt (pcf)	c (psf)	Phi (deg)	ru (ratio)	Pconst (psf)	Piez Surf No.	Soil Options
1	afo	120.0	120.0	200.0	34.0	0.000	0.0	1	
2	Tp	120.0	120.0	400.0	34.0	0.000	0.0	1	A
3	Qls	120.0	120.0	400.0	34.0	0.000	0.0	1	
4	Rupt	120.0	120.0	0.0	10.0	0.000	0.0	1	
5	af	120.0	120.0	200.0	34.0	0.000	0.0	1	



GEOSTASE FS = 1.87

Simplified Janbu (Corrected) Method

kh = 0.15000

GEOSTASE Slope Stability Analysis

GREGORY GEOTECHNICAL

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

*** 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: 7/ 7/ 2023
Analysis Time:
Analysis By: LGC Geotechnical / BPP
Input File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 6 (Final Condition - Rupture(Seismic).gsd
Output File Name: Z:\2020\20080-01 Project Dimensions - Royal Vista \Engineering\2023_07 Slope Stability Response to Comments\9-9'\Sec 9 - Stage 6 (Final Condition - Rupture(Seismic).OUT
Unit System: English

PROJECT: Royal Vista - Cross Section 9

DESCRIPTION: Stage 6 (Final Condition - Rupture (Seismic))

BOUNDARY DATA

17 Surface Boundaries
30 Total Boundaries

Boundary No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Soil Type Below Bnd
1	0.000	642.600	72.600	642.700	5
2	72.600	642.700	72.700	640.100	5
3	72.700	640.100	166.200	640.100	5
4	166.200	640.100	166.300	641.100	5
5	166.300	641.100	215.100	641.000	5
6	215.100	641.000	215.500	640.100	5
7	215.500	640.100	302.600	640.100	5
8	302.600	640.100	303.200	638.100	5
9	303.200	638.100	305.100	638.100	5
10	305.100	638.100	307.100	639.100	5
11	307.100	639.100	325.800	645.100	5
12	325.800	645.100	326.000	646.000	5
13	326.000	646.000	341.100	645.100	5
14	341.100	645.100	360.000	643.600	5
15	360.000	643.600	371.400	643.600	3
16	371.400	643.600	384.400	644.000	3
17	384.400	644.000	500.000	644.000	3
18	31.200	642.000	41.900	636.700	5
19	41.900	636.700	94.300	614.300	2
20	94.300	614.300	184.500	608.800	2
21	184.500	608.800	295.000	611.100	2
22	295.000	611.100	298.100	612.600	2
23	298.100	612.600	304.600	615.900	4
24	304.600	615.900	360.000	643.600	3
25	0.000	640.800	18.600	639.900	2
26	18.600	639.900	24.400	639.400	2

27	24.400	639.400	38.300	637.800	2
28	38.300	637.800	41.900	636.700	2
29	304.600	615.900	500.000	628.600	4
30	298.100	612.600	500.000	625.600	2

User Specified X-Origin = 0.000(ft)

User Specified Y-Origin = 560.000(ft)

MOHR-COULOMB SOIL PARAMETERS

5 Type(s) of Soil Defined

Soil Number and Description	Moist Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Ratio(ru)	Pressure Constant (psf)	Water Surface Option No.
1 afo	120.0	120.0	200.00	34.00	0.000	0.0	1 0
2 Tp	120.0	120.0	400.00	34.00	0.000	0.0	1 0
3 Qls	120.0	120.0	400.00	34.00	0.000	0.0	1 0
4 Rupt	120.0	120.0	0.00	10.00	0.000	0.0	1 0
5 af	120.0	120.0	200.00	34.00	0.000	0.0	1 0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	3.0	400.00	34.00
2	7.0	300.00	12.00
3	90.0	400.00	34.00

WATER SURFACE DATA

1 Water Surface(s) Defined

Unit Weight of Water = 62.400 (pcf)

Water Surface No. 1 Specified by 11 Coordinate Points
Pore Pressure Inclination Factor = 0.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	640.80
2	18.60	639.90
3	38.30	637.80
4	41.90	636.70
5	94.30	614.30
6	184.50	608.80
7	295.00	611.10
8	360.00	643.60
9	371.40	643.00

10	384.40	644.00
11	500.00	644.00

Drained Shear Strength Reduction Factor applied after first stage = 1.0000

SEISMIC (EARTHQUAKE) DATA

Specified Peak Ground Acceleration Coefficient (PGA) = 0.000(g)
Default Velocity = 0.000(ft) per second
Specified Horizontal Earthquake Coefficient (kh) = 0.15000(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 Ignored.

Tieback No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	ULength (ft)	BLength (ft)
1	330.00	628.60	226000.0	20.0	35.00	23.0	25.0

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.

TIEBACK ANCHOR LOAD DATA HAS BEEN SUPPRESSED

PIER/PILE LOAD(S)
1 Pier/Pile Load(s) Specified

Pier/Pile No.	X-Pos (ft)	Y-Pos (ft)	Load (lbs)	Spacing (ft)	Inclination (deg)	Length (ft)	Force Incl. Factor
1	377.00	643.77	12000.0	1.0	90.00	50.0	0.00

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

NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
Assuming A Uniform Distribution Of Load Horizontally Between
Individual Piers/Piles.

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 = 5.00(ft)

Zone No.	X - 1 (ft)	Y - 1 (ft)	X - 2 (ft)	Y - 2 (ft)	Height (ft)
1	305.00	614.50	375.00	619.00	3.00
2	380.00	619.70	490.00	626.70	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 = 55

Number of Trial Surfaces With Valid FS = 945

Percentage of Trial Surfaces With Non-Converged and/or
Non-Valid FS Solutions of the Total Attempted = 5.5 %

Statistical Data On All Valid FS Values:
FS Max = 13.236 FS Min = 1.867 FS Ave = 3.447
Standard Deviation = 1.555 Coefficient of Variation = 45.12 %

Critical Surface is Sequence Number 110 of Those Analyzed.

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

COORDINATES OF INTERSECTION OF PIER/PILE(S) WITH FAILURE SURFACE

Pier/Pile No.	X-Int.	Y-Int.
1	377.00	618.83

Factor Of Safety For The Critical or Specified Surface = 1.867

Table 1 - Geometry Data on the 56 Slices

Slice No.	Width (ft)	Height (ft)	X-Cntr (ft)	Y-Cntr-Base (ft)	Y-Cntr-Top (ft)	Alpha (deg)	Beta (deg)	Base Length (ft)
1	1.93	0.66	283.18	639.44	640.10	-34.16	0.00	2.34
2	3.89	2.88	286.09	637.22	640.10	-38.94	0.00	5.00
3	3.55	6.22	289.81	633.88	640.10	-44.80	0.00	5.00
4	4.57	8.99	293.87	631.11	640.10	-23.96	0.00	5.00
5	3.57	11.76	297.93	628.34	640.10	-44.51	0.00	5.00
6	2.88	14.24	301.16	625.86	640.10	-26.72	0.00	3.23
7	0.60	14.12	302.90	624.98	639.10	-26.72	-73.30	0.67
8	0.98	13.51	303.69	624.59	638.10	-26.72	0.00	1.10
9	0.92	14.19	304.64	623.91	638.10	-43.19	0.00	1.26
10	2.00	16.06	306.10	622.54	638.60	-43.19	26.57	2.74
11	0.73	17.96	307.46	621.26	639.22	-43.19	17.79	1.00
12	2.43	19.90	309.04	619.82	639.72	-41.98	17.79	3.27
13	1.29	22.17	310.90	618.15	640.32	-41.98	17.79	1.73
14	1.70	23.78	312.39	617.02	640.80	-33.22	17.79	2.03
15	2.49	25.82	314.48	615.65	641.47	-33.22	17.79	2.97
16	5.04	27.68	318.25	615.00	642.68	3.73	17.79	5.05
17	5.04	28.97	323.28	615.33	644.29	3.73	17.79	5.05
18	0.20	30.05	325.90	615.50	645.55	3.73	77.47	0.20
19	5.03	30.18	328.52	615.67	645.85	3.73	-3.41	5.04
20	5.03	29.55	333.55	616.00	645.55	3.73	-3.41	5.04

21	5.03	28.93	338.58	616.32	645.25	3.73	-3.41	5.04
22	4.72	28.27	343.46	616.64	644.91	3.73	-4.54	4.74
23	4.72	27.59	348.19	616.95	644.54	3.73	-4.54	4.74
24	4.72	26.90	352.91	617.26	644.16	3.73	-4.54	4.74
25	4.73	26.22	357.64	617.57	643.79	3.73	-4.54	4.74
26	5.70	25.69	362.85	617.91	643.60	3.73	0.00	5.71
27	5.70	25.32	368.55	618.28	643.60	3.73	0.00	5.71
28	4.33	25.06	373.57	618.61	643.67	3.73	1.76	4.34
29	4.33	24.91	377.90	618.89	643.80	3.73	1.76	4.34
30	4.33	24.76	382.23	619.17	643.93	3.73	1.76	4.34
31	4.97	24.53	386.89	619.47	644.00	3.73	0.00	4.98
32	4.97	24.20	391.86	619.80	644.00	3.73	0.00	4.98
33	4.97	23.88	396.83	620.12	644.00	3.73	0.00	4.98
34	4.97	23.55	401.80	620.45	644.00	3.73	0.00	4.98
35	4.97	23.23	406.77	620.77	644.00	3.73	0.00	4.98
36	4.97	22.91	411.74	621.09	644.00	3.73	0.00	4.98
37	4.97	22.58	416.71	621.42	644.00	3.73	0.00	4.98
38	4.97	22.26	421.68	621.74	644.00	3.73	0.00	4.98
39	4.97	21.93	426.65	622.07	644.00	3.73	0.00	4.98
40	4.97	21.61	431.62	622.39	644.00	3.73	0.00	4.98
41	4.97	21.28	436.59	622.72	644.00	3.73	0.00	4.98
42	4.97	20.96	441.56	623.04	644.00	3.73	0.00	4.98
43	4.97	20.64	446.54	623.36	644.00	3.73	0.00	4.98
44	4.97	20.31	451.51	623.69	644.00	3.73	0.00	4.98
45	4.97	19.99	456.48	624.01	644.00	3.73	0.00	4.98
46	4.97	19.66	461.45	624.34	644.00	3.73	0.00	4.98
47	4.97	19.34	466.42	624.66	644.00	3.73	0.00	4.98
48	4.97	19.01	471.39	624.99	644.00	3.73	0.00	4.98
49	4.97	18.69	476.36	625.31	644.00	3.73	0.00	4.98
50	4.97	18.37	481.33	625.63	644.00	3.73	0.00	4.98
51	1.62	17.28	484.63	626.72	644.00	48.85	0.00	2.47
52	1.67	15.39	486.27	628.61	644.00	48.85	0.00	2.53
53	3.33	12.57	488.77	631.43	644.00	48.24	0.00	5.00
54	0.05	8.21	490.46	635.79	644.00	89.38	0.00	5.00
55	3.45	3.90	492.22	640.10	644.00	46.36	0.00	5.00
56	1.08	1.05	494.48	642.95	644.00	62.71	0.00	2.35

Table 2 - Force Data On The 56 Slices (Excluding Reinforcement)

Slice No.	Weight (lbs)	Ubeta Force Top (lbs)	Ualpha Force Bot (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Distributed Load (lbs)
1	152.2	0.0	0.0	22.8	0.0	0.0
2	1345.6	0.0	0.0	201.8	0.0	0.0
3	2646.6	0.0	0.0	397.0	0.0	0.0
4	4930.9	0.0	0.0	739.6	0.0	0.0
5	5032.3	0.0	0.0	754.8	0.0	0.0
6	4926.5	0.0	0.0	739.0	0.0	0.0
7	1016.3	0.0	0.0	152.4	0.0	0.0
8	1594.1	0.0	0.0	239.1	0.0	0.0
9	1561.7	0.0	0.0	234.3	0.0	0.0
10	3854.6	0.0	0.0	578.2	0.0	0.0
11	1569.9	0.0	0.0	235.5	0.0	0.0
12	5804.2	0.0	0.0	870.6	0.0	0.0
13	3421.9	0.0	77.8	513.3	0.0	0.0
14	4839.0	0.0	281.3	725.8	0.0	0.0
15	7707.2	0.0	771.0	1156.1	0.0	0.0
16	16726.9	0.0	1946.4	2509.0	0.0	0.0
17	17504.9	0.0	2498.0	2625.7	0.0	0.0
18	721.3	0.0	110.6	108.2	0.0	0.0
19	18230.6	0.0	3069.8	2734.6	0.0	0.0
20	17851.1	0.0	3620.8	2677.7	0.0	0.0
21	17471.6	0.0	4171.8	2620.7	0.0	0.0
22	16029.6	0.0	4417.7	2404.4	0.0	0.0
23	15642.2	0.0	4903.3	2346.3	0.0	0.0
24	15254.8	0.0	5388.9	2288.2	0.0	0.0
25	14867.5	0.0	5874.5	2230.1	0.0	0.0
26	17574.6	0.0	9079.6	2636.2	0.0	0.0

27	17320.3	0.0	8840.8	2598.0	0.0	0.0
28	13032.0	0.0	6616.4	1954.8	0.0	0.0
29	12954.4	0.0	6630.1	1943.2	0.0	0.0
30	12876.7	0.0	6643.7	1931.5	0.0	0.0
31	14629.9	0.0	7623.7	2194.5	0.0	0.0
32	14436.5	0.0	7522.9	2165.5	0.0	0.0
33	14243.1	0.0	7422.1	2136.5	0.0	0.0
34	14049.7	0.0	7321.4	2107.5	0.0	0.0
35	13856.3	0.0	7220.6	2078.4	0.0	0.0
36	13662.9	0.0	7119.8	2049.4	0.0	0.0
37	13469.5	0.0	7019.0	2020.4	0.0	0.0
38	13276.1	0.0	6918.3	1991.4	0.0	0.0
39	13082.7	0.0	6817.5	1962.4	0.0	0.0
40	12889.4	0.0	6716.7	1933.4	0.0	0.0
41	12696.0	0.0	6615.9	1904.4	0.0	0.0
42	12502.6	0.0	6515.2	1875.4	0.0	0.0
43	12309.2	0.0	6414.4	1846.4	0.0	0.0
44	12115.8	0.0	6313.6	1817.4	0.0	0.0
45	11922.4	0.0	6212.8	1788.4	0.0	0.0
46	11729.0	0.0	6112.1	1759.4	0.0	0.0
47	11535.6	0.0	6011.3	1730.3	0.0	0.0
48	11342.2	0.0	5910.5	1701.3	0.0	0.0
49	11148.9	0.0	5809.7	1672.3	0.0	0.0
50	10955.5	0.0	5708.9	1643.3	0.0	0.0
51	3366.0	0.0	2659.8	504.9	0.0	0.0
52	3078.5	0.0	2432.6	461.8	0.0	0.0
53	5025.1	0.0	3923.3	753.8	0.0	0.0
54	53.2	0.0	2561.5	8.0	0.0	0.0
55	1615.1	0.0	1217.0	242.3	0.0	0.0
56	135.4	0.0	153.6	20.3	0.0	0.0

TOTAL WEIGHT OF SLIDING MASS = 543587.82(lbs)

EFFECTIVE WEIGHT OF SLIDING MASS = 329048.05(lbs)

TOTAL AREA OF SLIDING MASS = 4529.90(ft2)

TABLE 2A - SOIL STRENGTH & SOIL OPTIONS DATA ON THE 56 SLICES

Slice No.	Soil Type	Cohesion (psf)	Phi(Deg)	Options
1	5	200.00	34.00	
2	5	200.00	34.00	
3	5	200.00	34.00	
4	5	200.00	34.00	
5	5	200.00	34.00	
6	5	200.00	34.00	
7	5	200.00	34.00	
8	5	200.00	34.00	
9	5	200.00	34.00	
10	5	200.00	34.00	
11	5	200.00	34.00	
12	5	200.00	34.00	
13	3	400.00	34.00	
14	3	400.00	34.00	
15	4	0.00	10.00	
16	4	0.00	10.00	
17	4	0.00	10.00	
18	4	0.00	10.00	
19	4	0.00	10.00	
20	4	0.00	10.00	
21	4	0.00	10.00	
22	4	0.00	10.00	
23	4	0.00	10.00	
24	4	0.00	10.00	
25	4	0.00	10.00	
26	4	0.00	10.00	
27	4	0.00	10.00	
28	4	0.00	10.00	
29	4	0.00	10.00	
30	4	0.00	10.00	

31	4	0.00	10.00
32	4	0.00	10.00
33	4	0.00	10.00
34	4	0.00	10.00
35	4	0.00	10.00
36	4	0.00	10.00
37	4	0.00	10.00
38	4	0.00	10.00
39	4	0.00	10.00
40	4	0.00	10.00
41	4	0.00	10.00
42	4	0.00	10.00
43	4	0.00	10.00
44	4	0.00	10.00
45	4	0.00	10.00
46	4	0.00	10.00
47	4	0.00	10.00
48	4	0.00	10.00
49	4	0.00	10.00
50	4	0.00	10.00
51	4	0.00	10.00
52	3	400.00	34.00
53	3	400.00	34.00
54	3	400.00	34.00
55	3	400.00	34.00
56	3	400.00	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 56 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Stress (psf)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-34.16	283.18	2.34	209.17	341.09	178.89
1	-34.16	283.18	2.34	209.17	341.09	178.89
2	-38.94	286.09	5.00	631.01	625.62	328.11
2	-38.94	286.09	5.00	631.01	625.62	328.11
3	-44.80	289.81	5.00	1378.33	1129.69	592.48
3	-44.80	289.81	5.00	1378.33	1129.69	592.48
4	-23.96	293.87	5.00	1358.89	1116.58	585.60
4	-23.96	293.87	5.00	1358.89	1116.58	585.60
5	-44.51	297.93	5.00	2430.64	1839.49	964.74
5	-44.51	297.93	5.00	2430.64	1839.49	964.74
6	-26.72	301.16	3.23	2183.29	1672.65	877.24
6	-26.72	301.16	3.23	2183.29	1672.65	877.24
7	-26.72	302.90	0.67	2164.98	1660.30	870.76
7	-26.72	302.90	0.67	2164.98	1660.30	870.76
8	-26.72	303.69	1.10	2075.70	1600.08	839.18
8	-26.72	303.69	1.10	2075.70	1600.08	839.18
9	-43.19	304.64	1.26	2812.80	2097.26	1099.93
9	-43.19	304.64	1.26	2812.80	2097.26	1099.93
10	-43.19	306.10	2.74	3161.58	2332.51	1223.31
10	-43.19	306.10	2.74	3161.58	2332.51	1223.31
11	-43.19	307.46	1.00	3515.65	2571.34	1348.56
11	-43.19	307.46	1.00	3515.65	2571.34	1348.56
12	-41.98	309.04	3.27	3784.31	2752.55	1443.60
12	-41.98	309.04	3.27	3784.31	2752.55	1443.60
13	-41.98	310.90	1.73	4284.01	3289.60	1725.26
13	-41.98	310.90	1.73	4284.01	3289.60	1725.26
14	-33.22	312.39	2.03	3811.81	2971.10	1558.22
14	-33.22	312.39	2.03	3811.81	2971.10	1558.22
15	-33.22	314.48	2.97	3037.01	535.51	280.85
15	-33.22	314.48	2.97	3037.01	535.51	280.85
16	3.73	318.25	5.05	2916.92	514.33	269.75

16	3.73	318.25	5.05	2916.92	514.33	269.75
17	3.73	323.28	5.05	2961.81	522.25	273.90
17	3.73	323.28	5.05	2961.81	522.25	273.90
18	3.73	325.90	0.20	3034.97	535.15	280.66
18	3.73	325.90	0.20	3034.97	535.15	280.66
19	3.73	328.52	5.04	2993.97	527.92	276.87
19	3.73	328.52	5.04	2993.97	527.92	276.87
20	3.73	333.55	5.04	2810.52	495.57	259.91
20	3.73	333.55	5.04	2810.52	495.57	259.91
21	3.73	338.58	5.04	2627.07	463.22	242.94
21	3.73	338.58	5.04	2627.07	463.22	242.94
22	3.73	343.46	4.74	2443.67	430.89	225.98
22	3.73	343.46	4.74	2443.67	430.89	225.98
23	3.73	348.19	4.74	2260.33	398.56	209.03
23	3.73	348.19	4.74	2260.33	398.56	209.03
24	3.73	352.91	4.74	2076.98	366.23	192.07
24	3.73	352.91	4.74	2076.98	366.23	192.07
25	3.73	357.64	4.74	1893.64	333.90	175.12
25	3.73	357.64	4.74	1893.64	333.90	175.12
26	3.73	362.85	5.71	1484.11	261.69	137.24
26	3.73	362.85	5.71	1484.11	261.69	137.24
27	3.73	368.55	5.71	1481.32	261.20	136.99
27	3.73	368.55	5.71	1481.32	261.20	136.99
28	3.73	373.57	4.34	1474.20	259.94	136.33
28	3.73	373.57	4.34	1474.20	259.94	136.33
29	3.73	377.90	4.34	1453.28	256.25	134.39
29	3.73	377.90	4.34	1453.28	256.25	134.39
30	3.73	382.23	4.34	1432.35	252.56	132.46
30	3.73	382.23	4.34	1432.35	252.56	132.46
31	3.73	386.89	4.98	1403.61	247.49	129.80
31	3.73	386.89	4.98	1403.61	247.49	129.80
32	3.73	391.86	4.98	1385.06	244.22	128.08
32	3.73	391.86	4.98	1385.06	244.22	128.08
33	3.73	396.83	4.98	1366.50	240.95	126.37
33	3.73	396.83	4.98	1366.50	240.95	126.37
34	3.73	401.80	4.98	1347.95	237.68	124.65
34	3.73	401.80	4.98	1347.95	237.68	124.65
35	3.73	406.77	4.98	1329.39	234.41	122.94
35	3.73	406.77	4.98	1329.39	234.41	122.94
36	3.73	411.74	4.98	1310.84	231.14	121.22
36	3.73	411.74	4.98	1310.84	231.14	121.22
37	3.73	416.71	4.98	1292.29	227.86	119.51
37	3.73	416.71	4.98	1292.29	227.86	119.51
38	3.73	421.68	4.98	1273.73	224.59	117.79
38	3.73	421.68	4.98	1273.73	224.59	117.79
39	3.73	426.65	4.98	1255.18	221.32	116.07
39	3.73	426.65	4.98	1255.18	221.32	116.07
40	3.73	431.62	4.98	1236.62	218.05	114.36
40	3.73	431.62	4.98	1236.62	218.05	114.36
41	3.73	436.59	4.98	1218.07	214.78	112.64
41	3.73	436.59	4.98	1218.07	214.78	112.64
42	3.73	441.56	4.98	1199.52	211.51	110.93
42	3.73	441.56	4.98	1199.52	211.51	110.93
43	3.73	446.54	4.98	1180.96	208.24	109.21
43	3.73	446.54	4.98	1180.96	208.24	109.21
44	3.73	451.51	4.98	1162.41	204.96	107.50
44	3.73	451.51	4.98	1162.41	204.96	107.50
45	3.73	456.48	4.98	1143.85	201.69	105.78
45	3.73	456.48	4.98	1143.85	201.69	105.78
46	3.73	461.45	4.98	1125.30	198.42	104.06
46	3.73	461.45	4.98	1125.30	198.42	104.06
47	3.73	466.42	4.98	1106.75	195.15	102.35
47	3.73	466.42	4.98	1106.75	195.15	102.35
48	3.73	471.39	4.98	1088.19	191.88	100.63
48	3.73	471.39	4.98	1088.19	191.88	100.63
49	3.73	476.36	4.98	1069.64	188.61	98.92
49	3.73	476.36	4.98	1069.64	188.61	98.92
50	3.73	481.33	4.98	1051.08	185.33	97.20
50	3.73	481.33	4.98	1051.08	185.33	97.20
51	48.85	484.63	2.47	893.44	157.54	82.62
51	48.85	484.63	2.47	893.44	157.54	82.62
52	48.85	486.27	2.53	438.04	695.46	364.74

52	48.85	486.27	2.53	438.04	695.46	364.74
53	48.24	488.77	5.00	330.87	623.17	326.83
53	48.24	488.77	5.00	330.87	623.17	326.83
54	89.38	490.46	5.00	13.06	8.81	4.62
54	89.38	490.46	5.00	13.06	8.81	4.62
55	46.36	492.22	5.00	160.63	108.35	56.82
55	46.36	492.22	5.00	160.63	108.35	56.82
56	62.71	494.48	2.35	34.68	23.39	12.27
56	62.71	494.48	2.35	34.68	23.39	12.27

Table 4 - Base Force Data on the 56 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Effective Normal Force (lbs)	Available Shear Force (lbs)	Mobilized Shear Force (lbs)
1	-34.16	283.18	2.34	488.81	797.08	418.04
1	-34.16	283.18	2.34	488.81	797.08	418.04
2	-38.94	286.09	5.00	3155.05	3128.11	1640.57
2	-38.94	286.09	5.00	3155.05	3128.11	1640.57
3	-44.80	289.81	5.00	6891.63	5648.46	2962.39
3	-44.80	289.81	5.00	6891.63	5648.46	2962.39
4	-23.96	293.87	5.00	6794.45	5582.91	2928.01
4	-23.96	293.87	5.00	6794.45	5582.91	2928.01
5	-44.51	297.93	5.00	12153.21	9197.44	4823.69
5	-44.51	297.93	5.00	12153.21	9197.44	4823.69
6	-26.72	301.16	3.23	7047.27	5399.01	2831.56
6	-26.72	301.16	3.23	7047.27	5399.01	2831.56
7	-26.72	302.90	0.67	1454.26	1115.25	584.91
7	-26.72	302.90	0.67	1454.26	1115.25	584.91
8	-26.72	303.69	1.10	2284.22	1760.81	923.48
8	-26.72	303.69	1.10	2284.22	1760.81	923.48
9	-43.19	304.64	1.26	3537.84	2637.85	1383.45
9	-43.19	304.64	1.26	3537.84	2637.85	1383.45
10	-43.19	306.10	2.74	8672.52	6398.31	3355.65
10	-43.19	306.10	2.74	8672.52	6398.31	3355.65
11	-43.19	307.46	1.00	3512.62	2569.12	1347.40
11	-43.19	307.46	1.00	3512.62	2569.12	1347.40
12	-41.98	309.04	3.27	12373.19	8999.74	4720.00
12	-41.98	309.04	3.27	12373.19	8999.74	4720.00
13	-41.98	310.90	1.73	7413.03	5692.31	2985.39
13	-41.98	310.90	1.73	7413.03	5692.31	2985.39
14	-33.22	312.39	2.03	7726.01	6022.01	3158.30
14	-33.22	312.39	2.03	7726.01	6022.01	3158.30
15	-33.22	314.48	2.97	9029.44	1592.13	835.01
15	-33.22	314.48	2.97	9029.44	1592.13	835.01
16	3.73	318.25	5.05	14720.60	2595.64	1361.31
16	3.73	318.25	5.05	14720.60	2595.64	1361.31
17	3.73	323.28	5.05	14947.14	2635.58	1382.26
17	3.73	323.28	5.05	14947.14	2635.58	1382.26
18	3.73	325.90	0.20	608.28	107.26	56.25
18	3.73	325.90	0.20	608.28	107.26	56.25
19	3.73	328.52	5.04	15101.65	2662.83	1396.55
19	3.73	328.52	5.04	15101.65	2662.83	1396.55
20	3.73	333.55	5.04	14176.33	2499.67	1310.98
20	3.73	333.55	5.04	14176.33	2499.67	1310.98
21	3.73	338.58	5.04	13251.01	2336.51	1225.41
21	3.73	338.58	5.04	13251.01	2336.51	1225.41
22	3.73	343.46	4.74	11570.89	2040.26	1070.03
22	3.73	343.46	4.74	11570.89	2040.26	1070.03
23	3.73	348.19	4.74	10702.75	1887.18	989.75
23	3.73	348.19	4.74	10702.75	1887.18	989.75
24	3.73	352.91	4.74	9834.60	1734.11	909.47
24	3.73	352.91	4.74	9834.60	1734.11	909.47
25	3.73	357.64	4.74	8966.46	1581.03	829.19
25	3.73	357.64	4.74	8966.46	1581.03	829.19
26	3.73	362.85	5.71	8477.38	1494.79	783.96
26	3.73	362.85	5.71	8477.38	1494.79	783.96
27	3.73	368.55	5.71	8461.44	1491.98	782.48
27	3.73	368.55	5.71	8461.44	1491.98	782.48

28	3.73	373.57	4.34	6401.79	1128.81	592.01
28	3.73	373.57	4.34	6401.79	1128.81	592.01
29	3.73	377.90	4.34	6310.92	1112.79	583.61
29	3.73	377.90	4.34	6310.92	1112.79	583.61
30	3.73	382.23	4.34	6220.05	1096.76	575.21
30	3.73	382.23	4.34	6220.05	1096.76	575.21
31	3.73	386.89	4.98	6991.92	1232.86	646.59
31	3.73	386.89	4.98	6991.92	1232.86	646.59
32	3.73	391.86	4.98	6899.50	1216.57	638.04
32	3.73	391.86	4.98	6899.50	1216.57	638.04
33	3.73	396.83	4.98	6807.07	1200.27	629.49
33	3.73	396.83	4.98	6807.07	1200.27	629.49
34	3.73	401.80	4.98	6714.65	1183.97	620.95
34	3.73	401.80	4.98	6714.65	1183.97	620.95
35	3.73	406.77	4.98	6622.23	1167.68	612.40
35	3.73	406.77	4.98	6622.23	1167.68	612.40
36	3.73	411.74	4.98	6529.80	1151.38	603.85
36	3.73	411.74	4.98	6529.80	1151.38	603.85
37	3.73	416.71	4.98	6437.38	1135.08	595.31
37	3.73	416.71	4.98	6437.38	1135.08	595.31
38	3.73	421.68	4.98	6344.95	1118.79	586.76
38	3.73	421.68	4.98	6344.95	1118.79	586.76
39	3.73	426.65	4.98	6252.53	1102.49	578.21
39	3.73	426.65	4.98	6252.53	1102.49	578.21
40	3.73	431.62	4.98	6160.10	1086.19	569.66
40	3.73	431.62	4.98	6160.10	1086.19	569.66
41	3.73	436.59	4.98	6067.68	1069.90	561.12
41	3.73	436.59	4.98	6067.68	1069.90	561.12
42	3.73	441.56	4.98	5975.25	1053.60	552.57
42	3.73	441.56	4.98	5975.25	1053.60	552.57
43	3.73	446.54	4.98	5882.83	1037.30	544.02
43	3.73	446.54	4.98	5882.83	1037.30	544.02
44	3.73	451.51	4.98	5790.40	1021.00	535.48
44	3.73	451.51	4.98	5790.40	1021.00	535.48
45	3.73	456.48	4.98	5697.98	1004.71	526.93
45	3.73	456.48	4.98	5697.98	1004.71	526.93
46	3.73	461.45	4.98	5605.55	988.41	518.38
46	3.73	461.45	4.98	5605.55	988.41	518.38
47	3.73	466.42	4.98	5513.13	972.11	509.83
47	3.73	466.42	4.98	5513.13	972.11	509.83
48	3.73	471.39	4.98	5420.70	955.82	501.29
48	3.73	471.39	4.98	5420.70	955.82	501.29
49	3.73	476.36	4.98	5328.28	939.52	492.74
49	3.73	476.36	4.98	5328.28	939.52	492.74
50	3.73	481.33	4.98	5235.85	923.22	484.19
50	3.73	481.33	4.98	5235.85	923.22	484.19
51	48.85	484.63	2.47	2204.47	388.71	203.86
51	48.85	484.63	2.47	2204.47	388.71	203.86
52	48.85	486.27	2.53	1109.39	1761.34	923.75
52	48.85	486.27	2.53	1109.39	1761.34	923.75
53	48.24	488.77	5.00	1654.35	3115.87	1634.15
53	48.24	488.77	5.00	1654.35	3115.87	1634.15
54	89.38	490.46	5.00	65.29	44.04	23.10
54	89.38	490.46	5.00	65.29	44.04	23.10
55	46.36	492.22	5.00	803.15	541.73	284.12
55	46.36	492.22	5.00	803.15	541.73	284.12
56	62.71	494.48	2.35	81.60	55.04	28.87
56	62.71	494.48	2.35	81.60	55.04	28.87

****SLICE REINFORCEMENT DATA****

***Pier/Pile Slice Force Data on the 56 Slices (Only Applicable Slices Listed) ***

Slice No.	Horiz Force (lbs)	Vert Force (lbs)	Result Force (lbs)	Inclin(deg)	Moment@Base Cntr (ft/lbs)
29	12000.0	0.0	12000.0	90.00	0.704396E+03

Sum of the Resisting Forces = 103659.77 (lbs)

Average Available Shear Strength = 444.63(psf)

Sum of the Driving Forces = 58466.39 (lbs)

Average Mobilized Shear Stress = 250.78(psf)

Total length of the failure surface = 233.14(ft)

Factor of Safety Balance Check: FS = 1.77298

Janbu's Correction Factor (fo) = 1.0528

Janub's FS Corrected = 1.86664

The FS Calculation To Determine The Seismic Yield Coefficient (ky) Did Not Converge in 30 Iterations.

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

Appendix E
General Grading and Earthwork Recommendations

General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the project plans and specifications. The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of “equipment” of work and the estimated quantities of daily earthwork

contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the
Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

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

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be over-excavated as specified in the following section. Scarification shall continue until soils are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Over-excavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

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

3.0 Fill Material

3.1 General

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

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of the geotechnical consultant. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

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

4.6 ***Frequency of Compaction Testing***

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 ***Compaction Test Locations***

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than
5 feet apart from potential test locations shall be provided.

5.0 ***Subdrain Installation***

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 ***Excavation***

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

7.0 ***Trench Backfills***

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

7.2 All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over

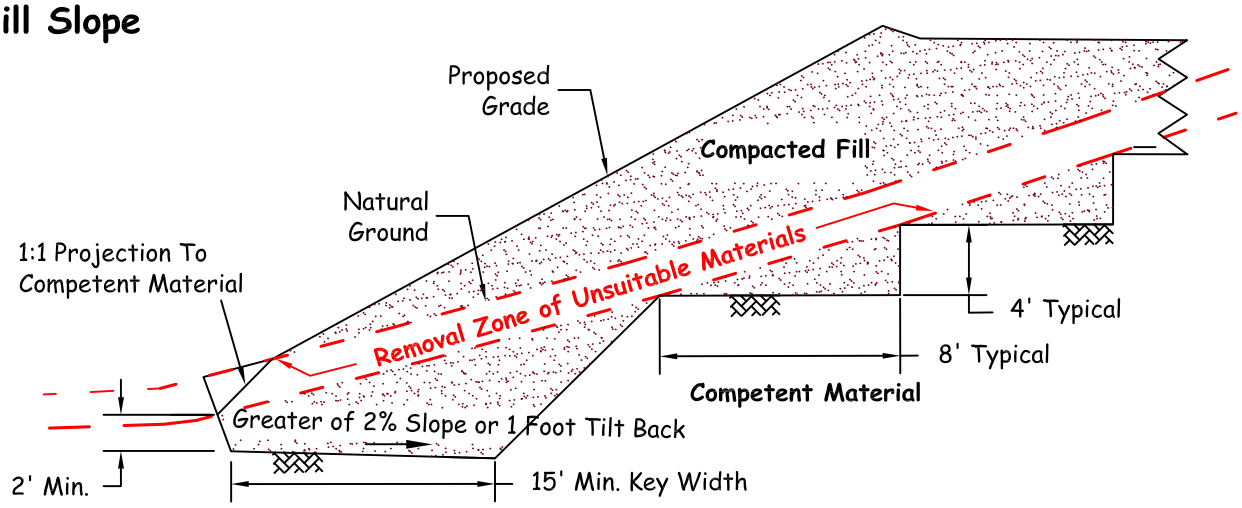
the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

7.3 The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

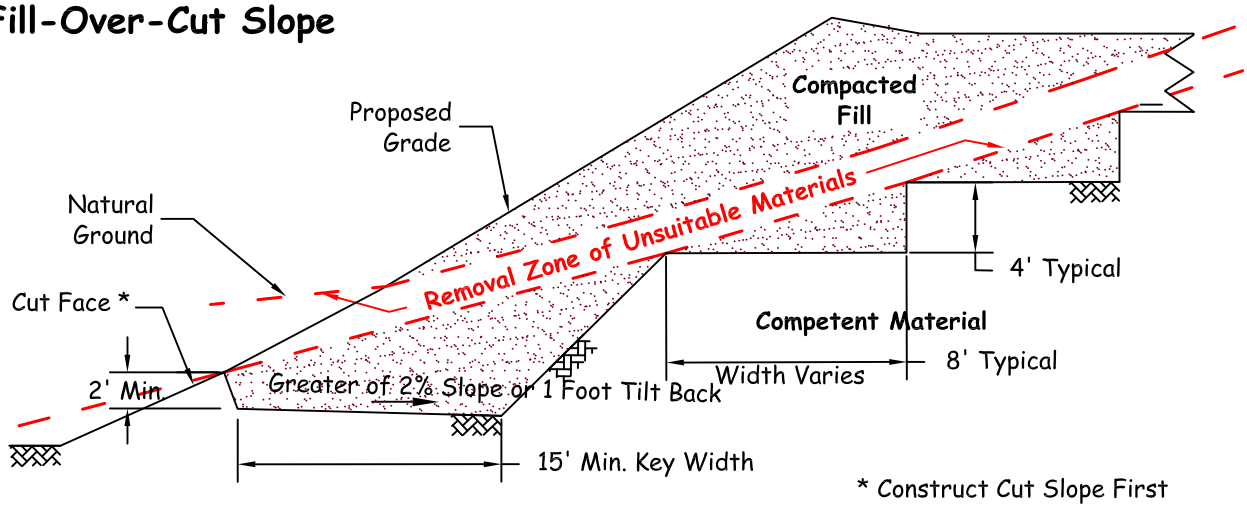
7.4 The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

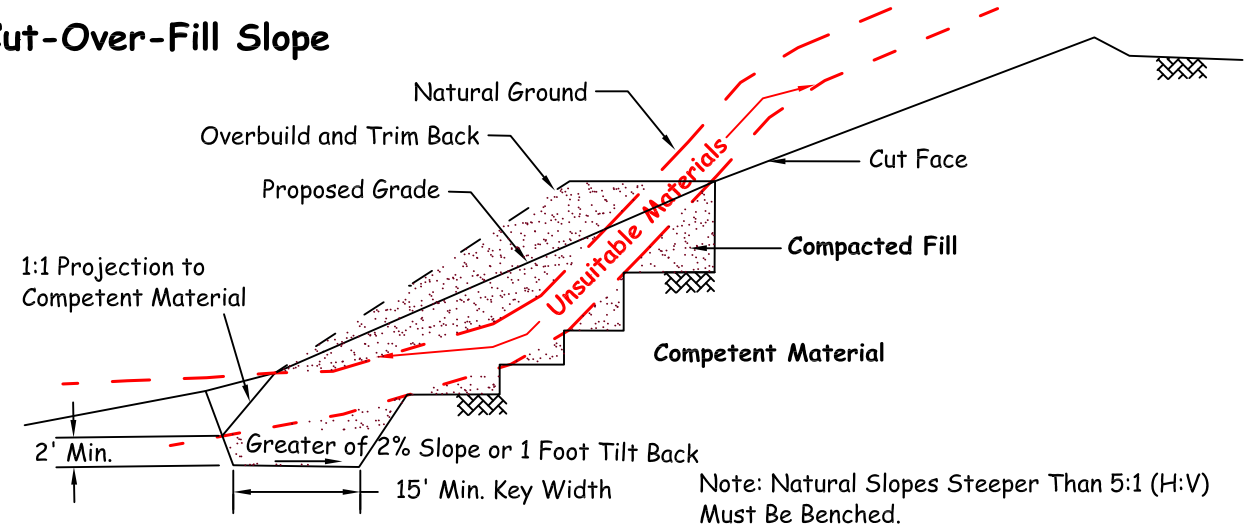
Fill Slope



Fill-Over-Cut Slope



Cut-Over-Fill Slope



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

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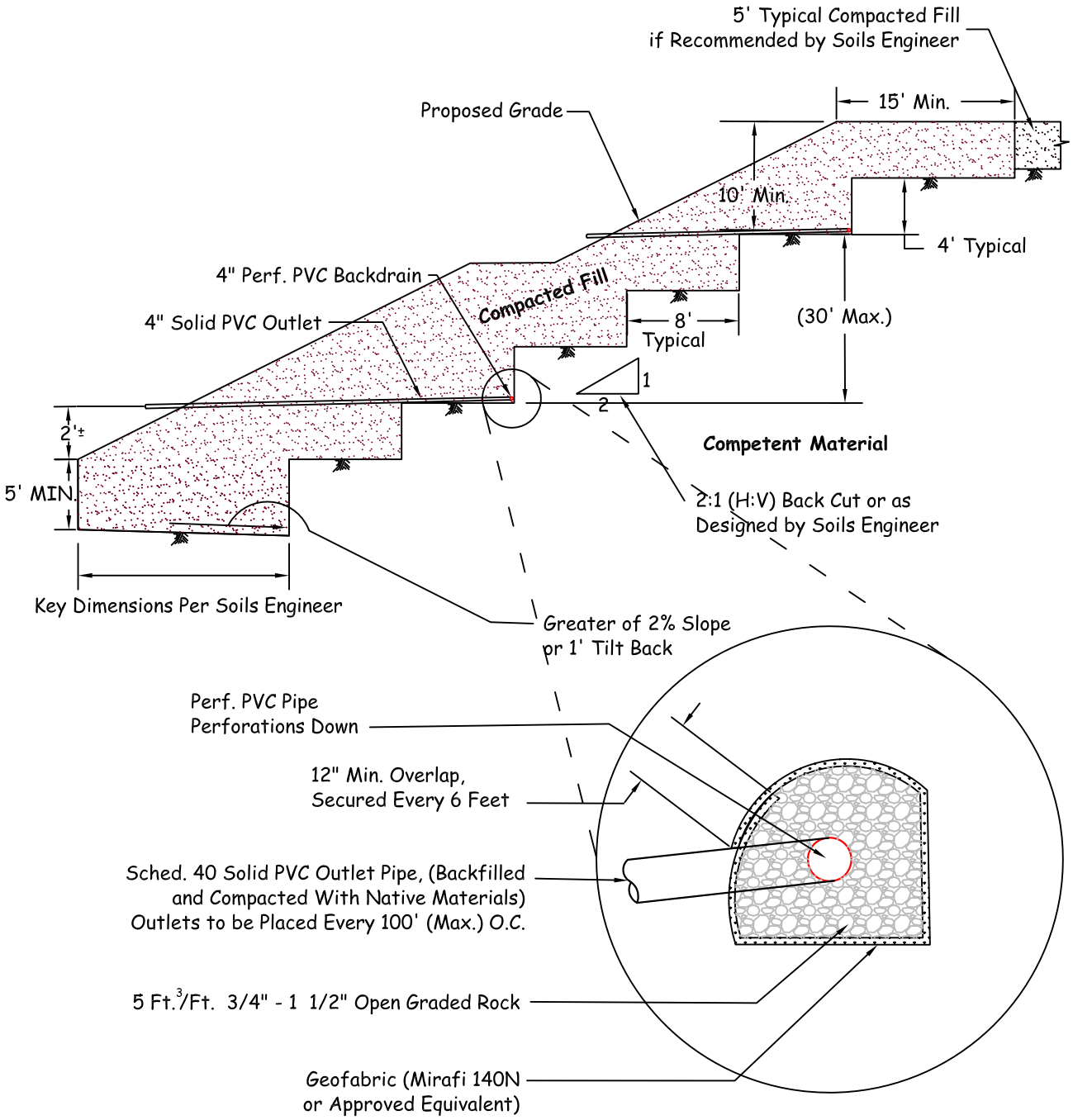
KEYING AND BENCHING



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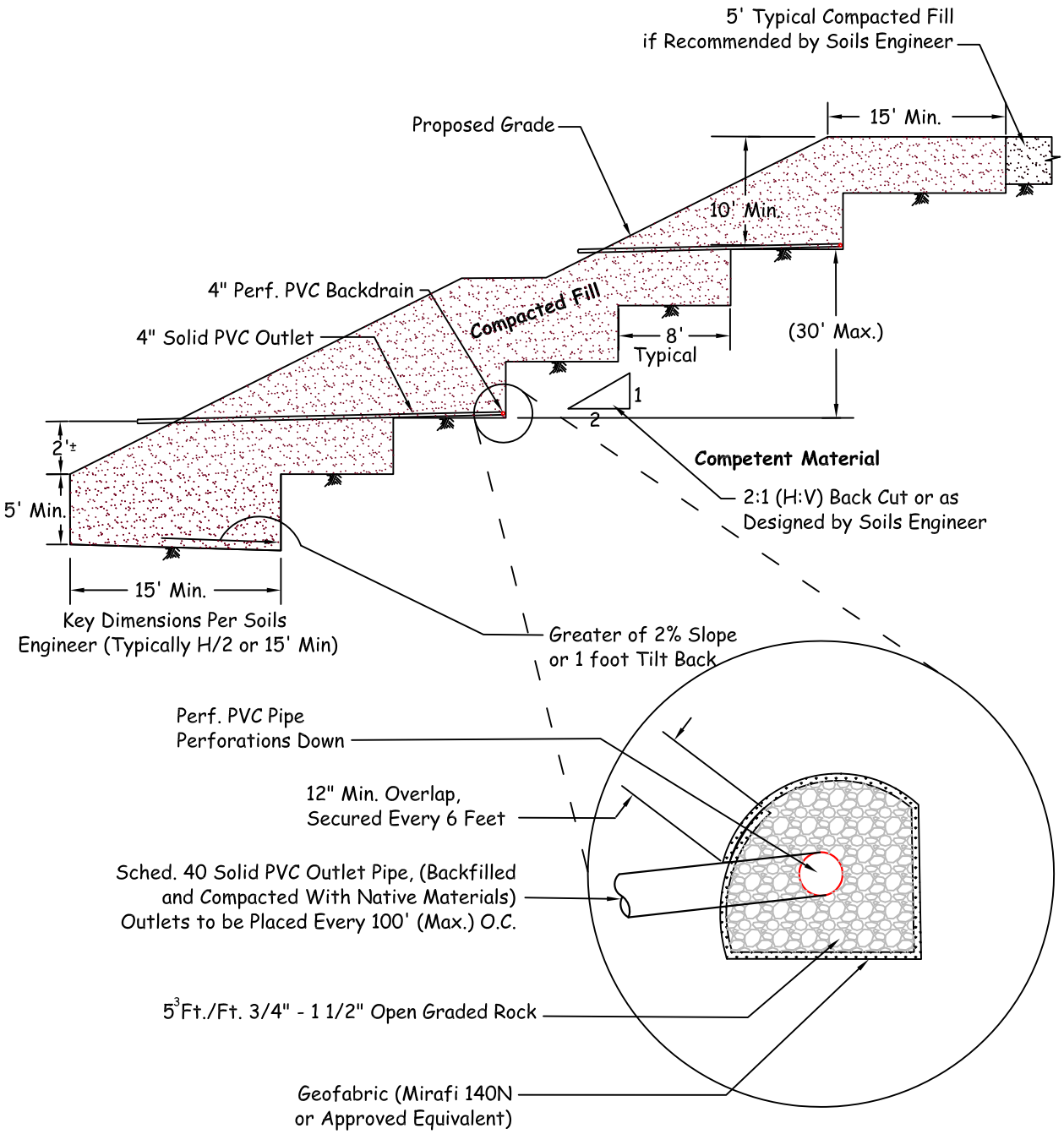
TYPICAL BUTTRESS DETAIL



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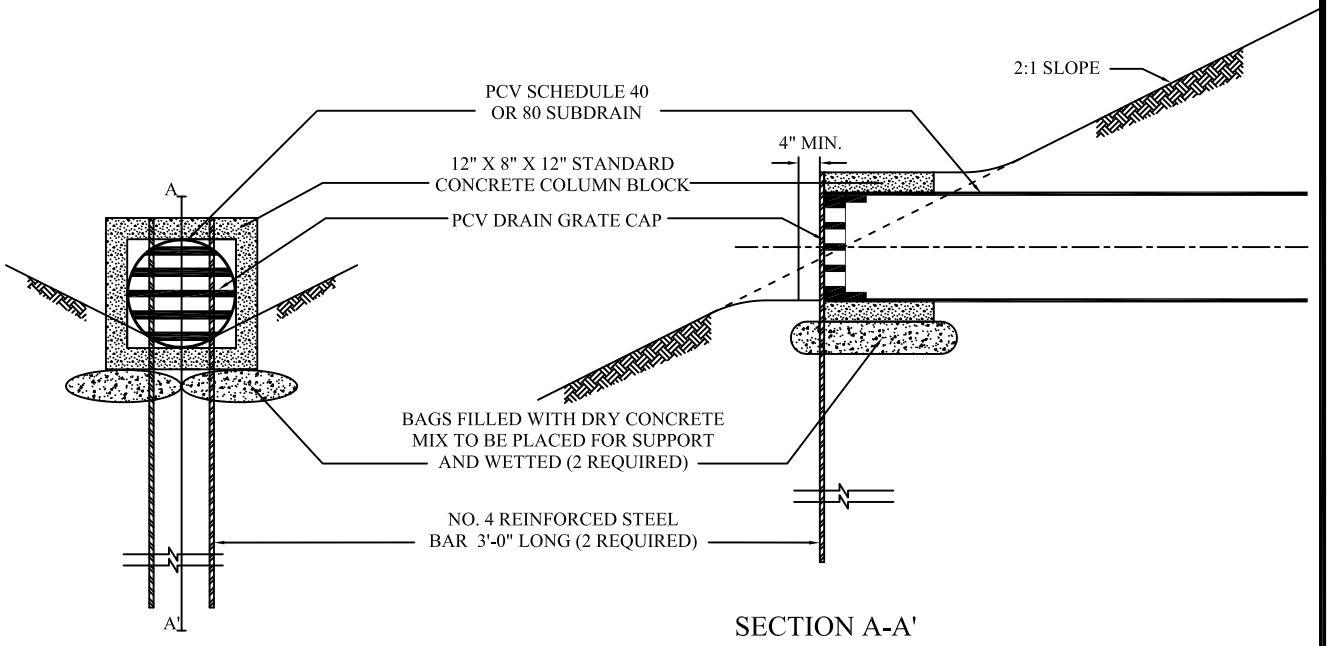
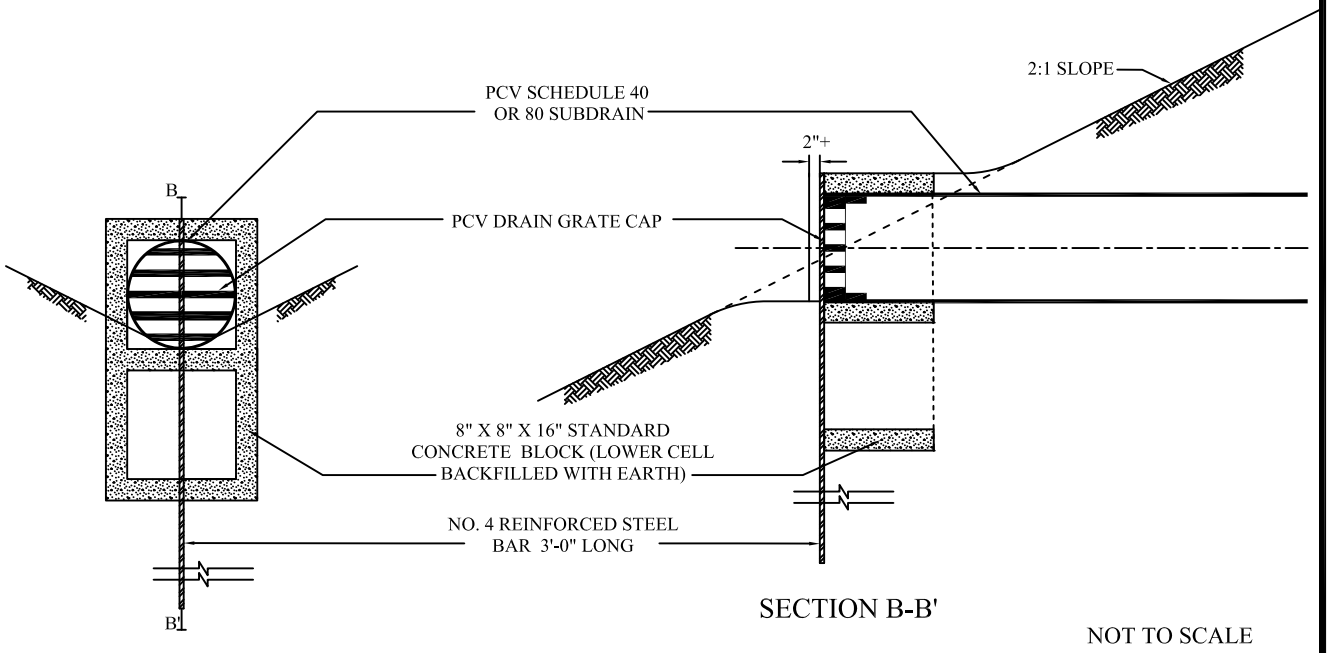
TYPICAL STABILIZATION FILL DETAIL

SUBDRAIN OUTLET MARKER -6" & 8" PIPE



SUBDRAIN OUTLET MARKER -4" PIPE



NOT TO SCALE

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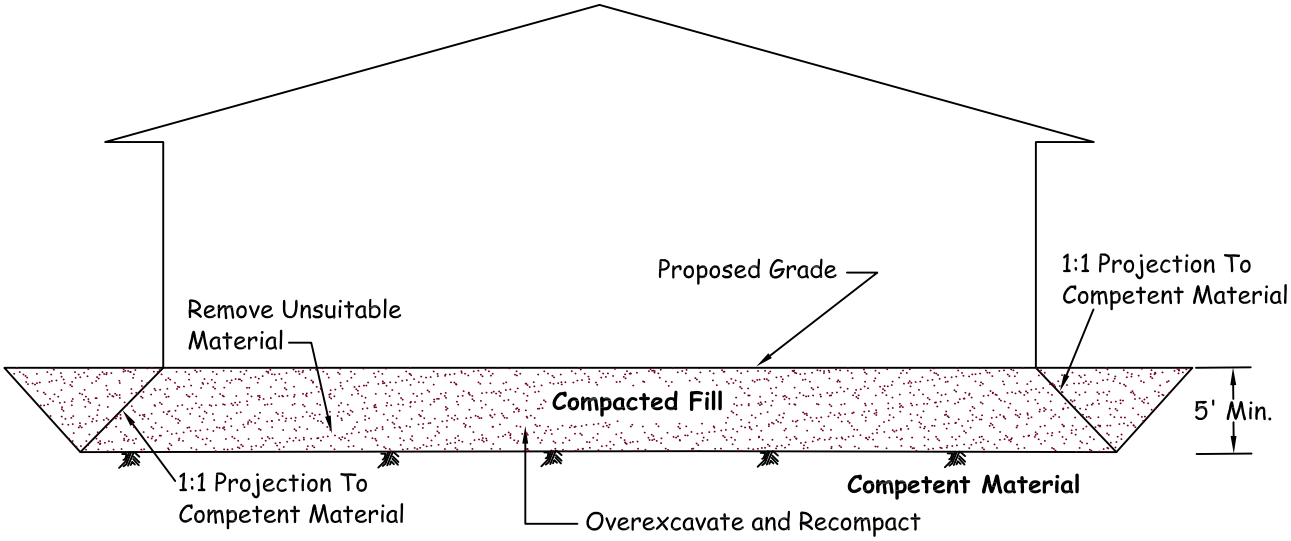
SUBDRAIN OUTLET MARKER DETAIL

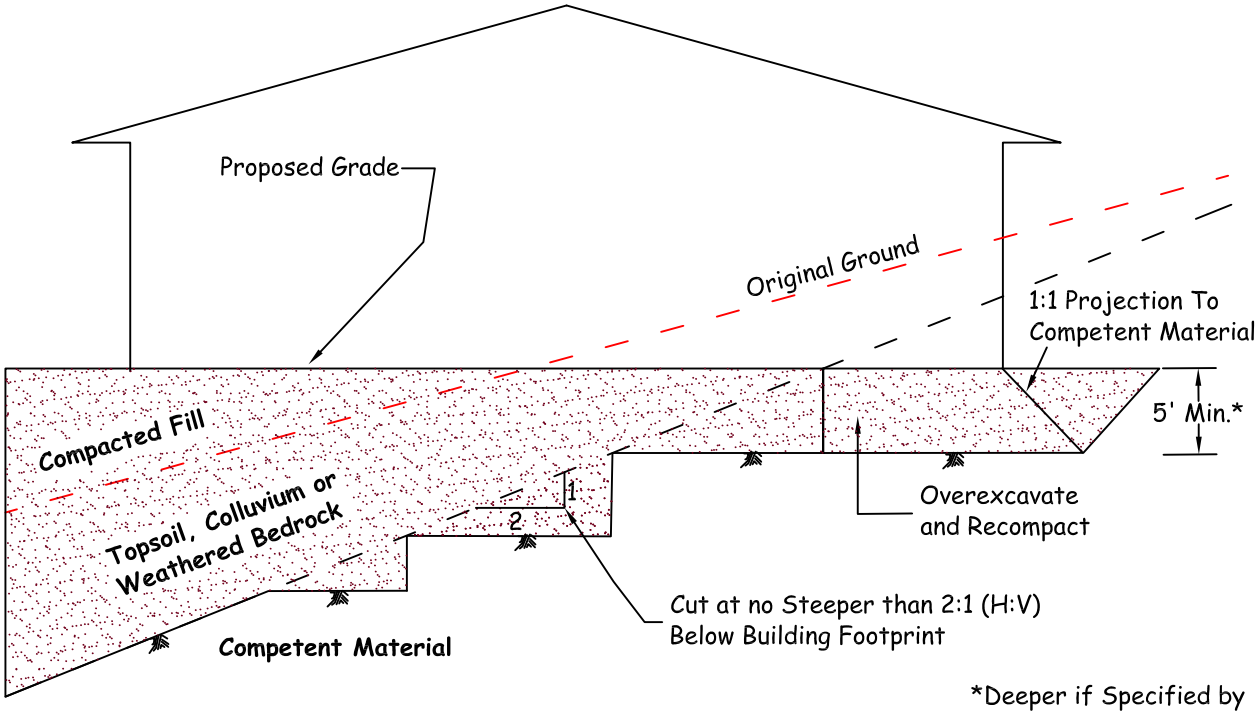
Cut Lot
(Exposing Unsuitable Soils at Design Grade)



Note 1: Removal Bottom Should be Graded With Minimum 2% Fall Towards Street or Other Suitable Area (as Determined by Soils Engineer) to Avoid Ponding Below Building

Note 2: Where Design Cut Lots are Excavated Entirely Into Competent Material, Overexcavation May Still be Required for Hard-Rock Conditions or for Materials With Variable Expansion Characteristics.

Cut/Fill Transition Lot



*Deeper if Specified by Soils Engineer

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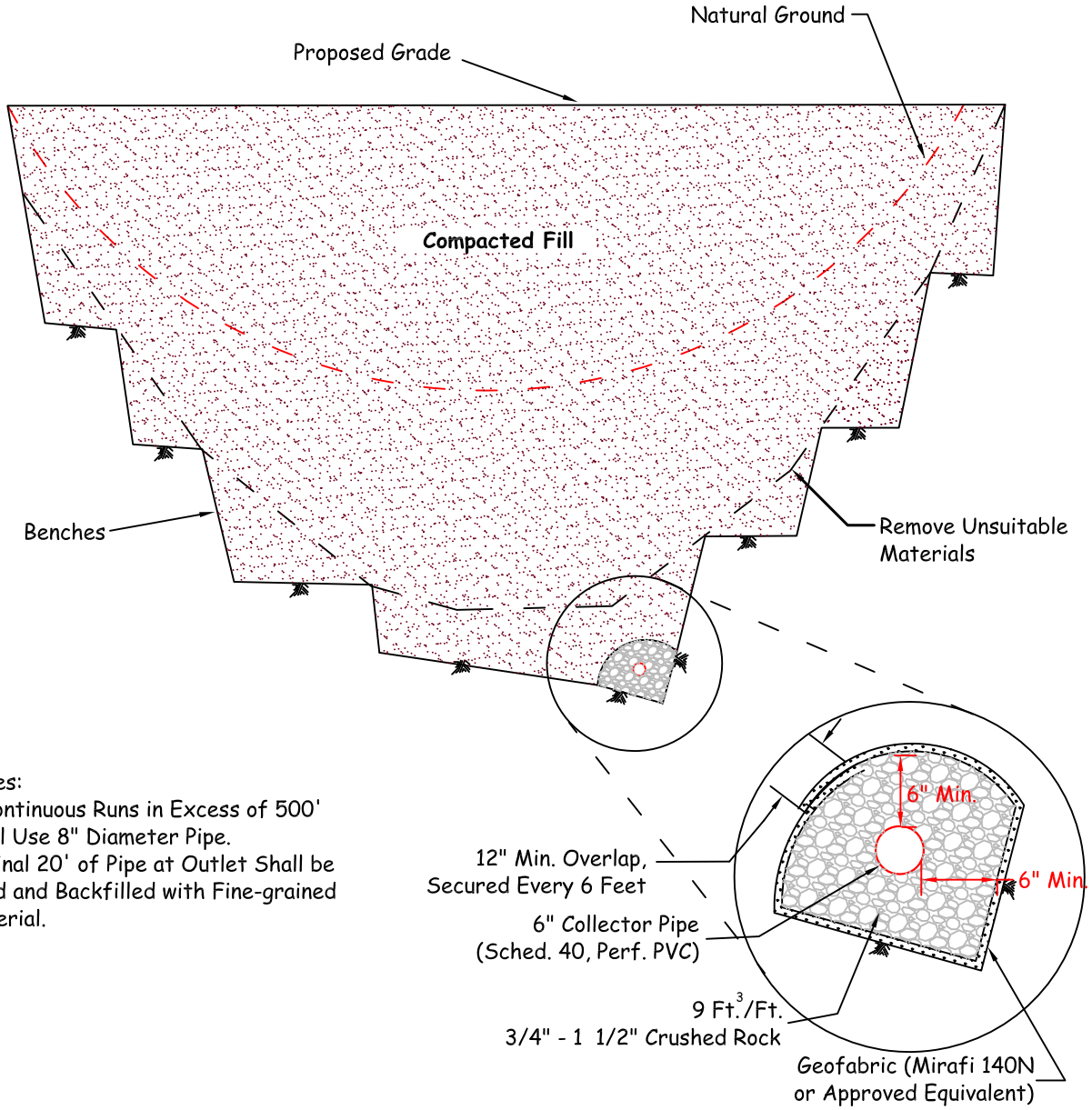
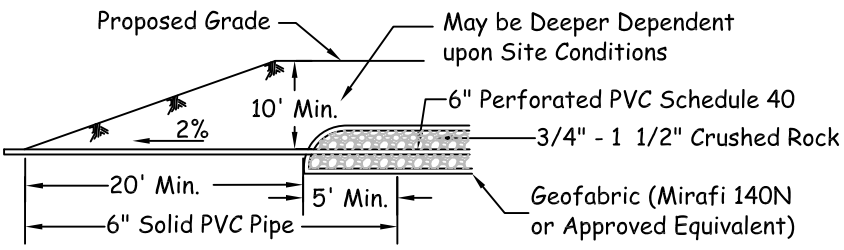
CUT AND TRANSITION LOT OVEREXCAVATION DETAIL



Notes:
1) Continuous Runs in Excess of 500' Shall Use 8" Diameter Pipe.
2) Final 20' of Pipe at Outlet Shall be Solid and Backfilled with Fine-grained Material.

Proposed Outlet Detail



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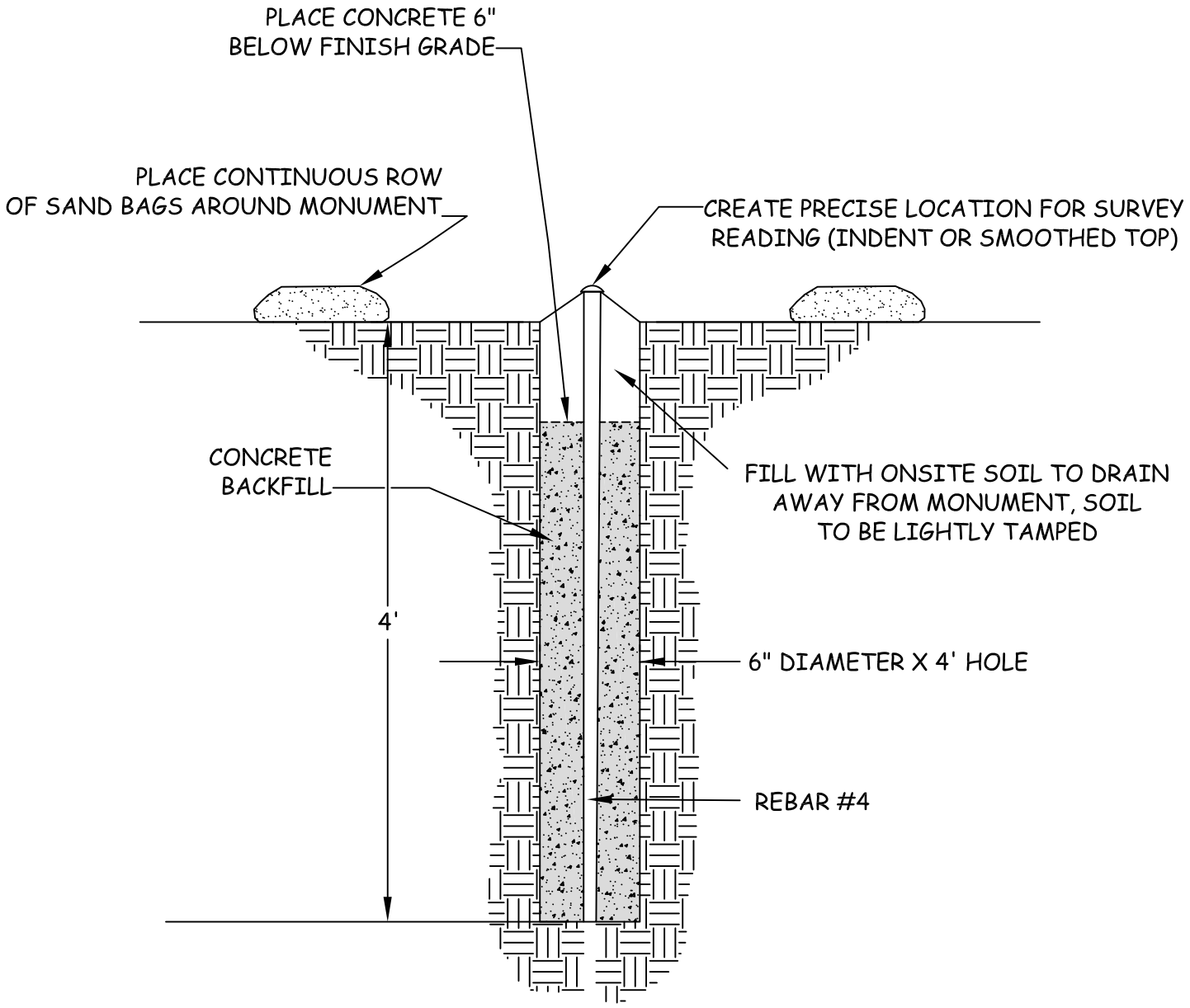
CANYON SUBDRAINS



NO CONSTRUCTION EQUIPMENT WITHIN 25 FEET
OF ANY INSTALLED SETTLEMENT MONUMENTS

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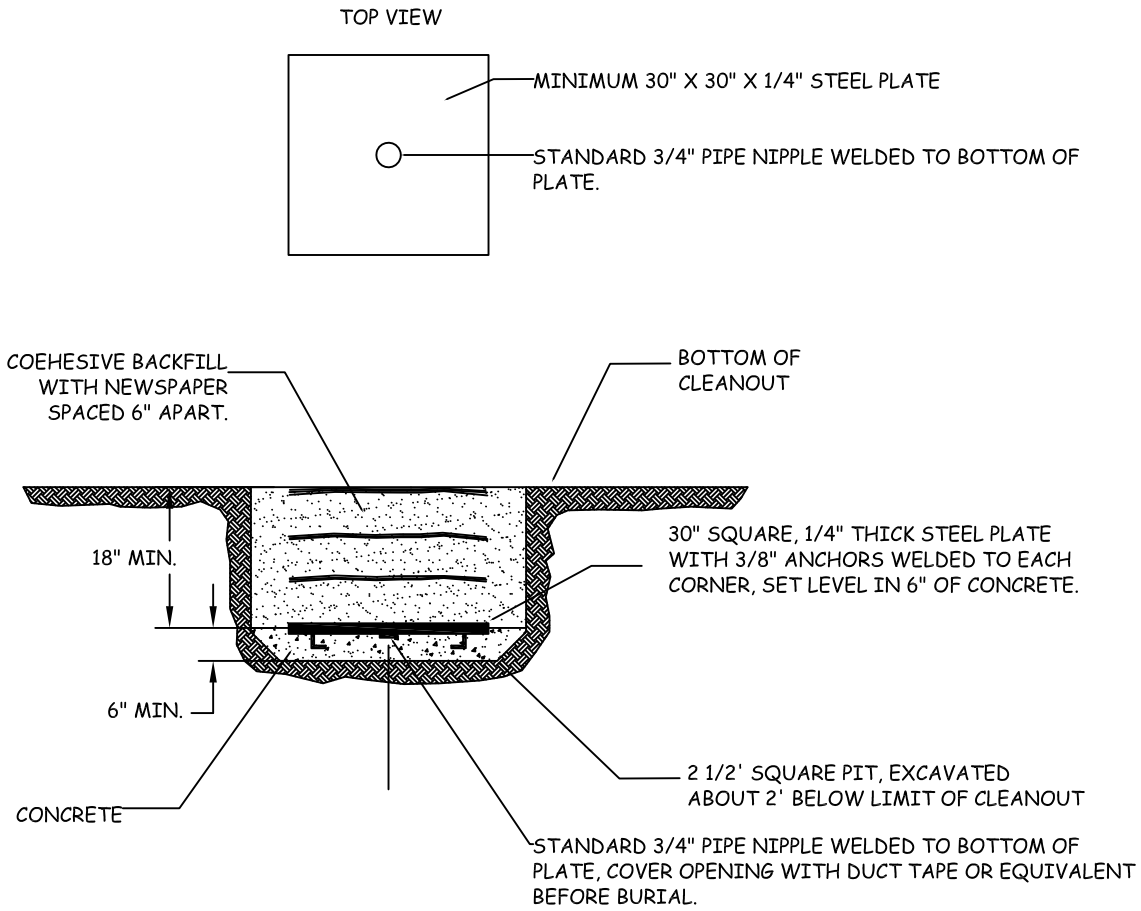
TYPICAL SURFACE SETTLEMENT MONUMENT



1. SURVEY FOR HORIZONTAL AND VERTICAL LOCATION TO NEAREST .01 INCH PRIOR TO BACKFILL USING KNOW LOCATIONS THAT WILL REMAIN INTACT DURING THE DURATION OF THE MONITORING PROGRAM. KNOW POINTS EXPLICITELY NOT ALLOWED ARE THOSE LOCATED ON FILL OR THAT WILL BE DESTROYED DURING GRADING.
2. IN THE EVENT OF DAMAGE TO SETTLEMENT PLATE DURING GRADING, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE GEOTECHNICAL ENGINEER AND SHALL BE RESPONSIBLE FOR RESTORING THE SETTLEMENT PLATES TO WORKING ORDER.
3. DRILL TO RECOVER AND ATTACH RISER PIPE.

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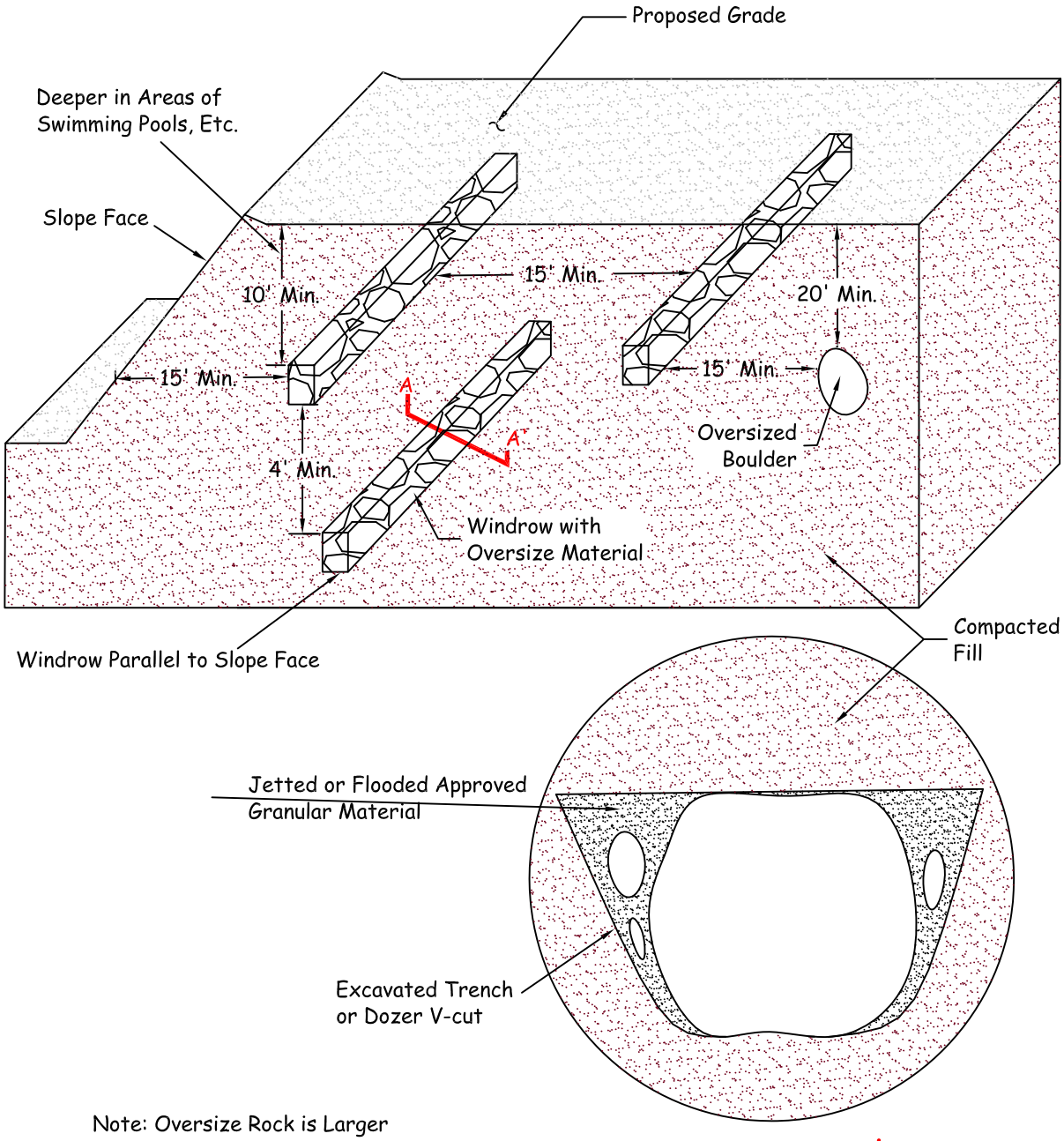
TYPICAL SETTLEMENT PLATE AND RISER



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

Section A-A'

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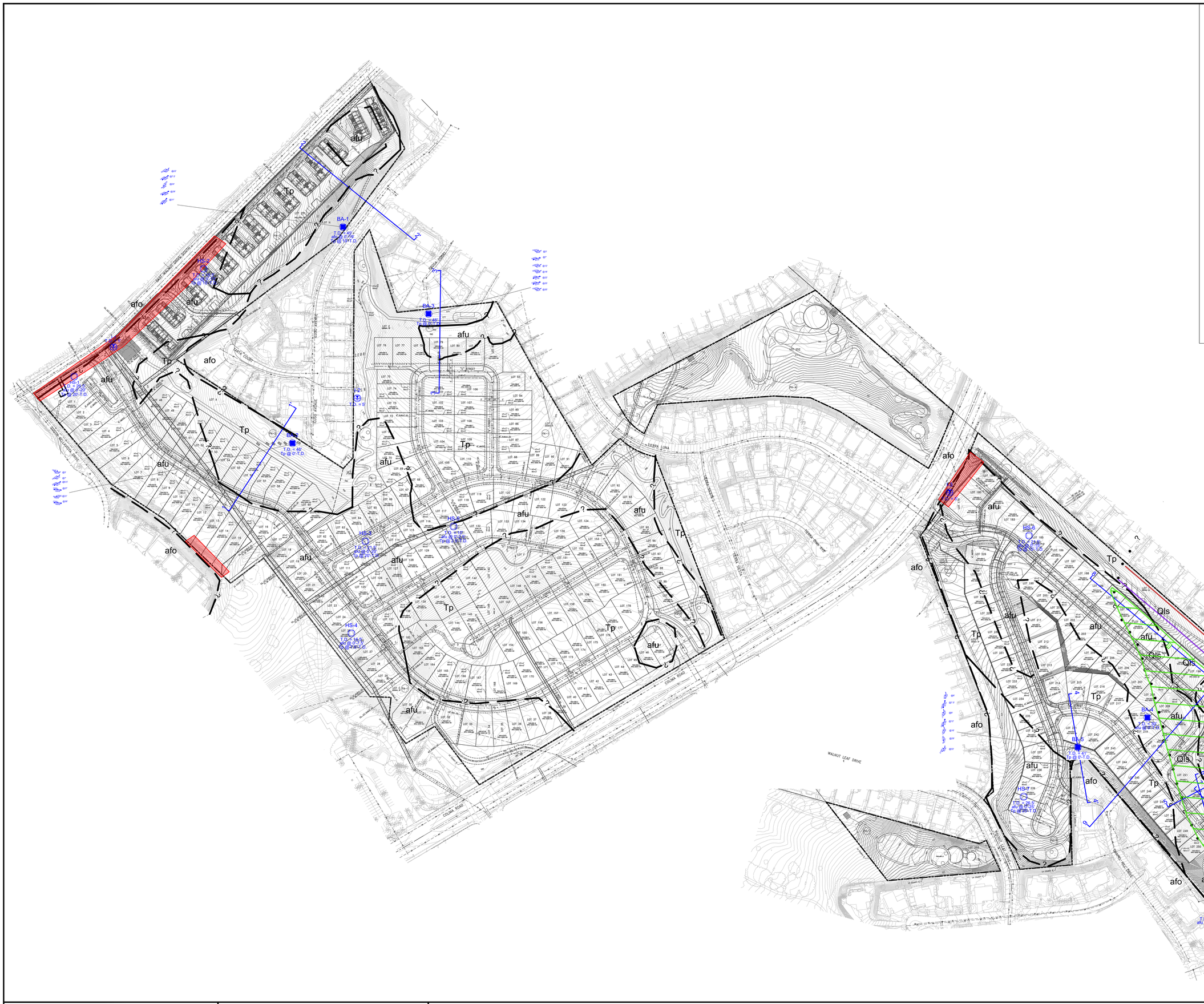
OVERSIZE ROCK DISPOSAL DETAIL



LEGEND

HS-7 T.D. = 26.5'	Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet
I-3 T.D. = 5'	Approximate Location of Hollow Stem Auger Infiltration Boring by LGC Geotechnical, With Total Depth in Feet
BA-8 T.D. = 24.5'	Approximate Location of Bucket Auger Boring by LGC Geotechnical, With Total Depth in Feet
BA-11 T.D. = 41'	Approximate Location of Bucket Auger Boring by Harrington, 2006, with Total Depth in Feet
afu	Artificial Fill - Undocumented
afo	Artificial Fill - Older
Tp	Puente Formation
	Geotechnical Cross Section
	Approximate Location of Geologic Contact; Dotted Where Buried, Queried Where Uncertain
	Approximate area of deeper removals that may require temporary shoring or slot cuts
	Approximate Preliminary Keyway/Qls Removal with Elevations in Feet
	Approximate Preliminary Tieback Locations; Refer to Text for Details
	Approximate Preliminary Shear Pin Alignment

Geologic Attitudes (Dashed Where Subsurface)

	General Bedding
	Bedding
	Clay Bed
	Rupture Surface *with Striation Trend, Where Applicable*

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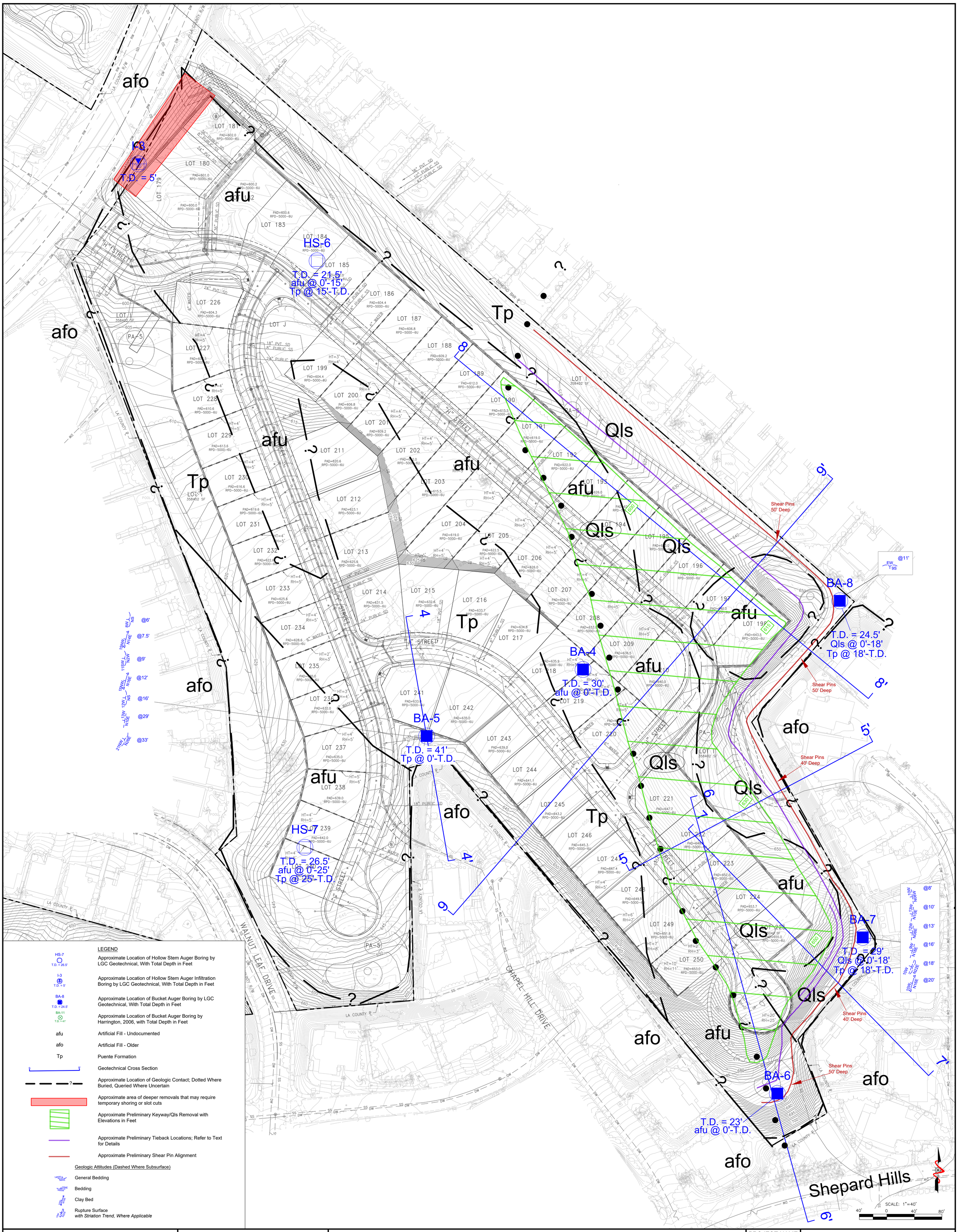
Updated Geotechnical Map

PROJECT NAME	Project Dimensions - Royal Vista
PROJECT NO.	200080-01
ENG. / GEOL.	RLD / KBC
SCALE	1" = 100'
DATE	July 2023



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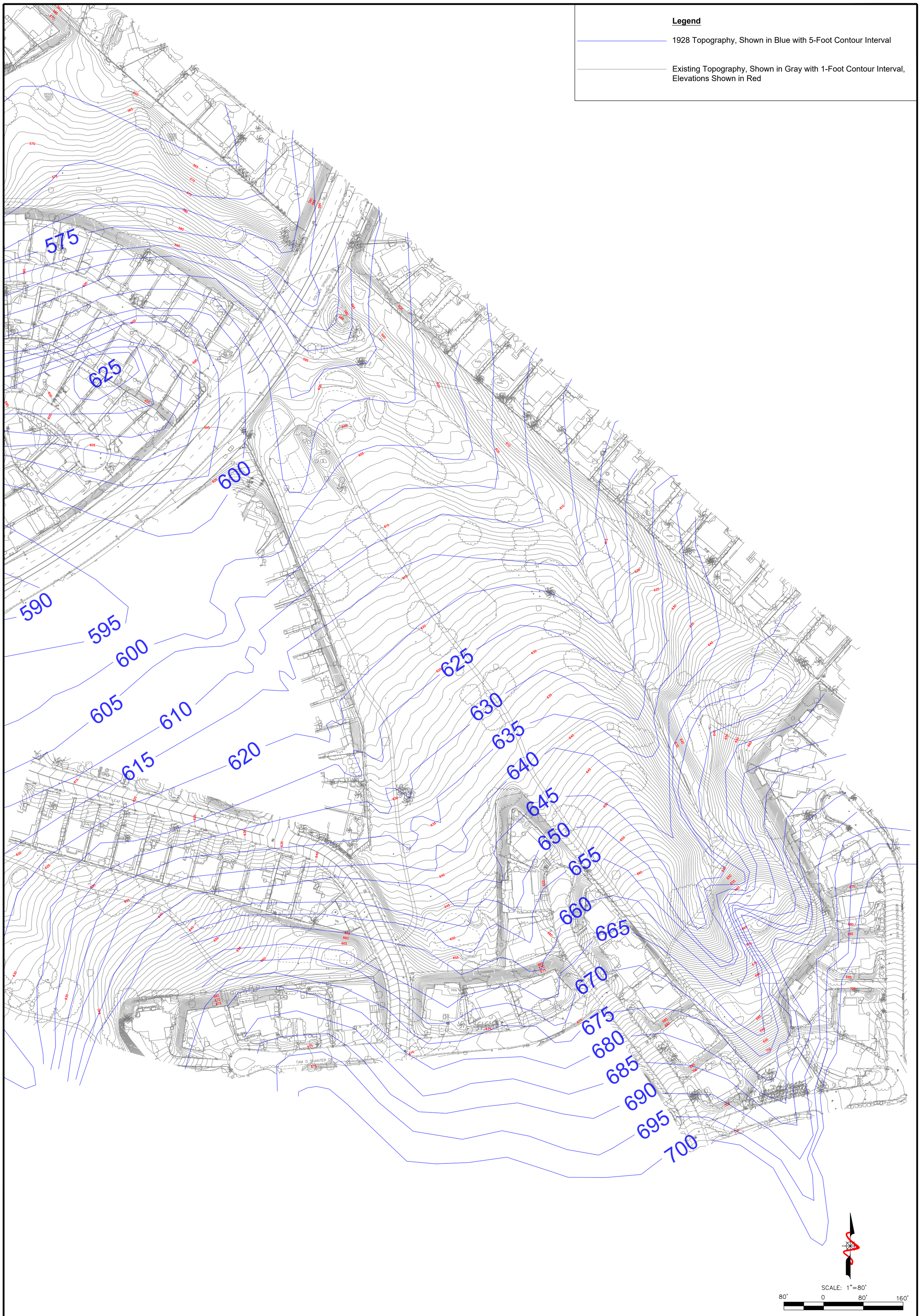
Updated Geotechnical Map

PROJECT NAME	Royal Vista Golf Course
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1"=40'
DATE	July 2023



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1928 Vs. 2020 Topography Comparison Exhibit

PROJECT NAME	Project Dimensions - Royal Vista
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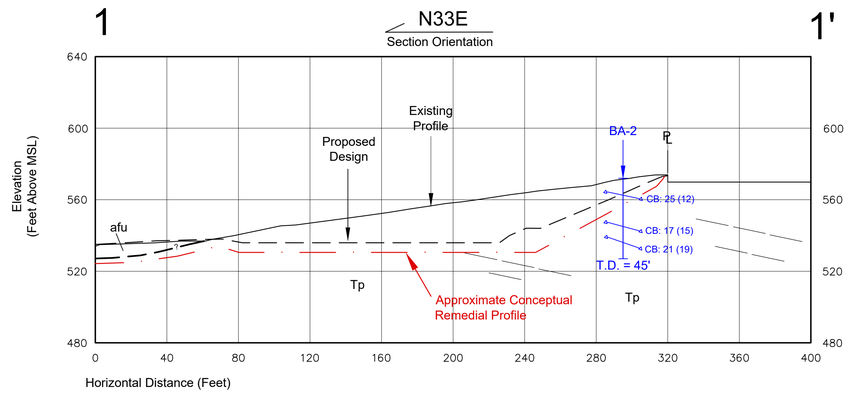
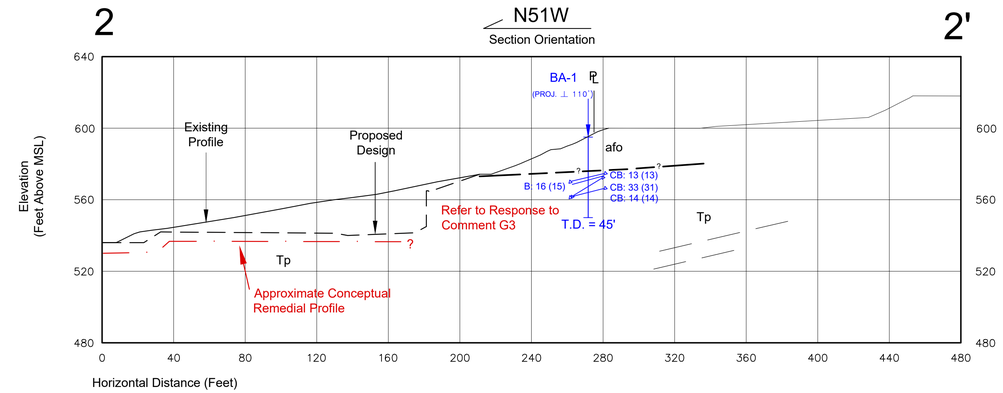
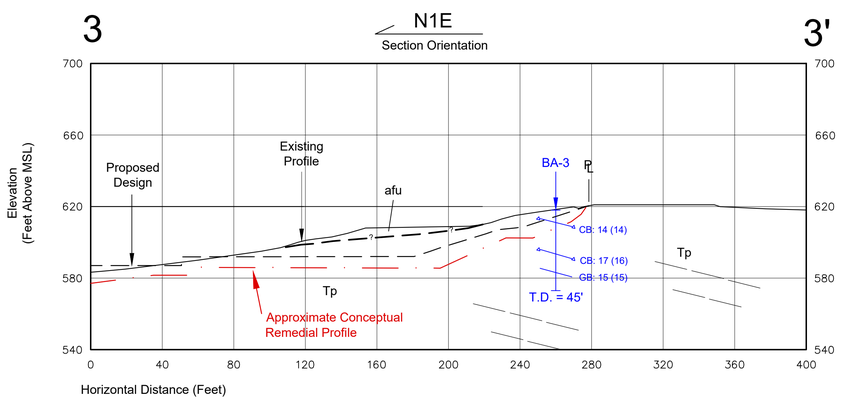
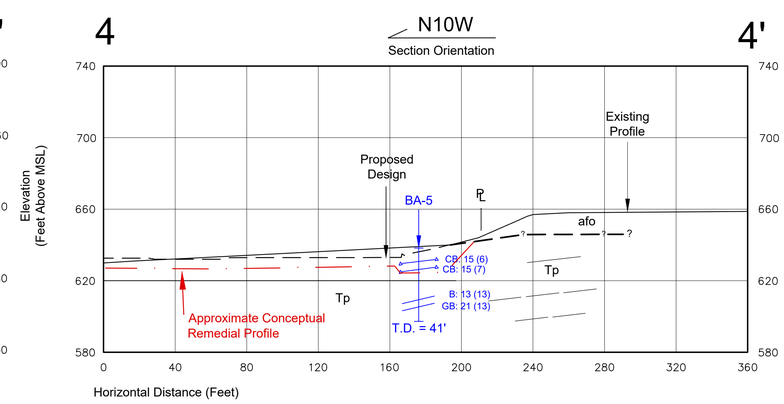
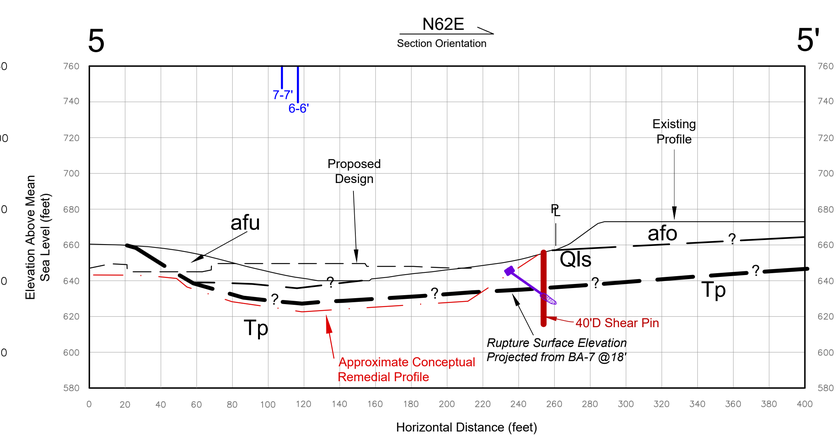
ENG. / GEOL.	RLD / KBC
SCALE	1:80
DATE	July 2023











SCALE: 1"=40'

40' 0 40' 80'

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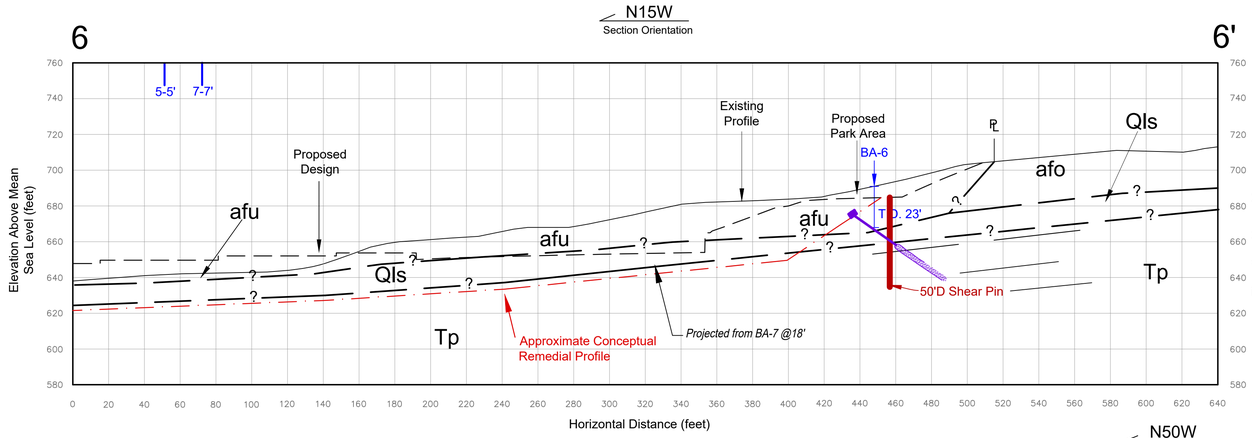
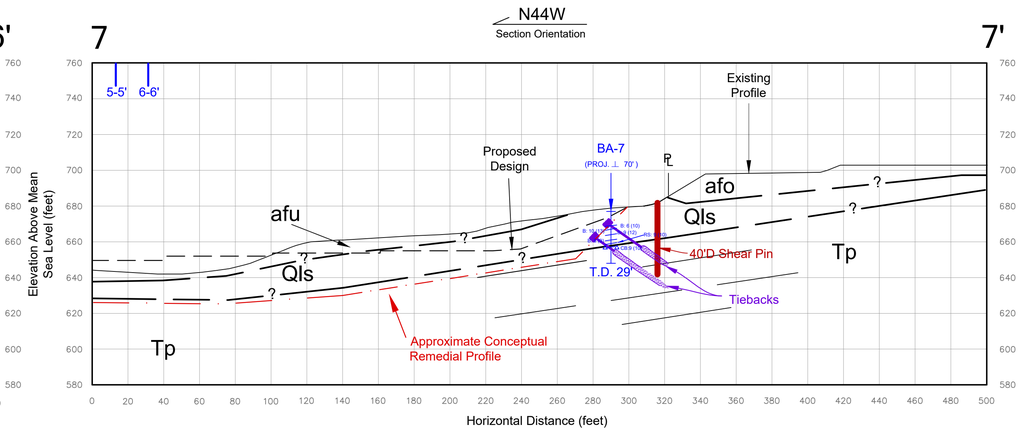
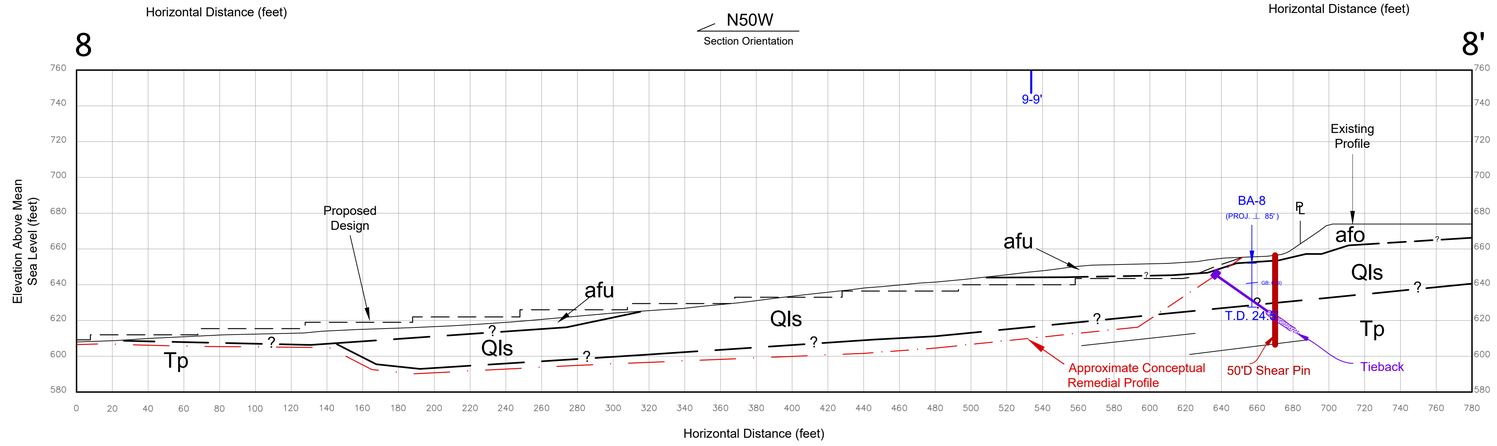
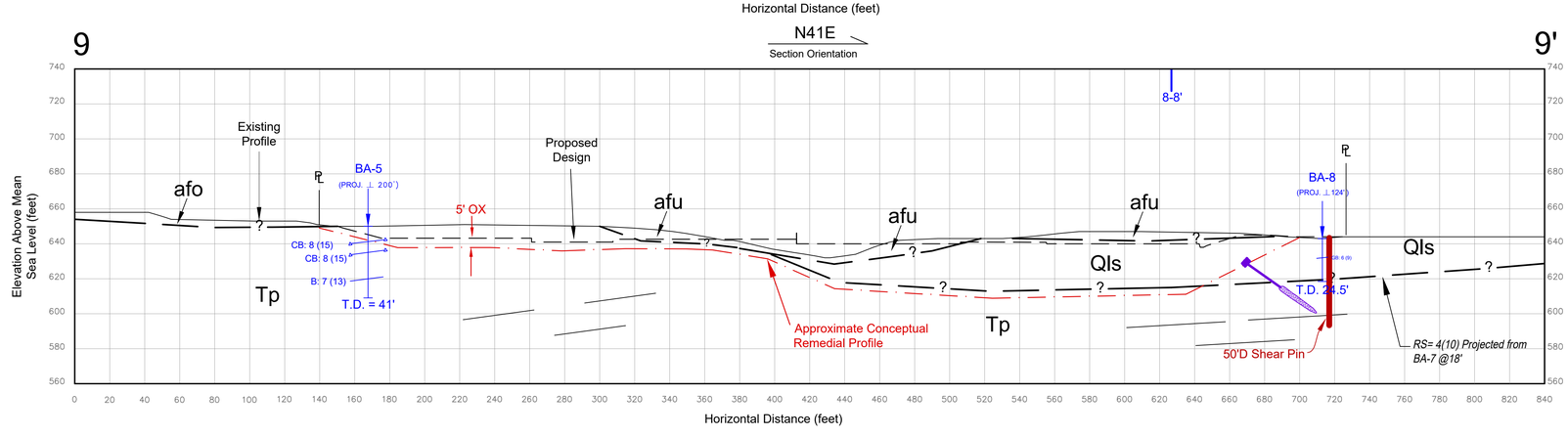
Geotechnical Cross-Sections

PROJECT NAME	Royal Vista
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1" = 40'
DATE	July 2023









SCALE: 1"=40'

40' 0 40' 80'

LGC Geotechnical, Inc.

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

Geotechnical Cross-Sections

PROJECT NAME	Royal Vista
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1" = 40'
DATE	July 2023

SHEET 5 of 5

September 12, 2023 Project No. 20080-01
(Amended September 27, 2023, with Revised Sheet 1 of 5)

Mr. Jon Conk
Project Dimensions, Inc.
4 Park Plaza, Suite 700
Irvine, California 92614

Subject: ***Response to Geotechnical Review Comments dated September 3, 2023 Regarding the Proposed Residential Development of Portions of Royal Vista Golf Course, Rowland Heights, California***

Introduction

In accordance with your request, LGC Geotechnical, Inc. has prepared this response to geotechnical review comments dated September 3, 2023 regarding the proposed residential development to be located on portions of the existing Royal Vista Golf Course in the City of Rowland Heights, California. The provided review comments (Los Angeles County Public Works, 2023) are primarily based on our Summary of Geotechnical Evaluation and Feasibility Study (LGC Geotechnical, 2020), Updated Summary of Geotechnical Evaluation and Feasibility Study (LGC Geotechnical, 2021) and our recent response to County comments (LGC Geotechnical, 2023a & b).

This response-report should be considered as part of the project design documents in conjunction with our previous geotechnical reports (refer to references). In the case of conflict, the recommendations contained herein should supersede those provided in our previous reports. The remaining recommendations provided in our previous geotechnical reports (refer to references) remain valid and applicable.

Geotechnical Review Dated September 3, 2023

For your convenience, the geotechnical review comments have been repeated below along with our responses. A copy of the review sheet is provided in Appendix B.

Comment No. G1

"Provide justification for the northern limits of the landslide shown in cross section 8-8'. The 1928 topographic data does not constrain the northern limits of the slide."

Response to Comment No. G1

We have updated Sheet 3 – "1928 vs. 2020 Topographic Comparison Exhibit" to depict more information to clarify how the limits of the landslide were determined. In order to determine the limits of the landslide, we compared existing topography to historic (1928) topographic contours, and reviewed reports for the Morning Sun Landslide (Harrington, 2006; Leighton & Associates, 2003 & 2010) and in-house geotechnical reports for the adjacent South Pointe residential development (LGC Geotechnical, 2016).

The topographic expression of the northern limits of the landslide is clearly defined by the northwesterly trending drainage depicted on the 1928 topographic map (Sheet 3). The drainage defines the contact between the landslide mass and the Puente Formation bedrock to the north. As part of golf course grading, the drainage was infilled with fill soils, burying and obscuring the contact. The northern-most limit of the landslide was interpreted by the subtle change in topographic contours at that location. This interpretation is consistent with the geologic conditions encountered and the geometry depicted on Geotechnical Cross-Section 8-8'. The landslide is long and relatively thin.

Comment No. G2

"Please provide critical cross-sections oriented down dip of bedding structural data obtained from Boring BA-7. Show all geologic contacts and the locations of all proposed buttresses, shear pins, tiebacks, and/or any other proposed mitigation measures. Update stability analysis as appropriate."

Response to Comment No. G2

In response to Comment No. G2, we have prepared Geotechnical Cross-Section 10-10' (see Sheet 5). The location of the cross-section is depicted on our Geotechnical Map (Sheets 1 and 2). The requested section extends through a corner of the site and is only a very limited representation of the temporary and proposed conditions to be exposed. Furthermore, as can be seen by comparing the profile and geologic structure depicted on the subject cross-section with that of the directly adjacent Geotechnical Cross-Section 7-7', Geotechnical Cross-Section 7-7' is clearly the more critical section with regards to both temporary and permanent slope stability issues (refer to Sheet 5). The primary difference is that there is significantly more driving force for slope stability issues on Geotechnical Cross-Section 7-7' than on Geotechnical Cross-Section 10-10'. Additionally, Geotechnical Cross Section 7-7' is oblique to the proposed design 2:1 slope. For the purposes of this study, we have depicted the same level of mitigation on both geotechnical cross sections. It is our opinion that for this level evaluation, analysis of Geotechnical Cross-Section 10-10' is not warranted at this time. Additional analysis may be performed at this and other locations on the site to "value engineer" the mitigation presented herein, at the 40-scale grading plan review stage of the project.

Comment No. G3

"Will the proposed shear pin and tieback mitigation be sufficient to support the mass of the slide that extends east and southeast of the tract? The sections do not show the extent of the slide up slope of the tract."

Response to Comment No. G3

Yes, the proposed mitigation system will be sufficient to support the offsite properties, including the remaining offsite portion of the landslide. Rather than extend cross-sections further offsite, we have added both the extent of the historic and ancient landslide from the California Geological Survey (CGS) Landslide Inventory database (CGS, 2023) on Sheet 3 presented herein. We have also included the As-Graded Geotechnical Map from the South Pointe Residential Development located east of Morning Sun Avenue, which was rough graded in 2015 (LGC Geotechnical, 2016). As can be seen by the overall map, very little of the landslide remains east and south of the site and even less of the landslide will remain once site remedial grading has been completed. Furthermore, the topography in the remaining area of the landslide south and east of the site is very subdued, resulting in minimal driving force.

Comment No. G4

"Please provide slope stability analyses for the cut slope with proposed ~20-foot-high retaining wall in the northern part of the tentative map. Feasibility must be demonstrated for this proposed cut slope/retaining wall."

Response to Comment No. G4

Only the northern approximately one-third of the retaining wall will include heights exceeding approximately 15 vertical feet. The majority of the retaining wall will be less than 10-feet-tall. While adversely oriented clay beds were encountered, landslide material was not. As such, and as there is ample room between the proposed retaining wall and property line, it is clear that mitigation is feasible at this location. We anticipate that the vast majority of the retaining wall will be constructable as a nail wall. Locally, in the taller portions of the proposed retaining wall, tieback anchors will likely be added to the wall construction for global stability.

Please note, additional design level slope stability analysis will need to be performed once 40-scale rough grading plans have been prepared and more details are available regarding finalized slope and retaining wall configurations, etc. This additional evaluation may include additional cross-sections and slope stability analysis. Additional subsurface evaluation may be warranted.

Comment No. G5

"There is over 25 feet of fill in the vicinity of HS-7. When this fill is removed, will the surrounding slopes supporting offsite properties be temporarily stable? Provide cross sections and analyses."

Response to Comment No. G5

Yes, in our opinion, temporary stability can be achieved for the offsite areas during grading. We have added provision for either temporary shoring and/or slot cutting to enable the recommended remedial grading in this area on our updated Geotechnical Map, refer to Sheet 1.

Comment No. S1

"Slope stability analyses will be required when the geology of the site is conclusively determined. See comment G1."

Response to Comment No. S1

Based on our conversations and our responses to the comments presented herein, it is our understanding that additional slope stability analysis is not warranted at this time. Additional analysis may be performed to "value engineer" the mitigation presented herein, and in the reference geotechnical reports, at the 40-scale grading plan review stage of the project.

Comment No. S2

"Show/Note the following on the geotechnical map

a. Existing and proposed grades.
b. Proposed slope stabilization support.
c. Approximate limits and depth of removal and recompaction of unsuitable soils.
d. Recommendations and grading requirements for construction of buttress/stabilization fills.
e. Detail of keying and benching for placement of fill over slopes steeper than 5: 1 gradient.
f. Location of "Restricted Use Area(s)" / "Building Setback(s)", if applicable.
g. Location and limits of "Restricted Use Area(s)" for all areas with geogrid(s) and 10 feet horizontally from the limit of the embedment area of the proposed geogrid material.
h. All recommended mitigation measures.

Response to Comment No. S2

a. Existing and proposed grades have been included on the updated Geotechnical Map (Sheets 1 and 2).
b. Proposed mitigation systems for potential slope stability issues have been depicted on our updated Geotechnical Map (Sheets 1 and 2).
c. The approximate limits and depths of remedial grading have been depicted on the updated Geotechnical Maps (Sheet 1 and 2).
d. Recommendations for buttress and stabilization fill construction are provided herein.

Buttress/Stability Fill Slopes

With the exception of the ancient landslide area in the southern portion of the site development area, design permanent cut slopes are anticipated to be grossly stable as designed, as long as they are constructed in accordance with these recommendations and our General Earthwork and Grading Specifications (Appendix C) and are properly landscaped and maintained. Slope faces that are to remain as part of the proposed

development requiring cut of bedrock material may be designed to be stabilized with stability fills to reduce the potential for surficial failures and to facilitate planting.

Where there is a potential for exposure of adverse bedding and/or material prone to poor surficial stability, we recommend that the outer portion of the proposed cut slopes be replaced with manufactured buttress/stability fill slopes. Additionally, in some areas where cut slopes have been proposed in areas of existing compacted fill, manufactured stability fill slopes are recommended to ensure an appropriate minimum fill thickness behind the finished slope face.

The approximate locations and bottom elevations of the recommended landslide mitigation buttress fill key are provided on the updated Geotechnical Map; Sheet 2. Stability fill key locations will be delineated at the 40-sacle grading plan review stage of the project. Cross-Sections 1-1' through 4-4' have been updated within Approximate Conceptual Remedial profiles. The locations and dimensions of the recommended keyways, once finalized for the site, should be confirmed by the geotechnical consultant during grading. Some variation to the location and dimensions provided herein should be anticipated based on the conditions encountered.

Stabilization fills should be constructed on proposed cut slopes over 10 feet in height, or where hard rock material will be exposed in the finish slope face, in accordance with the detail provided in Appendix C. Keyway widths should be a minimum of one-half of the total height of the slope or no less than 15 feet wide, whichever is greater. Keyways should be a minimum of 5 feet deep, determined from the lowest toe-of-slope elevation, and tilt back to the heel a minimum of 1-foot or 2 percent (whichever is greater). Stabilization fill backcuts should be excavated so that at least a minimum 15-foot-wide fill width is maintained for the entire height of the stability fill slope. In general, backcuts should be excavated at 2:1 (horizontal to vertical) inclinations. If grading limits do not allow sufficient room for maintaining 15-foot widths at 2:1 backcut inclinations, then portions of the backcut may be cut steeper to accommodate the stability fill slopes at the appropriate widths at the discretion of the geotechnical consultant. Properly outletted back drains should be constructed along stabilization fill backcuts.

In general, to reduce the potential for backcut failures, we recommend the keyway backcuts be planned to minimize the time the backcut is left exposed. The backcuts should not be initiated prior to forecasted rain or where they will be left open for extended periods, such as weekends.

Backcuts and key excavations should be geologically mapped by the geotechnical consultant during excavation to confirm the anticipated conditions. If adverse joints, fractures, and/or bedding are exposed, additional analysis and/or remediation measure may be required. The grading contractor must trim the backcuts with a slope board to remove loose material to allow for confirmational mapping.

Slope buttress keyways that are depicted on the updated Geotechnical Map are not differentiated from the stability fill keyways other than that they are wider and/or deeper than the minimum recommendations for stability fills. Earthwork in the areas of

Geotechnical Cross-Sections 5-5' through 9-9' should be constructed as buttress fill slopes in general accordance with the General Earthwork and Grading Specification (Appendix C). In general, the recommendations provided above for stability fills are applicable to buttress slopes, with the exception of keyway dimensions.

e. Details for keying and benching are provided in the recommendations provided herein and in our General Grading and Earthwork Recommendations provided in Appendix C.
f. No restricted use areas/building setbacks area currently required/proposed.
g. The use of geogrid reinforcement is not currently proposed. As such, no geotechnical restricted use areas or building setbacks are currently required. This will be reevaluated at the 40-scale grading plan review stage of the project.
h. The recommended remedial measures and/or conceptual remedial measures are depicted on our updated Geotechnical Map and Cross Sections.

Comment No. S5

"Please submit documents in response to this review using the EPIC-LA system at the following URL: https://epicla.lacounty.gov/SelfService/#/home. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000458. Please contact GMED staff at (626) 458-4925 if documents cannot be uploaded to the plan case."

Response to Comment No. S5

Acknowledged.

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

Sincerely,

LGC Geotechnical, Inc.

Ryan Douglas, GE 3147
Project Engineer

Kevin B. Colson, CEG 2210
Vice President

KBC/RLD/amm

Attachments: Appendix A – References
Appendix B – Los Angeles County Public Works – Geotechnical Review Sheet dated September 3, 2023
Appendix C – General Grading and Earthwork Recommendations
Sheet 1 – Geotechnical Map of Entire Site (100-Scale)
Sheet 2 – Geotechnical Map of Southeast Corner of Site (40-Scale)
Sheet 3 – 1928 vs. 2020 Topographic Comparison Exhibit
Sheet 4 – Geotechnical Cross Sections (40-Scale)
Sheet 5 – Geotechnical Cross Sections (40-Scale)

Distribution: (1) Addressee (electronic copy)

Appendix A
References

APPENDIX A

References

County of Los Angeles, 2013, Department of Public Works, Manual for Preparation of Geotechnical Reports, July 1, 2013.

California Geological Survey, 2023, California Landslide Inventory, accessed on September 6, 2023, Retrieved from: https://maps.conservation.ca.gov/cgs/lsi/.

Gregory Geotechnical Software, 2019, GEOSTASE, Slope Stability Analysis Software, Version 2.7, January 2019.

Fuscoe Engineering, 2023, Major Land Division Vesting Tentative Tract No. 83534, for Merging and Subdividing Residential Planned Development and Condominium Purposes, Located in Unincorporated Territory, in the County of Los Angeles, State of California, Job No. 0662-004, dated May 26, 2023.

Harrington Geotechnical Engineering, Inc., 2006, Updated Supplemental Geotechnical Investigation and Preliminary Grading Study Review South Pointe West Residential Development, Diamond Bar, California, Project No. 04-01-2336, dated July 5, 2006

LGC Geotechnical, 2016, As Graded Geotechnical Report, South Pointe Residential development, Tract 63623, City of Diamond Bar, California, Project No. 15117-01, dated June 29, 2016

_____, 2020, Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated July 13, 2020.

_____, 2021, Updated Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated July 26, 2021.

_____, 2023a, Geotechnical Addendum Report and Response to Geotechnical Review Comments Regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, Los Angeles County, California, Project No. 20080-01, dated May 1, 2023.

_____, 2023b, Response to Geotechnical Review Comments dated May 31, 2023 regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California, Project No. 20080-01, dated July 7, 2023.

Leighton, 2003, Geotechnical Due Diligence Review for the Proposed Development of the Sasak-Patel Property, Tract 51253, Morning Sun Avenue, North of Shepard Hills Road, City of Diamond Bar, California, Project No. 021060-001, dated November 24, 2003

_____, 2010, Supplemental Geotechnical Investigation and Grading Plan Review, Proposed South Pointe West Residential Development, Tract 63623, Between Morning Sun Drive and Larkstone Drive, City of Diamond Bar, California, Project No. 021060-006, dated September 10, 2010

Los Angeles County Public Works, 2021, Geotechnical and Materials Engineering Division, Geologic and Soils Engineering Review Sheet, PCA GMTR / A866, EPIC LA RPPL2021007149, dated November 9, 2021.

_____, 2023, Geotechnical and Materials Engineering Division, Geologic and Soils Engineering Review Sheet, PCA: GMGP & GMGR, EPIC LA ESTU2021000458 and RPPL2021007149, Tract Map 83534, dated September 3, 2023.

Post-Tensioning Institute (PTI), 2014, Recommendations for Prestressed Rock and Soil Anchors, PTI DC-35: Prestressed Rock and Soil Anchor Committee, 2014.

Stark, T. D., et al, 2012, Empirical Correlations – Drained Shear Strength for Slope Stability Analyses, Journal of Geotechnical and Geo-Environmental Engineering, dated August 30, 2012.

Appendix B
Los Angeles County Public Works – Geotechnical Review Sheet dated September 3, 2023

Dist. Office 2.0
PCA GMGP & GMGR
ESTU2021000458
EPIC LA RPPL2021007149
Telephone: (626) 458-4925

Los Angeles County Public Works
Geotechnical and Materials Engineering Division

GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET

900 S. Fremont Avenue, Alhambra, CA 91803

Tract Map	83534	**Lot(s)**	---	**Parent Tract**	---
Site Address	---	**Location**	Walnut	**APN**	8222-009-900, -901, -902
Geologist	LGC Geotechnical, Inc	**Subdivider**	Project Dimensions, Inc.		
Soils Engineer	LGC Geotechnical, Inc	**Engineer/Arch.**	Fuscoe Engineering, Inc.		

Review of:

Grading P.C. No.: RPPL2021007149
Submittal Received by GMED: **07/10/2023**

For: Proposed grading to create 360 single-family residential lots, one multi-family lot with 72 condominium townhouse units within 14 buildings, and two public park lots (1,923,600 cyd)

Geologic Report(s) Dated: ---
Soils Engineering Report(s) Dated: ---
Geotechnical Report(s) Dated: **07/07/2023,** 05/01/2023, 07/26/2021
References: Tract 27141 Documents – F. Beach Leighton: 06/22/1966, 01/09/1967, 07/10/1967, 08/14/1967, 12/01/1967, 01/19/1968; Converse Foundation: 05/07/1962; Triad Foundation: 01/12/1966, 04/21/1967,12/11/1967, 07/29/1968
Morning Sun Landslide Documents - Triad Geotechnical Consultants: 05/23/1995, 06/07/1995, 10/04/1995, 10/27/1995, 11/07/1995, 11/20/1995, 01/15/1996, 03/04/1996; Soils and Geology: 12/10/1996; Woodward-Clyde: 02/29/1996, 02/27/2001; Leighton: 01/18/2008; GMED: 07/23/2002

Action: Plan is not recommended for approval from a geotechnical standpoint.

G1. Provide justification for the northern limits of the landslide shown in cross section 8-8'. The 1928 topographic data does not constrain the northern limits of the slide.

G2. Please provide critical cross-sections oriented down dip of bedding structural data obtained from Boring BA-7. Show all geologic contacts and the locations of all proposed buttresses, shear pins, tiebacks, and/or any other proposed mitigation measures. Update stability analysis as appropriate.

G3. Will the proposed shear pin and tieback mitigation be sufficient to support the mass of the slide that extends east and southeast of the tract? The sections do not show the extent of the slide up slope of the tract.

G4. Please provide slope stability analyses for the cut slope with proposed ~20-foot high retaining wall in the northern part of the tentative map. Feasibility must be demonstrated for this proposed cut slope/retaining wall.

G5. There is over 25 feet of fill in the vicinity of HS-7. When this fill is removed, will the surrounding slopes supporting offsite properties be temporarily stable? Provide cross sections and analyses.

S1. Slope stability analyses will be required when the geology of the site is conclusively determined. See comment G1.

S2. Show/Note the following on the geotechnical map:
a. Existing and proposed grades.
b. Proposed slope stabilization support.
c. Approximate limits and depth of removal and recompaction of unsuitable soils.
d. Recommendations and grading requirements for construction of buttress/stabilization fills.
e. Detail of keying and benching for placement of fill over slopes steeper than 5:1 gradient.
f. Location of "Restricted Use Area(s)" / "Building Setback(s)", if applicable.
g. Location and limits of "Restricted Use Area(s)" for all areas with geogrid(s) and 10 feet horizontally from the limit of the embedment area of the proposed geogrid material.
h. All recommended mitigation measures.

S5. Please submit documents in response to this review using the EPIC-LA system at the following URL: https://epicla.lacounty.gov/SelfService/#/home. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000458. Please contact GMED staff at (626) 458-4925 if documents cannot be uploaded to the plan case.

Los Angeles County Public Works
Geotechnical and Materials Engineering Division
GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET (continued)

Grading P.C. No.: RPPL2021007149

Remarks (continued):

Prepared by

George Molina
Soils Section

Matthew Cruz
Geology Section

Date 9/3/2023

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey

NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

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Appendix C
General Grading and Earthwork Recommendations

General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the project plans and specifications. The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of “equipment” of work and the estimated quantities of daily earthwork

contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the
Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

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

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be over-excavated as specified in the following section. Scarification shall continue until soils are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Over-excavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

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

3.0 Fill Material

3.1 General

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

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of the geotechnical consultant. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

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

4.6 ***Frequency of Compaction Testing***

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 ***Compaction Test Locations***

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than
5 feet apart from potential test locations shall be provided.

5.0 ***Subdrain Installation***

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 ***Excavation***

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

7.0 ***Trench Backfills***

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

7.2 All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over

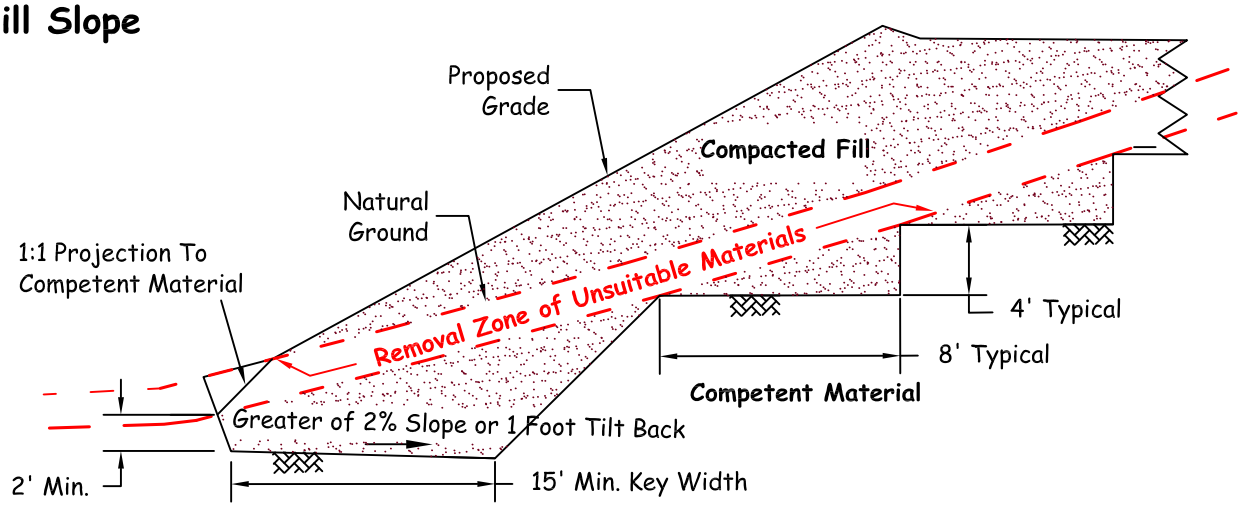
the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

7.3 The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

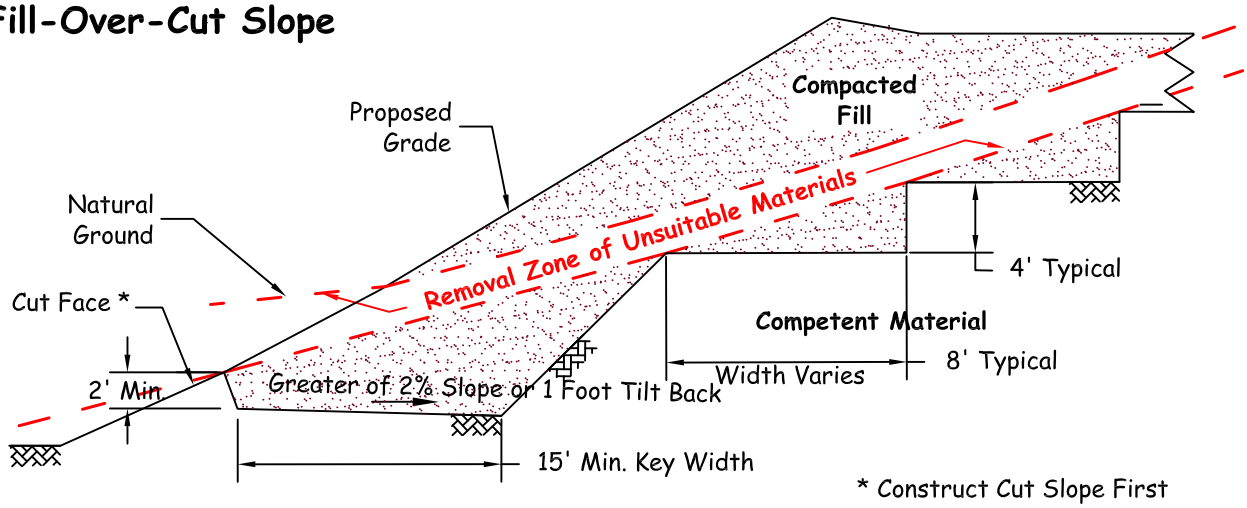
7.4 The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

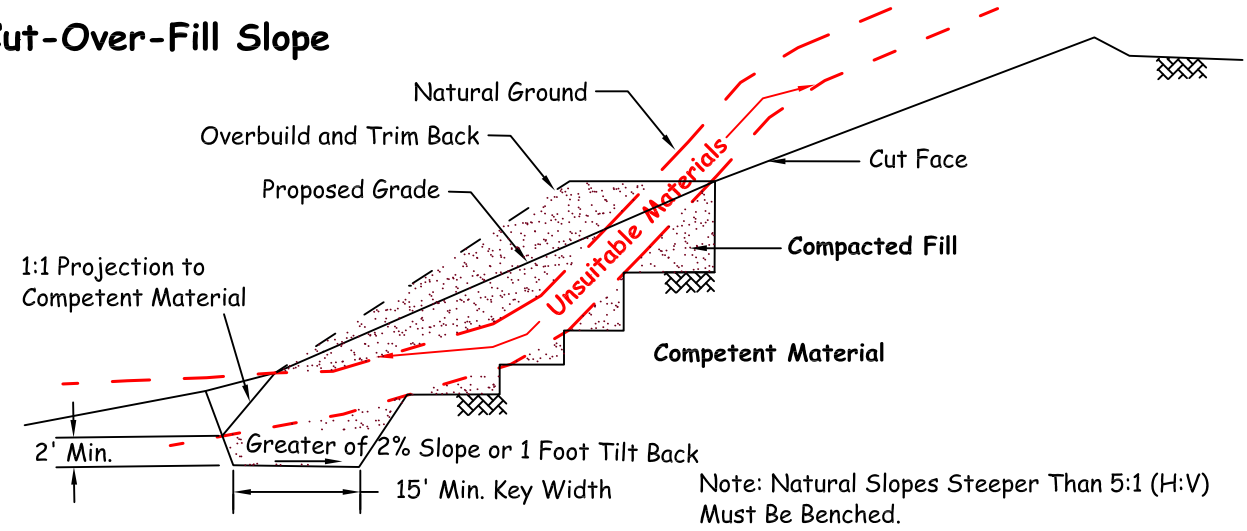
Fill Slope



Fill-Over-Cut Slope



Cut-Over-Fill Slope



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

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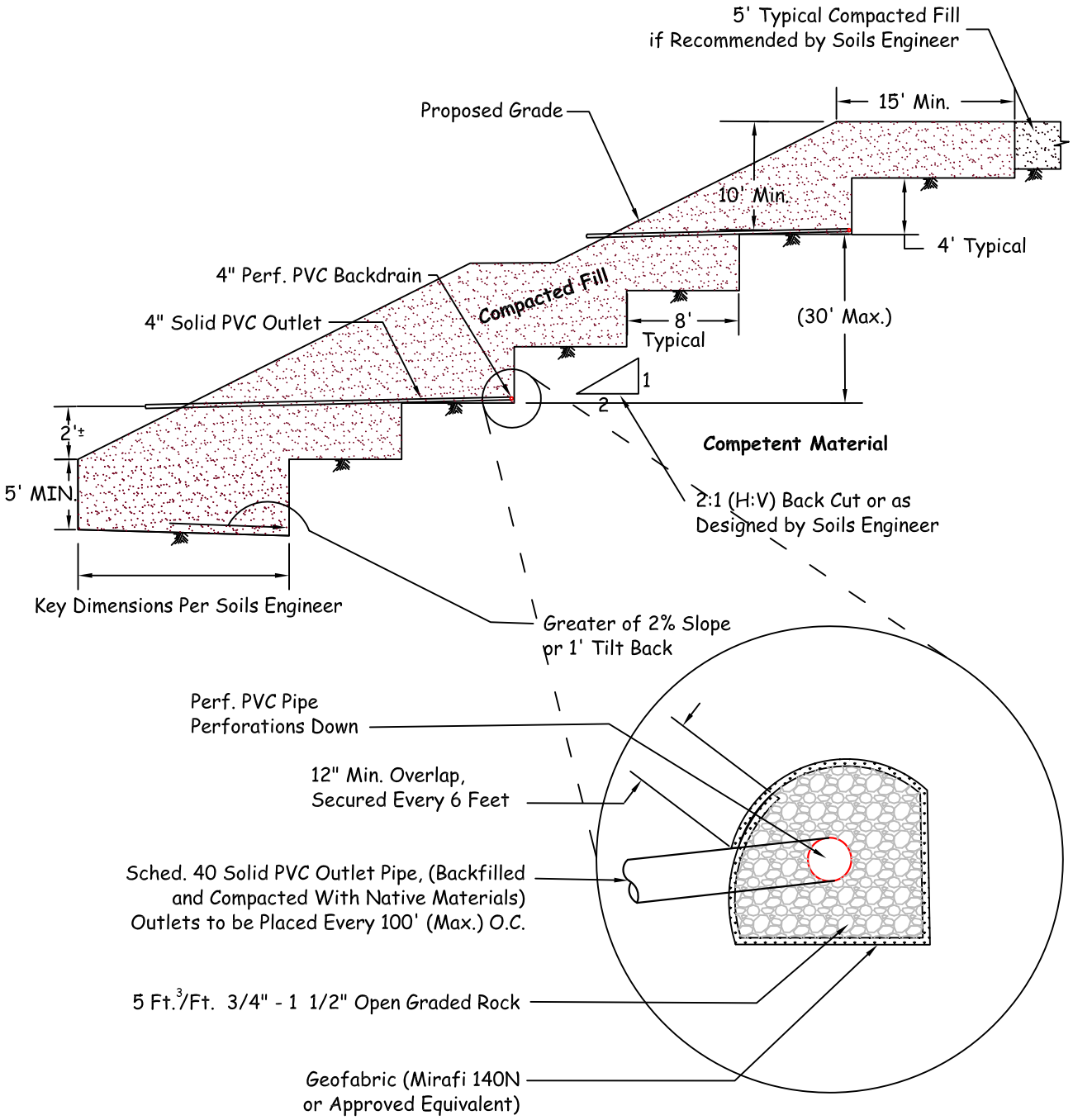
KEYING AND BENCHING



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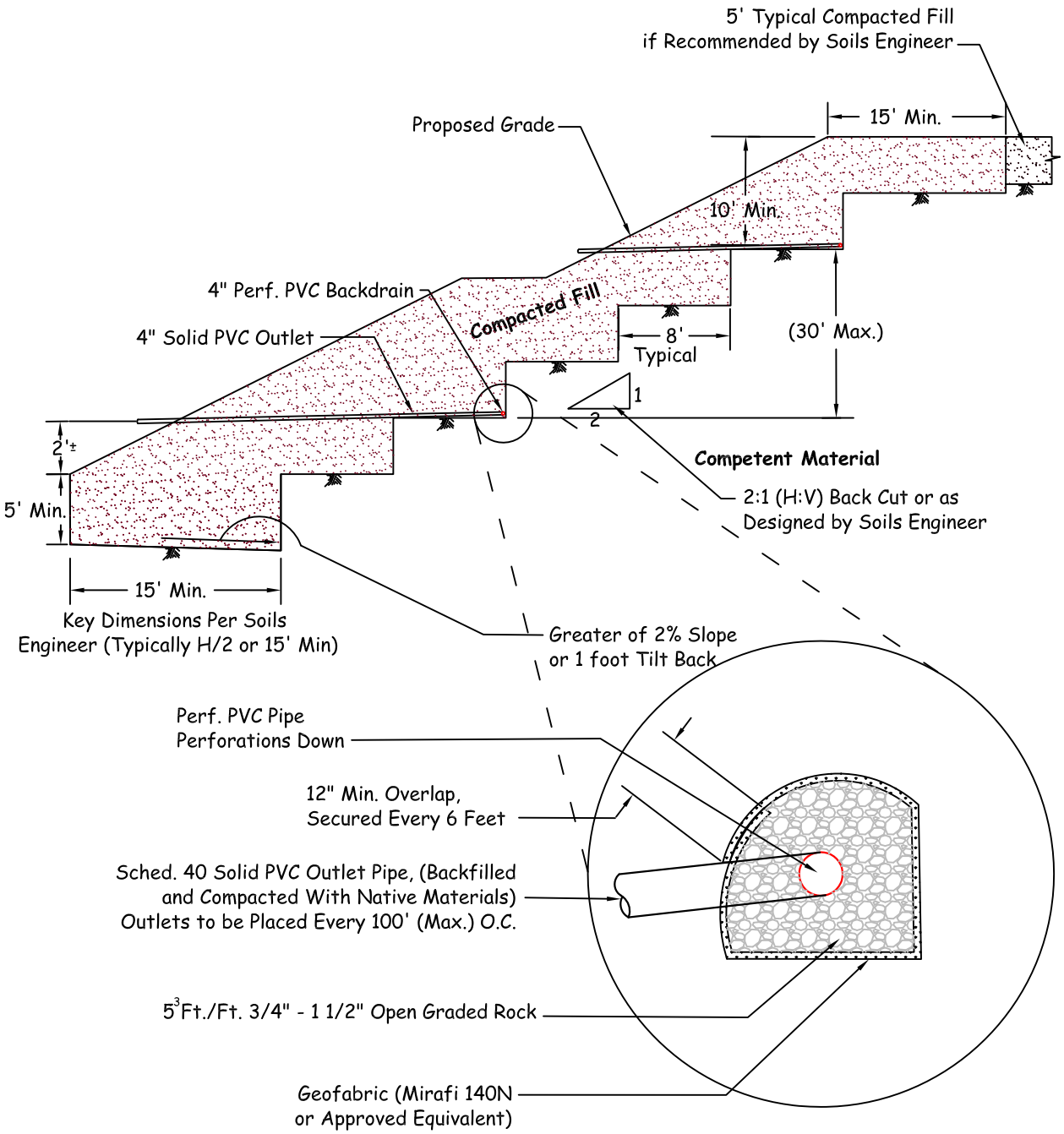
TYPICAL BUTTRESS DETAIL



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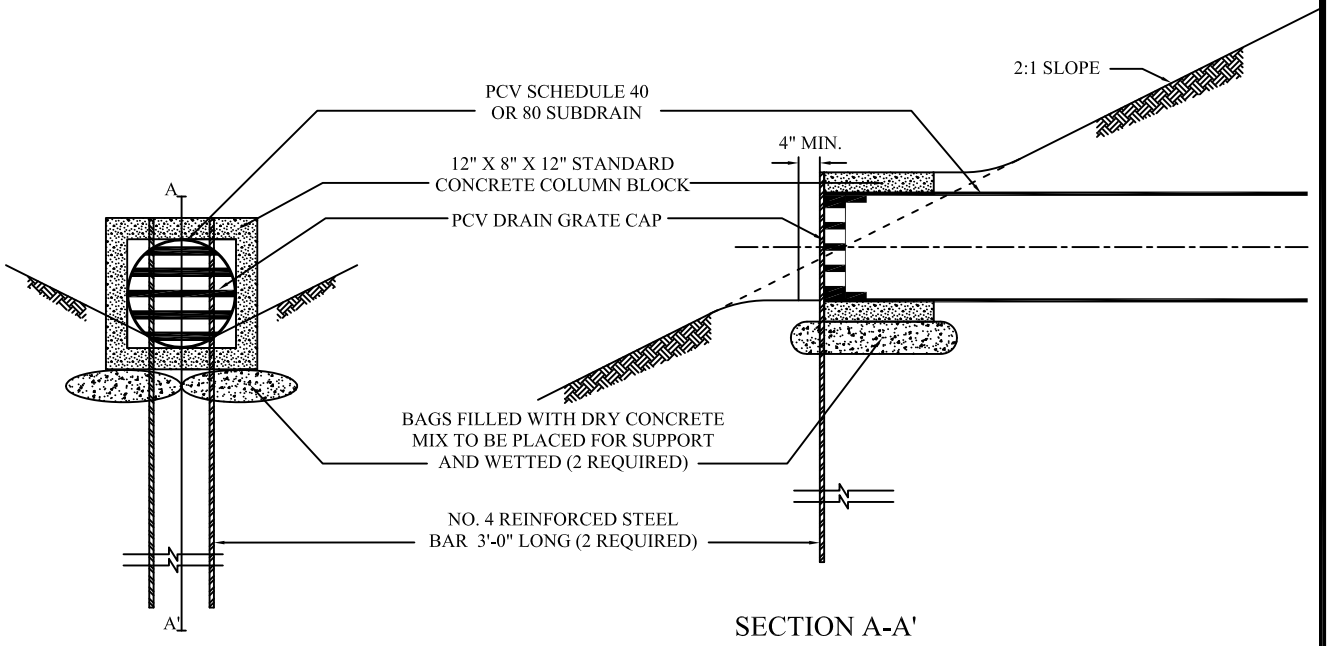
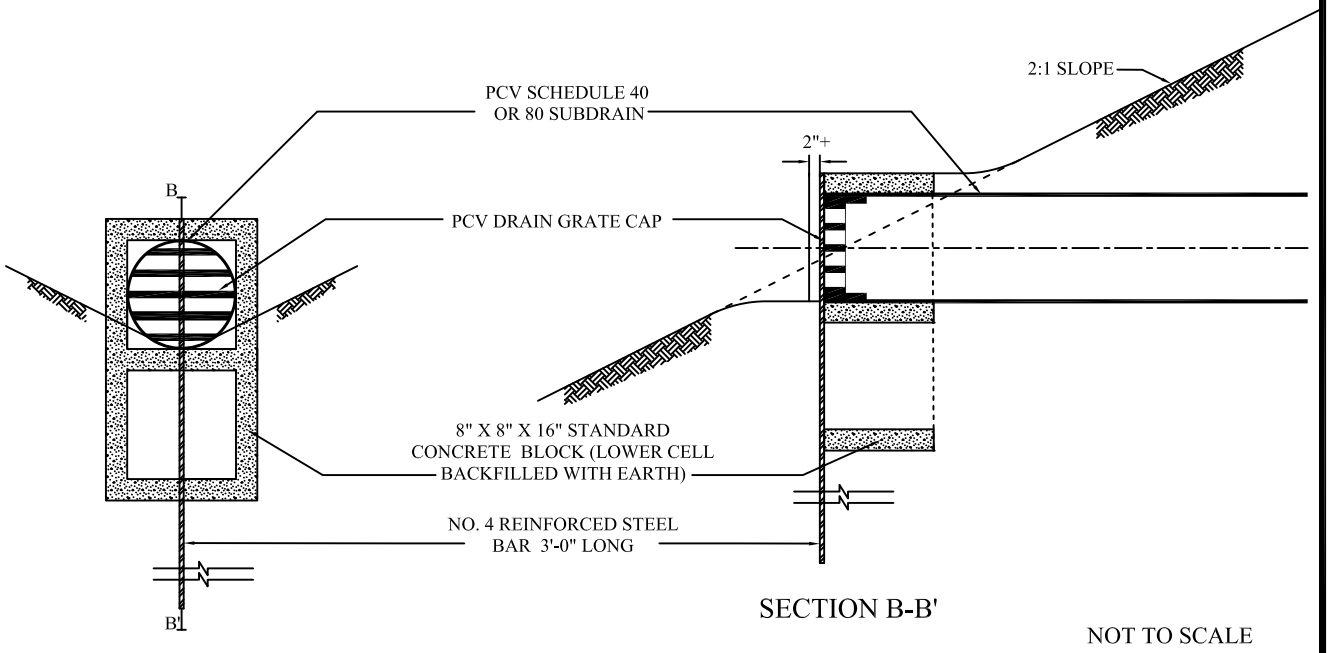
TYPICAL STABILIZATION FILL DETAIL

SUBDRAIN OUTLET MARKER -6" & 8" PIPE



SUBDRAIN OUTLET MARKER -4" PIPE



NOT TO SCALE

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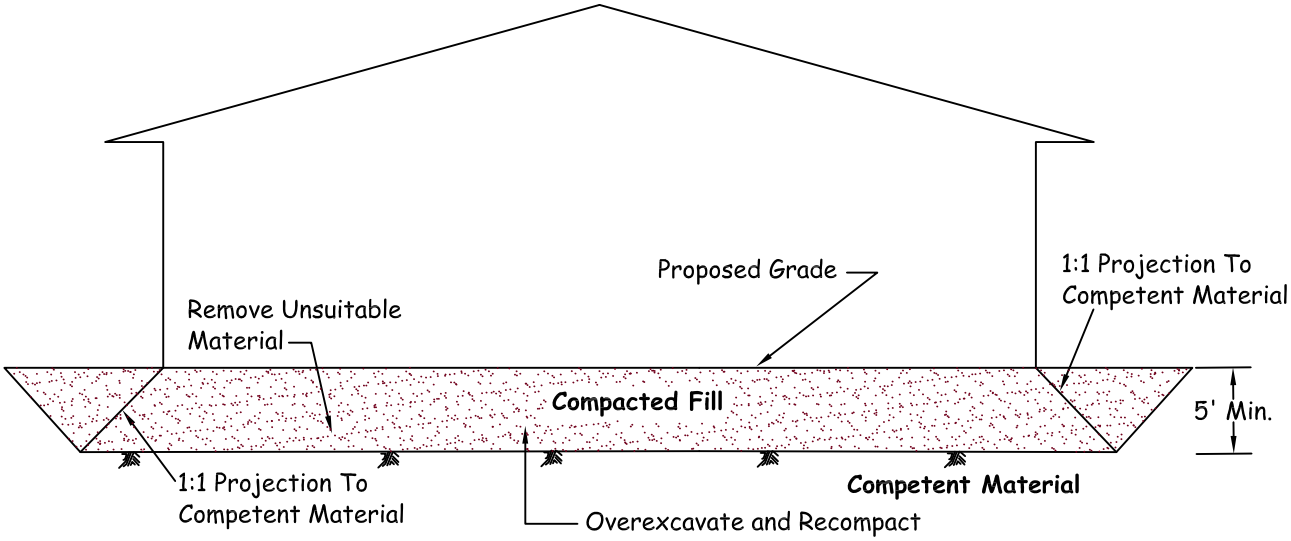
SUBDRAIN OUTLET MARKER DETAIL

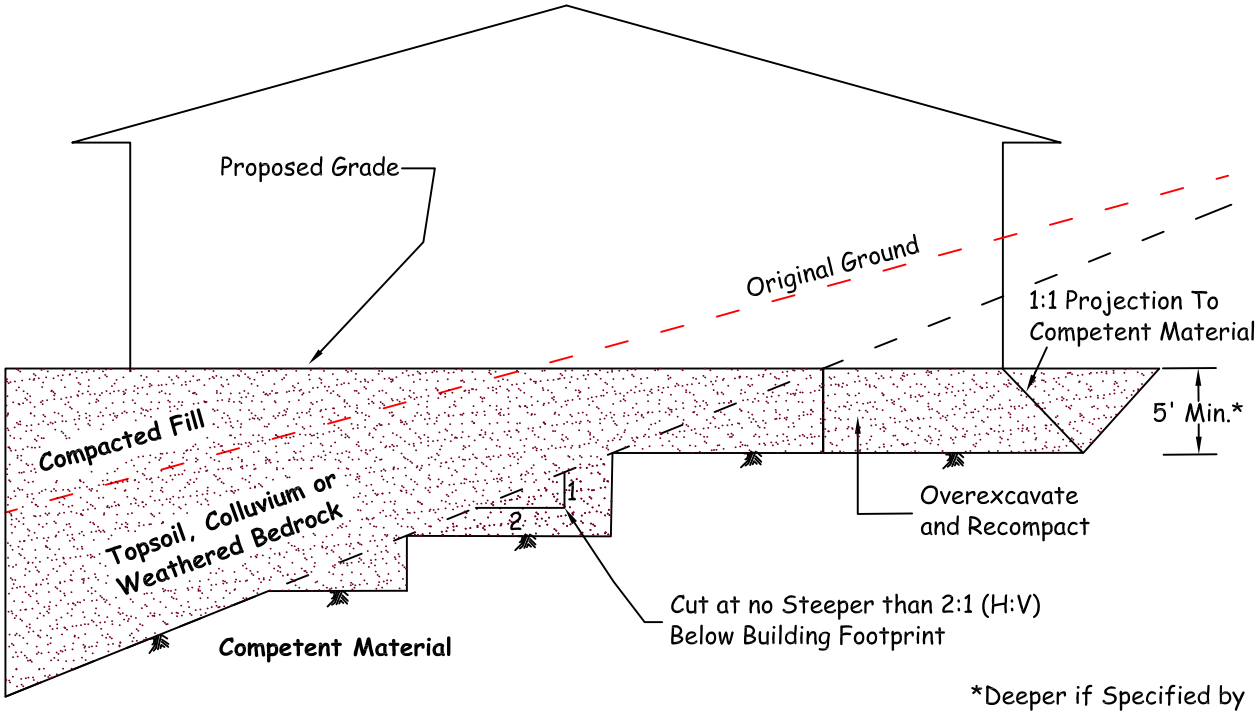
Cut Lot
(Exposing Unsuitable Soils at Design Grade)



Note 1: Removal Bottom Should be Graded With Minimum 2% Fall Towards Street or Other Suitable Area (as Determined by Soils Engineer) to Avoid Ponding Below Building

Note 2: Where Design Cut Lots are Excavated Entirely Into Competent Material, Overexcavation May Still be Required for Hard-Rock Conditions or for Materials With Variable Expansion Characteristics.

Cut/Fill Transition Lot



*Deeper if Specified by Soils Engineer

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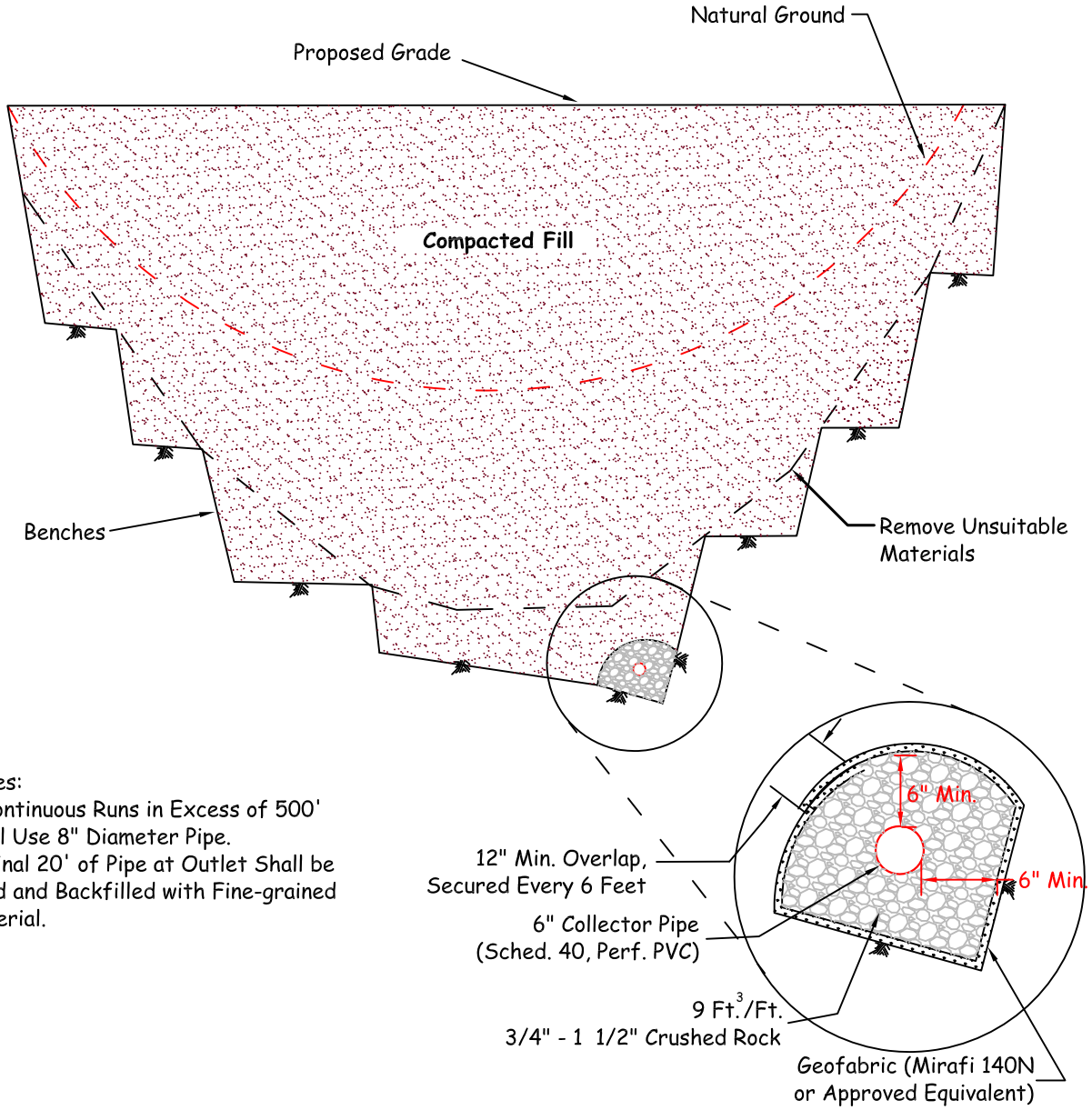
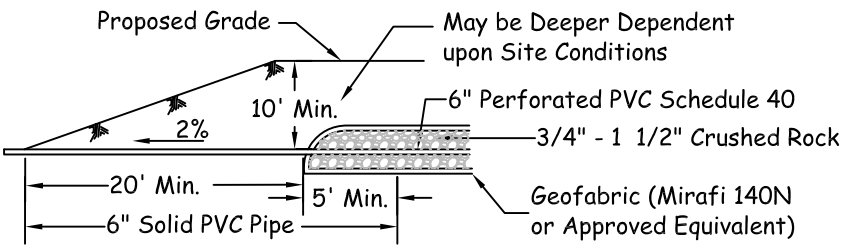
CUT AND TRANSITION LOT OVEREXCAVATION DETAIL



Notes:
1) Continuous Runs in Excess of 500' Shall Use 8" Diameter Pipe.
2) Final 20' of Pipe at Outlet Shall be Solid and Backfilled with Fine-grained Material.

Proposed Outlet Detail



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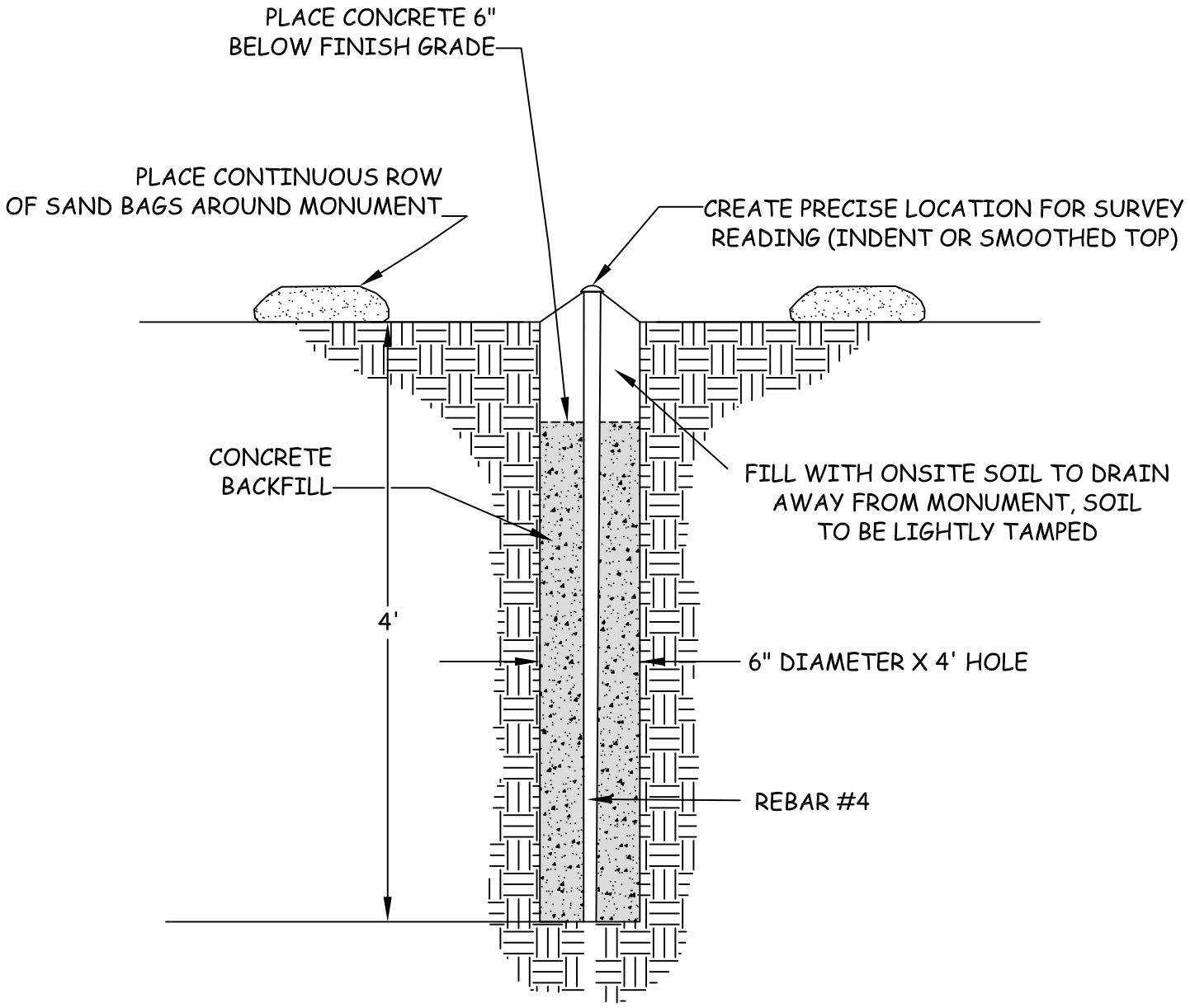
CANYON SUBDRAINS



NO CONSTRUCTION EQUIPMENT WITHIN 25 FEET
OF ANY INSTALLED SETTLEMENT MONUMENTS

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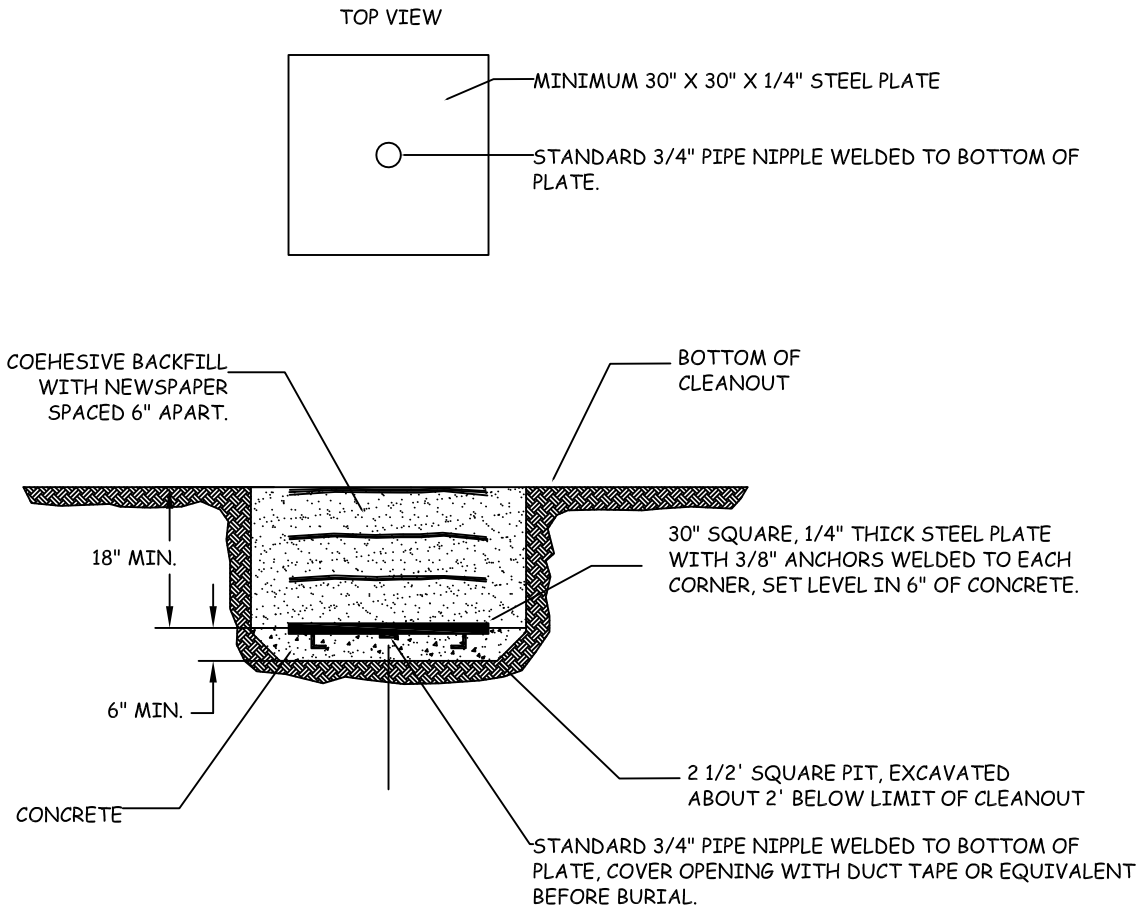
TYPICAL SURFACE SETTLEMENT MONUMENT



1. SURVEY FOR HORIZONTAL AND VERTICAL LOCATION TO NEAREST .01 INCH PRIOR TO BACKFILL USING KNOW LOCATIONS THAT WILL REMAIN INTACT DURING THE DURATION OF THE MONITORING PROGRAM. KNOW POINTS EXPLICITELY NOT ALLOWED ARE THOSE LOCATED ON FILL OR THAT WILL BE DESTROYED DURING GRADING.
2. IN THE EVENT OF DAMAGE TO SETTLEMENT PLATE DURING GRADING, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE GEOTECHNICAL ENGINEER AND SHALL BE RESPONSIBLE FOR RESTORING THE SETTLEMENT PLATES TO WORKING ORDER.
3. DRILL TO RECOVER AND ATTACH RISER PIPE.

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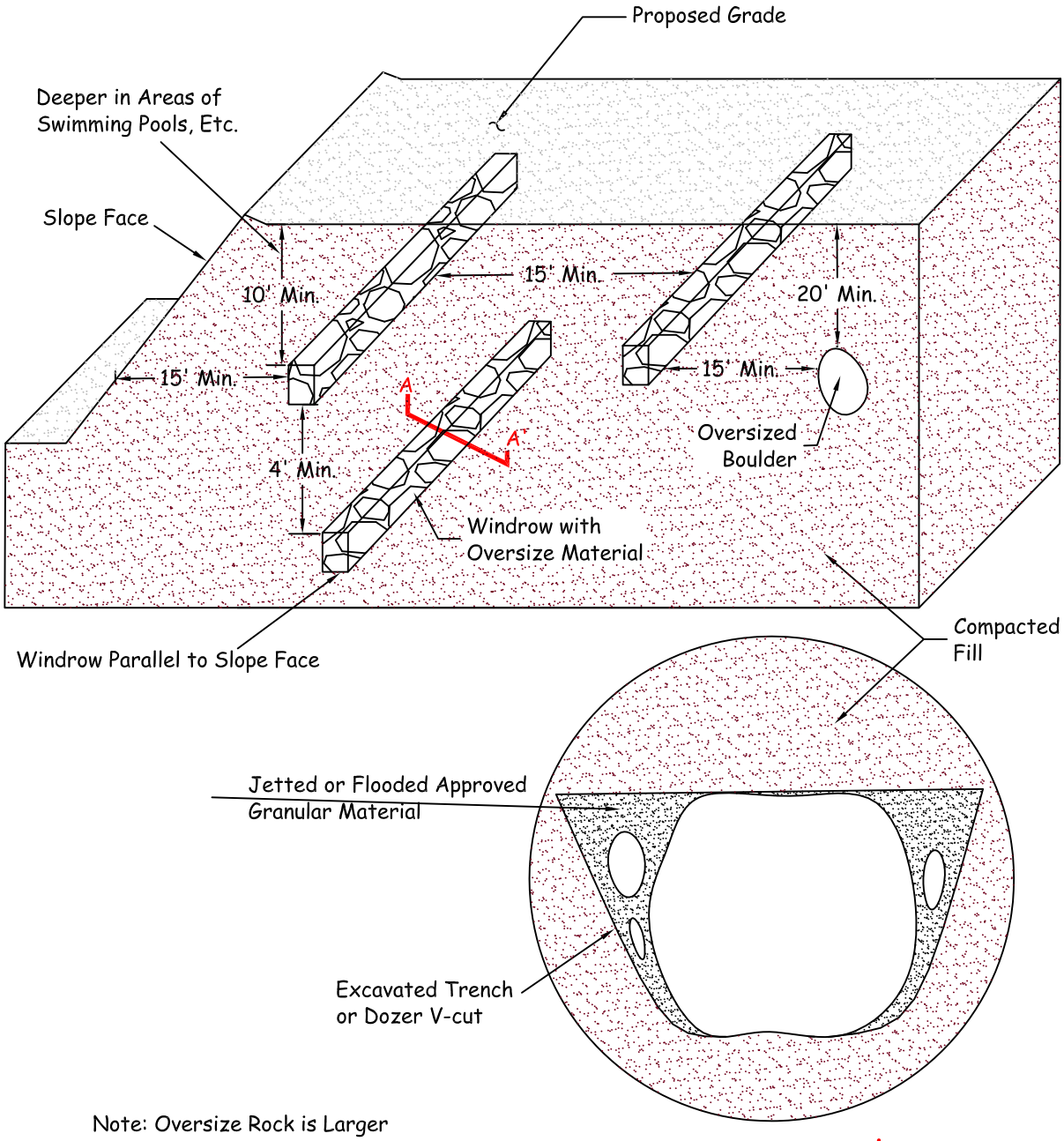
TYPICAL SETTLEMENT PLATE AND RISER



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

Section A-A'

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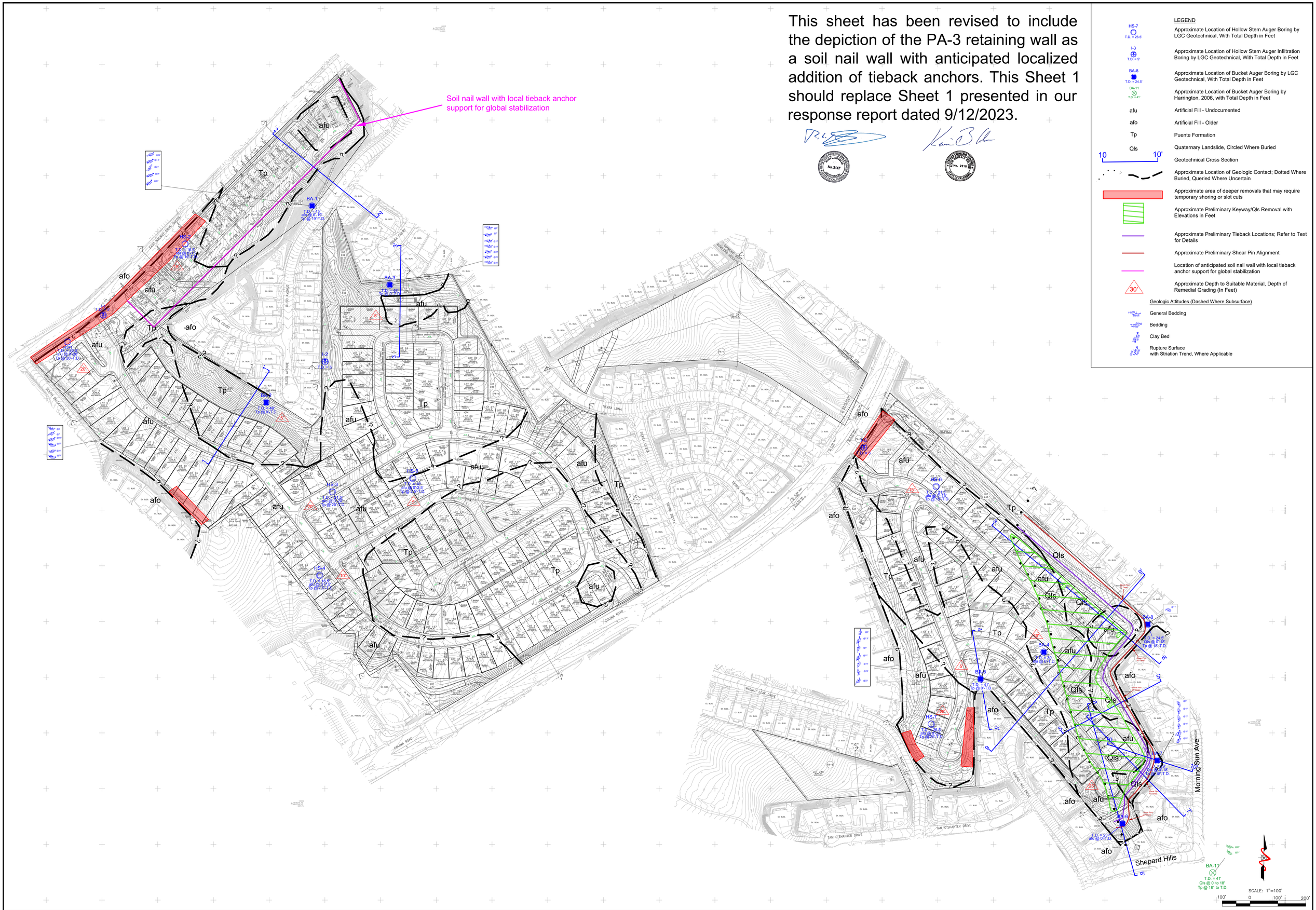
OVERSIZE ROCK DISPOSAL DETAIL

This sheet has been revised to include the depiction of the PA-3 retaining wall as a soil nail wall with anticipated localized addition of tieback anchors. This Sheet 1 should replace Sheet 1 presented in our response report dated 9/12/2023.



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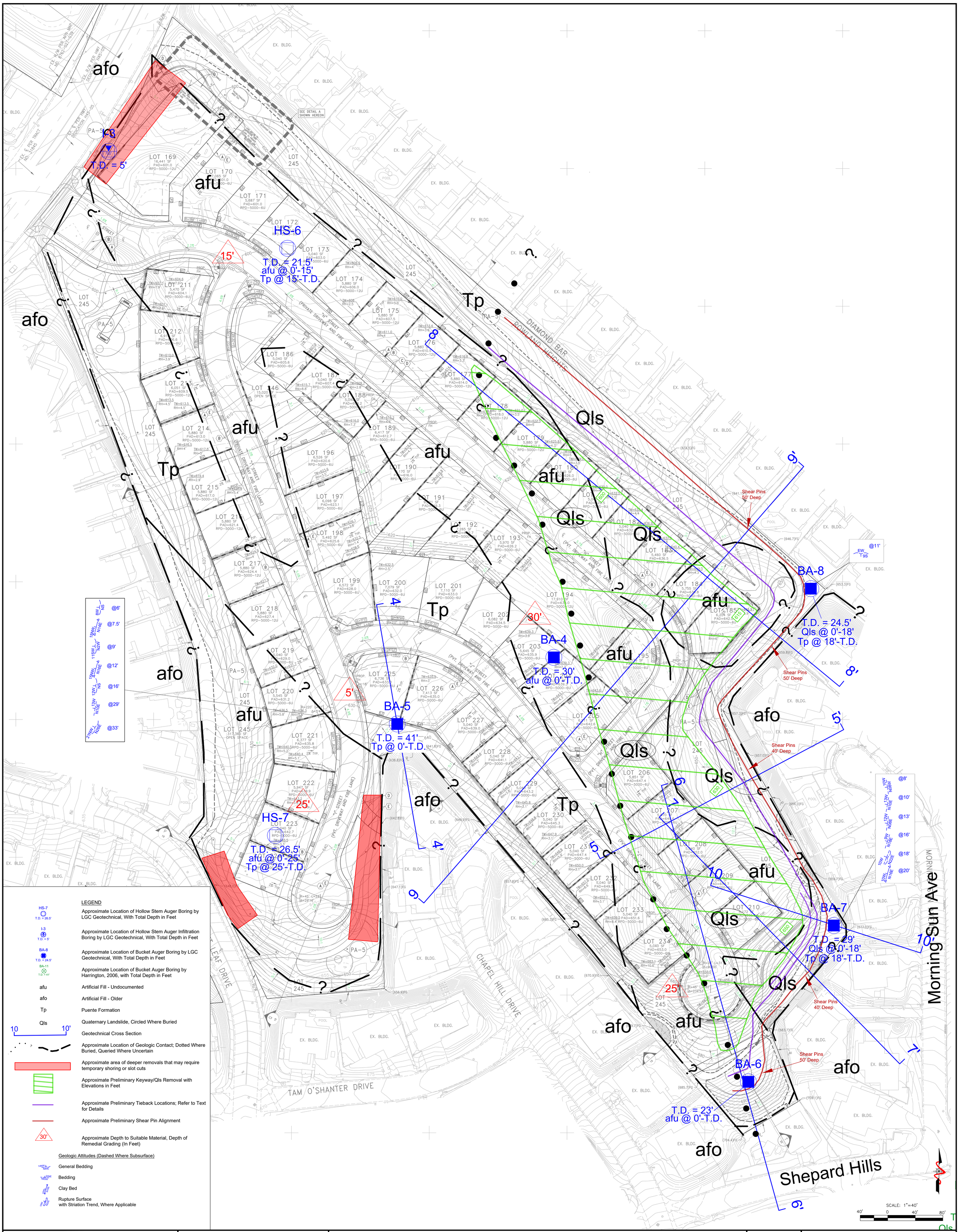
Revised Geotechnical Map

PROJECT NAME	Project Dimensions - Royal Vista
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1" = 100'
DATE	September 2023

SHEET 1 of 5



LEGEND

HS-7 T.D. = 26.5'	Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet
I-3 T.D. = 5'	Approximate Location of Hollow Stem Auger Infiltration Boring by LGC Geotechnical, With Total Depth in Feet
BA-8 T.D. = 24.5'	Approximate Location of Bucket Auger Boring by LGC Geotechnical, With Total Depth in Feet
BA-11 T.D. = 41'	Approximate Location of Bucket Auger Boring by Harrington, 2006, with Total Depth in Feet
afu	Artificial Fill - Undocumented
afo	Artificial Fill - Older
Tp	Puente Formation
Qls	Quaternary Landslide, Circled Where Buried
10 10'	Geotechnical Cross Section
	Approximate Location of Geologic Contact; Dotted Where Buried, Queried Where Uncertain
	Approximate area of deeper removals that may require temporary shoring or slot cuts
	Approximate Preliminary Keyway/Qls Removal with Elevations in Feet
	Approximate Preliminary Tieback Locations; Refer to Text for Details
	Approximate Preliminary Shear Pin Alignment
30'	Approximate Depth to Suitable Material, Depth of Remedial Grading (In Feet)

Geologic Attitudes (Dashed Where Subsurface)

14NW ∠ N35E	General Bedding
∠ 12NE N55W	Bedding
20SW ∠ N10E	Clay Bed
10W ∠ N20E	Rupture Surface with Striation Trend, Where Applicable

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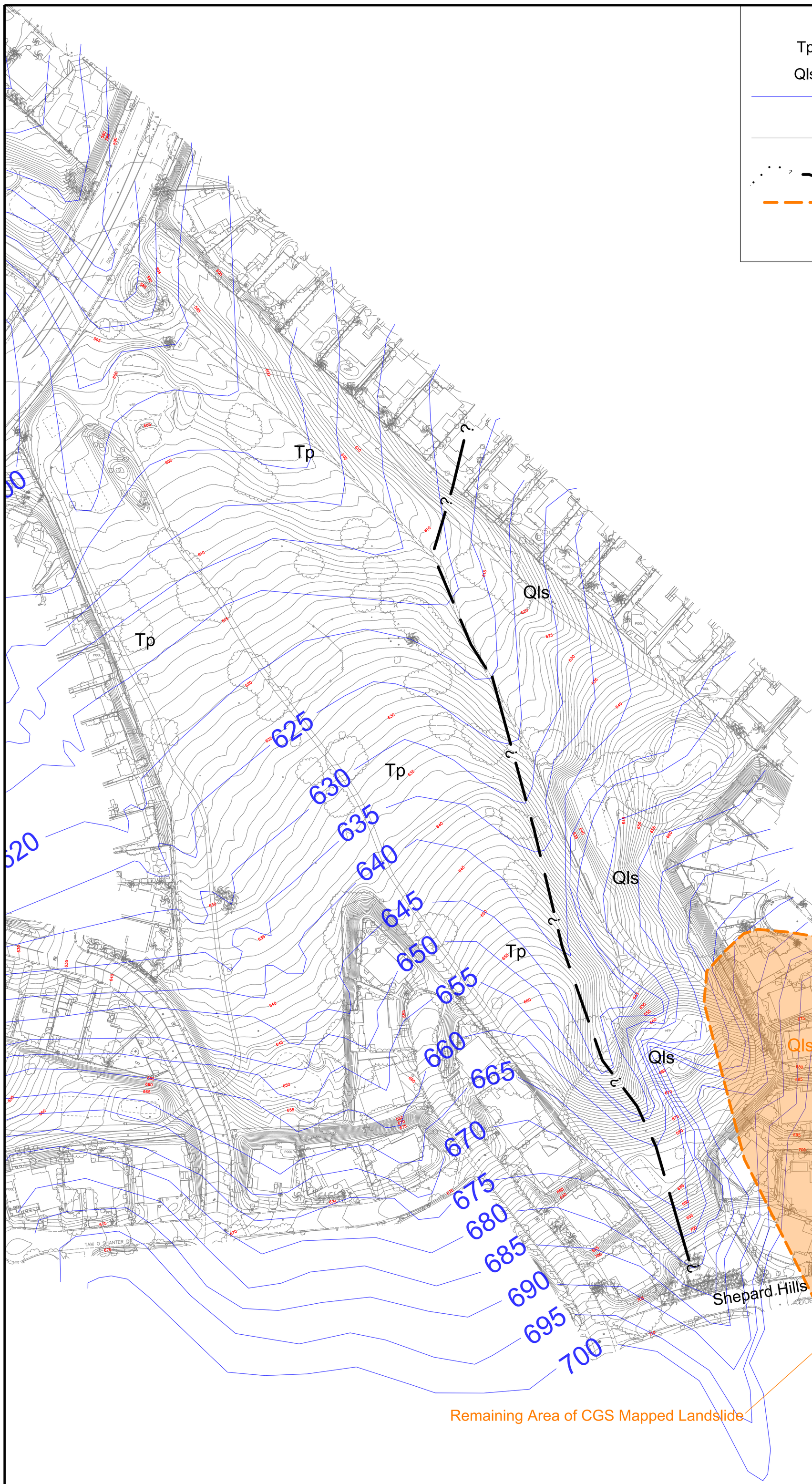
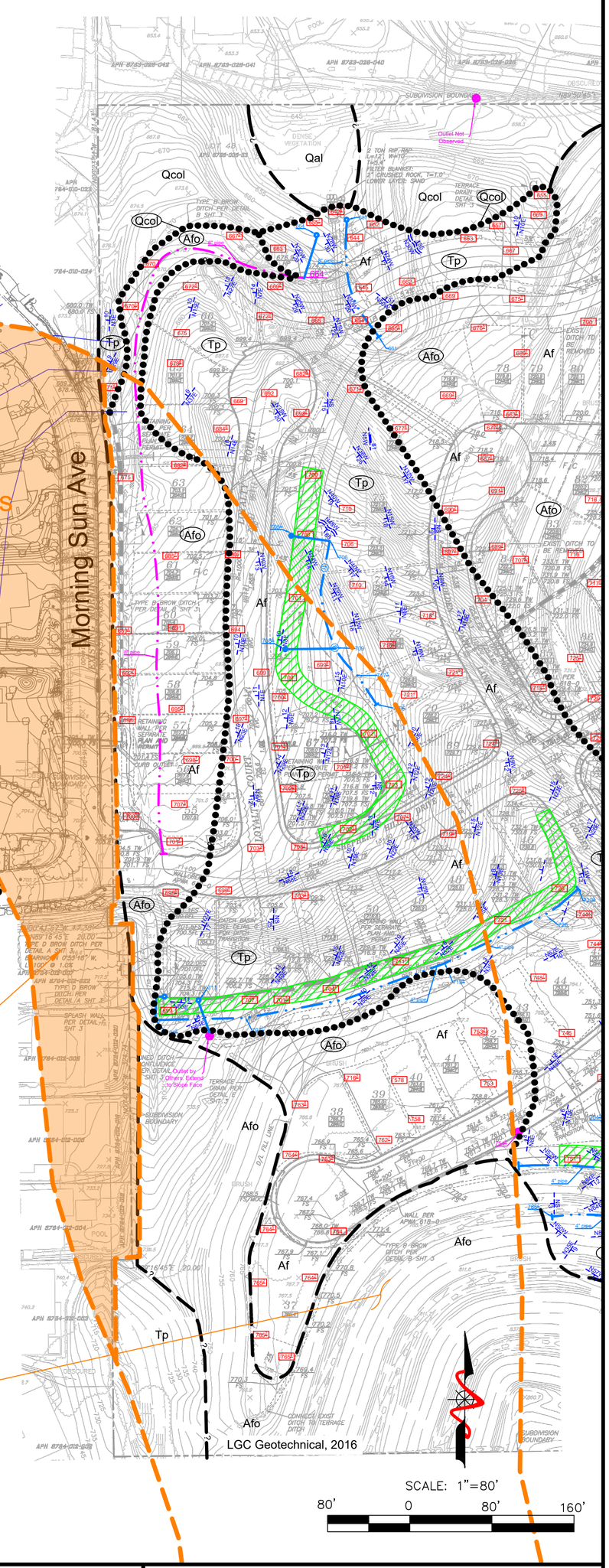
Geotechnical Map

PROJECT NAME	Royal Vista Golf Course
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1"=40'
DATE	September 2023

Legend

Tp	Puente Formation
Qls	Quaternary Landslide, Circled Where Buried
	1928 Topography, Shown in Blue with 5-Foot Contour Interval
	Existing Topography, Shown in Gray with 1-Foot Contour Interval, Elevations Shown in Red
	Approximate Location of Geologic Contact; Dotted Where Buried, Queried Where Uncertain
	Approximate Location of CGS Landslide Footprint (CGS, 2023)





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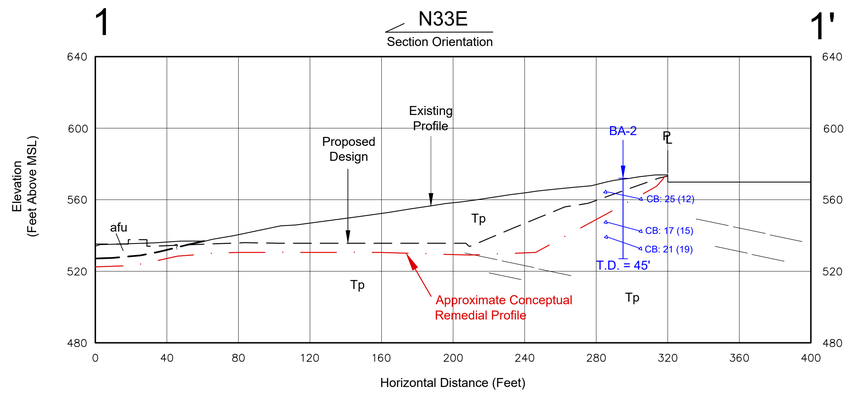
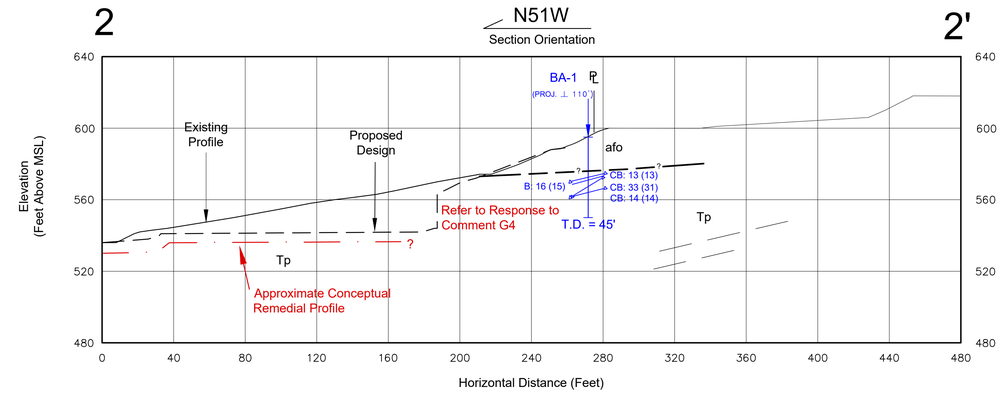
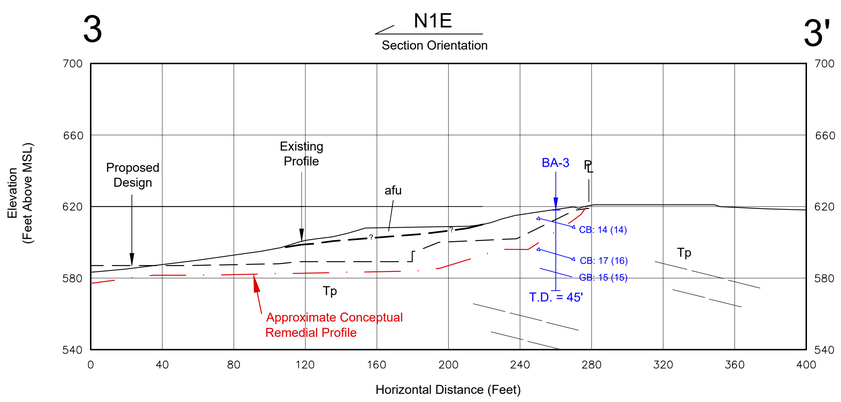
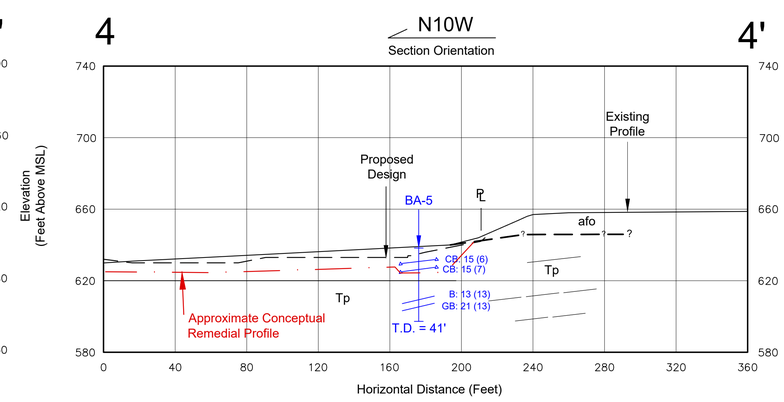
1928 Vs. 2020 Topography Comparison Exhibit

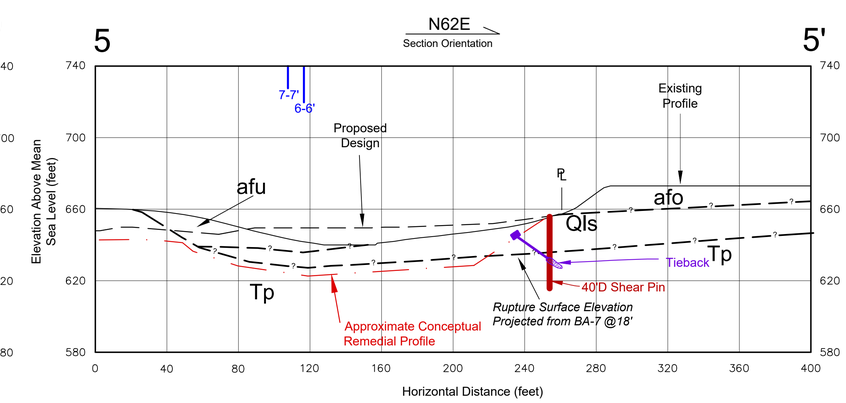
PROJECT NAME	Project Dimensions - Royal Vista
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1:80
DATE	September 2023











SCALE: 1"=40'

40' 0 40' 80'

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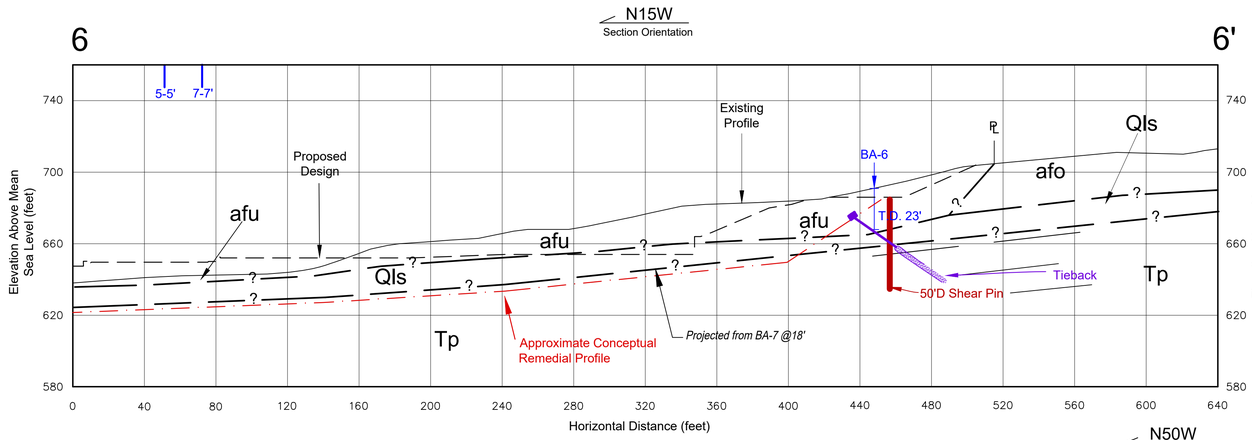
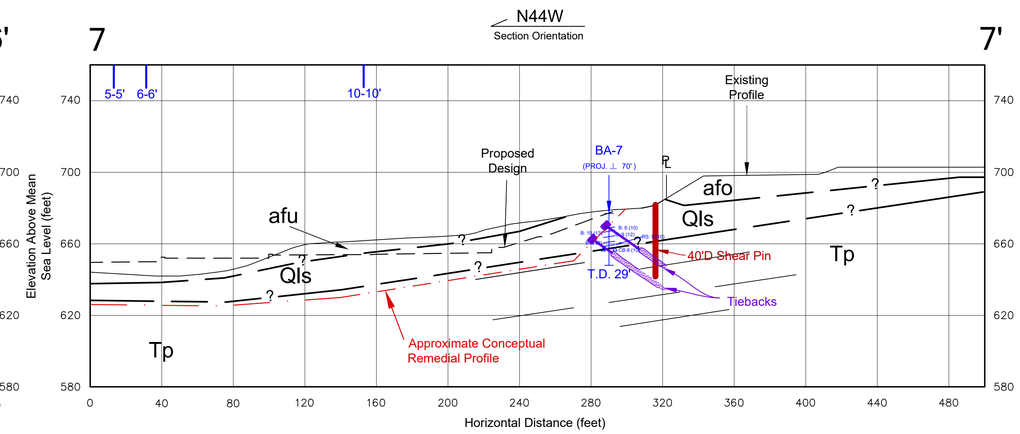
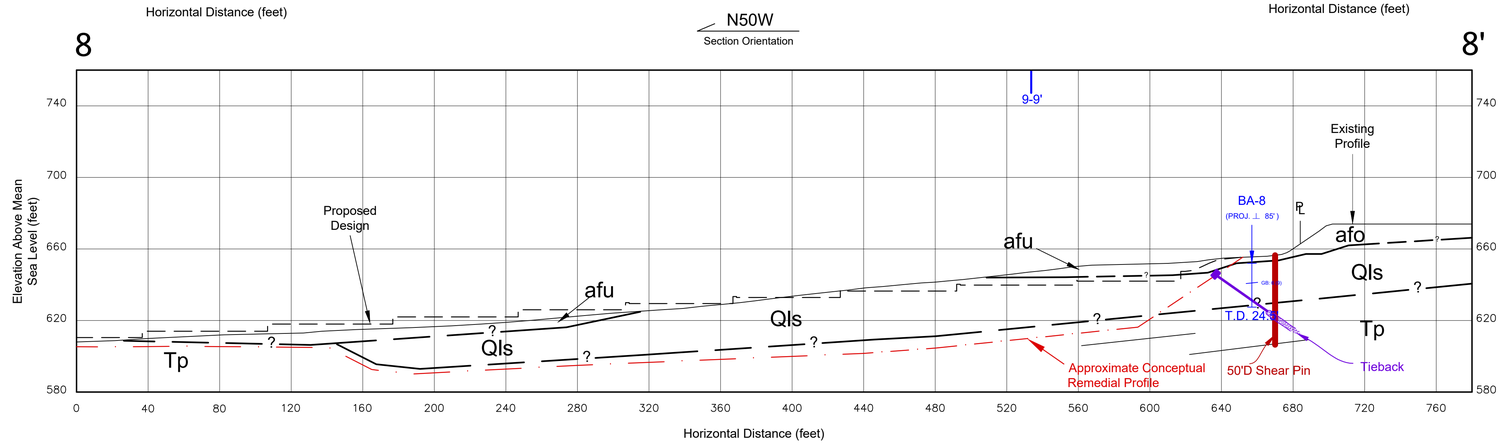
Geotechnical Cross-Sections

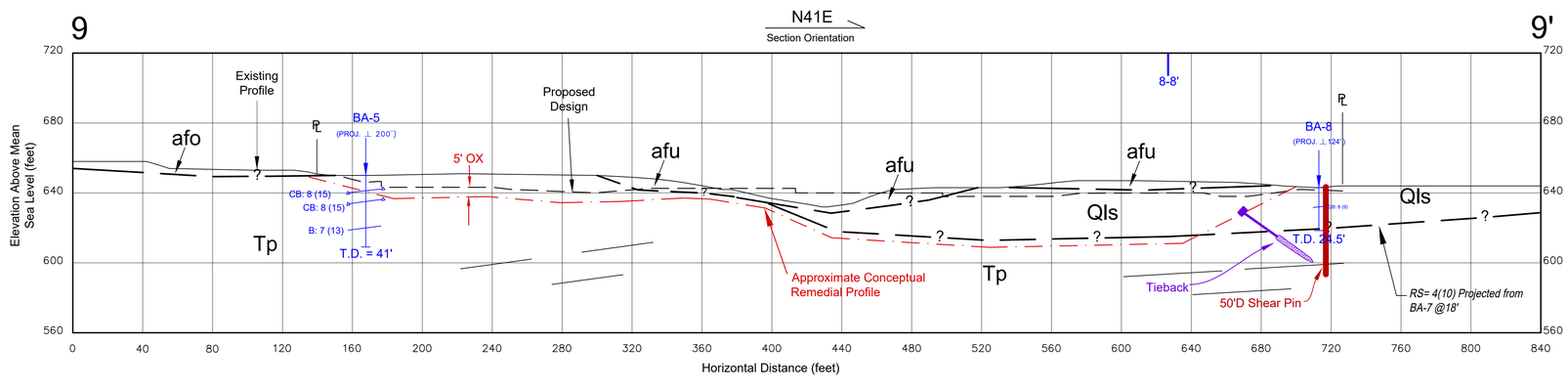
PROJECT NAME	Royal Vista
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1" = 40'
DATE	September 2023

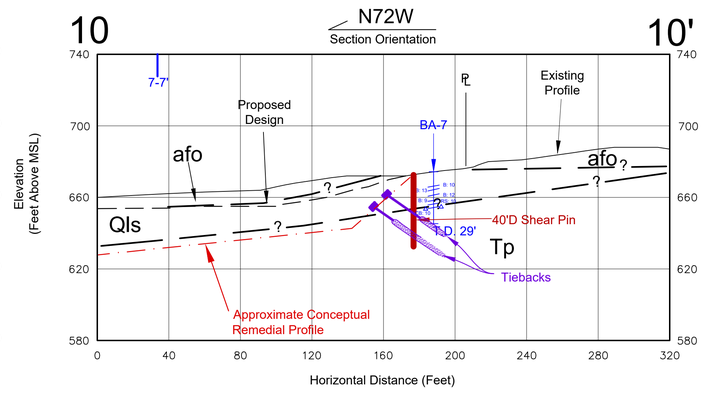
SHEET 4 of 5











SCALE: 1"=40'

40' 0 40' 80'

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Geotechnical Cross-Sections

PROJECT NAME	Royal Vista
PROJECT NO.	20080-01
ENG. / GEOL.	RLD / KBC
SCALE	1" = 40'
DATE	September 2023

SHEET 5 of 5